Chapter 3
Affected Environment and Environmental Consequences

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

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 500kV transmission line and associated facilities.

3.1.1 Summary of Changes from the Draft Environmental Impact Statement

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 2.7.2). The analysis of environmental effects was updated to reflect the additional data.

In response to comments on the Draft EIS, particularly comments relating to effective demonstration by BLM, USFS, and the FWS of compliance during the NEPA process with the requirements under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712) and the various Memorandums of Understanding (MOU) established in response to Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, and additional agency coordination among the BLM, USFS, and FWS, migratory birds are discussed in a separate section, Section 3.2.9, in the Final EIS. Relevant information available in Sections 3.2.5, 3.2.7, and 3.2.9 is referenced as appropriate.

To provide distinction between the policy issues and the management emphasis relevant to designated areas established by an act of Congress and other special designations, Congressional Designations are discussed in a separate section, Section 3.2.14, in the Final EIS.

To provide distinction between the specific resources issues and policy and management requirements relevant to national historic and scenic trails and recreational trails, national historic and scenic trails are discussed in a separate section, Section 3.2.19, in the Final EIS.

Several of the alternative routes contain a series of route variations to compare local routing options. In the Draft EIS, the route variations were included in Chapters 3 and 4 with analysis of the alternative routes. Based on comments received on the Draft EIS, including requests for analysis of additional local route variations, the complexity of these routes necessitated a different presentation in the Final EIS. Thus, in the Final EIS, Chapters 3 and 4 describe the affected environment and environmental consequences associated with complete alternative routes, including the Agency Preferred Alternative route, while the local route options are analyzed and compared in Appendix F. The methodology for comparing and analyzing the local route variations is the same as described in Chapters 3 and 4.

In the Draft EIS and Final EIS, the resource data and results of the impact assessment and mitigation planning process are addressed and disclosed by resource; that is, without specific attention to the various jurisdictions crossed along the routes. In response to a request by NPS, the results specific to the route variations across and in the vicinity of the NPS-administered lands at Deerlodge Road, which is managed as part of the Dinosaur National Monument, are documented in Appendix G of the Final EIS to supplement the Final EIS with additional required information that could be used by the agency to support the Applicant's application for right-of-way across Deerlodge Road, if needed.

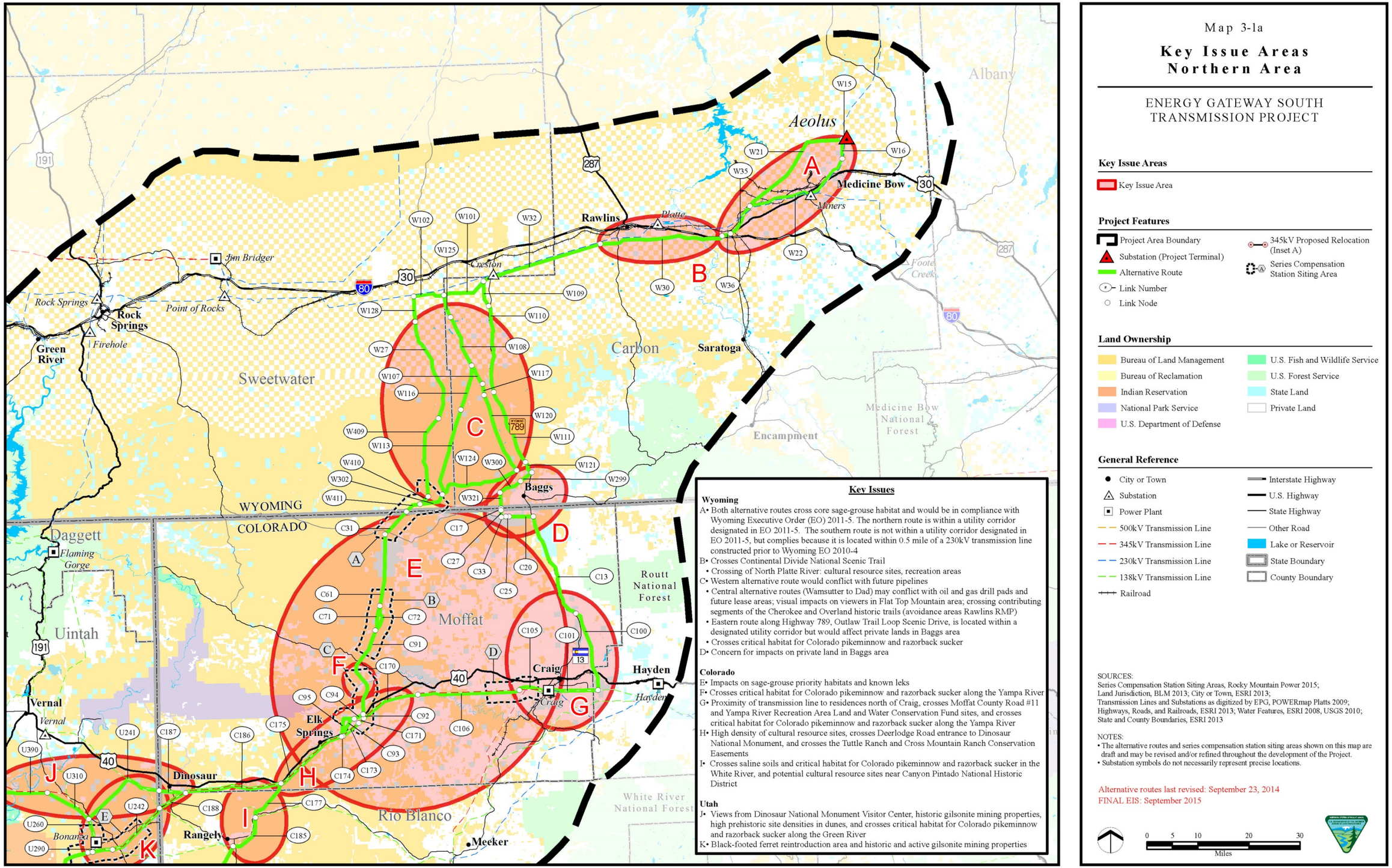
Substantive changes made between the Draft EIS and the Final EIS are demarcated in the left margin of this chapter by a vertical black line.

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, social and economic conditions, and public health and safety.

- Climate and Air Quality
- Earth Resources
  - Geologic Hazards
  - Soil Resources
  - Mineral Resources
- Paleontological Resources
- Water Resources
- Biological Resources
  - Vegetation
  - Special Status Plants
  - Wildlife
  - Special Status Wildlife
  - Migratory Birds
  - Fish and Aquatic Resources
- Land Use
- Parks, Preservation, and Recreation
- Transportation and Access
- Congressional Designations
- Special Designations and Other Management Areas
- Lands with Wilderness Characteristics
- Inventoried Roadless Areas and Unroaded/Undeveloped Areas
- Visual Resources
- National Trails System
- Cultural Resources
- 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. Issues raised by the public and agencies during scoping are presented in Table 1-1. Key issue areas (i.e., areas where issues raised during scoping were identified on the ground) were identified based on the resource inventory data and though collaboration with the Agency Interdisciplinary Team during preparation of the EIS and are presented on Maps 3-1a and 3-1b.


Map 3-1a
Key Issue Areas
Northern Area
ENERGY GATEWAY SOUTH
TRANSMISSION PROJECT
Key Issue Areas
Key Issue Area
Project Features
Project Area Boundary
Substation (Project Terminal)
Alternative Route
Link Number
Link Node
345kV Proposed Relocation (Inset A)
Series Compensation Station Siting Area
Land Ownership
Bureau of Land Management
Bureau of Reclamation
Indian Reservation
National Park Service
U.S. Department of Defense
U.S. Fish and Wildlife Service
U.S. Forest Service
State Land
Private Land
General Reference
City or Town
Substation
Power Plant
500kV Transmission Line
345kV Transmission Line
230kV Transmission Line
138kV Transmission Line
Railroad
Interstate Highway
U.S. Highway
State Highway
Other Road
Lake or Reservoir
State Boundary
County Boundary
SOURCES:
Series Compensation Station Siting Areas, Rocky Mountain Power 2015;
Land Jurisdiction, BLM 2013; City or Town, ESRI 2013;
Transmission Lines and Substations as digitized by EPG, POWERmap Platts 2009;
Highways, Roads, and Railroads, ESRI 2013; Water Features, ESRI 2008, USGS 2010;
State and County Boundaries, ESRI 2013
NOTES:
• The alternative routes and series compensation station siting areas shown on this map are draft and may be revised and/or refined throughout the development of the Project.
• Substation symbols do not necessarily represent precise locations.
Alternative routes last revised: September 23, 2014
FINAL EIS: September 2015
0 5 10 20 30
Miles
Key Issues
Wyoming
A• Both alternative routes cross core sage-grouse habitat and would be in compliance with Wyoming Executive Order (EO) 2011-5. The northern route is within a utility corridor designated in EO 2011-5. The southern route is not within a utility corridor designated in EO 2011-5, but complies because it is located within 0.5 mile of a 230kV transmission line constructed prior to Wyoming EO 2010-4
B• Crosses Continental Divide National Scenic Trail
• Crossing of North Platte River: cultural resource sites, recreation areas
C• Western alternative route would conflict with future pipelines
• Central alternative routes (Wamsutter to Dad) may conflict with oil and gas drill pads and future lease areas; visual impacts on viewers in Flat Top Mountain area; crossing contributing segments of the Cherokee and Overland historic trails (avoidance areas Rawlins RMP)
• Eastern route along Highway 789, Outlaw Trail Loop Scenic Drive, is located within a designated utility corridor but would affect private lands in Baggs area
• Crosses critical habitat for Colorado pikeminnow and razorback sucker
D• Concern for impacts on private land in Baggs area
Colorado
E• Impacts on sage-grouse priority habitats and known leks
F• Crosses critical habitat for Colorado pikeminnow and razorback sucker along the Yampa River
G• Proximity of transmission line to residences north of Craig, crosses Moffat County Road #11 and Yampa River Recreation Area Land and Water Conservation Fund sites, and crosses critical habitat for Colorado pikeminnow and razorback sucker along the Yampa River
H• High density of cultural resource sites, crosses Deerlodge Road entrance to Dinosaur National Monument, and crosses the Tuttle Ranch and Cross Mountain Ranch Conservation Easements
I• Crosses saline soils and critical habitat for Colorado pikeminnow and razorback sucker in the White River, and potential cultural resource sites near Canyon Pintado National Historic District
Utah
J• Views from Dinosaur National Monument Visitor Center, historic gilsonite mining properties, high prehistoric site densities in dunes, and crosses critical habitat for Colorado pikeminnow and razorback sucker along the Green River
K• Black-footed ferret reintroduction area and historic and active gilsonite mining properties
Aeolus
Medicine Bow
Rawlins
Saratoga
Carbon
Sweetwater
Albany
Encampment
Baggs
Craig
Hayden
Moffat
Rio Blanco
Uintah
Daggett
Vernal
Dinosaur
Rangely
Meeker
Bonanza
Elk Springs
Rock Springs
Green River
Jim Bridger
Creston
Firehole
Point of Rocks
Flaming Gorge
WYOMING
COLORADO
Routt National Forest
Medicine Bow National Forest
White River National Forest
Foote Creek
Miners
Platte
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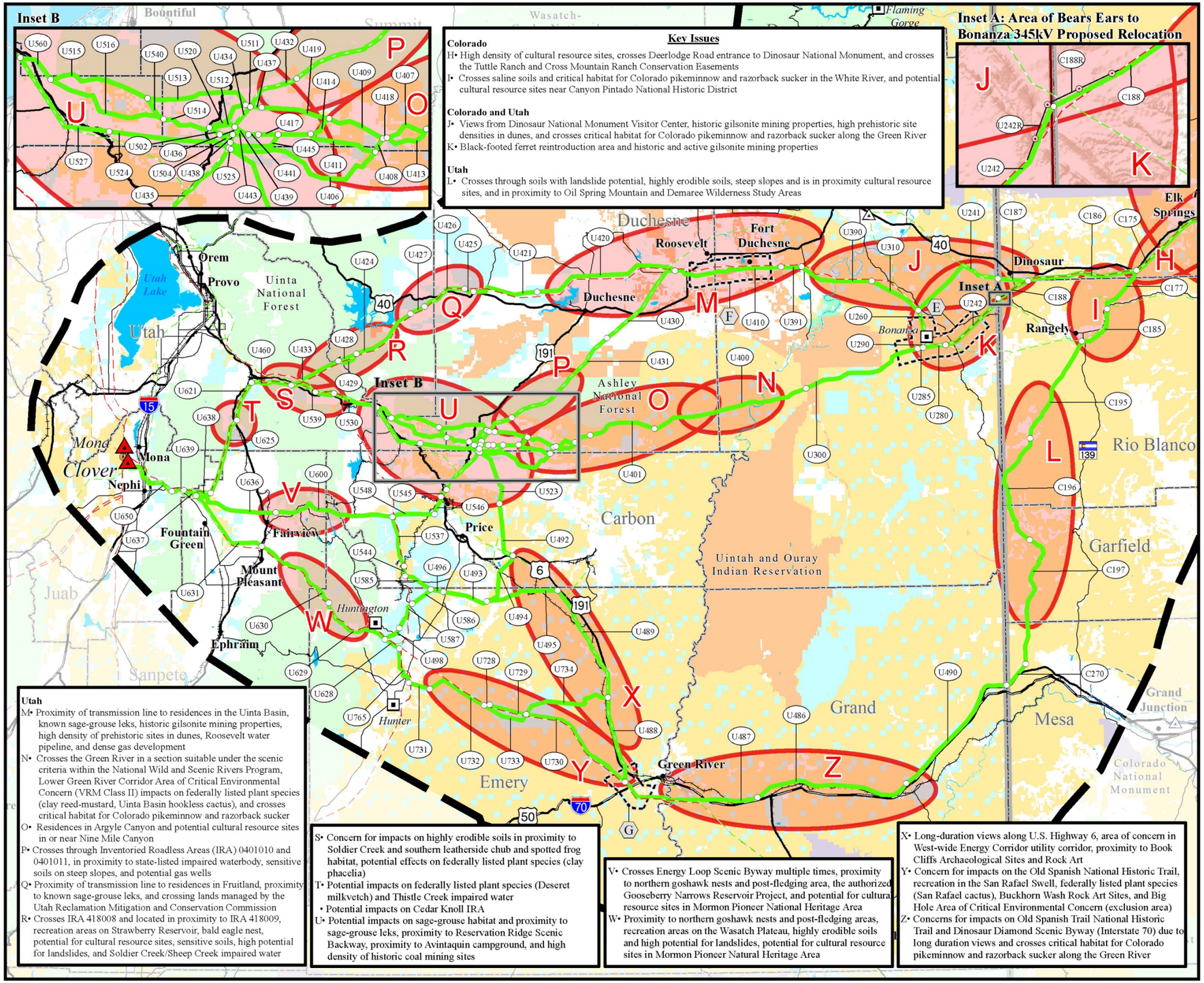

Map 3-1b

Key Issue Areas Southern Area

ENERGY GATEWAY SOUTH TRANSMISSION PROJECT

Key Issue Areas

- Key Issue Area

Project Features

- Project Area Boundary
- Substation (Project Terminal)
- Alternative Route
- Link Number
- Link Node
- 345kV Proposed Relocation (Inset A)
- Series Compensation Station Siting Area

Land Ownership

- Bureau of Land Management
- Bureau of Reclamation
- Indian Reservation
- National Park Service
- U.S. Department of Defense
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- State Land
- Private Land

General Reference

- City or Town
- Substation
- Power Plant
- 500kV Transmission Line
- 345kV Transmission Line
- 230kV Transmission Line
- 138kV Transmission Line
- Railroad
- Interstate Highway
- U.S. Highway
- State Highway
- Other Road
- Lake or Reservoir
- State Boundary
- County Boundary

SOURCES:
Series Compensation Station Siting Areas, Rocky Mountain Power 2015;
Land Jurisdiction, BLM 2013; City or Town, ESRI 2013;
Transmission Lines and Substations as digitized by EPG, POWERmap Platts 2009;
Highways, Roads, and Railroads, ESRI 2013; Water Features, ESRI 2008, USGS 2010;
State and County Boundaries, ESRI 2013

NOTES:
• The alternative routes and series compensation station siting areas shown on this map are draft and may be revised and/or refined throughout the development of the Project.
• Substation symbols do not necessarily represent precise locations.

Alternative routes last revised: September 23, 2014
FINAL EIS: September 2015

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Miles

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3.1.3 Environmental Consequences

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. An overview of the methodology for this analysis is presented in Section 2.7.1 and described for each resource in Section 3.2.

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 route. Generally, each resource discussion is organized as follows:

- **Introduction and Regulatory Framework**. A description of the resource and the laws, regulations, and policies related or relevant to management or analysis of the resource
- **Issues Identified for Analysis**. A description of the issues identified for each resource that were analyzed for the Project
- **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 impacts for each alternative route
- **Results by Alternative Route**
  - Affected Environment
  - Environmental Consequences

A summary of baseline resource inventory and results of the effects analysis is presented in each resource section. Tables S-4a to S-4e present a comparison of results of the effects analysis for the alternative routes, Table S-5 presents a summary of the 500kV transmission line parallel conditions and jurisdiction by alternative route, and Table S-6 presents a summary of the estimated ground disturbance, vegetation clearing, and miles of access roads.

Local routing options contained in several of the alternative routes are analyzed and compared in Appendix F.

3.2.1 Climate and Air Quality

3.2.1.1 Introduction and Regulatory Framework

3.2.1.1.1 Introduction

Air quality is a concern in much of the Rocky Mountain West and this section describes the air quality conditions existing in the portions of Wyoming, Colorado, and Utah that may be traversed by the proposed Project, including the types of pollutants emitted and regulations that would apply to construction and operation of the proposed transmission line and series compensation stations. In Section 3.2.1.5, the expected air-pollutant emissions from transmission line and series compensation station construction, and from certain sources during series compensation station operation, are quantified to the extent possible. Potential impacts (ground-level pollutant concentrations) are discussed and quantified for the most substantial emission sources and activities and are compared with state and federal ambient concentration standards.

This section also addresses climate parameters that describe the current weather patterns common to the region. These provide a baseline against which potential long-term climate change trends may be measured. Greenhouse gas (GHG) emissions from the Project-related activities that may contribute to climate change also are quantified and discussed in Section 3.2.1.5.

3.2.1.1.2 Regulatory Framework

Federal Air Quality Regulations and Standards

Responsibility for administering and enforcing rules and regulations pertaining to air quality in the Project study area is shared between federal, state, tribal, and county jurisdictions. Regulations and standards to implement the requirements of the federal Clean Air Act are set by the Environmental Protection Agency (EPA). While the EPA retains authority for certain air quality rules, including those pertaining to emission standards for mobile sources, many requirements are delegated to states and, in some cases, to tribal governments, which are treated in the same manner as states.

The EPA has set National Ambient Air Quality Standards (NAAQS) (Table 3-1) for air pollutants considered harmful to public health and the environment. Ambient standards regulate the amount of contaminants in the air due to all sources. Standards have been set for six pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone, lead, and particulate matter. There are two types of standards: primary standards set to protect public health and secondary standards set to protect public welfare, including damage to buildings, animals, and vegetation.

Both Wyoming and Colorado have set their own ambient standards for certain pollutants and averaging periods that apply only in those states. The Wyoming Ambient Air Quality Standards and Colorado Ambient Air Quality Standards also are shown in Table 3-1. Utah has not set state-level ambient standards.

Areas that do not meet the NAAQS are designated as nonattainment. Previously designated nonattainment areas that have since reached attainment are referred to as attainment areas with a maintenance plan (attainment/maintenance), or simply as maintenance areas. More stringent air quality regulations apply in these areas. Portions of the alternative routes that would traverse any nonattainment or maintenance area require a general conformity analysis (refer to Section 3.2.1.4.2). Areas that have insufficient air quality monitoring data to determine whether they are attaining the NAAQS are referred to as unclassifiable areas. Most of the areas traversed by the alternative routes are considered unclassifiable and are treated in federal and state regulations as attainment areas.

Ambient air quality standards have not been established for hazardous air pollutants (HAP); instead, HAPs are regulated on an emission basis by the National Emission Standards for Hazardous Air Pollutants (NESHAP) and various state regulations. The NESHAP regulates emissions from specified emission units and source types.

The GHG emissions are regulated under federal requirements that include mandatory reporting and GHG emission permits for major sources. It is not expected that the types of sources that will be part of the Project would be subject to these rules.

Sensitive areas such as certain national parks and wilderness areas have been designated under the federal Clean Air Act as Class I areas for the Prevention of Significant Deterioration (PSD) program. Class I areas are areas that have special national or regional natural, scenic, recreational, or historic value for which federal regulations provide special protection with respect to air quality degradation.

TABLE 3-1
AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Period	National Ambient Air Quality Standards		Wyoming Ambient Air Quality Standards		Colorado Ambient Air Quality Standards
		Primary Standards	Secondary Standards	Primary Standards	Secondary Standards	
Carbon monoxide	8 hour	9 ppm (10 mg/m^3)(1)	–	9 ppm (10 mg/m^3)(1)		–
	1 hour	35 ppm (40 mg/m^3)(1)	–	35 ppm (40 mg/m^3)(1)		–
Nitrogen dioxide	Annual arithmetic mean	0.053 ppm (100 μg/m^3)(2)	Same as Primary	53 ppb (100 μg/m^3)(2)	–	—
	1 hour	100 ppb (188.7 μg/m^3)(3)	–	100 ppb (188.7 μg/m^3)(3)	–	—
Sulfur dioxide	3 hour	–	0.5 ppm (1,300 μg/m^3)(1)	–	0.5 ppm (1,300 μg/m^3)(4)	700 μg/m^3 (0.267 ppm)
	1 hour	75 ppb (196.4 μg/m^3)(5)	–	75 ppb (196.4 μg/m^3)(5)	–	–
Ozone	8 hour(6)	0.075 ppm	Same as Primary	0.075 ppm	Same as Primary	–
Lead	Rolling 3-month average(7)	0.15 μg/m^3	Same as Primary	0.15 μg/m^3	Same as Primary	–
PM_{10}	Annual arithmetic mean	–	–	50 μg/m^3		–
	24 hour	150 μg/m^3(8)	Same as Primary	150 μg/m^3(9)		–
$PM_{2.5}$	Annual arithmetic mean	12.0 μg/m^3(10)	15.0 μg/m^3(10)	15.0 μg/m^3(11)	Same as Primary	–
	24 hour	35 μg/m^3(12)	Same as Primary	35 μg/m^3(13)	Same as Primary	–
Hydrogen sulfide	0.5 hour	–	–	70 μg/m^3(14)		–
	0.5 hour	–	–	40 μg/m^3(15)		–
Suspended sulfates	Annual average	–	–	0.25 mg sulfur trioxide/100 cm^2/day(16)		–
	30-day	–	–	0.50 mg sulfur trioxide/100 cm^2/day(16)		–

TABLE 3-1
AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Period	National Ambient Air Quality Standards		Wyoming Ambient Air Quality Standards		Colorado Ambient Air Quality Standards
		Primary Standards	Secondary Standards	Primary Standards	Secondary Standards	
Fluorides	30-day	–	–	0.4 μg/m$^{3(7)}$		–
	7-day	–	–	0.5 μg/m$^{3(7)}$		–
	24-hour	–	–	1.8 μg/m$^{3(7)}$		–
	12-hour	–	–	3.0 μg/m$^{3(7)}$		–

SOURCES: Colorado Department of Public Health and Environment 2013; Environmental Protection Agency 2013a; Wyoming Department of Environmental Quality 2013
NOTES:
[1]Not to be exceeded more than once per year.
[2]Standard is met when the annual arithmetic mean concentration in a calendar year is less than or equal to 0.053 ppm, rounded to three decimal places.
[3]To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor in an area must not exceed 100 ppb.
[4]Not to be exceeded more than once per calendar year, as determined from successive nonoverlapping 3-hour blocks starting at midnight each calendar day and rounded to one decimal place.
[5]To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor in an area must not exceed 75 ppb.
[6]To attain this standard, the 3-year average of the fourth highest daily maximum 8-hour average ozone concentrations measured at each monitor in an area over each year must not exceed 0.075 ppm.
[7]Not to be exceeded.
[8]Not to be exceeded more than once per year, on average over 3 years.
[9]Not more than one expected exceedance per year.
[10]Annual arithmetic mean, averaged over 3 years.
[11]Annual arithmetic mean.
[12]98th percentile, averaged over 3 years.
[13]98th percentile 24-hour average concentration.
[14]Not to be exceeded more than two times per year.
[15]Not to be exceeded more than two times in any five consecutive days.
[16]Measured as a sulfation rate by the lead peroxide method.
cm^2 = Square centimeters
mg = Milligrams
mg/m^3 = Milligrams per cubic meter
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers
ppm = Parts per million
ppb = Parts per billion
$\mu g/m^3$ = micrograms per cubic meter

Regional haze reduces long-range visibility over a wide region. Haze is caused by fine particles (and their precursors) that are so small they only settle out very slowly. In 1999 the EPA announced the Regional Haze Rule, which calls for state and federal agencies to work together to improve visibility in designated Class I areas. States are required to demonstrate reasonable progress towards the national visibility goal established in 1977 by the Clean Air Act, which is "the prevention of any future, and the remedying of any existing impairment of visibility in mandatory Class I federal areas which impairment results from man-made air pollution." The national goal is to restore natural visibility conditions in Class I areas by the year 2064.

The Western Regional Air Partnership is a voluntary partnership of states, tribes, federal land managers, local air agencies, and the EPA that was originally chartered to develop the technical and policy tools needed by western states and tribes to comply with the EPA's regional haze regulations. The organization was re-chartered in 2009. The new charter shifts the emphasis from policy work to technical work. It also shifts the focus from regional haze to a broader one-atmosphere, multi-pollutant approach to western air quality issues.

State Air Quality Regulations

Wyoming and Colorado state-level ambient air quality standards are shown in Table 3-1. Wyoming, Colorado, and Utah air quality regulations implement many of the federal air quality requirements through EPA-approved State Implementation Plans (SIP). State air quality regulations also regulate sources and emission types that may not be covered by the federal regulations. Specific regulatory requirements that may apply to transmission line and substation construction and operation are discussed in Section 3.2.1.4.

The Wyoming Environmental Quality Act, Wyoming Statutes (Wyo. Stat.) 35-11-101 et seq., and the Wyoming Air Quality Standards and Regulations (WAQSR) govern air quality requirements in the state of Wyoming. In Colorado, Colorado Revised Statutes (C.R.S.), Title 25, Article 7 governs air quality issues for stationary sources, while C.R.S. Title 42, Article 4, Parts 3 and 4 govern vehicle emission inspection requirements. Implementing regulations (Colorado Air Quality Control Commission regulations) are codified at 5 Code of Colorado Regulations (CCR) 1001. 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 in Utah. Regulations are codified at Utah Administrative Code (UAC), Title R307, Environmental Quality, Air quality.

3.2.1.2 Issues Identified for Analysis

3.2.1.2.1 Emissions from Construction

Emissions of the major regulated pollutants from construction of the transmission line and series compensation stations have been calculated. Emissions from construction sources such as traffic, construction equipment, fugitive dust from earthmoving, etc., are generally not subject to federal or state limitations; but in some cases do require mitigation (such as watering of disturbed areas) or are indirectly regulated through limitations imposed on the subject equipment itself (e.g., motor vehicle tailpipe standards or diesel engine performance standards). Due to the lack of any direct limitations with which to compare them, impacts on air quality are not determined based on project emissions in and of themselves.

3.2.1.2.2 Emissions During Operation

In general, emissions have not been quantified for the operation of the transmission line and series compensation stations with the exception of GHG emissions from circuit breakers. During the operations phase, emissions would be limited primarily to vehicular use for routine maintenance and emergency

repair activities. The sources would be similar to those from construction, but pollutants would be emitted in much smaller amounts on an annual basis; therefore, the majority of emissions and impacts would be associated with construction.

3.2.1.2.3 Ambient Air Pollutant Concentrations from Construction

In addition to tallying project emissions, a screening-level impact analysis has been performed using a dispersion model to predict ambient concentrations of pollutants for the project activities that have the most potential to exceed standards. Ambient levels of several project pollutants are limited by national and/or state ambient air quality standards (Table 3-1), which regulate concentrations of pollutants in the atmosphere from all sources of emissions. A significant impact on air quality would occur if ambient concentrations resulting from mitigated project emissions, when added to representative background concentrations of the subject pollutants from all other sources, exceed any national or state ambient air quality standard.

3.2.1.3 Regional Setting

3.2.1.3.1 Climate

Climate refers to the long-term average and range of weather conditions that prevail at any given place. Climatological normal conditions are defined as a 30-year average of weather, most often described in terms of temperature and precipitation. This section provides a state-by-state overview of the climate in the alternative route study corridors.

Wyoming's Climate

Wyoming's topography, including mountains and high plains, greatly influences the state's climate. Its mean elevation is about 6,700 feet above sea level, but the elevation ranges from 3,125 feet near the northeast corner of the state to 13,785 feet at Gannett Peak in the west-central portion of the state. The mountain ranges, which lie in a general north-south direction, are perpendicular to the prevailing westerly wind flow and provide effective barriers that force air moving in from the Pacific Ocean to rise and drop much of its moisture along the western slopes. Wyoming is considered semiarid east of the mountains. The topography and variations in elevation make it difficult to divide the state into homogeneous, climatological areas (National Oceanic and Atmospheric Administration [NOAA]1985).

Studies of wind flow patterns indicate Wyoming is covered most of the time by air from the Pacific. A smaller percentage of time the state is covered by cold air masses that move down from Canada (NOAA 1985).

The Continental Divide splits the state from near the northwest corner to the center of the southern border. The alternative route study corridors include areas to the east and west of the Continental Divide, as well as portions that would traverse the Great Divide Basin. There is no drainage from this Basin and precipitation, which averages only 7 to 10 inches annually, follows creek beds to ponds or small lakes where it either evaporates or percolates into the ground (NOAA 1985).

Because of its elevation, Wyoming has a relatively cool climate. The warmest parts of the state are those with the lowest elevations. With increasing elevation, average temperatures drop rapidly. Summer nights are cool, even though daytime temperatures may be quite high at times. In the winter, it is characteristic to have rapid and frequent changes between mild and cold spells. The majority of cold waves move southward on the east side of the Divide. During warm spells in the winter, nighttime temperatures frequently remain above freezing. Chinooks, warm downslope winds, are common along the eastern slopes. The state has long winters and short growing seasons (NOAA 1985).

Numerous valleys provide ideal pockets for the collection of cold air drainage at night. Protecting mountain ranges prevent the wind from stirring the air, and the colder, heavier air settles into the valleys, often sending temperatures well below zero. Such cold, stagnant conditions may lead to elevated air-pollutant levels if sufficient emission sources are available in the air shed (NOAA 1985).

For most of Wyoming, sunshine ranges from 60 percent of the possible amount during the winter to about 75 percent during the summer. Because the altitude provides less atmosphere for the sun's rays to penetrate and because of limited amounts of fog and haze, the intensity of sunshine is unusually high (NOAA 1985).

Like other states in the west, precipitation varies a great deal from one location to another. The period of maximum precipitation occurs in the spring and early summer over most of Wyoming. Precipitation is greater over the mountain ranges and usually at the higher elevations. During the summer, showers are quite frequent but often amount to only a few hundredths of an inch. Occasionally, there will be some very heavy rain associated with localized thunderstorms (NOAA 1985).

The average relative humidity is quite low. Low relative humidity, high percentage of sunshine, and rather high average winds all contribute to a high rate of evaporation (NOAA 1985).

Hailstorms are the most destructive type of local storm and damage to crops and property from hail amounts to many thousands of dollars every year. Tornadoes occur, but they are much less frequent, smaller, have a shorter duration, and are less destructive than those that occur in the Midwest. Wyoming is quite windy and during the winter there are frequent periods when the wind reaches 30 to 40 miles per hour (mph) with gusts to 50 or 60 (NOAA 1985).

Snow falls frequently from November through May and at lower elevations is light to moderate. Falls of 10 to 15 inches or more for a single storm occur but are infrequent outside of the mountains. Wind will frequently accompany or follow a snowstorm and pile the snow into drifts several feet deep. High winds and low temperatures with snow cause blizzard or near-blizzard conditions (NOAA 1985).

Total annual snowfall varies considerably. At the lower elevations in the east, the range is from 60 to 70 inches. The mountains receive a great deal more and in the higher ranges annual amounts are more than 200 inches. Many of the streams fed by melting snow furnish ample quantities of water for irrigation, electric power generation, and domestic use. Rapid run-off from heavy rain during thunderstorms may cause flash flooding (NOAA 1985).

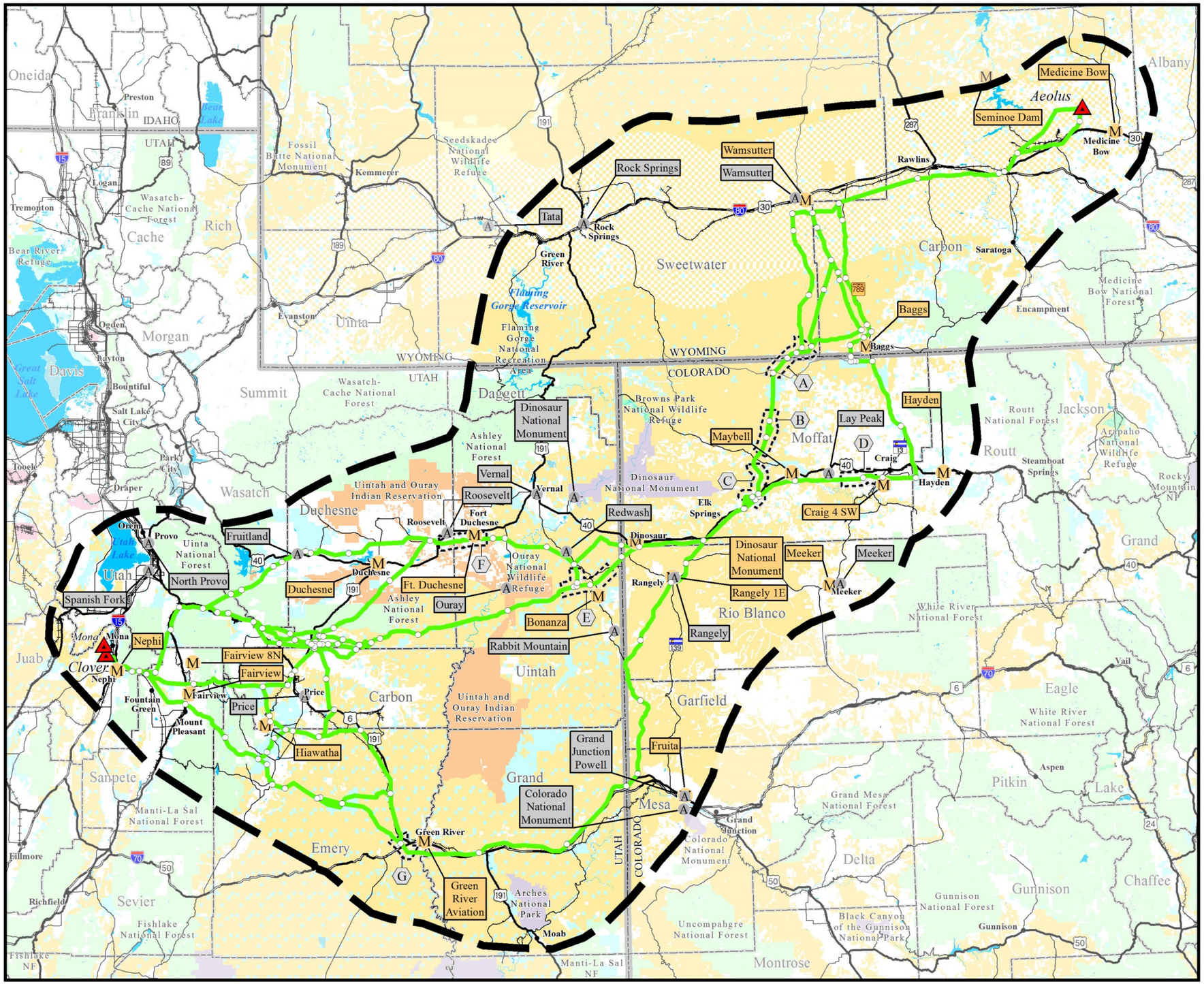
Nearly 4 percent of Wyoming is cultivated cropland, including both irrigated and nonirrigated. Another 13 percent is covered with forests, while parks and recreational areas take up about 4 percent. The majority of Wyoming is used for grazing and has a general appearance of dryness much of the time. The mountain areas provide timber and a storage place for the winter snows, which in the spring and summer feed lakes and reservoirs used in the irrigation districts. Principal crops in the irrigation districts are sugar beets, beans, potatoes, and hay. On the nonirrigated land, the principal crops are hay and grains, including wheat, barley, and oats (NOAA 1985).

Table 3-2 shows the 30-year normal climate temperature and precipitation records for stations located along the alternative route study corridors in Wyoming (generally arranged from north to south and east to west). Map 3-2 shows the location of these climate stations.

TABLE 3-2
CLIMATE STATISTICS FOR WYOMING

Climate	Month												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
Medicine Bow, Wyoming (Latitude: 41.8978, Longitude: -106.2017, Elevation: 6,605 feet, 2,013.2 meters)													
Average Maximum Temperature	30.0	33.0	43.1	53.9	63.7	75.4	83.1	80.9	70.6	57.4	40.5	30.3	55.3
Average Minimum Temperature	9.6	10.9	17.7	24.7	33.7	42.8	47.4	45.6	35.7	26.8	17.2	10.2	26.9
Average Total Precipitation	0.30	0.57	0.79	1.26	1.73	1.45	1.02	0.83	1.08	0.88	0.64	0.46	11.01
Average Total Snowfall	5.5	7.0	8.0	5.7	2.3	0.0	0.0	0.0	1.1	4.0	6.4	6.8	46.8
Seminoe Dam, Wyoming (Latitude: 42.1569, Longitude: -106.9153, Elevation: 6,837.9 feet, 2,084.2 meters)													
Average Maximum Temperature	31.5	34.4	43.6	51.9	64.4	75.7	84.6	82.4	71.5	57.2	41.4	31.1	55.90
Average Minimum Temperature	14.6	13.9	23.0	29.6	37.6	47.0	54.7	52.2	43.3	33.8	23.2	15.0	32.4
Average Total Precipitation	0.49	0.75	1.2	1.73	2.1	1.55	0.97	0.72	1.27	1.17	1.2	0.83	13.98
Wamsutter, Wyoming (Latitude: 41.6667, Longitude: -107.9667, Elevation: 6,740.2 feet, 2,054.4 meters)													
Average Maximum Temperature	28.0	32.9	44.0	54.4	65.0	76.2	84.7	82.3	72.2	58.6	41.0	29.5	55.9
Average Minimum Temperature	6.9	9.2	19.6	26.1	34.2	43.0	49.8	47.9	38.8	28.8	17.0	8.4	27.6
Average Total Precipitation	0.47	0.37	0.46	0.76	1.12	0.87	0.93	0.73	0.98	0.74	0.44	0.31	8.18
Average Total Snowfall	5.6	5.8	4.8	3.3	1.8	0.1	0.0	0.0	0.5	2.0	5.4	4.5	33.8
Baggs, Wyoming (Latitude: 41.0389, Longitude: -107.6575, Elevation: 6,240.2 feet, 1,902.0 meters)													
Average Maximum Temperature	31.8	35.4	46.9	57.8	67.6	78.4	85.8	82.9	73.3	59.9	43.5	32.2	58.1
Average Minimum Temperature	6.1	10.1	21.3	28.7	35.7	42.4	48.5	47.6	39.0	29.0	18.3	7.9	28.0
Average Total Precipitation	0.45	0.43	0.55	0.92	1.53	0.87	1.05	0.89	1.19	1.20	0.81	0.61	10.50
Average Total Snowfall	8.5	6.4	5.4	2.0	0.6	0.0	0.0	0.0	0.0	1.4	7.0	9.9	41.2

SOURCE: National Climatic Data Center 2013 (period of record: 1981 to 2010)
NOTE: Temperatures shown in degrees Fahrenheit. Precipitation and snowfall shown in inches.



Map 3-2

Air Quality and Meteorological Station Locations

ENERGY GATEWAY SOUTH TRANSMISSION PROJECT

Air Quality and Meteorological Station Locations

- Air Quality Monitoring Location
- Meterological Station Location

Project Features

- Project Area Boundary
- Link Node
- Substation (Project Terminal)
- Series Compensation Station Siting Area
- Alternative Route

Land Ownership

- Bureau of Land Management
- Bureau of Reclamation
- Indian Reservation
- National Park Service
- U.S. Department of Defense
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- State Land
- Private Land

General Reference

- City or Town
- Railroad
- Interstate Highway
- U.S. Highway
- State Highway
- Other Road
- Lake or Reservoir
- State Boundary
- County Boundary

SOURCES:
Air Quality Monitoring Locations, EPA 2013;
Meteorological Station Locations, NCDC 2013;
Series Compensation Station Siting Areas, Rocky Mountain Power 2015;
Land Jurisdiction, BLM 2013; City or Town, ESRI 2013;
Highways, Roads, and Railroads, ESRI 2013; Water Features, ESRI 2008, USGS 2010;
State and County Boundaries, ESRI 2013

NOTES:
- The alternative routes and series compensation siting areas shown on this map are draft and may be revised and/or refined throughout the development of the Project.
- Substation symbols do not necessarily represent precise locations.

Alternative routes last revised: September 23, 2014
FINAL EIS: September 2015

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Miles

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Colorado's Climate

The principal features of the Colorado geography are its inland continental location in the middle latitudes and the mountains and ranges extending north and south through the approximate center of the state. Colorado lies astride the highest mountains of the Continental Divide. With an average altitude of about 6,800 feet above sea level, Colorado is the highest state. The alternative route study corridors are located to the west of the Continental Divide (NOAA 1985).

The high plains of Colorado slope gently upward for a distance of some 200 miles from the state's eastern border to the base of the foothills of the Rocky Mountains. The lowest point in the state at 3,350 feet is on the eastern border. Backing the foothills are the mountain ranges with the highest peaks greater than 14,000 feet. West of these front ranges are additional ranges, generally extending north and south. These ranges enclose numerous high mountain parks and valleys. Farther westward, the mountains give way to rugged plateau country in the form of high mesas (some more than 10,000 feet in elevation), which extends to the western border of the state. All rivers in Colorado rise inside its borders and flow outward with the exception of the Green River, which flows diagonally across the extreme northwestern corner of the state (NOAA 1985).

Most of Colorado has a cool climate. During summer there are hot days in the plains, but these are often relieved by afternoon thundershowers. Mountain regions are nearly always cool. Humidity is generally quite low. The thin atmosphere allows greater penetration of solar radiation and results in pleasant daytime conditions even during winter (NOAA 1985).

The climate of local areas is profoundly affected by differences in elevation and, to a lesser degree, by the orientation of mountain ranges and valleys with respect to general air movements. Wide variations in both temperature and precipitation occur within short distances. While temperature decreases, and precipitation generally increases with elevation, these patterns are modified by the orientation of mountain slopes with respect to the prevailing winds and by the effect of topographical features in creating local air circulation patterns (NOAA 1985).

As a result of Colorado's distance from major sources of moisture (the Pacific Ocean and the Gulf of Mexico), precipitation is generally light in the lower elevations. Prevailing winds reach Colorado from westerly directions. Eastward-moving storms originating in the Pacific Ocean lose much of their moisture as rain or snow on the mountaintops and westward-facing slopes. Eastern slope areas receive relatively small amounts of precipitation from these storms (NOAA 1985).

The climate of the plains is comparatively uniform with characteristic features of low relative humidity, abundant sunshine, light rainfall, moderate to high wind movement, and a large daily range in temperature. A large portion of the annual precipitation falls during the growing season. During periods of drought, high winds give rise to dust storms (NOAA 1985). The rugged topography of western Colorado causes large variations in climate within short distances and few climatic generalizations apply to the area. Snow-covered mountain peaks and valleys often have very cold nighttime temperatures in winter when skies are clear and the air is still. As in Wyoming, this stagnation can give rise to elevated air-pollutant concentrations. Summer in the mountains is a cool season; above 7,000 feet, the nights are quite cool throughout the summer, while bright sunshine makes the days comfortably warm (NOAA 1985). The lower western valleys are protected by surrounding high terrain and have a greater uniformity of weather than the eastern plains. They experience high summer temperatures, comparable to those of the eastern plains, while average winter temperatures are somewhat lower than at similar elevations in the plains (NOAA 1985).

Precipitation west of the Continental Divide is more evenly distributed throughout the year than in the eastern plains. For most of western Colorado, the greatest monthly precipitation occurs in the winter months, while June is the driest month. In contrast, June is one of the wetter months in most of the eastern portions of the state (NOAA 1985). Thunderstorms are quite prevalent in the eastern plains and along the eastern slopes of the mountains during the spring and summer. These often become quite severe and the frequency of hail damage to crops in northeastern Colorado is quite high. Tornadoes almost never occur in the mountains or in the west and are relatively infrequent over the eastern plains. Other severe storms include the winter blizzards of the eastern high plains, while heavy snows in the high mountains create the danger of avalanches (NOAA 1985). In years when snow cover is heavy, or when there is a sudden warming in the spring at high elevations, there may be extensive flooding. Heavy thunderstorms in the eastern foothills and plains occasionally cause damaging flash floods. Similar flash floods occur on the western slopes, but with somewhat lower frequency (NOAA 1985).

As in other parts of the semiarid west, water is of prime importance in Colorado. In the eastern plains and in the flat valley areas, where agricultural activities are practicable, local precipitation is deficient. However, the heavy winter snow in the mountains provides a year-around source of water for streams and rivers. Many large reservoirs conserve the heavy spring runoff and often furnish power, in addition to serving irrigation purposes (NOAA 1985). As a result of its varied climate, Colorado has a highly diversified agriculture. In wet years excellent crop yields are realized, but the erratic variation in precipitation from year to year can seriously affect production. Periodic droughts, extending from 1 or 2 years to several years, create severe agricultural and economic problems (NOAA 1985). The portion of Colorado from the mountains west is so varied in terrain and climate that no overall description of the agriculture of the region may be made. At the higher western elevations, livestock husbandry is the most important agricultural activity. The sheltered valleys of western Colorado are very fertile and the climate is generally mild. Excellent pastures are found in many of the higher river and creek valleys and hay is one of the large and profitable crops (NOAA 1985).

Winter sports are popular in the state. The abundant snowfall means good skiing in many areas from November to as late as May (NOAA 1985). Table 3-3 shows 30-year normal climate temperature and precipitation records for stations located along the alternative route study corridors in Colorado (generally arranged from north to south and east to west). Map 3-2 shows the location of these climate stations.

TABLE 3-3
CLIMATE STATISTICS FOR COLORADO

Climate	Month												Annual
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	
Hayden, Colorado (Latitude: 40.4928, Longitude: -107.2547, Elevation: 6,466.9 feet, 1,971.1 meters)													
Average Maximum Temperature	30.3	34.5	46.3	58.3	68.4	78.7	85.2	83.2	74.4	61.4	44.4	31.3	58.1
Average Minimum Temperature	8.3	11.8	21.6	29.3	37.0	43.6	50.0	49.1	40.6	30.6	20.4	9.9	29.4
Average Total Precipitation	1.60	1.33	1.36	1.85	1.70	1.22	1.37	1.37	1.79	1.72	1.61	1.61	18.53
Average Total Snowfall	24.8	18.4	14.0	9.7	1.3	0.0	0.0	0.0	0.3	5.4	17.7	23.5	115.1

TABLE 3-3
CLIMATE STATISTICS FOR COLORADO

Climate	Month												Annual
	January	February	March	April	May	June	July	August	September	October	November	December	
Craig 4 SW, Colorado (Latitude: 40.4506, Longitude: -107.5894, Elevation: 6.496 feet, 1,980 meters)													
Average Maximum Temperature	31.2	35.1	46.2	56.6	65.9	77.2	85.1	83.2	73.7	60.8	44.3	32.0	57.7
Average Minimum Temperature	7.3	10.7	20.5	27.9	36.4	43.7	50.2	49.1	39.8	29.5	19.4	8.9	28.7
Average Total Precipitation	1.06	1.19	1.36	1.68	1.40	1.28	1.20	1.24	1.90	1.81	1.46	1.14	16.72
Average Total Snowfall	15.5	13.4	12.2	5.8	0.8	0.1	0.0	0.0	0.3	2.9	10.6	14.6	76.2
Maybell, Colorado (Latitude: 40.5158, Longitude: -108.0947, Elevation: 5,943.9 feet, 1,811.7 meters)													
Average Maximum Temperature	33.3	37.3	48.7	59.1	68.8	79.6	87.0	84.8	74.9	61.3	45.6	33.6	59.6
Average Minimum Temperature	1.7	6.8	18.4	25.6	33.4	40.3	47.4	45.8	35.5	25.4	14.8	3.4	25.0
Average Total Precipitation	0.83	0.86	1.05	1.35	1.12	1.14	0.85	0.98	1.40	1.39	1.10	0.97	13.04
Average Total Snowfall	11.0	10.7	9.1	3.0	0.8	0.0	0.0	0.0	0.1	2.0	9.3	12.4	58.4
Dinosaur National Monument, Colorado (Latitude: 40.2442, Longitude: -108.9719, Elevation: 5,972.11 feet, 1,820.3 meters)													
Average Maximum Temperature	33.2	39.2	51.7	61.5	72.6	84.1	91.2	88.3	78.1	63.5	46.5	33.7	62.1
Average Minimum Temperature	11.2	15.6	25.8	32.4	40.9	49.8	56.9	55.2	46.3	35.3	23.5	13.0	33.9
Average Total Precipitation	0.54	0.57	0.80	1.10	1.27	0.79	0.89	0.95	1.40	1.52	0.87	0.70	11.40
Average Total Snowfall	8.2	5.9	3.9	1.9	0.3	0.0	0.0	0.0	0.0	0.7	4.9	8.8	34.6
Rangely 1 E, Colorado (Latitude: 40.0894, Longitude: -108.7717, Elevation: 5,285.1 feet, 1,610.9 meters)													
Average Maximum Temperature	30.8	38.1	51.6	61.7	72.0	83.6	91.0	88.4	78.5	64.6	46.9	32.3	61.7
Average Minimum Temperature	3.5	10.6	23.7	31.7	40.7	49.4	56.0	54.2	44.2	31.9	19.9	6.7	31.1
Average Total Precipitation	0.58	0.61	0.91	1.12	1.10	0.89	0.85	1.04	1.41	1.48	0.87	0.60	11.46
Average Total Snowfall	7.7	5.4	3.3	2.1	0.1	0.0	0.0	0.0	0.0	0.2	3.4	7.4	29.6

TABLE 3-3
CLIMATE STATISTICS FOR COLORADO

Climate	Month												Annual
	January	February	March	April	May	June	July	August	September	October	November	December	
Meeker, Colorado (latitude: 40,036, Longitude: -107.906, Elevation: 6,230 feet, 1,898.9 meters)													
Average Maximum Temperature	32.8	37.4	48.1	57.3	66.6	77.3	84.9	82.1	73.3	61.0	45.5	33.6	58.3
Average Minimum Temperature	3.8	8.9	17.8	25.1	31.9	38.6	44.5	43.8	35.8	25.5	15.8	6.5	24.8
Average Total Precipitation	1.10	1.07	1.49	1.79	1.60	1.24	1.29	1.51	1.72	1.91	1.50	1.23	17.45
Average Total Snowfall	13.3	11.3	7.4	5.6	0.5	0.0	0.0	0.0	0.1	3.5	11.2	13.9	66.8
Fruita, Colorado (Latitude: 39.1653, Longitude: -108.7331, Elevation: 4,504.9 feet, 1,373.1 meters)													
Average Maximum Temperature	38.2	45.8	57.5	66.1	76.3	86.9	92.7	89.6	80.9	67.7	52.4	39.8	66.2
Average Minimum Temperature	13.4	20.9	28.6	35.1	44.0	51.9	59.0	57.4	47.0	35.1	24.9	16.6	36.2
Average Total Precipitation	0.63	0.65	0.93	0.85	0.75	0.58	0.69	0.89	1.03	1.23	0.74	0.69	9.66
Average Total Snowfall	2.7	1.1	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.9	2.6	7.8

SOURCE: National Climatic Data Center 2011 (period of record: 1981 to 2010)
NOTE: Temperatures shown in degrees Fahrenheit. Precipitation and snowfall shown in inches.

Utah's Climate

The topography of Utah is extremely varied with most of the state being mountainous. A series of mountains (including the Wasatch Range), which run generally north and south through the middle of Utah, and the Uinta Mountains, which extend east and west through the northeast portion, are the principal ranges. Less extensive ranges are scattered over the remainder of the state. The lowest area is the Virgin River Valley in the southwestern part with elevations between 2,500 and 3,500 feet, while the highest point is Kings Peak in the Uinta Mountains, which rises to 13,498 feet (NOAA 1985).

Eastern Utah is drained by the Colorado River and its principal tributary in the state, the Green River, although neither rises inside its borders. Western Utah is almost entirely in the Great Basin with no outlet to the sea (NOAA 1985).

Utah's climate is determined by its distance from the equator, its elevation above sea level, the location of the state with respect to the average storm paths over the Intermountain Region, and its distance from the principal moisture sources of the area, the Pacific Ocean and the Gulf of Mexico. Also, the mountain ranges over the western United States (U.S.), particularly the Sierra Nevada, Cascade Ranges, and the Rocky Mountains, have a marked influence on the climate of the state. Pacific storms, before reaching Utah, must first cross the Sierras or Cascades. As the moist air is forced to rise over these high mountains,

a large portion of the original moisture falls as precipitation. Thus, the prevailing westerly winds reaching Utah are comparatively dry, resulting in light precipitation over most of the state (NOAA 1985).

Great Salt Lake, in northwestern Utah, lies in the Great Basin, the largest closed basin in North America. Since this large body of water now has no drainage outlet, the salt content is high, averaging about 25 percent. Thus, the lake, which never freezes over, provides a moderating effect throughout the year on temperatures in the immediate vicinity (NOAA 1985).

There are variations in temperature with elevation and latitude. The mountains and the elevated valleys have cooler climates with the lower areas of the state having higher temperatures. Average yearly temperature also decreases from south to north. Weather stations in the southern counties generally have average annual temperatures 6 to 8 degrees Fahrenheit higher than those at similar altitudes over the northern counties (NOAA 1985).

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 (NOAA 1985).

Sunny skies prevail most of the year in Utah. The state experiences relatively strong insolation during the day and rapid nocturnal cooling, resulting in wide daily ranges in temperature. Even after the hottest days, nights are usually cool (NOAA 1985).

On clear nights the colder air accumulates, by drainage, on the valley bottoms, while the foothills and bench areas remain relatively warm. For this reason, the higher lands at the edges of the valleys are devoted to more delicate fruits, berries, and vegetables, while hardier grains and vegetables are planted in the bottom lands (NOAA 1985).

Precipitation varies greatly, from an average of less than 5 inches annually over the Great Salt Lake Desert (west of Great Salt Lake), to more than 40 inches in some parts of the Wasatch Mountains. The average annual precipitation in the leading agricultural areas is between 10 to 15 inches, requiring irrigation for the economic production of most crops (NOAA 1985).

Snowfall is moderately heavy in the mountains, especially over the northern part of the state. This is conducive to a large amount of winter sports activity, including skiing (NOAA 1985).

Runoff from melting mountain snow usually reaches a peak in April, May, or early June, and sometimes causes flooding along the lower streams. Flash floods from summer thunderstorms also occur. The most serious floods in Utah have occurred in the Great Basin (NOAA 1985).

During the late fall and winter months, anticyclones tend to settle over the Great Basin for as long as several weeks at a time. Under these conditions, smoke and haze accumulate in the lower levels of the stagnant air over the valleys of northwestern Utah, frequently becoming an obstruction to visibility. This is also true of fog, which may persist for several weeks at a time (NOAA 1985).

Wind speeds are usually light to moderate, below 20 mph. Tornados are fairly rare and cause only slight damage. However, strong winds occur occasionally, particularly in the vicinity of the canyon mouths along the western slopes of the Wasatch Mountains. Dust storms occur occasionally over western Utah, primarily during the spring months (NOAA 1985).

Utah is not a large agricultural state, even though appreciable crops, livestock, and dairy products are produced inside its boundaries. Only 4 percent of the land is under cultivation, but approximately 35 percent of the land area is used for livestock grazing. The largest crop is wheat, most of it being winter or dryland wheat. Other principal crops are barley, oats, hay, potatoes, corn, and sugar beets. Range feeds

and dryland crops in nonirrigable areas, particularly in the southern portion of the state, often suffer from lack of moisture. Hailstorms may damage fruit and vegetables in limited areas during spring and summer, although the hail is usually small (NOAA 1985).

Table 3-4 shows 30-year normal climate temperature and precipitation records for stations located along the alternative route study corridors in Utah (generally arranged from north to south and east to west). Map 3-2 shows the location of these climate stations.

TABLE 3-4
CLIMATE STATISTICS FOR UTAH

Climate	Month												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
Bonanza, Utah (Latitude: 40.0167, Longitude: -109.1833, Elevation: 5,45.13 feet, 1,661.2 meters)													
Average Maximum Temperature	30.7	37.8	51.7	63.7	73.0	86.2	92.3	89.4	79.6	65.5	47.2	32.5	62.6
Average Minimum Temperature	8.6	15.3	25.8	33.3	41.5	51.7	57.6	55.4	46.1	34.9	24.0	11.6	33.9
Fort Duchesne, Utah (Latitude: 40.2842, Longitude: -109.8611, Elevation: 5,051.8 feet, 1,539.8 meters)													
Average Maximum Temperature	29.2	37.3	52.3	63.7	73.4	84.2	91.9	89.1	78.8	64.7	47.1	31.8	62.1
Average Minimum Temperature	5.8	13.0	25.0	31.6	40.8	48.1	54.8	53.1	43.6	33.0	21.9	9.6	31.8
Average Total Precipitation	0.32	0.30	0.36	0.44	0.67	0.43	0.37	0.68	0.69	1.01	0.28	0.41	5.96
Duchesne, Utah (Latitude: 40.1678, Longitude: -110.3950, Elevation: 5,520 feet, 1,682.5 meters)													
Average Maximum Temperature	31.5	38.1	52.2	62.2	71.4	81.0	86.7	84.1	75.2	62.0	45.8	32.8	60.4
Average Minimum Temperature	8.4	14.3	25.3	32.6	40.6	48.1	54.7	53.0	44.4	33.6	22.0	11.0	32.4
Average Total Precipitation	0.57	0.59	0.66	0.88	0.99	0.77	0.97	1.27	1.21	1.01	0.55	0.64	10.11
Average Total Snowfall	7.3	7.2	3.2	1.6	0.2	0.0	0.0	0.0	0.0	0.8	2.7	7.8	30.8
Fairview 8N, Utah (Latitude: 39.7483, Longitude: -111.4164, Elevation: 6,750 feet, 2,057.4 meters)													
Average Maximum Temperature	35.9	37.2	45.5	54.7	64.0	75.1	81.9	80.8	72.7	58.9	43.8	34.3	57.2
Average Minimum Temperature	11.5	15.1	22.7	29.4	36.4	44.5	51.7	50.3	43.0	31.4	22.1	13.2	31.0
Average Total Precipitation	1.64	1.41	1.49	1.46	1.73	1.13	0.94	1.21	1.48	1.76	1.40	1.77	17.42
Average Total Snowfall	21.3	19.0	15.0	8.0	3.3	0.3	0.0	0.0	0.3	4.6	13.4	25.5	110.7

TABLE 3-4
CLIMATE STATISTICS FOR UTAH

Climate	Month												
	January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Annual**
Nephi, Utah (Latitude: 39.7122, Longitude: -111.8319, Elevation: 5,127.95 feet, 1,563.0 meters)													
Average Maximum Temperature	36.4	41.4	52.2	60.7	70.3	81.0	88.8	86.6	77.3	63.8	48.2	36.3	62.0
Average Minimum Temperature	20.1	23.9	30.9	36.7	44.3	52.7	60.5	59.1	49.6	38.7	28.6	20.4	38.9
Average Total Precipitation	1.31	1.29	1.63	1.67	1.62	0.96	0.75	0.91	1.19	1.57	1.28	1.33	15.51
Average Total Snowfall	12.3	9.9	7.1	3.2	0.5	0.0	0.0	0.0	0.0	1.2	7.3	13.6	55.1
Hiawatha, Utah (Latitude: 39.4833, Longitude: -111.0167, Elevation: 7,279.86 feet, 2,218.9 meters)													
Average Maximum Temperature	32.8	38.2	45.9	55.3	65.0	75.4	81.8	78.3	71.1	57.5	42.4	33.4	56.5
Average Minimum Temperature	14.8	17.0	24.0	30.9	37.9	47.4	54.6	52.4	44.8	33.9	21.5	13.9	32.8
Green River Aviation, Utah (Latitude: 38.9906, Longitude: -110.1544, Elevation: 4,069.9 feet, 1,240.5 meters)													
Average Maximum Temperature	41.1	50.5	62.9	72.0	82.2	93.0	98.5	94.9	86.0	71.3	55.6	43.5	71.1
Average Minimum Temperature	13.7	21.3	30.3	38.2	46.8	55.1	61.3	60.0	49.0	36.9	24.6	16.5	37.9
Average Total Precipitation	0.49	0.59	0.71	0.59	0.56	0.38	0.80	0.78	0.84	0.98	0.45	0.43	7.60
Average Total Snowfall	3.4	0.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.5	7.6

SOURCE: National Climatic Data Center 2011 (period of record: 1981 to 2010)
NOTE: Temperatures shown in degrees Fahrenheit. Precipitation and snowfall shown in inches.

3.2.1.3.2 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, the Earth's orbital geometry, and latitude. In addition to the sun's radiation, the 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 (GHGs), 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 U.S. 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 tend to occur several years per decade, reaching maximum amplitude in the Northern Hemisphere's winter season (Gutzler 2005).

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 U.S., while a positive phase brings wet decades (Gutzler 2005).

Forming a backdrop to climate variability are constant climatic shifts that occur over longer time scales. During the last ice age, abundant geological evidence indicates 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 the Earth's rotational axis (Gutzler 2005). Climate change is a normal part of the aging and evolution of the Earth and of changes in the factors that control climate that occur over multi-year to multi-decadal cycles (Gutzler 2005).

The climate of the intermountain west is changing with multiple independent measurements indicating an overall warming of about 2 degrees Fahrenheit across the region in the past 30 years. While climate in this region has always been highly variable at annual, decadal, century, and longer time scales, the rate of recent change is unusually rapid. It is also consistent with the well-understood physical effects of the increasing accumulations of GHGs in the atmosphere. While there has been no study specifically investigating whether the recent warming trends in Colorado, Utah, and Wyoming can be attributed to GHGs, such attribution has been made at continental (western North America) and global scales. Thus, it is reasonable to conclude that a substantial fraction of the recent warming in the region is due to anthropogenic climate change (Western Water Assessment 2013).

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 GHGs in the atmosphere and the 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). Thus, 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; agriculture also has contributed [EPA 2015]). Pre-industrial levels of CO_2 were approximately 280 parts per million (ppm) by volume and current levels are approximately 400 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 twenty-first century, CO_2 concentrations could be 75 to 350 percent above the pre-industrial concentration (Easterling and Karl 2011).

It is less clear whether the persistent drought conditions in the intermountain west since 2000 are related to anthropogenic climate change. The variations since 2000 in precipitation, the main driver of drought conditions, are consistent with the natural variability seen in long-term observed climate and paleoclimate records. However, the observed warming may have increased the severity of drought and exacerbated drought impacts, such as low streamflows (Western Water Assessment 2013). In Colorado, tree-ring and other paleoclimate indicators show multiple droughts prior to 1900 that were more severe and sustained than any in the observed record (Western Water Assessment 2014).

Global Climate Models (GCMs) are highly sophisticated computer representations of the global climate system—the atmosphere, the oceans, ice sheets and sea ice, and the land surface—based on both physical laws and parameters derived from observation. GCMs are the principal tools used by climate scientists to diagnose the causes of climate variability and to make projections of future climate, given the potential trajectories for GHG concentrations. (Western Water Assessment 2013)

The consensus of projections from about 20 different GCMs is that the intermountain west will warm by 2.5 degrees Fahrenheit [+1.5 to +3.5 degrees Fahrenheit] by 2025, relative to the 1950 to 1999 baseline, and 4 degrees Fahrenheit [+2.5 to +5.5 degrees Fahrenheit] by 2050. The projections show summers warming more (+5 degrees Fahrenheit [+3 to +7 degrees Fahrenheit]) than winters (+3 degrees Fahrenheit [+2 to +5 degrees Fahrenheit]), and typical summer temperatures in 2050 will be as warm as or warmer than the hottest 10 percent of summers that occurred between 1950 and 1999. Temperature regimes will effectively shift upslope and northwards as the climate warms. Note that the range of climate model projections does not capture the entire range of uncertainty (Western Water Assessment 2013).

The individual GCM projections do not agree whether average annual precipitation will increase or decrease in the region by 2050. The multi-model average shows little change in annual mean precipitation by 2050, though with a slight tendency towards drying in the southern part of the region and wetter conditions in the northern part of the region. The multi-model average also suggests a seasonal shift in precipitation, as the combined effects of a northward-shifting storm track, potentially wetter storms, and a drying of the sub-tropical regions globally may result in more mid-winter precipitation, and in some areas, a decrease in late spring and summer precipitation (Western Water Assessment 2013). The timing of snowmelt and spring runoff is projected to shift earlier by several weeks (Western Water Assessment 2014).

Record-setting wildfires are likely due to rising temperatures, related reductions in spring snowpack and soil moisture, and the effects of bark beetle infestations. Increased frequency and altered timing of flooding will increase risks to people, ecosystems, and infrastructure. Ozone pollution, which in some areas of the intermountain west increase as summer temperatures rise and clouds decrease, also may increase as a result of climate change (U.S. Global Change Research Program 2012).

More intense, longer-lasting heat waves will result in increasing peak demands for electricity for air conditioning, depleting electrical generation and distribution capacities, resulting in increased risks of brownouts and blackouts. EPA projects that climate change could increase the need for additional electric generating capacity by 10 to 20 percent by 2050 as a result. Conversely, the demand natural gas, oil, and wood for heating will decrease. Electricity supply also will be affected by changes in the timing of river flows and where hydroelectric systems have limited storage capacity and reservoirs, since increased year-to-year variability of precipitation is expected (U.S. Global Change Research Program 2012; EPA 2014).

3.2.1.3.3 Air Quality

Air quality monitoring networks operate in urban and rural areas throughout Wyoming, Colorado, and Utah, to inform the public about local air quality conditions and to help regulatory agencies identify sources of air pollution. Various agencies (state, federal, and local), companies, individuals, and organizations collect ambient air quality monitoring data at carefully chosen, representative physical locations. Monitors are sited to determine ambient concentrations of both criteria pollutants and HAPs. Networks also monitor the nature and cause of visibility impairment in Class I areas (areas where only a small amount of air quality deterioration is allowed) in all three states.

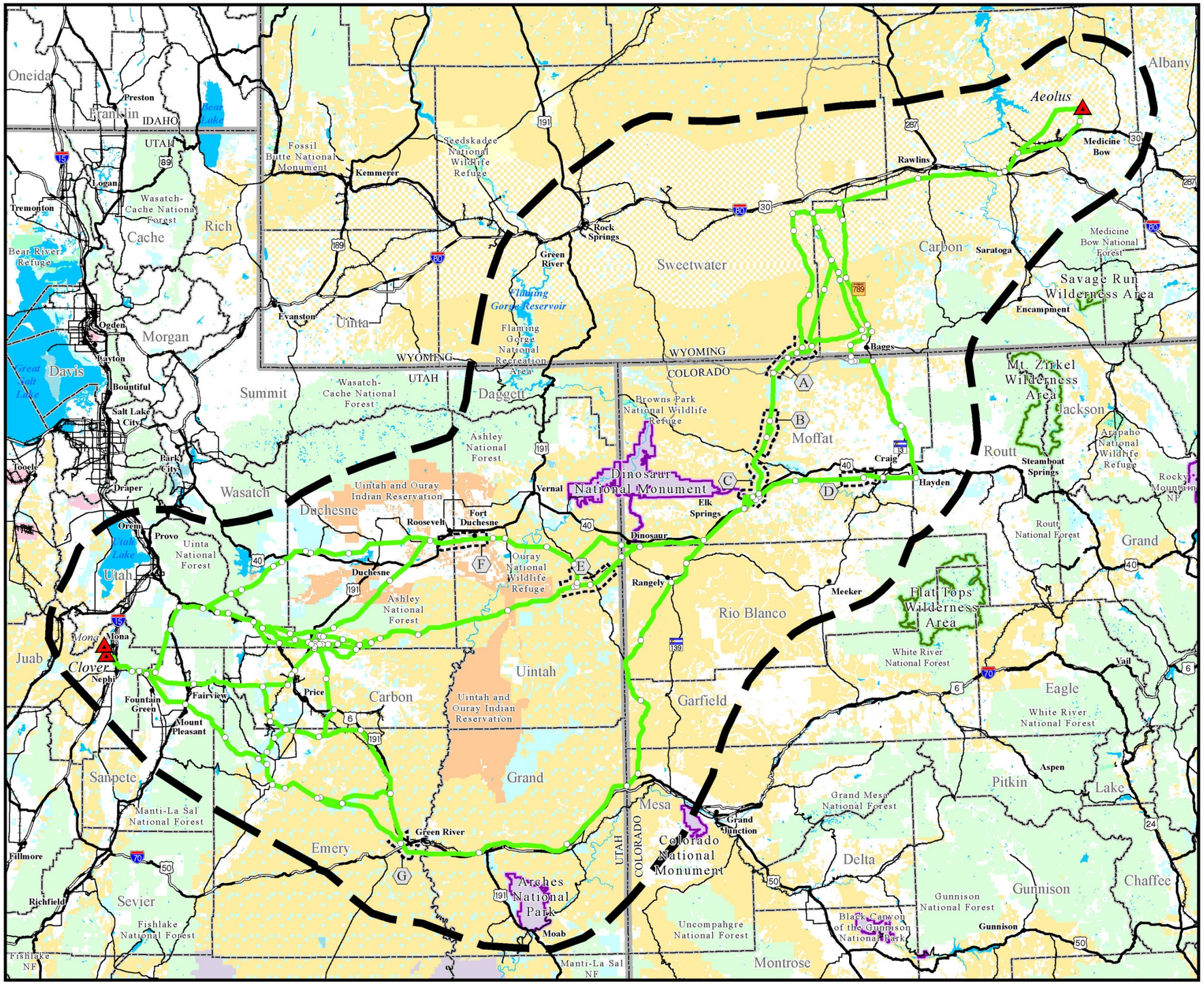
Air Quality in Wyoming

Table 3-5 shows recent air quality data from monitoring stations near the alternative route study corridors. Map 3-2 shows the air quality monitoring locations in Wyoming, Colorado, and Utah that have been used for this study. Map 3-3 shows the locations of the Class I areas closest to the alternative route study corridors. None of the alternative route study corridors will traverse any nonattainment or maintenance areas in Wyoming. The closest nonattainment area is the Upper Green River Basin Area, comprising parts of Lincoln, Sublette, and Sweetwater counties, which is designated a marginal nonattainment area for the 2008 8-hour ozone NAAQS. The nonattainment area is located to the west of the alternative route study corridors. These three counties are designated attainment/unclassifiable for all other NAAQS. Carbon County, which includes the eastern portions of the alternative route study corridors in Wyoming, is designated attainment/unclassifiable for all NAAQS.

TABLE 3-5
AIR QUALITY DATA FOR WYOMING

Site/Location	Year	Pollutant	Averaging Period	Concentration
Wamsutter (Sweetwater County)	2010 to 2012 (3-year average)	Ozone	8-hour	0.060 ppm (4th maximum)
Wamsutter (Sweetwater County)	2010 to 2012 (3-year average)	Nitrogen dioxide	1-hour	38 ppb (98th percentile)
			Annual	4.6 ppb
Wamsutter (Sweetwater County)	2010 to 2012 (3-year average)	PM_{10}	24-hour	58.6 µg/m^3 (2nd maximum)
			Annual	14.1 µg/m^3
Rock Springs (Sweetwater County)	2010 to 2012 (3-year average)	PM_{10}	24-hour	58.3 µg/m^3 (2nd maximum)
			Annual	—
Rock Springs (Sweetwater County)	2010 to 2012 (3-year average)	$PM_{2.5}$	24-hour	14.3 µg/m^3 (98th percentile)
			Annual	5.9 µg/m^3
Wamsutter (Sweetwater County)	2009	Sulfur dioxide	1-hour	7 ppb (99th percentile)
			3-hour	3.9 ppb (2nd maximum)
Tata (Sweetwater County)	2011 to 2012 (2-year average)	Carbon monoxide	1-hour	1.2 ppm
			8-hour	0.95 ppm

SOURCES: Air Resource Specialists 2010, 2011, 2012, 2013; Environmental Protection Agency 2013a
NOTES:
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers
ppm = Parts per million
ppb = Parts per billion
µg/m^3 = micrograms per cubic meter



Map 3-3

Air Quality Protected Class I Areas and Class II Areas Afforded Class I Protection

ENERGY GATEWAY SOUTH TRANSMISSION PROJECT

Protected Class I Areas and Class II Areas Afforded Class I Protection

- National Park or National Monument
- Wilderness Area

Project Features

- Project Area Boundary
- Link Node
- Substation (Project Terminal)
- Series Compensation Station Siting Area
- Alternative Route

Land Ownership

- Bureau of Land Management
- U.S. Fish and Wildlife Service
- Bureau of Reclamation
- U.S. Forest Service
- Indian Reservation
- State Land
- National Park Service
- Private Land
- U.S. Department of Defense

General Reference

- City or Town
- Other Road
- Railroad
- Lake or Reservoir
- Interstate Highway
- State Boundary
- U.S. Highway
- County Boundary
- State Highway

SOURCES:
National Park or Monument, BLM 2013;
Wilderness Areas, BLM 2013, USFS 2012, University of Montana 2010;
Series Compensation Station Siting Areas, Rocky Mountain Power 2015;
Land Jurisdiction, BLM 2013; City or Town, ESRI 2013;
Highways, Roads, and Railroads, ESRI 2013; Water Features, ESRI 2008, USGS 2010;
State and County Boundaries, ESRI 2013

NOTES:
- The alternative routes and series compensation station siting areas shown on this map are draft and may be revised and/or refined throughout the development of the Project.
- Substation symbols do not necessarily represent precise locations.

Alternative routes last revised: September 23, 2014
FINAL EIS: September 2015

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Miles

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Wyoming has seven mandatory federal Class I PSD areas, which require additional protection under federal regulations, including two national parks (Yellowstone and Grand Teton), and five wilderness areas (North Absaroka, Washakie, Teton, Bridger, and Fitzpatrick). All are located well to the northwest of the alternative route study corridors. In addition, Wyoming has one state Class I area, the Savage Run Wilderness Area. Savage Run Wilderness Area is located approximately 41 miles to the southeast of the alternative route study corridors, on the west side of the Medicine Bow Range in Carbon and Albany counties.

Air Quality in Colorado

The alternative route study corridors traverse portions of Moffat, Rio Blanco, Garfield, Mesa, and Routt counties. All of Moffat, Rio Blanco, Garfield, and Mesa counties are designated attainment/unclassifiable for all NAAQS. A portion of Routt County in the immediate vicinity of Steamboat Springs is a designated maintenance area for particulate matter less than 10 micrometers diameter (PM_{10}). However, the maintenance area is well to the east of any of the alternative route study corridors. The remainder of Routt County is designated attainment/unclassifiable for all other NAAQS.

Colorado has several federal Class I PSD areas including four national parks (Rocky Mountain, Black Canyon of the Gunnison, Great Sand Dunes, and Mesa Verde) and eight wilderness areas (Mount Zirkel, Rawah, Flat Tops, Eagles Nest, Maroon Bells-Snowmass, West Elk, La Garita, and Weminuche). In addition, Colorado affords Class I protection to certain Class II areas with respect to PSD increments for SO_2. These Class II areas are the Florissant Fossil Beds National Monument, Colorado National Monument, Dinosaur National Monument, portions of Black Canyon of the Gunnison National Park and Great Sand Dunes National Park and Preserve that are not Class I areas, the Uncompahgre Mountain Primitive Area, Wilson Mountain Primitive Area, and BLM land in the Gunnison Gorge Recreation Area.

The Class I and protected Class II areas closest to the alternative route study corridors include the Mount Zirkel Wilderness Area (34 miles), Dinosaur National Monument (0 miles; certain transmission line alternative routes cross the Deerlodge Road that leads into the national monument), Flat Tops Wilderness Area (26 miles), and the Colorado National Monument (16 miles).

Table 3-6 shows recent air quality data from monitoring stations near the alternative routes study corridors. Map 3-2 shows the air quality monitoring locations in Wyoming, Colorado, and Utah that have been used for this study. Map 3-3 shows the locations of the Class I areas (and Class II areas afforded special protection) that are closest to the alternative route study corridors.

TABLE 3-6
AIR QUALITY DATA FOR COLORADO

Site/Location	Year	Pollutant	Averaging Period	Concentration
Lay Peak (Moffat County)	2011 to 2012 (2-year average)	Ozone	8-hour	0.063 ppb (4th maximum)
Meeker (Rio Blanco County)	2010 to 2012 (3-year average)	Ozone	8-hour	0.064 ppb (4th maximum)
Rangely (Rio Blanco County)	2010 to 2012 (3-year average)	Ozone	8-hour	0.067 ppb (4th maximum)
Palisade (Mesa County)	2010 to 2012 (3-year average)	Ozone	8-hour	0.068 ppb (4th maximum)
Colorado National Monument (Mesa County)	2010 to 2012 (3-year average)	Ozone	8-hour	0.068 ppb (4th maximum)

TABLE 3-6
AIR QUALITY DATA FOR COLORADO

Site/Location	Year	Pollutant	Averaging Period	Concentration
Meeker (Rio Blanco County)	2010 to 2012 (3-year average)	Nitrogen dioxide	1-hour	5 ppb (98th percentile)
Rangely (Rio Blanco County)	2010 to 2012 (3-year average)	Nitrogen dioxide	1-hour	21 ppb (98th percentile)
Grand Junction Powell (Mesa County)	2010 to 2012 (3-year average)	PM_{10}	24-hour	43.5 µg/m3 (2nd maximum)
Rangely (Rio Blanco County)	2010 to 2012 (3-year average)	$PM_{2.5}$	24-hour	12 µg/m3 (98th percentile)
			Annual	3.1 µg/m3
Grand Junction Powell (Mesa County)	2010 to 2012 (3-year average)	$PM_{2.5}$	24-hour	27.7 µg/m3 (98th percentile)
			Annual	7.8 µg/m3
Welby (Denver County)	2010 to 2012 (3-year average)	Sulfur dioxide	1-hour	31.7 ppb (99th percentile)
	2009 to 2011 (3-year average)		3-hour	23 ppb (2nd maximum)
Walden (Jackson County)	2011 to 2012 (2-year average)	Sulfur dioxide	1-hour	3 ppb (99th percentile)
Grand Junction Pitkin (Mesa County)	2010 to 2012 (3-year average)	Carbon monoxide	1-hour	1.7 ppm (2nd maximum)
			8-hour	1.1 ppm (2nd maximum)
Denver Municipal Animal Shelter (Denver County)	2009 to 2011 (3-year average)	Lead	Quarterly	0.0092 µg/m3 (maximum)

SOURCES: Colorado Department of Public Health and Environment 2010, 2011, 2012; Environmental Protection Agency 2013a
NOTES:
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers
ppm = Parts per million
ppb = Parts per billion
$\mu g/m^3$ = micrograms per cubic meter

Air Quality in Utah

The alternative route study corridors traverse portions of Grand, Carbon, Emery, Sanpete, Juab, Wasatch, Uintah, Duchesne, and Utah counties. All of Grand, Carbon, Emery, Sanpete, Juab, and Wasatch counties are designated attainment/unclassifiable for all NAAQS. Uintah and Duchesne counties are attainment/unclassifiable for all NAAQS except the 2008 8-hour ozone NAAQS. These two counties are seeing a great deal of growth in oil and gas production and have been the locus of several intense field studies to examine patterns and causes of elevated ozone and particulate matter less than 2.5 micrometers diameter ($PM_{2.5}$) concentration in recent years. As result, the EPA has designated these counties as unclassifiable with respect to the 8-hour ozone standards at this time until additional monitoring data can be collected.

Portions of Utah County are designated as maintenance areas for CO and as a nonattainment area for the $PM_{2.5}$ NAAQS. No portion of the alternative route study corridors will traverse either the CO maintenance or $PM_{2.5}$ nonattainment area. However, the entire county is designated nonattainment for the PM_{10} NAAQS and the nonattainment area will be traversed by portions of Alternatives COUT-A, COUT-B, and COUT-C. A conformity analysis is required for this nonattainment area.

There are five federal Class I PSD areas in Utah, all national parks: Arches National Park, Canyonlands National Park, Capitol Reef National Park, Bryce Canyon National Park, and Zion National Park. The closest Class I PSD area to the alternative route study corridors is Arches National Parks, located approximately 8 miles to the south.

Table 3-7 shows recent air quality data from monitoring stations near the alternative routes study corridors. Map 3-2 shows the air quality monitoring locations in Wyoming, Colorado, and Utah that have been used for this study. Map 3-3 shows the locations of the Class I areas that are closest to the alternative route study corridors.

TABLE 3-7
AIR QUALITY DATA FOR UTAH

Site/Location	Year	Pollutant	Averaging Period	Concentration
Dinosaur National Monument (Uintah County)	2010 to 2012 (3-year average)	Ozone	8-hour	0.078 ppm (4th maximum)
Vernal (Uintah County)	2012	Ozone	8-hour	0.064 ppm (4th maximum)
Rabbit Mountain (Uintah County)	2012	Ozone	8-hour	0.072 ppm (4th maximum)
Redwash (Uintah County)	2010 to 2012 (3-year average)	Ozone	8-hour	0.088 ppm (4th maximum)
Ouray (Uintah County)	2010 to 2012 (3-year average)	Ozone	8-hour	0.101 ppm (4th maximum)
Roosevelt (Duchesne County)	2012	Ozone	8-hour	0.067 ppm (4th maximum)
Fruitland (Duchesne County)	2011 to 2012 (2-year average)	Ozone	8-hour	0.068 ppm (4th maximum)
Price (Carbon County)	2011 to 2012 (2-year average)	Ozone	8-hour	0.070 ppm (4th maximum)
Spanish Fork (Utah County)	2010 to 2012 (3-year average)	Ozone	8-hour	0.070 ppm (4th maximum)
North Provo (Utah County)	2010 to 2012 (3-year average)	Ozone	8-hour	0.071 ppm (4th maximum)
Vernal (Uintah County)	2012	Nitrogen dioxide	1-hour	102 ppb (98th percentile)
Rabbit Mountain (Uintah County)	2012	Nitrogen dioxide	1-hour	12 ppb (98th percentile)
Redwash (Uintah County)	2010 to 2012 (3-year average) 2010	Nitrogen dioxide	1-hour	30.3 ppb (98th percentile)
			Annual	3.8 ppb
Ouray (Uintah County)	2010 to 2012 (3-year average)	Nitrogen dioxide	1-hour	29 ppb (98th percentile)
	2011 to 2012 (2-year average)		Annual	3.6 ppb
Roosevelt (Duchesne County)	2012	Nitrogen dioxide	1-hour	36 ppb (98th percentile)
Fruitland (Duchesne County)	2011 to 2012 (2-year average)	Nitrogen dioxide	1-hour	17 ppb (98th percentile)
Price (Carbon County)	2011 to 2012 (2-year average)	Nitrogen dioxide	1-hour	35 ppb (98th percentile)
North Provo (Utah County)	2010 to 2012 (3-year average)	Nitrogen dioxide	1-hour	58 ppb (98th percentile)
	2009 to 2011 (3-year average)		Annual	16.7 ppb
Rabbit Mountain (Uintah County)	2012	PM_{10}	24-hour	145 $\mu g/m^3$ (2nd maximum)

TABLE 3-7
AIR QUALITY DATA FOR UTAH

Site/Location	Year	Pollutant	Averaging Period	Concentration
Roosevelt (Duchesne County)	2012	PM_{10}	24-hour	48 µg/m^3 (2nd maximum)
North Provo (Utah County)	2010 to 2012 (3-year average)	PM_{10}	24-hour	49.5 µg/m^3 (2nd maximum)
Vernal (Uintah County)	2012	$PM_{2.5}$	24-hour	24 µg/m^3 (98th percentile)
			Annual	7 µg/m3
Rabbit Mountain (Uintah County)	2012	$PM_{2.5}$	24-hour	17 µg/m^3 (98th percentile)
			Annual	4.9 µg/m3
Roosevelt (Duchesne County)	2012	$PM_{2.5}$	24-hour	26 µg/m^3 (98th percentile)
			Annual	6.4 µg/m3
Spanish Fork (Utah County)	2010 to 2012 (3-year average)	$PM_{2.5}$	24-hour	28.3 µg/m^3 (98th percentile)
			Annual	7.6 µg/m3
North Provo (Utah County)	2010 to 2012 (3-year average)	$PM_{2.5}$	24-hour	28 µg/m^3 (98th percentile)
			Annual	8.1 µg/m3
Bountiful (Davis County)	2010 to 2012 (3-year average)	Sulfur dioxide	1-hour	10.7 ppb (99th percentile)
Rabbit Mountain (Uintah County)	2012	Carbon monoxide	1-hour	3.8 ppm (2nd maximum)
			8-hour	1.5 ppm (2nd maximum)
North Provo (Utah County)	2010 to 2012 (3-year average)	Carbon monoxide	1-hour	2.8 ppm (2nd maximum)
			8-hour	1.9 ppm (2nd maximum)
Magna (Salt Lake County)	2010 to 2012 (3-year average)	Lead	24-hour Quarterly average not available	0.097 µg/m^3 (2nd maximum)

SOURCES: Enviroinmental Protection Agency 2013a; Utah Division of Air Quality 2011
NOTES:
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers
ppm = Parts per million
ppb = Parts per billion
µg/m3 = micrograms per cubic meter

3.2.1.4 Study Methodology

This section describes the methods used to calculate emissions and to estimate ambient impacts for the transmission line, series compensation stations, and concrete batch plants. The analysis of general conformity also is described. Emissions, impacts, regulatory requirements, and the results of the conformity analysis are presented in Section 3.2.1.5.

Emissions of air pollutants would occur during construction of the transmission line and series compensation stations and, to a lesser extent, during the operations phase of the transmission line and series compensation stations. This section provides the estimated amounts of criteria pollutant emissions that would occur during construction of the Project for each of the alternative routes under consideration. Where feasible, potential GHG emissions have also been quantified and reported in this section. Emissions from construction activities would be confined to daytime hours and would occur only during active construction periods. Additionally, emissions would be transient as construction progresses, so emissions would not occur in one area for a long duration, thereby limiting their impact. Ambient pollutant concentrations resulting from specific construction activities have been quantified and compared with applicable ambient standards.

In general, emissions have not been quantified for the operation of the transmission line(s) and series compensation stations with the exception of GHG emissions from circuit breakers. During the operations phase, emissions would be limited primarily to vehicular use for routine maintenance and emergency repair activities. The sources would be similar to those from construction, but pollutants would be emitted in much smaller amounts on an annual basis; therefore, the majority of emissions and impacts would be associated with construction.

Only the No Action alternative would result in no project-related emissions or impacts. Where emissions and ambient concentrations are below EPA- or state-defined *de minimis* levels, the impacts would be considered low. More substantial emissions and impacts that do not result in potential ambient standard exceedances would be considered moderate. Potential exceedances of ambient standards would represent high impact levels.

The following categories of emission sources have been considered:

- Fugitive dust from earth-moving activities associated with construction or expansion of the transmission line, series compensation stations, and concrete batch plants
- Paved and unpaved road dust associated with construction or expansion of the transmission line, series compensation stations, and concrete batch plants, as well as operation of the concrete batch plants
- Traffic (tailpipe) emissions from onroad vehicles associated with construction or expansion of the transmission line, series compensation stations, and concrete batch plants, as well as operation of the concrete batch plants
- Exhaust emissions from nonroad engines (i.e., construction equipment) associated with construction or expansion of the transmission line, series compensation stations, and concrete batch plants
- Helicopter emissions associated with construction of the transmission line
- Emissions from concrete batching operations
- Emissions of GHGs from circuit breakers at the series compensation stations

Reasonable and feasible selective mitigation measures have been incorporated into the emission estimates. Best available control measures are often defined and, in some jurisdictions, required for use in controlling fugitive dust from construction operations, as well as dust from paved and unpaved roads. The EPA has defined requirements for diesel nonroad engine emissions by model year (Tier standards). The use of Tier 3 engines, where possible, is assumed as the default for quantification of diesel equipment emissions. The onroad emission factors used in this analysis include the effects of vehicle fleet turnover in reducing tailpipe emissions over time.

3.2.1.4.1 Emission Calculation Methods

During construction, sources of PM_{10} and $PM_{2.5}$ would include grading and earthmoving associated with the development of access roads and work pad and series compensation station areas, digging and drilling to prepare for the structure foundations, constructing and operating the concrete batch plants, and vehicular traffic. Particulate matter emissions from traffic include both tailpipe emissions from fuel burning and fugitive dust from traffic on paved and unpaved roads.

Onroad vehicles and nonroad engines (i.e., construction equipment) would release nitrogen oxides (NO_x); CO; SO_2; PM_{10}, $PM_{2.5}$, volatile organic compounds (VOC); and GHGs, including CO_2, methane (CH_4), and NO_2. Fuel combustion in helicopters would release the same pollutants.

The primary emission sources associated with the operations phase of the transmission line would include windblown dust from ground disturbance, road dust, and vehicle emissions during periodic maintenance or emergency repair activities. Additionally, the circuit breakers at each of the series compensation stations would be filled with sulfur hexafluoride (SF_6), a GHG. There would be a small amount of ongoing leakage of SF_6 over time, resulting in emissions of this pollutant.

Because operational emissions and impacts would be much lower than the construction phase emissions and impacts, operational emissions have not been quantified with the exception of SF_6 from the circuit breakers.

Fugitive Dust from Transmission Line and Series Compensation Station Construction

Fugitive dust was estimated from construction of the transmission lines and series compensation stations. Fugitive dust emissions for construction of 5 to 6 mobile concrete batch plants, located at intervals along the transmission line right-of-way, are included in the transmission line construction emissions as part of the multi-purpose construction yards.

Uncontrolled fugitive dust emission factors of 0.42 ton PM_{10} per acre per month and 0.042 ton $PM_{2.5}$ per acre per month were used for access road construction, while uncontrolled fugitive dust emission factors of 0.11 ton PM_{10} per acre per month and 0.011 ton $PM_{2.5}$ per acre per month were used for other construction activities, including construction of the series compensation stations (Countess Environmental 2006; EPA 2001; Midwest Research Institute 2005). For the transmission line, the earthmoving and grading activities were assumed to be half for access roads and half for other activities, and average emission factors of 0.27 ton PM_{10} per acre per month and 0.027 ton $PM_{2.5}$ per acre per month were used (Countess Environmental 2006).

A control efficiency of 61 percent was assumed for watering, as needed, and application of dust suppressant, if warranted, was applied to uncontrolled emissions based on work sponsored by the Western Regional Air Partnership (Countess Environmental 2006).

Dust from paved and unpaved roads was estimated using vehicle counts and distances travelled that were supplied by project engineers for each transmission line section and series compensation station. For the transmission line construction, roads were assumed to be 60 percent unpaved and 40 percent paved. For series compensation station construction, roads were assumed to be 15 percent unpaved and 85 percent paved. Total vehicle miles travelled were calculated from vehicle counts and travel distances.

Emissions were calculated using spreadsheet models developed by Western Regional Air Partnership (2007) and adjusted to reflect updated EPA emission factor equations (EPA 2005a). In addition to speed control, selective mitigation measures would include dust suppressant application on unpaved roads, if warranted (i.e., when dust generation is observed despite imposition of other selective mitigation measures); frequent watering of unpaved roads (twice daily assumed); and prompt removal of dirt tracked onto paved roads.

Both earthmoving/grading fugitive dust and dust from paved and unpaved roads for transmission line and series compensation station construction were apportioned over the project duration based on relative month-by-month schedules for each activity supplied by project engineers. Emissions from construction-related fugitive dust were assumed to occur based on the expected timing of road or pad construction and foundation installation. Emissions from paved and unpaved roads were assumed to occur based on the fraction of total activities occurring in each month, since all activities have associated vehicle traffic, not just road/pad and foundation activities. The monthly emissions thus obtained were summed to provide total emissions during each year of project activity.

For transmission line construction, detailed schedules, numbers of vehicles, and miles traveled were supplied for the shortest transmission line alternative route. Final calculated fugitive dust emissions were scaled up for the other alternative routes based on the relative lengths of the alternative routes.

Construction Equipment Emissions

Nonroad engine exhaust emissions for the Project were estimated on a monthly basis, using the equipment information and schedules provided for each transmission line section and for the series compensation stations. Nonroad engine emission factors were selected based on the type and size of engine. Emission factors for criteria pollutant emissions from diesel engines were taken from federal emission standards applicable to nonroad engines (EPA 2010a) with the exception of SO_2 emission factors.

The SO_2 emission factor for diesel engines was estimated based on an equation given in EPA document NR-009A (*Exhaust Emission Factors for Nonroad Engine Modeling – Compression-Ignition*) (EPA 1998a) and the federal diesel fuel sulfur content limitation of 15 ppm. Emission factors for gasoline engines were taken from EPA document 420R-05-019 (*Exhaust Emission Factors for Nonroad Engine Modeling – Spark-Ignition*) (EPA 2005b). The SO_2 emission factor for gasoline engines was estimated based on an equation presented in EPA document NR 0010b (*Exhaust Emission Factors for Nonroad Engine Modeling – Spark Ignition*) (EPA 1999).

Assumptions made in emission factor selection and emission calculations include:

- PM emission factors were used to conservatively estimate emissions for PM_{10} and $PM_{2.5}$.
- Where available, nonmethane hydrocarbon emission factors were used to estimate VOC emissions. Where only hydrocarbon emission factors were available, these emissions were conservatively used to estimate VOC emissions.
- For diesel engines, Tier 3 was assumed.

Helicopter emissions were estimated based on hours of operation and fuel usage. An AgustaWestland AW139 (or equivalent) heavy lift helicopter was assumed for calculating steel erection emissions. An AS 350B (or equivalent) helicopter was assumed for calculating wire installation emissions. Emission information for helicopters was obtained from the Swiss Federal Office of Civil Aviation's document *Guidance on the Determination of Helicopter Emissions, Edition 1, March 2009* (Federal Office of Civil Aviation 2009).

CO_2 emission factors for gas engines were estimated based on an equation given in the EPA document *Exhaust Emission Factors for Nonroad Engine Modeling – Spark-Ignition* (EPA 2005b). 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). CH_4 and NO_2 emission factors for gas and diesel engines, and CO_2, CH_4, and NO_2 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.

Emissions for the transmission line and series compensation stations were apportioned over the project schedule. Month-by-month schedules for each activity were used to apportion the equipment emissions associated with that activity over time.

As with fugitive dust emissions, detailed equipment schedules, numbers of pieces of equipment, and hours per day of operation were supplied for the shortest transmission line alternative route. Final

calculated nonroad engine emissions were scaled up for the other alternative routes based on the relative lengths of the alternative routes.

Traffic Emissions

A number of support vehicles would be used during project construction, including a fleet of pickup trucks, flatbed trucks, and other vehicles such as concrete and water trucks. As each of these vehicles would emit regulated pollutants, the emissions of these pollutants were calculated using emission factors estimated by the EPA's Motor Vehicle Emission Simulator (MOVES2010b) model (EPA 2012a).

Traffic emissions from transmission line construction and series compensation station construction were calculated using vehicle types, vehicle numbers, and miles travelled as estimated for paved and unpaved road emissions, combined with emission factors from MOVES. These emission factors were applied to the various vehicle classes based on size and fuel used.

As with fugitive dust, emissions for the transmission line and the series compensation stations were apportioned over the project schedule. The relative fractions of total project activities occurring in each month were used to apportion emissions, rather than just road/pad and foundation activities, since vehicle traffic is associated with all activities involved in transmission line and series compensation station construction.

For transmission line construction, detailed schedules, numbers of vehicles, and miles traveled were supplied for the shortest transmission line alternative route. Final calculated traffic emissions were scaled up for the other alternative routes based on the relative lengths of the alternative routes.

Concrete Batch Plant Operation Emissions

Concrete batch plants would be operated to supply concrete for the project approximately every 60 miles along the right-of-way. It is expected that 3 to 4 of the batch plants will be existing concrete suppliers in communities within about 30 miles of the pour sites, while an additional 5 to 6 mobile batch plants will be needed at strategic locations along the route. Emissions generated in the construction of the mobile batch plants are included in the transmission line construction totals.

Operation emissions were based on emission factors in Section 11.12-1 of EPA's *Compilation of Air Pollutant Emission Factors* (AP-42) (EPA 2005a) for concrete batching operation. Emissions were based on the amount of concrete needed for the transmission line and series compensation station construction. The concrete was assumed to be truck-mixed. Emissions resulting from traffic involved in bringing raw materials to each batch plant were based on the estimated raw material loads needed to meet the concrete requirements.

Paved road emissions were estimated for batch plant operation based on the expected number of loads of raw materials delivered to the plants (paved and unpaved road emissions for delivery of concrete to the transmission line and series compensation station work sites was included in the construction emissions calculated for those activities). The number of raw material loads needed is a function of the expected cubic yards of concrete required for transmission line and series compensation station construction. Emissions resulting from traffic involved in bringing raw materials to each batch plant were based on the estimated raw material loads needed to meet the concrete requirements and emission factors from MOVES2010b (EPA 2012a). Trucks transporting raw materials to each concrete batch plant were assumed to have an average weight of 20 tons and to travel 100 miles round trip. Batch plant traffic emissions were not apportioned to months.

Series Compensation Station Emissions

The series compensation stations will include circuit breakers containing SF_6, a highly effective dielectric used for interrupting arcs. A potent GHG, SF_6 emissions from the series compensation stations would occur as a result of circuit breaker equipment leaks. A leak rate lower than 0.1 percent is obtainable for circuit breakers, even after many years of service (McDonald 2007). SF_6 emissions for each series compensation station have been calculated based on the total SF_6 content of the breakers and application of a 0.1 percent leak rate. CO_2e emissions have been calculated using the SF_6 global warming potential from 40 CFR 98, Table A-1.

3.2.1.4.2 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.

EPA's screening-level dispersion model, AERSCREEN, was used for the analysis. AERSCREEN is a screening version of the EPA's recommended model for near field dispersion analyses, AERMOD. AERSCREEN was used to simulate emissions and transport from transmission line and series compensation station construction for those pollutants for which state or federal ambient standards have been defined. Construction of mobile concrete batch plants was not modeled because the activities are similar to those employed in series compensation station construction (grading, structure erection, etc.), but with much smaller emissions. Similarly, operation emissions from the batch plants were not modeled because they would be negligible.

For the transmission line segments, maximum PM_{10}, $PM_{2.5}$, and NO_x emissions would occur during access road construction. Maximum CO emissions from construction equipment would occur during tree-clearing activities, while maximum SO_2 emissions would occur during steel assembly. For construction equipment, the emissions modeled represented the combined emissions of all construction equipment associated with the worst-case activities (e.g., access road construction, tree-clearing, steel erection) even though all equipment would not necessarily be active in the same area at the same time. 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 can only 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 work 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 (CDPHE), Air Pollution Control Division for fugitive sources with substantial turbulence (e.g., equipment activity) (CDPHE 2005). Although CDPHE 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.

AERSCREEN requires information about the surface characteristics that may influence dispersion, including representative albedo, Bowen ratio, and surface roughness length. Maximum and minimum expected temperatures also are entered. Annual average albedo, Bowen ratio, and surface roughness for

grasslands were calculated from seasonal values given in the AERMET User's Guide, Tables 4-1, 4-2a, and 4-3 (EPA 2004). Average maximum and minimum temperature data from the monitoring stations along the alternative routes were used in the modeling. Emissions from the Applicant's preferred alternative were modeled. Because the daily or hourly emissions from a single work site were modeled, impacts would apply equally to any location along the transmission line corridor and to any alternative route.

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. GHG emissions also were not modeled because there are no ambient standards for GHGs, and they contribute to climate change on a global, rather than local or regional, scale.

For series compensation station construction, maximum PM_{10}, $PM_{2.5}$, SO_2, and NO_x emissions would occur during site development. Maximum emissions of CO would occur during foundation work. As with the transmission line, these activities were simulated as area sources representing a work site. For construction equipment, the emissions modeled represented the combined emissions of all construction equipment associated with the worst-case activities (e.g., site development, foundation work) even though all equipment would not necessarily be active at the same time.

AERSCREEN calculates conservative impacts that are likely to overestimate actual impacts for several reasons. As noted above, 1-hour impacts are applied to all averaging periods. In reality, wind direction varies with time so that over longer averaging periods, the emissions plume becomes more diffuse with lower impacts at any given location. Additionally, AERSCREEN calculates maximum impacts based on worst-case meteorological conditions. The conditions simulated include those characteristic of both daytime and nighttime, even though construction operations will only occur during the day. Nighttime conditions often lead to the highest impacts because the atmosphere is often more stable at night; thus the emissions plume does not disperse as readily as during the day. Finally, many of the ambient standards that the impact analysis results are compared to have complicated forms that involve averaging submaximum concentrations over several years. For example, the 1-hour NO_2 standard is based on a 3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour concentrations. AERSCREEN only calculates maximum, rather than submaximum, concentrations and worst-case impacts would occur in a given location in only 1 year as construction moves along the transmission line corridor.

Regulatory Requirements

Federal, state, and local air quality requirements regulate emissions of a large number of pollutants from various sources. Many of the regulations are aimed at stationary sources, which would include the concrete batch plants and series compensation stations, but not construction emissions. Emissions of regulated pollutants from construction operations are primarily focused on control of fugitive dust, as outlined below. Tailpipe emissions from onroad traffic and from the nonroad engines used in construction equipment (such as cranes, bulldozers, etc.) are regulated at the federal level, through specified performance requirements for various types of engines. The burden of meeting the performance requirements is placed on manufacturers of such equipment.

GHGs also are regulated pollutants at the federal level. Federal requirements impose reporting obligations on owners of certain types of sources. Additionally, the EPA requires GHG emission inventories and control technology analyses for new or modified large sources of pollutants. None of the activities involved in the proposed project is expected to be subject to federal GHG requirements.

The regulatory requirements that would apply to activities associated with construction and operation of the transmission line, series compensation stations, and concrete batch plants are outlined below.

Transmission Line, Series Compensation Station, and Concrete Batch Plant Construction

- WAQSR Chapter 6, Permitting Requirements, requires a permit or waiver for the concrete batch plants. All permitted sources in Wyoming are required to employ Best Available Control Technology. Notifications, recordkeeping, reports, and performance tests may be required.
- WAQSR Chapter 3, General Emissions Standards, specifies appropriate fugitive dust control measures for construction activities and the handling and transport of materials.
- Open burning of vegetative material is regulated under WAQSR Chapter 10, Smoke Management. If any waste from tree clearing will be burned in Wyoming, the requirements of this chapter must be complied with, including notification, monitoring, reporting, emission control, and registration, if applicable.
- WAQSR Chapter 13, Mobile Sources, prohibits tampering with or removing any emission control device on a motor vehicle.
- Colorado Regulation 1 (5 CCR 1001-3), Section II.C and Regulation 9 (5 CCR 1001-11), covers open burning requirements. If any waste from tree clearing will be burned in Colorado, an open burning permit must be obtained and a burn plan may be required.
- Colorado Regulation 1 (5 CCR 1001-3), Section II.D, contains requirements for fugitive dust control. Requirements may apply to paved and unpaved roads, clearing or leveling of land in excess of 5 acres, haul roads and trucks, and blasting activities. A fugitive dust control plan will be required and will specify mitigation measures to be employed. Limitations that apply to various activities include no nuisance dust, no off-property transport, and no more than 20 percent opacity.
- Colorado Regulation 3 (5 CCR 1001-5), Parts A and B, govern emissions reporting and preconstruction permitting for minor sources. An Air Pollutant Emission Notice and preconstruction permit is required for land development activities exceeding 25 contiguous acres or exceeding 6 months duration. The permit will specify fugitive dust control measures to be employed. An Air Pollutant Emission Notice and preconstruction permit also may be required for the concrete batch plants.
- UAC R307-201-3 regulates visible emissions for sources outside of PM_{10} nonattainment or maintenance areas and would apply to all portions of Utah traversed by the alternative routes except Utah County. Opacity is limited to no more than 20 or 40 percent, depending on the source and situation. The requirements apply to both stationary sources and gasoline and diesel mobile sources.
- UAC R307-201-4 prohibits tampering with or removing any emission control device on a motor vehicle and requires proper maintenance and use of such devices.
- UAC R307-204 governs open burning outside of incorporated communities. If any waste from tree clearing will be burned in Utah, the requirements of this regulation must be complied with and a burn plan may be required.
- UAC R307-205 establishes minimum work practices and emission standards for sources of fugitive dust outside of PM_{10} nonattainment or maintenance areas and would apply to all portions of Utah traversed by the alternative routes except Utah County. The regulation limits opacity and requires control of dust from storage and handling of materials, clearing or leveling of land greater than 0.25 acre, and movement of trucks or construction equipment over cleared land greater than 0.25 acre or over access haul roads. Traffic count data may be required for roads and public or private paved roads must be cleaned promptly when materials are deposited.
- UAC R307-305 establishes reasonably available control technology requirements for PM_{10} nonattainment or maintenance areas and would apply in Utah County.

- UAC R307-309 establishes minimum work practices and emission standards for sources of fugitive dust in PM_{10} and $PM_{2.5}$ nonattainment or maintenance areas and would apply in Utah County. Opacity is limited to 10 to 20 percent, depending on the source and location. A fugitive dust control plan is required for storage, hauling, and handling operations; clearing or leveling 0.25 acre or more of land; earthmoving; excavation; and moving trucks or construction equipment over cleared land in excess of 0.25 acre or over access haul roads. Dust from paved and unpaved roads also is regulated.
- UAC R307-401 establishes permitting requirements for new and modified sources. A notice of intent and approval order will likely will be required for construction and relocation of the concrete batch plants.
- UAC R307-403 and R307-421 may require that any concrete batch plants located in Utah County obtain offsets.

Concrete Batch Plant Operation

The mobile concrete batch plants would be considered stationary or portable stationary sources in most air-quality jurisdictions. It is assumed the batch plants would not include any fuel-burning equipment or stationary internal combustion engines, such as generators. If fuel-burning or internal combustion engines are needed, additional requirements may apply. The following requirements are potentially applicable:

- WAQSR Chapter 6, Permitting Requirements, will require a state operating permit if a preconstruction permit is issued for the concrete batch plants. All permitted sources in Wyoming are required to employ Best Available Control Technology. Notifications, recordkeeping, reports, and performance tests may be required.
- WAQSR Chapter 3, General Emissions Standards, specifies appropriate fugitive dust control measures for the handling and transport of materials.
- Colorado Regulation 1 (5 CCR 1001-3), Section II.A, limits opacity from stationary sources to 20 to 30 percent.
- Colorado Regulation 1 (5 CCR 1001-3), Section III.C and Regulation 6 (5 CCR 1001-8), Part B, Section III.C, limits particulate matter from manufacturing processes and may apply to the concrete batch plants.
- Colorado Regulation 1 (5 CCR 1001-3), Section II.D, contains requirements for fugitive dust control. Requirements may apply to access roads and haul truck traffic associated with batch plant operation. A fugitive dust control plan will be required and will specify mitigation measures to be employed. Limitations that apply to various activities include no nuisance dust, no off-property transport, and no more than 20 percent opacity.
- Colorado Regulation 3 (5 CCR 1001-5), Part A, requires a relocation notice for portable sources.
- UAC R307-201-3 regulates visible emissions for sources outside of PM_{10} nonattainment or maintenance areas and would apply to all portions of Utah traversed by the alternative routes except Utah County. Opacity is limited to no more than 20 or 40 percent, depending on the source and situation.
- UAC R307-205 establishes minimum work practices and emission standards for sources of fugitive dust outside of PM_{10} nonattainment or maintenance areas and would apply to all portions of Utah traversed by the alternative routes except Utah County. The regulation limits opacity and requires control of dust from storage and handling of materials and movement of trucks over access haul roads. Traffic count data may be required for roads and public or private paved roads must be cleaned promptly when materials are deposited.

- UAC R307-305 establishes reasonably available control technology requirements for PM_{10} nonattainment or maintenance areas and would apply in Utah County.
- UAC R307-309 establishes minimum work practices and emission standards for sources of fugitive dust in PM_{10} and $PM_{2.5}$ nonattainment or maintenance areas and would apply in Utah County. Opacity is limited to 10 to 20 percent, depending on the source and location. A fugitive dust control plan is required for storage, hauling, and handling operations and moving trucks over access haul roads. Dust from paved and unpaved roads also is regulated.

Series Compensation Station Operation

The series compensation stations would be considered stationary sources in most air-quality jurisdictions; however, provided the substations have no fuel-burning equipment or stationary internal combustion engines, there would be few, if any, regulated emissions.

Mitigation Planning

Selective mitigation measures would be used to limit particulate-matter emissions during both the construction and operational phases of the project. As noted in the previous section, dust-control plans would be required in specific jurisdictions. Such permits or plans would detail specific mitigation measures to be applied and would be adhered to. Even where plans or permits are not required, the project would still be subject to fugitive dust control measures mandated by the applicable regulations. Following construction, disturbed areas would be reclaimed with native vegetation or seed mix prescribed by the land-management agency, which would limit ongoing fugitive-dust emissions.

The following dust control measures have been specifically applied to the Project emission estimates:

- Watering at least twice daily in all disturbed areas undergoing active construction or disturbance.
- Watering all unpaved roads at least twice daily in areas of active use.
- Application of dust suppressants, if warranted, to unpaved roads and other disturbed areas (i.e., when generation of dust is observed despite application of other control measures, such as speed control and watering).
- Limitation of speeds on unpaved roads to 20 mph.
- Sweeping up tracked-out dirt where unpaved roads or disturbed areas meet paved roads every 14 days, using PM_{10} efficient street sweepers, in areas of active construction or use.

Additional selective mitigation measures may be applied in accordance with dust control plans or permits issued or approved by the various air quality control jurisdictions.

With respect to other sources and pollutants, nonroad engine emissions would be limited by using diesel equipment with Tier 3 engines. Traffic emissions explicitly incorporate the effects of ongoing federal emissions reduction requirements. Where stationary source permits or notifications are required, the project would comply with all limitations or requirements imposed by the permitting authority. Leak detection monitoring that will alert when a circuit breaker loses 10 percent of its SF_6 is proposed to mitigate GHG emissions from the series compensation stations.

General Conformity

In 1993 the EPA promulgated a rule requiring federal actions to conform to SIPs, codified at 40 CFR 93. Conformity means that a federal action will not interfere with strategies to attain the NAAQS. The Utah

SIP, Section XXII, and UAC R307-115 address general conformity by incorporating the federal rule by reference.

Federal actions responsible for air-pollutant emissions in a nonattainment or maintenance area must undergo a conformity applicability analysis to determine whether a conformity determination is necessary. The only nonattainment or maintenance areas that would be traversed by any of the alternative routes are those in Utah County, Utah, which is a PM_{10} nonattainment area. Portions of Alternatives COUT-A, COUT-B, and COUT-C will cross the nonattainment area. Neither of the series compensation stations would be located in this nonattainment area; however, it is possible that one or more of the concrete batch plants would be located in this nonattainment area. A conformity analysis is required for this area.

To perform a conformity analysis, the total of project-related direct and indirect emissions (such as emissions from associated traffic) is tested against *de minimis* emission levels. The total of direct and indirect emissions should include regulated precursor substances. The definition of precursors to PM_{10} contained in 40 CFR 93 refers to "those pollutants described in the PM_{10} nonattainment area applicable SIP as significant contributors to the PM_{10} levels." The applicable SIP (Utah Division of Air Quality 2002) and Maintenance Plan (Utah Division of Air Quality 2005) for Utah County contain analyses and emission limits for NO_x and SO_2 in addition to directly emitted PM_{10}; therefore, these pollutants were incorporated in the conformity analysis. Conformity determinations are required for any federal action where the total of direct and indirect emissions exceeds the annual *de minimis* thresholds.

To calculate emissions for the conformity analysis, pollutant emissions for construction of the transmission line alternative routes that would traverse the nonattainment area were converted to 1 ton per mile of transmission line basis and then multiplied by the number of miles that cross the nonattainment area. The distance in the nonattainment area ranges from 29.5 miles to 49.5 miles. The maximum 12-month emissions at any point during the project schedule were used in these calculations to provide a conservative estimate of total emissions.

Emissions from the construction of batch plants were not included. Concrete batch plants will be located approximately every 60 miles along the transmission line and existing batch plants will be used when available. Therefore, since the maximum distance through the nonattainment area was less than 60 miles, it was assumed that no mobile concrete batch plans would be necessary in Utah County.

3.2.1.5 Results

This section discusses the results of the emissions estimation and impact analyses performed for the proposed Project.

3.2.1.5.1 No Action Alternative

Under this alternative, the environment would remain as it presently exists. The No Action alternative would mean that air-pollutant emissions from construction equipment, Project-related traffic, earthmoving activities, construction and operation of several concrete batch plants, and leakage of GHGs from series compensation station circuit breakers would not occur.

3.2.1.5.2 Impacts Common to All Action Alternatives

This section addresses criteria pollutant and GHG emissions associated with construction of two series compensation stations, criteria and GHG emissions from operation of the concrete batch plants, GHG emissions from circuit breakers at the series compensation stations, emissions from the geotechnical investigation, and the results of the general conformity analysis.

Series Compensation Station Emissions and Impacts

Criteria pollutant and GHG emissions associated with construction of the two series compensation stations are summarized in Table 3-8 and detailed in Appendix H. GHGs expressed as CO_2e from series compensation station construction include CO_2, CH_4, and NO_2.

TABLE 3-8
EMISSIONS FOR SERIES COMPENSATION STATION CONSTRUCTION

Pollutant	Series Compensation Station 1 (tons)	Series Compensation Station 2 (tons)	Both Series Compensation Stations (tons)
Carbon monoxide	22.2	22.2	44.5
Nitrogen oxides	16.9	16.9	33.7
PM_{10}	16.3	16.3	32.5
$PM_{2.5}$	2.7	2.7	5.4
Sulfur dioxide	0.03	0.03	0.06
Volatile organic compounds	1.8	1.8	3.7
Carbon dioxide equivalent	3,128.8	3,128.8	6,257.6

NOTES:
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers

Construction of the series compensation stations would result in the dispersion of emissions of criteria pollutants generated from construction equipment, vehicles, and fugitive dust. Overall, impacts on air quality from Project construction would be temporary, localized to the vicinity of the activity (maximum impacts would occur within a few hundred feet), and would disperse quickly or settle. Most of the predicted ambient concentrations from construction would be within all standard limitations. However, 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 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 NO_2 resulting from Project construction would not be anticipated. In addition, the 1-hour NO_2 NAAQS is based on a 3-year average of submaximum concentrations, while the model only predicts maximum concentrations over a 1-hour time period. An exceedance of the standard is unlikely because maximum emissions from construction of the series compensation stations is expected to occur over only a 40-day period for each station.

As discussed in Section 3.2.1.4.1, the series compensation stations will include circuit breakers containing SF_6, a highly effective dielectric used for interrupting arcs. SF_6 emissions from the series compensation stations would occur as a result of circuit breaker equipment leaks. These emissions are summarized in Table 3-9.

TABLE 3-9
SULFUR HEXAFLUORIDE (SF_6) EMISSIONS FOR SERIES COMPENSATION STATION OPERATION

Location	Number of Circuit Breakers	SF_6 Emissions (tons per year)	Carbon Dioxide Equivalent Emissions (tons per year)
Series Compensation Station 1	2	1.04E-03	23.64
Series Compensation Station 1	2	1.04E-03	23.64
Both Series Compensation Stations	4	2.07E-03	47.29

Concrete Batch Plant Operation Emissions

Table 3-10 shows the estimated emissions from operation of the concrete batch plants needed for the transmission line foundations (construction emissions associated with the mobile batch plants are included in transmission line emissions detailed in Section 3.2.1.5.4). Emissions include particulate matter emissions from the batching operation itself, dust from paved roads used to bring raw materials to the batch plant, tailpipe emissions from raw material deliveries, and emissions from diesel generators used to provide power to the mobile batch plants. GHGs expressed as CO_2e include CO_2, CH_4, and NO_2.

There would be slight variations in the amount of concrete needed between alternative routes. Therefore, emissions between the various alternative routes would vary as shown by the ranges of emissions listed in Table 3-10. Estimated emissions associated with the concrete needed for foundations for the two series compensations stations also are shown in Table 3-10.

TABLE 3-10
EMISSIONS FROM CONCRETE BATCH PLANT OPERATION

Pollutant	Batching Operations (tons)	Paved Roads (tons)	Onroad Traffic (tons)	Diesel Generators (tons)	Total (tons)	Tons per Mile of Transmission Line
Transmission Line[1]						
Carbon monoxide	–	–	0.64 to 0.85	68.23 to 91.22	68.86 to 92.07	0.170
Nitrogen Oxides	–	–	1.58 to 2.11	118.08 to 157.88	119.66 to 159.99	0.295
PM_{10}	0.79 to 1.06	1.03 to 1.37	0.11 to 0.14	3.94 to 5.26	5.86 to 7.84	0.014
$PM_{2.5}$	0.79 to 1.06	0.25 to 0.34	0.08 to 0.11	3.94 to 5.26	5.06 to 6.76	0.012
Sulfur dioxide	–	–	0.004 to 0.005	0.13 to 0.17	0.13 to 0.18	0.0003
Volatile organic compounds	–	–	0.17 to 0.22	7.87 to 10.53	8.04 to 10.75	0.020
Carbon dioxide equivalent	–	–	572 to 765	14,036 to 18,766	14,608 to 19,531	36.069
Series Compensation Stations[2]						
Carbon monoxide	–	–	0.10	–	0.10	–
Nitrogen Oxides	–	–	0.25	–	0.25	–
PM_{10}	0.13	0.16	0.02	–	0.31	–
$PM_{2.5}$	0.13	0.04	0.01	–	0.18	–
Sulfur dioxide	–	–	0.0007	–	0.0007	–
Volatile organic compounds	–	–	0.03	–	0.03	–
Carbon dioxide equivalent	–	–	91.12	–	91.12	–

NOTES:
[1]Range shown represents variation between alternative routes based on different transmission line lengths.
[2]Emissions shown are for both series compensation stations.
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers

500-kilovolt Transmission Line Component Impacts

Emissions from the construction of the 500-kilovolt transmission line components are discussed in Section 3.2.1.5.4. Although the emissions vary with each alternative, results of dispersion modeling are the same for all alternatives because they focus on local impacts from a single day of construction activities.

Air-pollutant Dispersion Modeling

The results of the air-pollutant dispersion modeling conducted for construction of the alternative routes are shown in Appendix H. As with the series compensation stations, construction of the transmission line would result in the dispersion of emissions of criteria pollutants generated from construction equipment, vehicles, and fugitive dust. Overall, impacts on air quality from Project construction would be temporary, localized to the vicinity of the activity (maximum impacts would occur within a few hundred feet) and would disperse quickly or settle. Most of the predicted ambient concentrations from construction would be within all standard limitations. However, 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 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 NO_2 resulting from Project construction would not be anticipated. In addition, the 1-hour NO_2 NAAQS is based on a 3-year average of submaximum concentrations, while the model only predicts maximum concentrations over a 1-hour time period. An exceedance of the standard is unlikely because Project construction will not occur in the same place over multiple years.

Geotechnical Investigation

A geotechnical investigation is planned to collect information regarding subsurface stability, which will be used in the final design of each transmission tower structure and foundation. The geotechnical investigation will consist of drilling and sampling soils to a typical depth of 50 to 60 feet below the existing ground surface. The boreholes would have a diameter of approximately 8 inches and would typically be backfilled with auger cuttings and on-site soils. Access roads and overland access routes as designed for the final right-of-way will be used. In some cases, helicopter-transported drill rigs may be used for geotechnical exploration in areas where existing roads do not provide adequate access or where overland travel is prohibited.

The geotechnical investigation will be completed before construction commences on either the transmission line or either of the series compensation stations; therefore, emissions from the geotechnical investigation will not overlap in time or space with emissions from other Project construction activities.

Geotechnical investigations will be conducted at the series compensation locations and along the transmission line right-of-way. The series compensation station geotechnical exploration program will consist of drilling approximately 12 borings at each series compensation station location. The series compensation station borings will be drilled using a truck-mounted drill rig.

The drilling exploration for the transmission line will consist of approximately 270 boring locations based on a maximum spacing of no more than 3 miles. Approximately 1.5 holes per day will be drilled, which will require a minimum of approximately 200 days for drilling based on a 5-day work week. Geotechnical drilling will be accomplished using a variety of drilling methods that are dependent on access and the type of soil and rock anticipated in the completion depth of the boring. At least two drill rigs will be employed. Drill sites with no available access will use aerial mobilization and demobilization of drilling equipment to the drill site locations.

Emissions from the geotechnical investigation will include fugitive dust from ground-disturbance activities, tailpipe emissions from traffic, helicopter emissions, and emissions from nonroad engines associated with drill rigs and other equipment. Emissions from the geotechnical investigation have not been quantified but would be qualitatively similar to those expected from transmission line and series compensation station construction but at a reduced level.

General Conformity

The total of direct and indirect emissions calculated for construction of the transmission line alternative routes that cross the Utah County, Utah PM_{10} nonattainment area was compared with conformity determination thresholds (*de minimis* levels) to determine whether additional analysis was required. The estimated emissions in each area are shown in Table 3-11. Because less than 50 miles of transmission line would cross the nonattainment area for any of the alternative routes, it was assumed that all PM_{10} emissions in the nonattainment area would occur within a 12-month period. Estimated emission totals for each of the three alternative routes that cross the Utah County nonattainment area are above the *de minimis* levels (100 tons per year of the pollutant for which the area is nonattainment or maintenance) due primarily to unpaved road emissions. If any of these alternative routes is chosen, a conformity determination will be required.

TABLE 3-11
GENERAL CONFORMITY ANALYSIS

Alternative route	Maximum Miles in Nonattainment Area	Total of Direct and Indirect PM_{10} Emissions (tons)	Conformity *de minimis* Levels (tons per year)
Conventional Steel Erection Option			
COUT-A	29.7	1,207	100
COUT-B	47.2	1,918	100
COUT-C	49.2	2,003	100
Steel Erection Using Helicopters Option			
COUT-A	29.7	1,185	100
COUT-B	47.2	1,882	100
COUT-C (Agency and Applicant Preferred Alternative)	49.2	1,965	100

NOTE: Emissions would occur from construction activities including either steel erection using helicopters or conventional steel erection, not both. Emissions above include all activities, not just steel erection.

3.2.1.5.3 345-kilovolt Ancillary Transmission Components

Separate impacts have not been analyzed for the 345kV ancillary transmission components. Instead, climate and air quality impacts for these components are included in Sections 3.2.1.5.2 and 3.2.1.5.4.

3.2.1.5.4 500-kilovolt Transmission Line Components

Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO)

Alternative WYCO-B (Agency and Applicant Preferred Alternative)

Affected Environment

The climate and existing air quality in the vicinity of Alternative WYCO-B are discussed in Sections 3.2.1.3.1 and 3.2.1.3.3. Alternative WYCO-B will not traverse any nonattainment or maintenance areas. The closest area afforded Class I air-quality protection in Wyoming is the Savage Run Wilderness Area, located approximately 41 miles from the transmission line right-of-way. In Colorado, Dinosaur National

Monument is the nearest protected Class II area to Alternative WYCO-B, which do not cross the access road (Deerlodge Road) for the national monument.

Environmental Consequences

Criteria pollutant and GHG emissions associated with construction of Alternative WYCO-B are summarized in Table 3-12 and detailed in Appendix H. GHGs expressed as CO_2e from transmission line construction include CO_2, CH_4, and NO_2.

TABLE 3-12
EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION
FOR ALTERNATIVE WYCO-B (AGENCY AND APPLICANT PREFERRED ALTERNATIVE)

Pollutant	Year 1 (tons)	Year 2 (tons)	Year 3 (tons)	Total (tons)	Tons Per Mile of Transmission Line
Conventional Steel Erection Option					
Carbon monoxide	29.9	62.7	7.7	100.3	0.49
Nitrogen oxides	30.2	64.2	8.0	102.4	0.50
PM_{10}	2,574.1	4,731.5	965.8	8,271.4	40.45
$PM_{2.5}$	260.7	479.5	97.6	837.8	4.10
Sulfur dioxide	0.2	0.7	0.1	1.0	0.01
Volatile organic compounds	2.9	7.2	1.0	11.1	0.05
Carbon dioxide equivalent	7,041.0	15,124.4	2,001.3	24,166.8	118.17
Steel Erection Using Helicopters Option[1]					
Carbon monoxide	29.9	51.6	6.2	87.7	0.43
Nitrogen oxides	31.0	53.2	6.5	90.7	0.44
PM_{10}	2,652.1	4,565.1	896.1	8,113.3	39.67
$PM_{2.5}$	268.5	462.2	90.5	821.2	4.02
Sulfur dioxide	0.4	0.7	0.1	1.2	0.01
Volatile organic compounds	3.7	6.4	0.9	11.0	0.05
Carbon dioxide equivalent	7,540.0	12,922.9	1,692.3	22,155.2	108.34

NOTES:
Emissions would occur from construction activities including either steel erection using helicopters or conventional steel erection, not both. Emissions above include all activities, not just steel erection.
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers

Alternative WYCO-C

Affected Environment

The climate and existing air quality in the vicinity of Alternative WYCO-C are discussed in Sections 3.2.1.3.1 and 3.2.1.3.3. Alternative WYCO-C will not traverse any nonattainment or maintenance areas. The closest area afforded Class I air quality protection in Wyoming is the Savage Run Wilderness Area, located approximately 41 miles from the transmission line right-of-way. In Colorado, Dinosaur National Monument is the nearest protected Class II area to Alternative WYCO-C, do not cross the access road (Deerlodge Road) for the national monument.

Environmental Consequences

Criteria pollutant and GHG emissions associated with construction of Alternative WYCO-C are summarized in Table 3-13 and detailed in Appendix H. GHGs expressed as CO_2e from transmission line construction include CO_2, CH_4, and NO_2.

TABLE 3-13 EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE WYCO-C					
Pollutant	**Year 1 (tons)**	**Year 2 (tons)**	**Year 3 (tons)**	**Total (tons)**	**Tons Per Mile of Transmission Line**
Conventional Steel Erection Option					
Carbon monoxide	30.8	64.5	7.9	103.2	0.49
Nitrogen oxides	31.1	66.0	8.2	105.4	0.50
PM_{10}	2,647.6	4,867.0	993.7	8,508.2	40.44
$PM_{2.5}$	268.1	493.3	100.4	861.9	4.10
Sulfur dioxide	0.2	0.8	0.1	1.1	0.01
Volatile organic compounds	3.0	7.4	1.0	11.4	0.05
Carbon dioxide equivalent	7,244.2	15,560.8	2,059.1	24,864.0	118.17
Steel Erection Using Helicopters Option					
Carbon monoxide	30.7	53.1	6.4	90.2	0.43
Nitrogen oxides	31.9	54.7	6.7	93.3	0.44
PM_{10}	2,727.8	4,695.9	921.9	8,345.6	39.67
$PM_{2.5}$	276.2	475.5	93.1	844.8	4.02
Sulfur dioxide	0.4	0.7	0.1	1.3	0.01
Volatile organic compounds	3.8	6.6	0.9	11.3	0.05
Carbon dioxide equivalent	7,757.6	13,295.7	1,741.1	22,794.4	108.34

NOTES:
Emissions would occur from construction activities including either steel erection using helicopters or conventional steel erection, not both. Emissions above include all activities, not just steel erection.
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers

Alternative WYCO-D

Affected Environment

The climate and existing air quality in the vicinity of Alternative WYCO-D are discussed in Sections 3.2.1.3.1 and 3.2.1.3.3. Alternative WYCO-D will not traverse any nonattainment or maintenance areas. The closest area afforded Class I air-quality protection in Wyoming is the Savage Run Wilderness Area, located approximately 41 miles from the transmission line right-of-way. In Colorado, the Mount Zirkel Wilderness Area (34 miles), the Flat Tops Wilderness Area (26 miles), and Dinosaur National Monument (1 mile) are the nearest Class I or protected Class II areas to Alternative WYCO-D.

Environmental Consequences

Criteria pollutant and GHG emissions associated with construction of Alternative WYCO-D are summarized in Table 3-14 and detailed in Appendix H. GHGs expressed as CO_2e from transmission line construction include CO_2, CH_4, and NO_2.

TABLE 3-14 EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE WYCO-D					
Pollutant	**Year 1 (tons)**	**Year 2 (tons)**	**Year 3 (tons)**	**Total (tons)**	**Tons/Mile of Transmission Line**
Conventional Steel Erection Option					
Carbon monoxide	36.6	76.6	9.4	122.6	0.49
Nitrogen oxides	37.0	78.5	9.7	125.2	0.50
PM_{10}	3,144.8	5,781.7	1,180.7	10,107.2	40.43
$PM_{2.5}$	318.5	586.0	119.3	1,023.8	4.10

TABLE 3-14 EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE WYCO-D					
Pollutant	**Year 1 (tons)**	**Year 2 (tons)**	**Year 3 (tons)**	**Total (tons)**	**Tons/Mile of Transmission Line**
Sulfur dioxide	0.2	0.9	0.1	1.3	0.01
Volatile organic compounds	3.6	8.7	1.2	13.5	0.05
Carbon dioxide equivalent	8,607.6	18,489.5	2,446.6	29,543.7	118.17
Steel Erection Using Helicopters Option					
Carbon monoxide	36.5	63.1	7.6	107.2	0.43
Nitrogen oxides	37.9	65.0	7.9	110.8	0.44
PM_{10}	3,240.1	5,578.4	1,095.4	9,913.9	39.66
$PM_{2.5}$	328.1	564.8	110.7	1,003.6	4.01
Sulfur dioxide	0.5	0.9	0.1	1.5	0.01
Volatile organic compounds	4.5	7.8	1.1	13.4	0.05
Carbon dioxide equivalent	9,217.6	15,798.1	2,068.8	27,090.2	108.34

NOTES:
Emissions would occur from construction activities including either steel erection using helicopters or conventional steel erection, not both. Emissions above include all activities, not just steel erection.
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers

Alternative WYCO-F

Affected Environment

The climate and existing air quality in the vicinity of Alternative WYCO-F are discussed in Sections 3.2.1.3.1 and 3.2.1.3.3. Alternative WYCO-F will not traverse any nonattainment or maintenance areas. The closest area afforded Class I air-quality protection in Wyoming is the Savage Run Wilderness Area, located approximately 41 miles from the transmission line right-of-way. In Colorado, Dinosaur National Monument is the nearest protected Class II area to Alternative WYCO-F do not cross the access road (Deerlodge Road) for the national monument.

Environmental Consequences

Criteria pollutant and GHG emissions associated with construction of Alternative WYCO-F are summarized in Table 3-15 and detailed in Appendix H. GHGs expressed as CO_2e from transmission line construction include CO_2, CH_4, and NO_2.

TABLE 3-15 EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE WYCO-F					
Pollutant	**Year 1 (tons)**	**Year 2 (tons)**	**Year 3 (tons)**	**Total (tons)**	**Tons/Mile of Transmission Line**
Conventional Steel Erection Option					
Carbon monoxide	32.0	67.1	8.3	107.4	0.49
Nitrogen oxides	32.4	68.7	8.5	109.6	0.50
PM_{10}	2,754.2	5,063.2	1,033.8	8,851.2	40.43
$PM_{2.5}$	278.9	513.2	104.5	896.6	4.10
Sulfur dioxide	0.2	0.8	0.1	1.1	0.01
Volatile organic compounds	3.1	7.7	1.1	11.9	0.05
Carbon dioxide equivalent	7,536.8	16,189.4	2,142.3	25,868.5	118.17

TABLE 3-15 EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE WYCO-F					
Pollutant	**Year 1 (tons)**	**Year 2 (tons)**	**Year 3 (tons)**	**Total (tons)**	**Tons/Mile of Transmission Line**
Steel Erection Using Helicopters Option					
Carbon monoxide	32.0	55.2	6.7	93.9	0.43
Nitrogen oxides	33.2	56.9	6.9	97.0	0.44
PM_{10}	2,837.7	4,885.2	959.1	8,682.0	39.66
$PM_{2.5}$	287.3	494.6	96.9	878.9	4.01
Sulfur dioxide	0.5	0.8	0.1	1.3	0.01
Volatile organic compounds	3.9	6.9	0.9	11.7	0.05
Carbon dioxide equivalent	8,070.9	13,832.8	1,811.5	23,715.2	108.34

NOTES:
Emissions would occur from construction activities including either steel erection using helicopters or conventional steel erection, not both. Emissions above include all activities, not just steel erection.
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers

Colorado to Utah – U.S. Highway 40 to Baxter Pass to Clover (COUT BAX)

Alternative COUT BAX-B

Affected Environment

The climate and existing air quality in the vicinity of Alternative COUT BAX-B are discussed in Sections 3.2.1.3.1 and 3.2.1.3.3. Alternative COUT BAX-B will not traverse any nonattainment or maintenance areas. The closest Class I area in Colorado is the Colorado National Monument, located approximately 16 miles from the transmission line right-of-way. In Utah, Arches National Park is located approximately 8 miles from Alternative COUT BAX-B.

Environmental Consequences

Criteria pollutant and GHG emissions associated with construction of Alternative COUT BAX-B are summarized in Table 3-16 and detailed in Appendix H. GHGs expressed as CO_2e from transmission line construction include CO_2, CH_4, and NO_2.

TABLE 3-16 EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE COUT BAX-B					
Pollutant	**Year 1 (tons)**	**Year 2 (tons)**	**Year 3 (tons)**	**Total (tons)**	**Tons/Mile of Transmission Line**
Conventional Steel Erection Option					
Carbon monoxide	71.6	161.1	24.1	256.8	0.92
Nitrogen oxides	35.5	105.6	25.2	166.3	0.60
PM_{10}	3,471.4	6,508.4	1,344.6	11,324.3	40.56
$PM_{2.5}$	351.9	661.7	136.7	1,150.3	4.12
Sulfur dioxide	0.2	1.0	0.4	1.5	0.01
Volatile organic compounds	6.5	16.2	3.3	25.9	0.09
Carbon dioxide equivalent	8,297.4	25,331.4	6,293.6	39,922.3	142.99
Steel Erection Using Helicopters Option					
Carbon monoxide	71.3	153.2	23.9	248.4	0.89
Nitrogen oxides	35.2	99.0	24.9	159.0	0.57
PM_{10}	3,577.8	6,281.7	1,249.4	11,109.0	39.79
$PM_{2.5}$	362.6	638.5	127.1	1,128.1	4.04
Sulfur dioxide	0.2	1.3	0.4	1.8	0.01

TABLE 3-16 EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE COUT BAX-B					
Pollutant	**Year 1 (tons)**	**Year 2 (tons)**	**Year 3 (tons)**	**Total (tons)**	**Tons/Mile of Transmission Line**
Volatile organic compounds	6.4	16.8	3.2	26.4	0.09
Carbon dioxide equivalent	8,233.4	24,101.0	5,289.9	37,624.3	134.76

NOTES:
Emissions would occur from construction activities including either steel erection using helicopters or conventional steel erection, not both. Emissions above include all activities, not just steel erection.
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers

Alternative COUT BAX-C

Affected Environment

The climate and existing air quality in the vicinity of Alternative COUT BAX-C are discussed in Sections 3.2.1.3.1 and 3.2.1.3.3. Alternative COUT BAX-C will not traverse any nonattainment or maintenance areas. The closest Class I area in Colorado is the Colorado National Monument, located approximately 16 miles from the transmission line right-of-way. In Utah, Arches National Park is located approximately 8 miles from Alternative COUT BAX-C.

Environmental Consequences

Criteria pollutant and GHG emissions associated with construction of Alternative COUT BAX-C are summarized in Table 3-17 and detailed in Appendix H. GHGs expressed as CO_2e from transmission line construction include CO_2, CH_4, and NO_2.

TABLE 3-17 EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE COUT BAX-C					
Pollutant	**Year 1 (tons)**	**Year 2 (tons)**	**Year 3 (tons)**	**Total (tons)**	**Tons/Mile of Transmission Line**
Conventional Steel Erection Option					
Carbon monoxide	74.3	167.2	25.0	266.5	0.92
Nitrogen oxides	36.9	109.6	26.1	172.6	0.60
PM_{10}	3,599.6	6,748.6	1,394.7	11,743.0	40.53
$PM_{2.5}$	364.9	686.1	141.8	1,192.8	4.12
Sulfur dioxide	0.2	1.0	0.4	1.6	0.01
Volatile organic compounds	6.7	16.8	3.4	26.9	0.09
Carbon dioxide equivalent	8,609.4	26,284.0	6,530.3	41,423.7	142.99
Steel Erection Using Helicopters Option					
Carbon monoxide	73.9	159.0	24.8	257.7	0.89
Nitrogen oxides	36.5	102.7	25.8	165.0	0.57
PM_{10}	3,710.1	6,513.4	1,296.0	11,519.5	39.76
$PM_{2.5}$	376.0	662.0	131.8	1,169.8	4.04
Sulfur dioxide	0.2	1.3	0.4	1.9	0.01
Volatile organic compounds	6.7	17.4	3.4	27.4	0.09
Carbon dioxide equivalent	8,543.0	25,007.4	5,488.9	39,039.3	134.76

NOTES:
Emissions would occur from construction activities including either steel erection using helicopters or conventional steel erection, not both. Emissions above include all activities, not just steel erection.
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers

Alternative COUT BAX-E

Affected Environment

The climate and existing air quality in the vicinity of Alternative COUT BAX-E are discussed in Sections 3.2.1.3.1 and 3.2.1.3.3. Alternative COUT BAX-E will not traverse any nonattainment or maintenance areas. The closest Class I area in Colorado is the Colorado National Monument, located approximately 16 miles from the transmission line right-of-way. In Utah, Arches National Park is located approximately 8 miles from Alternative COUT BAX-E.

Environmental Consequences

Criteria pollutant and GHG emissions associated with construction of Alternative COUT BAX-E are summarized in Table 3-18 and detailed in Appendix H. GHGs expressed as CO_2e from transmission line construction include CO_2, CH_4, and NO_2.

TABLE 3-18
EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE COUT BAX-E

Pollutant	Year 1 (tons)	Year 2 (tons)	Year 3 (tons)	Total (tons)	Tons/Mile of Transmission Line
Conventional Steel Erection Option					
Carbon monoxide	74.7	168.2	25.2	268.1	0.92
Nitrogen oxides	37.1	110.3	26.3	173.7	0.60
PM_{10}	3,618.0	6,782.4	1,402.6	11,803.0	40.49
$PM_{2.5}$	366.8	689.6	142.6	1,198.9	4.11
Sulfur dioxide	0.2	1.0	0.4	1.6	0.01
Volatile organic compounds	6.7	16.9	3.4	27.0	0.09
Carbon dioxide equivalent	8,662.9	26,447.3	6,570.8	41,681.1	142.99
Steel Erection Using Helicopters Option					
Carbon monoxide	74.4	159.9	25.0	259.3	0.89
Nitrogen oxides	36.8	103.3	26.0	166.0	0.57
PM_{10}	3,729.1	6.545.8	1,303.3	11,578.2	39.72
$PM_{2.5}$	377.9	665.3	132.5	1,175.8	4.03
Sulfur dioxide	0.2	1.3	0.4	1.9	0.01
Volatile organic compounds	6.7	17.5	3.4	27.6	0.09
Carbon dioxide equivalent	8,596.1	25,162.8	5,523.0	39,281.8	134.76

NOTES:
Emissions would occur from construction activities including either steel erection using helicopters or conventional steel erection, not both. Emissions above include all activities, not just steel erection.
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers

Colorado to Utah – U.S. Highway 40 to Central Utah to Clover (COUT)

Alternative COUT-A

Affected Environment

The climate and existing air quality in the vicinity of Alternative COUT-A are discussed in Sections 3.2.1.3.1 and 3.2.1.3.3. Alternative COUT-A will not traverse any nonattainment or maintenance areas in Colorado but will cross the Utah County PM_{10} nonattainment area in Utah (29.5 to 29.7 miles in the nonattainment area). The closest protected Class II area is the Dinosaur National Monument in Colorado, located approximately 1 mile from the transmission line right-of-way.

Environmental Consequences

Criteria pollutant and GHG emissions associated with construction of Alternative COUT-A are summarized in Table 3-19 and detailed in Appendix H. GHGs expressed as CO_2e from transmission line construction include CO_2, CH_4, and NO_2.

TABLE 3-19
EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE COUT-A

Pollutant	Year 1 (tons)	Year 2 (tons)	Year 3 (tons)	Total (tons)	Tons/Mile of Transmission Line
Conventional Steel Erection Option					
Carbon monoxide	52.8	118.9	17.8	189.5	0.92
Nitrogen oxides	26.2	77.9	18.6	122.7	0.60
PM_{10}	2,567.4	4,814.3	933.3	8,375.0	40.66
$PM_{2.5}$	260.3	489.4	100.9	850.7	4.13
Sulfur dioxide	0.1	0.7	0.3	1.1	0.01
Volatile organic compounds	4.8	11.9	2.4	19.1	0.09
Carbon dioxide equivalent	6,122.0	18,690.0	4,643.5	29,455.6	142.99
Steel Erection Using Helicopters Option					
Carbon monoxide	52.6	113.0	17.6	183.2	0.89
Nitrogen oxides	26.0	73.0	18.3	117.3	0.57
PM_{10}	2,645.9	4,647.1	923.1	8,216.1	39.88
$PM_{2.5}$	268.2	472.3	93.9	834.3	4.05
Sulfur dioxide	0.1	1.0	0.3	1.3	0.01
Volatile organic compounds	4.7	12.4	2.4	19.5	0.09
Carbon dioxide equivalent	6,074.8	17,782.3	3,903.0	27,760.1	134.76

NOTES:
Emissions would occur from construction activities including either steel erection using helicopters or conventional steel erection, not both. Emissions above include all activities, not just steel erection.
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers

Alternative COUT-B

Affected Environment

The climate and existing air quality in the vicinity of Alternative COUT-B are discussed in Sections 3.2.1.3.1 and 3.2.1.3.3. Alternative COUT-B will not traverse any nonattainment or maintenance areas in Colorado but will cross the Utah County PM_{10} nonattainment area in Utah (45.6 to 49.2 miles in the nonattainment area). The portions of Utah County relevant to the county's nonattainment designation are the heavily populated areas located west of the Wasatch Range, while the proposed transmission line route in Utah County would generally traverse the less populated areas of the county. The closest protected Class II area is the Dinosaur National Monument in Colorado, located approximately 1 mile from the transmission line right-of-way.

Environmental Consequences

Criteria pollutant and GHG emissions associated with construction of Alternative COUT-B are summarized in Table 3-20 and detailed in Appendix H. GHGs expressed as CO_2e from transmission line construction include CO_2, CH_4, and NO_2.

TABLE 3-20 EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE COUT-B					
Pollutant	**Year 1 (tons)**	**Year 2 (tons)**	**Year 3 (tons)**	**Total (tons)**	**Tons/Mile of Transmission Line**
Conventional Steel Erection Option					
Carbon monoxide	55.4	124.7	18.6	198.7	0.92
Nitrogen oxides	27.5	81.7	19.5	128.7	0.60
PM_{10}	2,691.0	5,046.0	1,041.3	8,778.3	40.64
$PM_{2.5}$	272.8	513.0	105.8	891.6	4.13
Sulfur dioxide	0.1	0.8	0.3	1.2	0.01
Volatile organic compounds	5.0	12.5	2.5	20.0	0.09
Carbon dioxide equivalent	6,419.2	19,597.3	4,869.0	30,885.4	1432.99
Steel Erection Using Helicopters Option					
Carbon monoxide	55.1	118.5	18.5	192.1	0.89
Nitrogen oxides	27.2	76.6	19.2	123.0	0.57
PM_{10}	2,773.4	4,870.6	967.7	8,611.7	39.87
$PM_{2.5}$	281.1	495.0	98.4	874.5	4.05
Sulfur dioxide	0.1	1.0	0.3	1.4	0.01
Volatile organic compounds	5.0	13.0	2.5	20.4	0.09
Carbon dioxide equivalent	6,369.7	18,645.5	4,092.5	29,107.6	134.76

NOTES:
Emissions would occur from construction activities including either steel erection using helicopters or conventional steel erection, not both. Emissions above include all activities, not just steel erection.
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers

Alternative COUT-C (Agency and Applicant Preferred Alternative)

Affected Environment

The climate and existing air quality in the vicinity of Alternative COUT-C are discussed in Sections 3.2.1.3.1 and 3.2.1.3.3. Alternative COUT-C will not traverse any nonattainment or maintenance areas in Colorado but will cross the Utah County PM_{10} nonattainment area in Utah (45.6 to 49.2 miles in the nonattainment area). The closest protected Class II area is the Dinosaur National Monument in Colorado, located approximately 1 mile from the transmission line right-of-way.

Environmental Consequences

Criteria pollutant and GHG emissions associated with construction of Alternative COUT-C are summarized in Table 3-21 and detailed in Appendix H. GHGs expressed as CO_2e from transmission line construction include CO_2, CH_4, and NO_2.

TABLE 3-21 EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE COUT-C (AGENCY AND APPLICANT PREFERRED ALTERNATIVE)					
Pollutant	**Year 1 (tons)**	**Year 2 (tons)**	**Year 3 (tons)**	**Total (tons)**	**Tons/Mile of Transmission Line**
Conventional Steel Erection Option					
Carbon monoxide	53.8	121.1	18.1	193.0	0.92
Nitrogen oxides	26.7	79.4	18.9	125.0	0.60
PM_{10}	2,618.8	4,911.2	1,012.3	8,542.3	40.72
$PM_{2.5}$	265.5	499.3	102.9	867.6	4.14
Sulfur dioxide	0.1	0.7	0.3	1.1	0.01

TABLE 3-21 EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE COUT-C (AGENCY AND APPLICANT PREFERRED ALTERNATIVE)					
Pollutant	**Year 1 (tons)**	**Year 2 (tons)**	**Year 3 (tons)**	**Total (tons)**	**Tons/Mile of Transmission Line**
Volatile organic compounds	4.9	12.1	2.5	19.5	0.09
Carbon dioxide equivalent	6,234.9	19,034.8	4,729.2	29,998.9	142.99
Steel Erection Using Helicopters Option					
Carbon monoxide	53.5	115.1	18.0	186.6	0.89
Nitrogen oxides	26.5	74.4	18.7	119.5	0.57
PM_{10}	2,698.8	4,740.9	940.9	8,380.5	39.95
$PM_{2.5}$	273.5	481.8	95.7	851.0	4.06
Sulfur dioxide	0.1	1.0	0.3	1.4	0.01
Volatile organic compounds	4.8	12.6	2.4	19.9	0.09
Carbon dioxide equivalent	6,186.8	18,110.3	3,975.0	28,272.1	134.76

NOTES:
Emissions would occur from construction activities including either steel erection using helicopters or conventional steel erection, not both. Emissions above include all activities, not just steel erection.
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers

Alternative COUT-H

Affected Environment

The climate and existing air quality in the vicinity of Alternative COUT-H are discussed in Sections 3.2.1.3.1 and 3.2.1.3.3. The COUT-H alternative routes will not traverse any nonattainment or maintenance areas. The closest protected Class II area is the Dinosaur National Monument in Colorado, located approximately 1 mile from the transmission line right-of-way.

Environmental Consequences

Criteria pollutant and GHG emissions associated with construction of Alternative COUT-H are summarized in Table 3-22 and detailed in Appendix H. GHGs expressed as CO_2e from transmission line construction include CO_2, CH_4, and NO_2.

TABLE 3-22 EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE COUT-H					
Pollutant	**Year 1 (tons)**	**Year 2 (tons)**	**Year 3 (tons)**	**Total (tons)**	**Tons/Mile of Transmission Line**
Conventional Steel Erection Option					
Carbon monoxide	51.4	115.8	17.3	184.5	0.92
Nitrogen oxides	25.5	75.9	18.1	119.5	0.60
PM_{10}	2,499.6	4,687.1	967.1	8,153.8	40.65
$PM_{2.5}$	253.4	476.5	98.3	828.2	4.13
Sulfur dioxide	0.1	0.7	0.3	1.1	0.01
Volatile organic compounds	4.6	11.6	2.4	18.6	0.09
Carbon dioxide equivalent	5,961.5	18,200.1	4,521.8	28,683.4	142.99
Steel Erection Using Helicopters Option					
Carbon monoxide	51.2	110.1	17.2	178.4	0.89
Nitrogen oxides	25.3	71.1	17.9	114.3	0.57
PM_{10}	2,576.1	4,524.2	898.8	7,999.1	39.88
$PM_{2.5}$	261.1	459.8	91.4	812.3	4.05
Sulfur dioxide	0.1	0.9	0.3	1.3	0.01

TABLE 3-22 EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE COUT-H					
Pollutant	**Year 1 (tons)**	**Year 2 (tons)**	**Year 3 (tons)**	**Total (tons)**	**Tons/Mile of Transmission Line**
Volatile organic compounds	4.6	12.0	2.3	19.0	0.09
Carbon dioxide equivalent	5,915.5	17,316.1	3,800.7	27,032.4	134.76

NOTES:
Emissions would occur from construction activities including either steel erection using helicopters or conventional steel erection, not both. Emissions above include all activities, not just steel erection.
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers

Alternative COUT-I

Affected Environment

The climate and existing air quality in the vicinity of Alternative COUT-I are discussed in Sections 3.2.1.3.1 and 3.2.1.3.3. Alternative COUT-I will not traverse any nonattainment or maintenance areas. The closest protected Class II area is the Dinosaur National Monument in Colorado, located approximately 1 mile from the transmission line right-of-way.

Environmental Consequences

Criteria pollutant and GHG emissions associated with construction of Alternative COUT-I are summarized in Table 3-23 and detailed in Appendix H. GHGs expressed as CO_2e from transmission line construction include CO_2, CH_4, and NO_2.

TABLE 3-23 EMISSIONS FOR TRANSMISSION LINE CONSTRUCTION FOR ALTERNATIVE COUT-I					
Pollutant	**Year 1 (tons)**	**Year 2 (tons)**	**Year 3 (tons)**	**Total (tons)**	**Tons/Mile of Transmission Line**
Conventional Steel Erection Option					
Carbon monoxide	61.6	138.6	20.7	221.0	0.92
Nitrogen oxides	30.6	90.9	21.6	143.1	0.60
PM_{10}	2,992.0	5,610.4	1,157.8	9,760.3	40.63
$PM_{2.5}$	303.3	570.4	117.7	991.4	4.13
Sulfur dioxide	0.1	0.8	0.3	1.3	0.01
Volatile organic compounds	5.6	13.9	2.8	22.3	0.09
Carbon dioxide equivalent	7,138.4	21,793.0	5,415.5	34,345.8	142.99
Steel Erection Using Helicopters Option					
Carbon monoxide	61.3	131.8	20.6	213.7	0.89
Nitrogen oxides	30.3	85.1	21.4	136.8	0.57
PM_{10}	3,083.6	5,415.4	1,076.0	9,575.0	39.86
$PM_{2.5}$	312.5	550.4	109.4	972.3	4.05
Sulfur dioxide	0.1	1.1	0.3	1.6	0.01
Volatile organic compounds	5.5	14.4	2.8	22.7	0.09
Carbon dioxide equivalent	7,083.3	20,734.5	4,551.0	32,368.8	134.76

NOTES:
Emissions would occur from construction activities including either steel erection using helicopters or conventional steel erection, not both. Emissions above include all activities, not just steel erection.
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers
PM_{10} = Particulate matter less than 10 micrometers

3.2.2 Earth Resources

3.2.2.1 Introduction and Regulatory Framework

This section describes the existing condition of earth resources in the alternative route study corridors, and addresses potential effects on vegetation resources that could result from construction, operation, and maintenance of the Project.

3.2.2.1.1 Geologic Hazards

Geologic hazards generally consist of Quaternary faults, seismicity (earthquakes), steep terrain, landslide susceptibility, subsidence, and flooding. Earthquakes are the surface expression of large energy releases that result from motion along faults. Quaternary faults are considered active and are likely to have earthquakes occur along their length. The U.S. Geological Survey (USGS) defines seismicity as the probability of an area being affected by a damaging earthquake and is measured as the probability of a certain degree of ground shaking in terms of the percentage of acceleration due to gravity (Paterson et al. 2008). In accordance with the NESC, the Applicant is required to consider the potential for seismic activity in the design of transmission structures and facilities and must construct any structures and facilities to withstand seismic forces.

Landslides are defined as the downward and outward movement of earth materials on a slope through the falling, sliding, or flowing of rock or soil that is the result of slope failure, which may be a result of ground saturation and/or ground shaking (Radbruch-Hall et al. 1982). In the Wyoming Basin Province, Tertiary lakebeds and other continental deposits of the Green River and Wasatch formations have been involved in considerable sliding and flowage; in the High Plateaus of the Utah Division of the Middle Rocky Mountains Province, slumps and flows are common where softer rocks are interbedded or overlain by more resistant rocks (Radbruch-Hall et al. 1982). Slumps and flows are especially common along steep outcrops of the Cretaceous and Paleocene North Horn Formation and the Paleocene Green River Formation.

Flooding would affect the Project by destabilizing the land surface and potentially damaging towers and access roads.

Subsidence is defined as the local lowering of the Earth's surface caused by subsurface removal or compaction of material (Dunrud and Osterwald 1980). Subsidence could affect the Project by damaging towers or access roads.

It is possible that construction of the Project could increase susceptibility to geological hazards in some areas (e.g., in areas with slumps and flows). Avoidance of geologic hazards and engineering constraints criteria were applied in the Applicant's identification of feasible corridors for the siting and construction of transmission lines as part of the design features of the Proposed Action.

The protection of transmission lines from landslides, unstable soils, flooding, and other hazards is regulated by 49 CFR 192.317, which states "The operator must take all practicable steps to protect each transmission line or main from washouts, floods, unstable soil, landslides, or other hazards that may cause the pipeline to move or to sustain abnormal loads."

3.2.2.1.2 Soil Resources

Soils are the interface between the lithosphere (Earth's crust) and the biosphere (Earth's surface) and consist of various mineral or organic horizons of differing thickness formed by physical and chemical processes from mineralogical and biological sources (Birkeland 1999). Agency objectives for managing

soil resources center on the preservation of the natural properties of the resource, including soil productivity and surface stability.

In addition to the requirements of NEPA and FLPMA, the Farmland Protection Policy Act of 1981 requires the assessment of impacts on designated farmland soils from proposed conversion of farmlands to nonagricultural uses.

3.2.2.1.3 Mineral Resources

In this analysis, mineral resources are divided into three broad categories: locatable, leasable, and salable. Locatable minerals are a complex category containing precious metals like gold and silver, including industrial minerals such as calcium chloride and uranium. Leasable resources typically are extracted for use in energy production and include oil, natural gas, coal, fissionable, and geothermal deposits. Leasable mineral resources on federal lands require a lease of set duration with the government for extraction or development. 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 managed lands via a permit or contract or through small-scale methods such as recreational rock collecting.

NEPA and FLPMA serve as the primary legislation requiring assessment and mitigation of potential impacts on mineral resources when considering proposals for major actions on federally administered land.

3.2.2.2 Issues Identified for Analysis

General concern regarding potential impacts on earth resources was expressed as an issue during agency and public scoping for the Project.

3.2.2.2.1 Geologic Hazards

Impacts resulting from geologic hazards are generally restricted to the local geography of the Project. Potential effects on the Project would occur from landslides where the Project crosses steep, unstable slopes; from flooding where the Project is located in a floodplain; and from Quaternary faults where the Project crosses them. Impacts on the Project resulting from geological hazards are discussed in detail in Section 3.2.2.5.

3.2.2.2.2 Soil Resources

Impacts on soil resources resulting from the Project are associated with ground-disturbing activities that potentially could result in the removal or mixture of the surface soil horizons, loss of soil-stabilizing vegetation, compaction of soils, or the permanent conversion of designated Prime or Unique Farmland soils to nonagricultural use. Impacts on soil resources resulting from the Project are discussed in detail in Section 3.2.2.5.

3.2.2.2.3 Mineral Resources

Impacts on mineral resources resulting from the Project are associated with the restriction of access for the extraction of a given mineral resource and potentially would occur in areas where the Project is located in proximity to mineral resource development such as mines, sand and gravel pits, and oil and gas well fields. Impacts on mineral resources resulting from the Project are discussed in detail in Section 3.2.2.5.

3.2.2.3 Regional Setting

The Project crosses the Wyoming Basin and Middle Rocky Mountain physiographic provinces of the Rocky Mountains Division in Wyoming, Colorado, and Utah; the Uinta Basin, Canyon Lands, and High Plateaus of Utah sections of the Colorado Plateaus Province; and the Great Basin section of the Basin and Range Province of the Intermontane Plateaus division in Colorado and Utah (Fenneman and Johnson 1946).

Quaternary faults are most commonly crossed by the Project in Utah; the potential for landslides is highest where mountainous areas are crossed by the Project in Colorado and Utah; and the potential for flooding occurs throughout the Project area where crossing of waterbodies, rivers, or streams is necessary.

Soil resources that exhibit a wide range of properties (e.g., susceptibility to water and/or wind erosion) occur at the land surface and immediate subsurface throughout the entire Project area.

Mineral resources are common throughout the Project area. Active mines (e.g., coal) occur in Wyoming, Colorado, and Utah with a specific concentration in the vicinity of Huntington, Utah. Oil and gas wells and leases are concentrated in a number of structural basins in the Project area, including the Greater Green River Basin (Wyoming) and the Uinta Basin (Utah). Other mineral resources have the potential to occur intermittently throughout the Project area, including mining claims for locatable and salable minerals.

3.2.2.4 Study Methodology

3.2.2.4.1 Inventory

Geologic Hazards

Information regarding geologic hazards was obtained from the scientific literature and discussions with resource specialists at the BLM, USGS, USFS, Wyoming Department of Environmental Quality (WDEQ), Wyoming Geological Survey, Colorado Geological Survey, Utah Geological Survey, University of Utah seismograph stations, and the National Pipeline Mapping System. Geological units in the Project area were identified from geological maps (Green 1992; Green and Drouilard 1994; Hintze et al. 2000; USGS 2005); fault data were compiled from USGS Atlas-Digital Library (USGS 2012a); earthquake data from 1973 to the present were acquired from the National Earthquake Information Center (USGS 2012b); and landslide and flood data were derived from the mapping system used for the National Pipeline Hazard Index. The geologic hazards identified for the Project are shown n MV-2a and MV-2b.

Soil Resources

Information for the soil inventory was obtained primarily from the Natural Resources Conservation Service (NRCS) (Web Soil Survey) and the USFS. Soils in 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 resource data were provided by the USFS TEAMS enterprise for select portions of USFS-administered land in Utah. 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. The soil resources identified for the Project are shown in MV-3a and MV-3b.

Mineral Resources

Areas with active mining claims, mineral material sites, oil and gas leases, coal leases, and geothermal leases in the study corridors were identified using the BLM and USFS Geocommunicator and Legacy

Rehost 2000 System (LR2000) database (BLM 2009a). Additional information pertaining to mineral resources was obtained from other federal and state sources, including the USGS, U.S. Bureau of Mines, BLM, Utah Geological Survey, and Utah Department of Natural Resources (UDNR) Division of Oil, Gas, and Mining (UDOGM), Wyoming Oil and Gas Conservation Commission, Wyoming Landscape Conservation Initiative, and State of Colorado. The USGS database for active and closed rare earths mines was also assessed (USGS 2015a). The BLM is not aware of active or closed rare earths mines in the Project area. The mineral resources identified for the Project are shown in MV-4a and MV-4b.

3.2.2.4.2 Impact Assessment and Mitigation Planning

Geologic Hazards

After compiling the resource inventory for geologic hazards, the methodology for assessing their potential impacts on the Project included (1) identifying the types of potential effects on the Project from geologic hazards, (2) developing criteria for assessing the level of potential impacts on the Project from geologic hazards, (3) classifying the level of impacts (high, moderate, low), (4) assessing initial impacts on the Project, (5) identifying the appropriate selective mitigation measures for minimizing potential adverse effects, (6) determining specific areas where selective mitigation should be applied, and (7) disclosing potential residual impacts on the Project from geologic hazards.

Types of Potential Effects Resulting from Geologic Hazards

The Project would not be anticipated to affect faults, cause earthquakes, or cause liquefaction. However, the Project potentially could contribute to destabilization of slopes or the reactivation of landslide deposits. Specific locations where geologic hazards could be affected are identified in Section 3.2.2.5. 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 to high landslide susceptibility. A potential indirect effect is the removal of vegetation, which could affect slope stability.

Criteria for Assessing Level of Impacts

Criteria were developed to assess the level of potential impacts resulting from a geological hazard on the Project (Table 3-24). Quaternary faults were assigned a high level of impact 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 impact because these faults could be reactivated in the distant future. Level of impacts related to the potential for landsliding was based on an area's landslide susceptibility, previously mapped landslides, and steep slopes. Areas for flood susceptibility were assigned values of high, moderate, or low based on an area's proximity to streams and rivers as well as on topography.

TABLE 3-24 CRITERIA FOR ASSESSING LEVEL OF IMPACTS FROM GEOLOGIC HAZARDS	
Level 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 ▪ Areas in the highest percentile (85 to 100 percent rank) for flooding[1]
Moderate	▪ Areas with moderately steep terrain (15 to 30 percent slope) or moderate landslide susceptibility ▪ Areas with pre-Quaternary faults (inactive) present ▪ Areas in a moderate percentile (70 to 84 percent rank) for flooding[1]
Low	▪ Areas without steep terrain (0 to 15 percent slope) having low landslide susceptibility ▪ Areas in the lowest percentile (0 to 69 percent rank) for flooding[1]
SOURCE: (U.S. Department of Transportation 1996) NOTE: [1]Based on the Hazard Index of the National Pipeline Mapping System	

Effects Analysis

Assessment of Initial Impacts

The level of potential impacts from geologic hazards that could result from implementation of the Project is used for assessing initial impacts of geologic hazards. Based on the level of potential effects on geologic hazards, initial impacts were assigned using the criteria presented in Table 3-24 and are presented in Table 3-25.

Mitigation Planning and Effectiveness

In addition to the design features of the Proposed Action included as part of the Project description (refer to Table 2-8), selective mitigation measures would be applied to areas where the Project crosses geologic hazards, where feasible, to reduce impacts on the Project from these hazards. Selective mitigation measures applied to reduce impacts from geologic hazards are summarized in Table 3-25 and described in this section.

- **Selective Mitigation Measure 3 (minimize slope cut and fill).** New access roads and overland access routes in areas with high and moderate landslide susceptibility would be aligned to follow the landform contours where practicable, to reduce destabilization of steep slopes.

Residual Impacts

Table 3-25 summarizes the initial impacts (based on the level of potential effects) on geologic hazards, the selective mitigation measures applied to mitigate potentially adverse effects by geologic hazards, and residual impacts.

TABLE 3-25 SUMMARY OF INITIAL AND RESIDUAL IMPACTS FROM GEOLOGIC HAZARDS			
Geological Hazard	**Initial Impact**	**Selective Mitigation Measures Applied**	**Residual Impact**
Quaternary faults	Moderate	None	Moderate
High landslide susceptibility	Moderate	3	Low
High flooding susceptibility	Moderate	None	Moderate
Pre-Quaternary faults	Low	None	Low
Moderate landslide susceptibility	Low	None	Low
Moderate flooding susceptibility	Moderate	None	Low
NOTE: Initial impacts reflect implementation of design features of the Proposed Action. Residual impacts reflect the implementation of design features and selective mitigation measures.			

Soil Resources

After compiling the resource inventory for soil resources, the methodology for assessing potential impacts on these resources included (1) identifying the types of potential effects on soil resources from implementation of the Project, (2) developing criteria for assessing the level of potential impacts on soil resources resulting from the Project, (3) classifying the level of potential effects (high, moderate, low) based on the susceptibility to accelerated erosion by water or wind and the conversion of designated Prime or Unique Farmland soils to nonagricultural uses, (4) assessing initial impacts on soil resources by applying the Project access model (Table 2-10) as well as disclosing the amount of estimated disturbance along the right-of-way from temporary and permanent disturbance (Table 2-1), (5) identifying the appropriate selective mitigation measures for minimizing potential adverse effects, (6) determining specific areas where selective mitigation 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 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 or Unique Farmland soils (i.e., conversion to nonagricultural uses) (permanent)
- Compaction of soil resources by construction vehicles, equipment, and activities at tower sites, construction yards, substations, series compensation stations, and regeneration stations (permanent and temporary)
- Loss of soil resources occurs when removed from the productive land base, which includes the footprint of buildings needed for the Project (temporary and permanent)

Potential direct effects associated with the operation of the facilities, presence of the transmission line, or maintenance activities associated with the Project include soil compaction by maintenance vehicles along permanent access roads.

Indirect effects associated with the construction, operation, and maintenance of the Project could include the following:

- Construction of permanent access roads that could be used by the general public to access currently inaccessible areas, potentially resulting in accelerated erosion by water or wind (permanent)
- Degradation of the land surface and loss of soil productivity resulting from accelerated soil erosion (temporary to permanent)

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 water ponding 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 water ponding. 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 and could increase the potential for erosion.

Rutting could occur where soils are saturated, making the soil strength insufficient to support the weight of vehicular traffic on existing or newly constructed roads and during overland travel. The topsoil and subsoil could mix, reducing productivity and affecting the surface hydrology of an area. Rutting would be mitigated by limiting movement of construction equipment over moist soils and limiting vegetation clearing. Retaining vegetation less than 25 feet in height in portions of the right-of-way would reduce the level of this impact. Overall, soil compaction, water ponding, and rutting would be mitigated by the design features of the Proposed Action for environmental protection and selective mitigation measures to be included as requirements in the POD, including soil tillage, limited movement of construction equipment over moist soils, limited vegetation clearing, and use of agency-approved herbicides under the direction of agency-issued Pesticide Use Permits.

Criteria for Assessing Level of Impacts

Criteria were developed to assess the level of a potential effect on soil resources associated with implementation of the Project (Table 3-26). These criteria were based on susceptibility of soils to water and wind erosion relevant to slope percentage and potential impact on designated Prime or Unique Farmland soils.

Soil susceptibilities to water and wind erosion were assessed based on standards from the NRCS. The susceptibility of a soil to water erosion is based on its assigned K_w value, a numerical factor representing the relative water erodibility of the whole soil. Soils assigned a K_w 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. 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 (WEG). Soils assigned to WEG 1 or 2 are highly susceptible to wind erosion; soils assigned to WEG 3, 4, or 4L have a moderate susceptibility to wind erosion; soils assigned to WEG 5, 6, or 7 have a low susceptibility to wind erosion; and soils assigned to WEG 8 are not susceptible to wind erosion.

TABLE 3-26 CRITERIA FOR ASSESSING LEVEL OF IMPACTS ON SOIL RESOURCES	
Level of Impacts	**Description**
High	▪ Disturbance of land surface where soils exhibit high susceptibility to erosion by water or wind on slopes greater than 15 percent (i.e., access levels 2, 5, and 6) [1] ▪ Construction of new access roads across designated Prime or Unique Farmland soils
Moderate	▪ Disturbance of land surface where soils exhibit high susceptibility to erosion by water or wind on slopes between 0 and 15 percent (i.e., access levels 3 and 4) [1] ▪ Disturbance of land surface where soils exhibit moderate susceptibility to erosion by water or wind on slopes greater than 15 percent ▪ 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 high susceptibility to erosion by water or wind on slopes between 0 and 8 percent and existing access is present (i.e., access level 1) [1] ▪ Disturbance of land surface where soils exhibit moderate susceptibility to erosion by water or wind on slopes less than 15 percent (i.e., access levels 1, 3, and 4) ▪ Disturbance of land surface where soils exhibit low susceptibility to erosion by water or wind for all slope gradients (i.e., all access levels) ▪ Use of existing roads
NOTE: [1]Access levels are defined in Table 2-10.	

Effects Analysis

Assessment of Initial Impacts

The level 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 3-26 and are presented in Table 3-27.

Mitigation Planning and Effectiveness

In addition to the design features of the Proposed Action included as part of the Project (Table 2-8), selective mitigation measures would be applied to areas of potential high and moderate (initial) impacts on soils and designated Prime or Unique Farmland soils, where feasible, to reduce impacts. Selective mitigation measures applied to reduce impacts on soil resources are summarized in Table 3-27 and described in this section.

- **Selective Mitigation Measure 1 (disturbance of sensitive soils and vegetation)**. Existing access roads or trails would not be widened or otherwise upgraded for construction and maintenance in areas where soils are moderately to highly susceptible to accelerated erosion and where designated Prime or Unique Farmland soils would be crossed by the Project. This measure would limit new disturbance associated with construction and maintenance of the Project in previously undisturbed areas, which would reduce exposure of soils highly or moderately susceptible to wind or water erosion.
- **Selective Mitigation Measure 3 (minimize slope cut and fill)**. 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) would be aligned to follow the landform contours, where practicable, to reduce associated soil erosion by maintaining the natural land contours, thereby limiting the rate of water runoff. This mitigation measure would only be applied in areas with slopes greater than 3 percent.
- **Selective Mitigation Measure 7 (span and/or avoid sensitive features).** Tower structures would be located so as to span designated Prime or Unique Farmland soils to minimize

irreversible conversion of agricultural lands to nonagricultural uses by limiting the number of tower sites located on designated Prime or Unique Farmland soils.

- **Selective Mitigation Measure 13 (overland access)**. Where no grading would be needed to access work areas, overland access would be used to the extent possible in areas where soils would be moderately to highly susceptible to accelerated erosion and in designated Prime or Unique Farmland soils, 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 3-27 summarizes the initial impacts based on the level of potential effects on soil resources, the selective mitigation measures applied to mitigate potentially adverse impacts on soil resources, and residual impacts.

TABLE 3-27
SUMMARY OF INITIAL AND RESIDUAL IMPACTS ON SOIL RESOURCES

Soil Resource	Initial Impact	Selective Mitigation Measures Applied	Residual Impact
Soils with high susceptibility to water and wind erosion (based on range of slopes identified for access levels 2, 5, or 6)	High	1, 3, 7, 13	Low
Soils designated Prime or Unique Farmland	High	1, 3, 7, 13	Low
Soils with high susceptibility to water and wind erosion (based on range of slopes identified for access levels 3 and 4)	Moderate	1, 3, 7, 13	Low
Soils with moderate susceptibility to water and wind erosion (based on range of slopes identified for access levels 2, 5, or 6)	Moderate	1, 3, 7, 13	Low
Soils with high susceptibility to water or wind erosion (based on range of slopes identified for access level 1)	Low	None	Low
Soils with moderate susceptibility to water or wind erosion (based on range of slopes identified for access levels 1, 3, or 4)	Low	None	Low
Soils with low susceptibility to water or wind erosion (based on range of slopes identified for all access levels)	Low	None	Low
Soils not designated Prime or Unique Farmland	Low	None	Low

NOTE: Initial impacts reflect implementation of design features for the Proposed Action and selective mitigation measures.

Mineral Resources

After compiling the resource inventory for mineral resources, the methodology for assessing potential impacts on these resources included (1) identifying the types of potential effects on the mineral resources that could result from the construction, operation, and maintenance of the proposed transmission line and associated facilities, (2) developing criteria for assessing the level of a potential effect on a mineral resource, (3) identifying the level of potential effects on the mineral resources, (4) assessing the initial impacts on mineral resources, and (5) identifying the appropriate selective mitigation measures for minimizing potential adverse effects on mineral resources, (6) determining specific areas where selective mitigation measures should be applied, and (7) disclosing potential residual impacts on the mineral resources.

Types of Potential Environmental Effects

Locatable, leasable, 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. Extensive petroleum exploration, recovery, and transportation infrastructure exists or could exist in the future. Active mines and mining operations exist in a number of counties that could be crossed by the Project. Avoidance of land-use conflicts (e.g., mining operations and oil and gas production areas) where possible, was a criterion in the Applicant's engineering study to identify locations where transmission lines could be sited and constructed. It is the BLM's expectation that the Applicant would obtain permissions and resolve conflicts with regard to mineral ownership and access along the selected alternative route prior to discussion. For example, it is the responsibility of the right-of-way grantee to conduct proper due diligence to ensure that legally valid mining claims are respected and agreements are made with claim owners. Where such claims currently exist, they represent valid existing rights that would need to be addressed prior to construction, or routed around. In general, the BLM expects that the likelihood and potential for such conflicts are low and the effect small. With the availability of current technology, mining and oil and gas recovery still could occur in proximity to transmission lines. Where mining operations or mineral resources cannot be avoided, construction and maintenance of the Project could have the following direct effects on mineral resources:

- Loss of mineral resources caused by construction activities
- Limited development and extraction of mineral resources resulting from the presence of permanent facilities (permanent)
- Prevention of future 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 Level of Impacts

Criteria were developed to assess the level of a potential effect on a mineral resource associated with implementation of the Project (Table 3-28). These criteria were based on the type of mineral resource and any activities associated with the mineral resource.

TABLE 3-28
CRITERIA FOR ASSESSING LEVEL OF IMPACTS ON MINERAL RESOURCES

Level of Impacts	Description
High	▪ Areas with active mines or mining claims ▪ Permitted mines ▪ Areas with producing oil and gas or geothermal wells
Moderate	▪ Coal leases ▪ Oil and gas leases ▪ Geothermal leases
Low	▪ Potential mineral areas[1]

NOTE: [1]Areas where a mineral resource potential is identified but is not currently being developed

Effects Analysis

Assessment of Initial Impacts

The level of potential effects on mineral resources that could result from implementation of the Project is the basis for assessing initial impacts on mineral resources. The initial impacts were assigned using the criteria presented in Table 3-28 and are presented in Table 3-29. For mineral resources, there are large

areas where different types of leases (e.g., coal or oil and gas) overlap. In such cases, the miles are not duplicated in the initial impacts.

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 2-8), selective mitigation measures were developed to avoid or minimize potential high and moderate impacts on mineral resources, where feasible. Selective mitigation measures applied to reduce impacts on soil resources are summarized in Table 3-29 and described in this section.

- **Selective Mitigation Measure 2 (sensitive resource avoidance).** There would be no blading of new access roads in areas with active mines, producing wells, permitted mines, coal and other leases, oil and gas leases, geothermal leases, and active mines to limit potential conflicts with the development of these resources.
- **Selective Mitigation Measure 7 (span/avoid sensitive features).** Tower structures would be located so as to span and/or avoid active mines and producing oil, gas, or geothermal wells to limit conflicts with access to or expansion of these sites, where practicable.

Residual Impacts

Table 3-29 summarizes the initial impacts based on the level 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 3-29
SUMMARY OF INITIAL AND RESIDUAL IMPACTS ON MINERAL RESOURCES

Mineral Resource	Initial Impact[1]	Selective Mitigation Measures Applied	Residual Impact
Active mines and producing oil and gas or geothermal wells	Moderate	2, 7	Low
Permitted mines	Moderate	2, 7	Low
Coal leases	Moderate	None	Moderate
Oil and gas leases	Moderate	None	Moderate
Geothermal leases	Moderate	None	Moderate
Active mining claims	Moderate	None	Moderate
Potential mines	Low	None	Low

NOTE: [1]Initial impacts reflect implementation of design features of the Proposed Action.

3.2.2.5 Results

The summaries of baseline resource inventories and results of the effects analysis for geologic hazards, mineral resources, and soils are presented in Tables 3-30, 3-31, and 3-32 and are described in this section. The description of residual impacts should be reviewed in conjunction with the resource inventory maps in Volume II. Table S-4a presents a comparison of results of the effects analysis for the alternative routes organized by resource.

3.2.2.5.1 No Action Alternative

Under this alternative, the environment would remain as it presently exists.

3.2.2.5.2 Impacts Common to All Action Alternatives

Impacts associated with geologic hazards, soil resources, and mineral resources are closely tied to the physical presence of the Project and would vary by alternative route. Minor variations are frequent throughout the comparisons of alternative routes for earth resources, meaning small changes in the amount of impacts (mileage) occur between the alternative routes.

The estimated acreages of temporary disturbance (i.e., work areas, wire-tensioning sites, wire-splicing sites, construction yards, and guard structures), permanent disturbance (i.e., structure pad areas, regeneration stations, and substations), and vegetation clearing in the right-of-way that would affect the soil resources for each alternative route are presented in Tables 2-11 and 2-12.

3.2.2.5.3 345-kilovolt Ancillary Transmission Line Components

Geologic Hazards

Quaternary faults are the only geologic hazards crossed by the 345kV transmission line components between the Mona and Clover substations. Residual impacts from geologic hazards along each of these links would be moderate.

Soil Resources

Soils that are moderately susceptible to water and/or wind erosion and small areas of designated Prime or Unique Farmland soils are crossed by the 345kV transmission line components between the Mona and Clover substations. Residual impacts on soil resources along each of these links would be moderate in areas where Prime or Unique Farmland soils are crossed and low where soils that are moderately susceptible to water and/or wind erosion are crossed.

Mineral Resources

No active mines, producing wells, or leases of any type are crossed by the 345kV transmission line components between the Mona and Clover substations. Sections of the 345kV components cross an area with mineral potential. Residual impacts on mineral resources along each of these links would be low, associated with a mineral potential area crossed by the 345kV transmission line components between the Mona and Clover substations.

3.2.2.5.4 500-kilovolt Transmission Line Components

Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO)

The summaries of baseline resource inventories and results of the effects analysis for geologic hazards, mineral resources, and soils for WYCO alternative routes are presented in Table 3-30.

Alternative WYCO-B (Agency and Applicant Preferred Alternative)

Affected Environment (Wyoming)

Geologic Hazards

Alternative WYCO-B in Wyoming cross 0.2 mile of areas with potential mine subsidence, 6.4 miles of areas with moderate flood susceptibility, and 0.2 mile of areas with moderate landslide potential (Table 3-30 and MV-2a).

TABLE 3-30
ALTERNATIVE ROUTE COMPARISON FOR EARTH RESOURCES INVENTORY DATA AND RESIDUAL IMPACTS FOR THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES

		Geologic Hazards (miles crossed)					Soil Resources (miles crossed)										Miles of Residual Impacts (miles crossed)				
			Flooding		Landslide Susceptibility		Farmland		Water Erosion Susceptibility			Wind Erosion Susceptibility			Mineral Resources (miles crossed)		Geologic Hazards		Soil Resources	Mineral Resources	
Alternative Route	**Total Miles**	**Mine Subsidence**	**Moderate**	**Low**	**Moderate**	**Low or None**	**High**	**Low**	**High**	**Moderate**	**Low or None**	**High**	**Moderate**	**Low or None**	**Moderate**	**Low or None**	**Moderate**	**Low**	**Low**	**No Identifiable**	**Low**
WYCO-B (Agency and Applicant Preferred Alternative)	206.3	0.2	6.4	199.9	20.2	186.1	6.4	199.9	0.5	26.2	179.6	2.0	16.1	188.2	82.0	124.3	6.4	199.9	206.3	75.6	130.7
Wyoming	*141.0*	*0.2*	*6.4*	*134.6*	*0.2*	*140.8*	*0.0*	*141.0*	*0.1*	*14.4*	*126.5*	*0.0*	*4.8*	*136.2*	*53.9*	*87.1*	*6.4*	*134.6*	*141.0*	*58.8*	*82.2*
Colorado	*65.3*	*0.0*	*0.0*	*65.3*	*20.0*	*45.3*	*6.4*	*58.9*	*0.4*	*11.8*	*53.1*	*2.0*	*11.3*	*52.0*	*28.1*	*37.2*	*0.0*	*65.3*	*65.3*	*16.8*	*48.5*
WYCO-C	210.0	0.2	6.4	203.6	20.0	190.0	6.4	203.6	0.5	26.1	183.4	2.0	16.1	191.9	83.1	126.9	6.4	203.6	210.0	74.8	135.2
Wyoming	*144.7*	*0.2*	*6.4*	*138.3*	*0.0*	*144.7*	*0.0*	*144.7*	*0.1*	*14.3*	*130.3*	*0.0*	*4.8*	*139.9*	*55.0*	*89.7*	*6.4*	*138.3*	*144.7*	*58.0*	*86.7*
Colorado	*65.3*	*0.0*	*0.0*	*65.3*	*20.0*	*45.3*	*6.4*	*58.9*	*0.4*	*11.8*	*53.1*	*2.0*	*11.3*	*52.0*	*28.1*	*37.2*	*0.0*	*65.3*	*65.3*	*16.8*	*48.5*
WYCO-D	249.4	0.8	8.0	241.4	67.4	182.0	12.8	236.6	0.8	21.5	227.1	1.3	15.1	233.0	86.1	163.3	8.0	241.4	249.4	91.9	157.5
Wyoming	*134.9*	*0.8*	*5.6*	*129.3*	*2.0*	*132.9*	*0.0*	*134.9*	*0.7*	*10.7*	*123.5*	*0.0*	*2.0*	*132.9*	*46.6*	*88.3*	*5.6*	*129.3*	*134.9*	*65.6*	*69.3*
Colorado	*114.5*	*0.0*	*2.4*	*112.1*	*65.4*	*49.1*	*12.8*	*101.7*	*0.1*	*10.8*	*103.6*	*1.3*	*13.1*	*100.1*	*39.5*	*75.0*	*2.4*	*112.1*	*114.5*	*26.3*	*88.2*
WYCO-F	218.8	0.2	6.4	212.4	20.0	198.8	6.4	212.4	0.5	26.3	192.0	2.0	15.0	201.8	67.7	151.1	6.4	212.4	218.8	90.2	128.6
Wyoming	*153.5*	*0.2*	*6.4*	*147.1*	*0.0*	*153.5*	*0.0*	*153.5*	*0.1*	*14.5*	*138.9*	*0.0*	*3.7*	*149.8*	*39.6*	*113.9*	*6.4*	*147.1*	*153.5*	*73.4*	*80.1*
Colorado	*65.3*	*0.0*	*0.0*	*65.3*	*20.0*	*45.3*	*6.4*	*58.9*	*0.4*	*11.8*	*53.1*	*2.0*	*11.3*	*52.0*	*28.1*	*37.2*	*0.0*	*65.3*	*65.3*	*16.8*	*48.5*

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Soil Resources

Alternative WYCO-B in Wyoming crosses no lands designated as Prime or Unique Farmland soils, 0.1 mile of soils highly susceptible to water erosion and 14.4 miles of soils moderately susceptible to water erosion, and no soils highly susceptible to wind erosion and 4.8 miles of soils moderately susceptible to wind erosion (Table 3-30 and MV-3a).

Mineral Resources

Alternative WYCO-B in Wyoming cross 7.4 miles of active mines or producing wells; 49.3 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 51.3 miles of potential mineral resources (Table 3-30 and MV-4a).

Environmental Consequences (Wyoming)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative WYCO-B in Wyoming, the alternative route crosses 6.4 miles of areas having moderate impacts and 134.6 miles of areas that would have low impacts from geologic hazards (Table 3-30 and MV-2a).

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative WYCO-B in Wyoming, there would be 141.0 miles of low impacts on soil resources (Table 3-30 and MV-3a).

Mineral Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative WYCO-B in Wyoming, there would be 82.2 miles of low impacts on potential mineral resources (Table 3-30 and MV-4a).

Affected Environment (Colorado)

Geologic Hazards

Alternative WYCO-B in Colorado crosses 20.0 miles of areas with moderate landslide susceptibility (Table 3-30 and MV-2b).

Soil Resources

Alternative WYCO-B in Colorado crosses 6.4 miles of lands designated as Prime or Unique Farmland soils, 0.4 miles of soils highly susceptible to water erosion and 11.8 miles of soils moderately susceptible to water erosion, and 2.0 miles of soils highly susceptible to wind erosion and 11.3 miles of soils moderately susceptible to wind erosion (Table 3-30 and MV-3b).

Mineral Resources

Alternative WYCO-B in Colorado crosses 28.1 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases, and 36.4 miles of potential mineral resources (Table 3-30 and MV-4b).

Environmental Consequences (Colorado)

Geologic Hazards

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative WYCO-B in Colorado, the alternative route crosses 65.3 miles of areas that would pose only low impacts on the Project from geologic hazards (Table 3-30 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative WYCO-B in Colorado, there would be 65.3 miles of low impacts on soil resources (Table 3-30 and MV-3b).

Mineral Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative WYCO-B in Colorado, there would be 48.5 miles of low impacts on mineral resources (Table 3-30 and MV-4b).

Alternative WYCO-C

Affected Environment (Wyoming)

Geologic Hazards

Alternative WYCO-C in Wyoming cross 0.2 miles of areas of potential mine subsidence and 6.4 miles of areas with moderate flood susceptibility (Table 3-30 and MV-2a).

Soil Resources

Alternative WYCO-C in Wyoming cross no lands designated as Prime or Unique Farmland soils, 0.1 mile of soils highly susceptible to water erosion and 14.3 miles of soils moderately susceptible to water erosion, and no soils highly susceptible to wind erosion and cross 4.8 miles of soils moderately susceptible to wind erosion (Table 3-30 and MV-3a).

Mineral Resources

Alternative WYCO-C in Wyoming crosses 7.1 miles of active mines or producing wells; 57.5 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 58.2 miles of potential mineral resources (Table 3-30 and MV-4a).

Environmental Consequences (Wyoming)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative WYCO-C in Wyoming, the alternative route crosses 6.4 miles of areas having moderate impacts and 138.3 miles of areas that could pose low impacts on the Project from geologic hazards (Table 3-30 and MV-2a). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative WYCO-C in Wyoming, there would be 144.7 miles of low impacts on soil resources (Table 3-30 and MV-3a).

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative WYCO-C in Wyoming, there would be 86.7 miles of low impacts on mineral resources (Table 3-30 and MV-4a).

Affected Environment (Colorado)

Geologic Hazards

Alternative WYCO-C in Colorado crosses 20.0 miles of areas with moderate landslide susceptibility (Table 3-30 and MV-2b).

Soil Resources

Alternative WYCO-C in Colorado crosses 6.4 miles of lands designated as Prime or Unique Farmland soils, 0.4 miles of soils highly susceptible to water erosion and 11.8 miles of soils moderately susceptible to water erosion, and 2.0 miles of soils highly susceptible to wind erosion and 11.3 miles of soils moderately susceptible to wind erosion (Table 3-30 and MV-3b).

Mineral Resources

Alternative WYCO-C in Colorado crosses 28.1 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases and 36.4 miles of potential mineral resources (Table 3-30 and MV-4b).

Environmental Consequences (Colorado)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative WYCO-C in Colorado, the alternative route crosses 65.3 miles of areas that could pose low impacts on the Project from geologic hazards (Table 3-30 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative WYCO-C in Colorado, there would be 65.3 miles of low impacts on soil resources (Table 3-30 and MV-3b).

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative WYCO-C in Colorado, there would be 48.5 miles of low impacts on mineral resources (Table 3-30 and MV-4b).

Alternative WYCO-D

Affected Environment (Wyoming)

Geologic Hazards

Alternative WYCO-D in Wyoming crosses 0.8 mile of areas with potential mine subsidence, 5.6 miles of areas with moderate flood susceptibility, and 2.0 miles of areas with moderate landslide susceptibility (Table 3-30 and MV-2a).

Soil Resources

Alternative WYCO-D in Wyoming does not cross any lands designated as Prime or Unique Farmland soils, crosses 0.7 mile of soils highly susceptible to water erosion and 10.7 miles of soils moderately susceptible to water erosion, and does not cross any soils highly susceptible to wind erosion and crosses 2.0 miles of soils moderately susceptible to wind erosion (Table 3-30 and MV-3a).

Mineral Resources

Alternative WYCO-D in Wyoming cross 6.8 miles of active mines or producing wells; 42.3 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 85.9 miles of potential mineral resources (Table 3-30 and MV-4a).

Environmental Consequences (Wyoming)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative WYCO-D in Wyoming, the alternative route crosses 5.6 miles of areas with moderate impacts and 129.3 miles of areas that could pose low impacts on the Project from geologic hazards (Table 3-30 and MV-2a). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative WYCO-D in Wyoming, there would be 134.9 miles of low impacts on soil resources (Table 3-30 and MV-3a). Alternative WYCO-D would have a greater impact on farmlands than any other alternative route in the WYCO group.

Mineral Resources

Following the implementation of the design features of the Proposed Action and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative WYCO-D in Wyoming, there would be 69.3 miles of low impacts on mineral resources (Table 3-30 and MV-4a).

Affected Environment (Colorado)

Geologic Hazards

Alternative WYCO-D in Colorado crosses 2.4 miles of areas with moderate flood susceptibility and 65.4 miles of areas with moderate landslide susceptibility (Table 3-30 and MV-2b).

Soil Resources

Alternative WYCO-D in Colorado crosses 12.8 miles of lands designated as Prime or Unique Farmland soils, 0.1 mile of soils highly susceptible to water erosion and 10.8 miles of soils moderately susceptible to water erosion, and 1.3 miles of soils highly susceptible to wind erosion and 13.1 miles of soils moderately susceptible to wind erosion (Table 3-30 and MV-3b).

Mineral Resources

Alternative WYCO-D in Colorado crosses 0.3 mile of active mines or producing wells; 40.2 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 77.9 miles of potential mineral resources (Table 3-30 and MV-4b).

Environmental Consequences (Colorado)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative WYCO-D in Colorado, the alternative route crosses 2.4 miles of areas that would pose moderate impacts and 112.1 miles of areas that could pose low impacts on the Project from geologic hazards (Table 3-30 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative WYCO-D in Colorado, there would be 114.5 miles of low impacts on soil resources (Table 3-30 and MV-3b). Alternative WYCO-D would have greater impact on farmlands than any other alternative route in the WYCO group.

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative WYCO-D in Colorado, there would be 88.2 miles of low impacts on mineral resources (Table 3-30 and MV-4b).

Alternative WYCO-F

Affected Environment (Wyoming)

Geologic Hazards

Alternative WYCO-F in Wyoming, crosses 0.2 mile of areas with potential mine subsidence and 6.4 miles of areas with moderate flood susceptibility (Table 3-30 and MV-2a).

Soil Resources

Alternative WYCO-F in Wyoming does not cross any lands designated as Prime or Unique Farmland soils or soils highly susceptible to wind erosion; however, the alternative route crosses 0.1 mile of soils highly susceptible to water erosion, 14.5 miles of soils moderately susceptible to water erosion, and 3.7 miles of soils moderately susceptible to wind erosion (Table 3-30 and MV-3a).

Mineral Resources

Alternative WYCO-F in Wyoming crosses 7.0 miles of active mines or producing wells; 34.1 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 64.5 miles of potential mineral resources (Table 3-30 and MV-4a).

Environmental Consequences (Wyoming)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative WYCO-F in Wyoming, the alternative route crosses 6.4 miles of areas that pose moderate impacts and 147.1 miles of areas that could pose low impacts on the Project from geologic hazards (Table 3-30 and MV-2a). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative WYCO-F in Wyoming, there would be 153.5 miles of low impacts on soil resources (Table 3-30 and MV-3a).

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative WYCO-F in Wyoming, there would be 80.1 miles of low impacts on mineral resources in Wyoming (Table 3-30 and MV-4a).

Affected Environment (Colorado)

Geologic Hazards

Alternative WYCO-F in Colorado crosses 20.0 miles of areas with moderate landslide susceptibility (Table 3-30 and MV-2b).

Soil Resources

Alternative WYCO-F in Colorado crosses 6.4 miles of lands designated as Prime or Unique Farmland soils, 0.4 mile of soils highly susceptible to water erosion and 11.8 miles of soils moderately susceptible to water erosion, and 2.9 miles of soils highly susceptible to wind erosion and 11.3 miles of soils moderately susceptible to wind erosion (Table 3-30 and MV-3b).

Mineral Resources

Alternative WYCO-F in Colorado crosses 28.1 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases and 36.4 miles of potential mineral resources (Table 3-30 and MV-4b).

Environmental Consequences (Colorado)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative WYCO-F in Colorado, the alternative route crosses 65.3 miles of areas that could pose low impacts on the Project from geologic hazards (Table 3-30 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative WYCO-F in Colorado, there would be 65.3 miles of low impacts on soil resources (Table 3-30 and MV-3b).

Mineral Resources

Following the implementation of the design features of the Proposed Action and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative WYCO-F in Colorado, there would be 48.5 miles of low impacts on mineral resources (Table 3-30 and MV-4b).

Colorado to Utah – U.S. Highway 40 to Baxter Pass to Clover (COUT BAX)

The summaries of baseline resource inventories and results of the effects analysis for geologic hazards, mineral resources, and soils for the COUT BAX alternative routes are presented in Table 3-31.

Alternative COUT BAX-B

Affected Environment (Colorado)

Geologic Hazards

Alternative COUT BAX-B in Colorado crosses 1.3 miles of areas with potential mine subsidence, 6.6 miles of areas with moderate flood susceptibility and 60.3 miles of areas with moderate landslide susceptibility (Table 3-31 and MV-2b).

Soil Resources

Alternative COUT BAX-B in Colorado crosses 4.6 miles of lands designated as Prime or Unique Farmland soils, no soils highly susceptible to water erosion and 15.6 miles of soils moderately susceptible to water erosion, and no soils highly susceptible to wind erosion and 18.5 miles of soils moderately susceptible to wind erosion (Table 3-31 and MV-3b).

Mineral Resources

Alternative COUT BAX-B in Colorado crosses 7.1 miles of active mines or producing wells; 63.7 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 76.1 miles of potential mineral resources (Table 3-31 and MV-4b).

Environmental Consequences (Colorado)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT BAX-B in Colorado, the alternative route crosses 6.6 miles of areas that could pose moderate impacts and 80.4 miles of areas that could pose low impacts on the Project from geologic hazards (Table 3-31 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT BAX-B in Colorado, there would be 87.0 miles of low impacts on soil resources (Table 3-31 and MV-3b).

Mineral Resources

Following the implementation of the design features of the Proposed Action and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT BAX-B in Colorado, there would be 79.5 miles of low impacts on mineral resources (Table 3-31 and MV-4b).

Affected Environment (Utah)

Geologic Hazards

Alternative COUT BAX-B in Utah crosses 0.3 mile of areas with potential mine subsidence, 1.5 miles of areas with Quaternary faults, 13.8 miles of areas with moderate flood susceptibility and 82.0 miles of areas with moderate landslide susceptibility (Table 3-31 and MV-2b).

Soil Resources

Alternative COUT BAX-B in Utah crosses 5.6 miles of lands designated as Prime or Unique Farmland soils, 0.6 mile of soils highly susceptible to water erosion and 17.3 miles of soils moderately susceptible to water erosion, and 1.6 miles of soils highly susceptible to wind erosion and 12.0 miles of soils moderately susceptible to wind erosion (Table 3-31 and MV-3b).

Mineral Resources

Alternative COUT BAX-B in Utah crosses 7.7 miles of active mines or producing wells; 118.2 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 171.7 miles of potential mineral resources (Table 3-31 and MV-4b).

Environmental Consequences (Utah)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT BAX-B in Utah, the alternative route crosses 15.3 miles of areas that could pose moderate impacts and 177.6 miles of areas that could pose low impacts on the Project from geologic hazards (Table 3-31 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT BAX-B in Utah, there would be 192.9 miles of low impacts on soil resources (Table 3-31 and MV-3b).

The USFS evaluated whether implementation of Alternative COUT BAX-B would be in conformance with standards, guidelines, and management objectives pertaining to the soil resources contained in applicable USFS LRMPs. The results of this evaluation are presented in the Soils Report available for review and download from the Project website. The analysis found that Alternative COUT BAX-B could be approved in compliance with standards, guidelines, and management objectives pertaining to soils contained in applicable USFS LRMPs.

Mineral Resources

Following the implementation of the design features of the Proposed Action and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT BAX-B in Utah, there would be 174.8 miles of low impacts on mineral resources (Table 3-31 and MV-4b).

TABLE 3-31
ALTERNATIVE ROUTE COMPARISON FOR EARTH RESOURCES INVENTORY DATA AND RESIDUAL IMPACTS FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO BAXTER PASS TO CLOVER (COUT BAX) ALTERNATIVE ROUTES

Alternative Route	Total Miles	Geologic Hazards (miles crossed)						Soil Resources (miles crossed)								Mineral Resources (miles crossed)		Miles of Residual Impacts (miles crossed)				
		Mine Subsidence	Quaternary Faults	Flooding		Landslide Susceptibility		Farmland		Water Erosion Susceptibility			Wind Erosion Susceptibility					Geologic Hazards		Soil Resources	Mineral Resources	
				Moderate	Low	Moderate	Low or None	High	Low	High	Moderate	Low or None	High	Moderate	Low or None	Moderate	Low or None	Moderate	Low	Low	No Identifiable	Low
COUT BAX-B	279.9	1.6	1.5	20.4	259.5	142.3	137.6	10.2	269.7	0.6	32.9	246.4	1.6	30.5	247.8	165.4	114.5	21.9	258.0	279.9	25.6	254.3
Colorado	*87.0*	*1.3*	*0.0*	*6.6*	*80.4*	*60.3*	*26.7*	*4.6*	*82.4*	*0.0*	*15.6*	*71.4*	*0.0*	*18.5*	*68.5*	*58.9*	*28.1*	*6.6*	*80.4*	*87.0*	*7.5*	*79.5*
Utah	*192.9*	*0.3*	*1.5*	*13.8*	*179.1*	*82.0*	*110.9*	*5.6*	*187.3*	*0.6*	*17.3*	*175.0*	*1.6*	*12.0*	*179.3*	*106.5*	*86.4*	*15.3*	*177.6*	*192.9*	*18.1*	*174.8*
COUT BAX-C	290.4	1.3	1.5	15.9	274.5	137.2	153.2	10.2	280.2	0.6	33.6	256.2	1.0	24.8	264.6	169.9	120.5	17.4	273.0	290.4	25.6	264.8
Colorado	*87.0*	*1.3*	*0.0*	*6.6*	*80.4*	*60.3*	*26.7*	*4.6*	*82.4*	*0.0*	*15.6*	*71.4*	*0.0*	*18.5*	*68.5*	*58.9*	*28.1*	*6.6*	*80.4*	*87.0*	*7.5*	*79.5*
Utah	*203.4*	*0.3*	*1.5*	*9.3*	*194.1*	*76.9*	*126.5*	*5.6*	*197.8*	*0.6*	*18.0*	*184.8*	*1.0*	*6.3*	*196.1*	*111.0*	*92.4*	*10.8*	*192.6*	*203.4*	*18.1*	*185.3*
COUT BAX-E	292.2	3.9	1.8	15.3	276.9	124.1	168.1	11.6	280.6	0.6	34.0	257.6	0.0	21.2	271.0	174.4	117.8	17.1	275.1	292.2	25.3	266.9
Colorado	*87.0*	*1.3*	*0.0*	*6.6*	*80.4*	*60.3*	*26.7*	*4.6*	*82.4*	*0.0*	*15.6*	*71.4*	*0.0*	*18.5*	*68.5*	*58.9*	*28.1*	*6.6*	*80.4*	*87.0*	*7.5*	*79.5*
Utah	*205.2*	*2.6*	*1.8*	*8.7*	*196.5*	*63.8*	*141.4*	*7.0*	*198.2*	*0.6*	*18.4*	*186.2*	*0.0*	*2.7*	*202.5*	*115.5*	*89.7*	*10.5*	*194.7*	*205.2*	*17.8*	*187.4*

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Alternative COUT BAX-C

Affected Environment (Colorado)

Geologic Hazards

Alternative COUT BAX-C in Colorado crosses 1.3 mile of areas with potential mine subsidence, 6.6 miles of areas with moderate flood susceptibility and 60.3 miles of areas with moderate landslide susceptibility (Table 3-31 and MV-2b).

Soil Resources

Alternative COUT BAX-C in Colorado crosses 4.6 miles of lands designated as Prime or Unique Farmland soils, no soils highly susceptible to water erosion and 15.6 miles of soils moderately susceptible to water erosion, and no soils highly susceptible to wind erosion and 18.5 miles of soils moderately susceptible to wind erosion (Table 3-31 and MV-3b).

Mineral Resources

Alternative COUT BAX-C in Colorado crosses 7.1 miles of active mines or producing wells; 63.4 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 76.1 miles of potential mineral resources (Table 3-31 and MV-4b).

Environmental Consequences (Colorado)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT BAX-C in Colorado, the alternative route crosses 6.6 miles of areas that could pose moderate impacts and 80.4 miles of areas that could pose low impacts on the Project from geologic hazards (Table 3-31 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT BAX-C in Colorado, there would be 87.0 miles of low impacts on soil resources (Table 3-31 and MV-3b).

Mineral Resources

Following the implementation of the design features of the Proposed Action and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT BAX-C in Colorado, there would be 79.5 miles of low impacts on mineral resources (Table 3-31 and MV-4b).

Affected Environment (Utah)

Geologic Hazards

Alternative COUT BAX-C in Utah crosses 0.3 mile of areas with potential mine subsidence, 1.5 miles of areas with Quaternary faults, 9.3 miles of areas with moderate flood susceptibility, and 76.9 miles of areas with moderate landslide susceptibility (Table 3-31 and MV-2b).

Soil Resources

Alternative COUT BAX-C in Utah crosses 5.6 miles of lands designated as Prime or Unique Farmland soils, 0.6 mile of soils highly susceptible to water erosion and 19.0 miles of soils moderately susceptible to water erosion, and 1.0 mile of soils highly susceptible to wind erosion and 6.3 miles of soils moderately susceptible to wind erosion (Table 3-31 and MV-3b).

Mineral Resources

Alternative COUT BAX-C in Utah crosses 7.9 miles of active mines or producing wells; 122.7 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 182.2 miles of potential mineral resources (Table 3-31 and MV-4b).

Environmental Consequences (Utah)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT BAX-C in Utah, the alternative route crosses 10.8 miles of areas that could pose moderate impacts and 192.6 miles of areas that could pose low impacts on the Project from geologic hazards (Table 3-31 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT BAX-C in Utah, there would be 203.4 miles of low impacts on soil resources (Table 3-31 and MV-3b).

The USFS evaluated whether implementation of Alternative COUT BAX-C would be in conformance with standards, guidelines, and management objectives pertaining to the soil resources contained in applicable USFS LRMPs. The results of this evaluation are presented in the Soils Report available for review and download from the Project website. The analysis found that Alternative COUT BAX-C could be approved in compliance with standards, guidelines, and management objectives pertaining to soils contained in applicable USFS LRMPs.

Mineral Resources

Following the implementation of the design features of the Proposed Action and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT BAX-C in Utah, there would be 185.3 miles of low impacts on mineral resources (Table 3-31 and MV-4b).

Alternative COUT BAX-E

Affected Environment (Colorado)

Geologic Hazards

Alternative COUT BAX-E in Colorado crosses 1.3 mile of areas with potential mine subsidence, 6.6 miles of areas with moderate flood susceptibility and 60.3 miles of areas with moderate landslide susceptibility (Table 3-31 and MV-2b).

Soil Resources

Alternative COUT BAX-E in Colorado crosses 4.6 miles of lands designated as Prime or Unique Farmland soils, no soils highly susceptible to water erosion and 15.6 miles of soils moderately susceptible to water erosion, and no soils highly susceptible to wind erosion and 18.5 miles of soils moderately susceptible to wind erosion (Table 3-31 and MV-3b).

Mineral Resources

Alternative COUT BAX-E in Colorado crosses 7.1 miles of active mines or producing wells; 63.4 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 76.1 miles of potential mineral resources (Table 3-31 and MV-4b).

Environmental Consequences (Colorado)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT BAX-E in Colorado, the alternative route crosses 6.6 miles of areas that pose moderate impacts and 80.4 miles of areas that pose low impacts on the Project from geologic hazards (Table 3-31 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT BAX-E in Colorado, there would be 87.0 miles of low impacts on soil resources (Table 3-31 and MV-3b). Alternative COUT BAX-E would have the greatest impacts on farmlands of all the alternative routes in the COUT BAX group.

Mineral Resources

Following the implementation of the design features of the Proposed Action and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT BAX-E in Colorado, there would be 79.5 miles of low impacts on mineral resources (Table 3-31 and MV-4b). High and moderate impacts would include potential impacts on oil and gas leases, mines, and geothermal resources along Links 45, 66, and 381.

Affected Environment (Utah)

Geologic Hazards

Alternative COUT BAX-E in Utah crosses 2.6 mile of areas with potential mine subsidence, 1.8 miles of areas with Quaternary faults, 8.7 miles of areas with moderate flood susceptibility, and 63.8 miles of areas with moderate landslide susceptibility (Table 3-31 and MV-2b).

Soil Resources

Alternative COUT BAX-E in Utah crosses 7.0 miles of lands designated as Prime or Unique Farmland soils, 0.6 mile of soils highly susceptible to water erosion and 18.4 miles of soils moderately susceptible to water erosion, 2.7 miles of soils moderately susceptible to wind erosion and no soils highly susceptible to wind erosion (Table 3-31 and MV-3b).

Mineral Resources

Alternative COUT BAX-E in Utah crosses 14.2 miles of active mines or producing wells; 130.7 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 186.9 miles of potential mineral resources (Table 3-31 and MV-4b).

Environmental Consequences (Utah)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT BAX-E in Utah, the alternative route crosses 10.5 miles of areas that could pose moderate impacts and 194.7 miles of areas that could pose low impacts on the Project from geologic hazards (Table 3-31 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT BAX-E in Utah, there would be 205.2 miles of low impacts on soil resources (Table 3-31 and MV-3b). Alternative COUT BAX-E would have the greatest impacts on farmlands of all the alternative routes in the COUT BAX group.

The USFS evaluated whether implementation of Alternative COUT BAX-E would be in conformance with standards, guidelines, and management objectives pertaining to the soil resources contained in applicable USFS LRMPs. The results of this evaluation are presented in the Soils Report available for review and download from the Project website. The analysis found that Alternative COUT BAX-E could be approved in compliance with standards, guidelines, and management objectives pertaining to soils contained in applicable USFS LRMPs.

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT BAX-E in Utah, there would be 187.4 miles of low impacts on mineral resources (Table 3-31 and MV-4b).

Colorado to Utah – U.S. Highway 40 to Central Utah to Clover (COUT)

The summaries of baseline resource inventories and results of the effects analysis for geologic hazards, mineral resources, and soils for the COUT alternative routes are presented in Table 3-32.

Alternative COUT-A

Affected Environment (Colorado)

Geologic Hazards

Alternative COUT-A in Colorado does not cross and areas with moderate or high impacts (Table 3-32 and MV-2b).

Soil Resources

Alternative COUT-A in Colorado crosses 1.7 miles of lands designated as Prime or Unique Farmland soils, 1.5 miles of soils moderately susceptible to water erosion, and 2.4 miles of soils moderately susceptible to wind erosion (Table 3-32 and MV-3b).

TABLE 3-32
ALTERNATIVE ROUTE COMPARISON FOR EARTH RESOURCES INVENTORY DATA AND RESIDUAL IMPACTS FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES

		Geologic Hazards (miles crossed)						Soil Resources (miles crossed)										Miles of Residual Impacts (miles crossed)				
				Flooding		Landslide Susceptibility		Farmland		Water Erosion Susceptibility			Wind Erosion Susceptibility			Mineral Resources (miles crossed)		Geologic Hazards		Soil Resources	Mineral Resources	
Alternative Route	Total Miles	Mine Subsidence	Quaternary Faults	Moderate	Low	Moderate	Low or None	High	Low	High	Moderate	Low or None	High	Moderate	Low or None	Moderate	Low or None	Moderate	Low	Low	No Identifiable	Low
COUT-A	207.9	0.0	0.6	2.5	205.4	27.5	180.4	13.1	194.8	7.5	14.5	185.9	0.0	24.0	183.9	77.1	130.8	3.1	204.8	207.9	24.4	183.5
Colorado	*24.3*	*0.0*	*0.0*	*0.0*	*24.3*	*0.0*	*24.3*	*1.7*	*22.6*	*0.0*	*1.5*	*22.8*	*0.0*	*2.4*	*21.9*	*10.3*	*14.0*	*0.0*	*24.3*	*24.3*	*3.1*	*21.2*
Utah	*183.6*	*0.0*	*0.6*	*2.5*	*181.1*	*27.5*	*156.1*	*11.4*	*172.2*	*7.5*	*13.0*	*163.1*	*0.0*	*21.6*	*162.0*	*66.8*	*116.8*	*3.1*	*180.5*	*183.6*	*21.3*	*162.3*
COUT-B	218.2	0.0	0.8	8.7	209.5	36.1	182.1	13.4	204.8	9.4	18.6	190.2	0.0	26.1	192.1	87.4	130.8	9.5	208.7	218.2	24.4	193.8
Colorado	*24.3*	*0.0*	*0.0*	*0.0*	*24.3*	*0.0*	*24.3*	*1.7*	*22.6*	*0.0*	*1.5*	*22.8*	*0.0*	*2.4*	*21.9*	*10.3*	*14.0*	*0.0*	*24.3*	*24.3*	*3.1*	*21.2*
Utah	*193.9*	*0.0*	*0.8*	*8.7*	*185.2*	*36.1*	*157.8*	*11.7*	*182.2*	*9.4*	*17.1*	*167.4*	*0.0*	*23.7*	*170.2*	*77.1*	*116.8*	*9.5*	*184.4*	*193.9*	*21.3*	*172.6*
COUT-C (Agency and Applicant Preferred Alternative)	208.2	*0.0*	0.3	2.3	205.9	49.5	158.7	4.8	203.4	6.0	18.3	183.9	0.0	20.9	187.3	139.0	69.2	2.6	205.6	208.2	24.4	208.2
Colorado	*25.0*	*0.0*	*0.0*	*0.0*	*25.0*	*1.2*	*23.8*	*1.7*	*23.3*	*0.0*	*1.5*	*23.5*	*0.0*	*2.4*	*22.6*	*13.5*	*11.5*	*0.0*	*25.0*	*25.0*	*3.1*	*25.0*
Utah	*183.2*	*0.0*	*0.3*	*2.3*	*180.9*	*48.3*	*134.9*	*3.1*	*180.1*	*6.0*	*16.8*	*160.4*	*0.0*	*18.5*	*164.7*	*125.5*	*57.7*	*2.6*	*180.6*	*183.2*	*21.3*	*183.2*
COUT-H	200.6	2.7	0.7	2.3	198.3	37.4	163.2	5.4	195.2	0.6	21.9	178.1	0.0	20.5	180.1	118.7	81.9	3.0	197.6	200.6	*20.5*	180.1
Colorado	*25.0*	*0.0*	*0.0*	*0.0*	*25.0*	*1.2*	*23.8*	*1.7*	*23.3*	*0.0*	*1.5*	*23.5*	*0.0*	*2.4*	*22.6*	*13.5*	*11.5*	*0.0*	*25.0*	*25.0*	*3.1*	*21.9*
Utah	*175.6*	*2.7*	*0.7*	*2.3*	*173.3*	*36.2*	*139.4*	*3.7*	*171.9*	*0.6*	*20.4*	*154.6*	*0.0*	*18.1*	*157.5*	*105.2*	*70.4*	*3.0*	*172.6*	*175.6*	*17.4*	*158.2*
COUT-I	240.2	1.1	0.8	3.2	237.0	48.7	191.5	6.5	233.7	0.4	28.4	211.4	1.0	24.1	215.1	168.0	72.2	4.0	236.2	240.2	*21.2*	219.0
Colorado	*25.0*	*0.0*	*0.0*	*0.0*	*25.0*	*1.2*	*23.8*	*1.7*	*23.3*	*0.0*	*1.5*	*23.5*	*0.0*	*2.4*	*22.6*	*13.5*	*11.5*	*0.0*	*25.0*	*25.0*	*3.1*	*21.9*
Utah	*215.2*	*1.1*	*0.8*	*3.2*	*212.0*	*47.5*	*167.7*	*4.8*	*210.4*	*0.4*	*26.9*	*187.9*	*1.0*	*21.7*	*192.5*	*154.5*	*60.7*	*4.0*	*211.2*	*215.2*	*18.1*	*197.1*

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Mineral Resources

Alternative COUT-A in Colorado crosses 10.3 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases and 21.2 miles of potential mineral resources (Table 3-32 and MV-4b).

Environmental Consequences (Colorado)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT-A in Colorado, the alternative route crosses 24.3 miles of areas that could pose low impacts on the Project from geological hazards (Table 3-32 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT-A in Colorado, there would be 24.3 miles of low impacts on soil resources (Table 3-32 and MV-3b).

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT-A in Colorado, there would be 21.2 miles of low impacts on mineral resources (Table 3-32 and MV-4b).

Affected Environment (Utah)

Geologic Hazards

Alternative COUT-A in Utah crosses 0.6 mile of areas with Quaternary faults, 2.5 miles of areas with moderate flood susceptibility and 27.5 miles of areas with moderate landslide susceptibility (Table 3-32 and MV-2b).

Soil Resources

Alternative COUT-A in Utah crosses 11.4 miles of lands designated as Prime or Unique Farmland soils, 7.5 miles of soils highly susceptible to water erosion, and 13.0 miles of soils moderately susceptible to water erosion, and no soils highly susceptible to wind erosion and 21.6 miles of soils moderately susceptible to wind erosion (Table 3-32 and MV-3b).

Mineral Resources

Alternative COUT-A crosses in Utah 7.2 miles of active mines or producing wells; 65.3 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 117.0 miles of potential mineral resources (Table 3-32 and MV-4b).

Environmental Consequences (Utah)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT-A in Utah, the alternative route crosses 3.1 miles of areas that could pose moderate impacts and 180.5 miles of areas that could pose low impacts on

the Project from geologic hazards (Table 3-32 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT-A in Utah, there would be 183.6 miles of low impacts on soil resources (Table 3-32 and MV-3b).

The USFS evaluated whether implementation of Alternative COUT-A would be in conformance with standards, guidelines, and management objectives pertaining to the soil resources contained in applicable USFS LRMPs. The results of this evaluation are presented in the Soils Report available for review and download from the Project website. The analysis found that Alternative COUT-A could be approved in compliance with standards, guidelines, and management objectives pertaining to soils contained in applicable USFS LRMPs.

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT-A in Utah, there would be 162.3 miles of low impacts on mineral resources (Table 3-32 and MV-4b).

Alternative COUT-B

Affected Environment (Colorado)

Geologic Hazards

Alternative COUT-B in Colorado does not cross any areas with moderate or high impacts (Table 3-32 and MV-2b).

Soil Resources

Alternative COUT-B in Colorado crosses 1.7 miles of lands designated as Prime or Unique Farmland soils, 1.5 miles of soils moderately susceptible to water erosion, and 2.4 miles of soils moderately susceptible to wind erosion (Table 3-32 and MV-3b).

Mineral Resources

Alternative COUT-B in Colorado crosses 10.3 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases and 21.2 miles of potential mineral resources (Table 3-32 and MV-4b).

Environmental Consequences (Colorado)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT-B in Colorado, the alternative route crosses 24.3 miles of areas that pose low impacts on the Project from geologic hazards (Table 3-32 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT-B in Colorado, there would be

24.3 miles of low impacts on soil resources (Table 3-32 and MV-3b). Alternative COUT-B would have a greater impact on farmlands than the other alternative routes in the COUT group.

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT-B in Colorado, there would be 21.2 miles of low impacts on mineral resources (Table 3-32 and MV-4b).

Affected Environment (Utah)

Geologic Hazards

Alternative COUT-B in Utah crosses 0.8 mile of areas with Quaternary faults, 8.7 miles of areas with moderate flood susceptibility and 36.1 miles of areas with moderate landslide susceptibility (Table 3-32 and MV-2b).

Soil Resources

Alternative COUT-B in Utah crosses 11.7 miles of lands designated as Prime or Unique Farmland soils, 9.4 miles of soils highly susceptible to water erosion and 17.1 miles of soils moderately susceptible to water erosion, and no soils highly susceptible to wind erosion and 23.7 miles of soils moderately susceptible to wind erosion (Table 3-32 and MV-3b).

Mineral Resources

Alternative COUT-B in Utah crosses 9.6 miles of active mines or producing wells; 74.2 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 167.5 miles of potential mineral resources (Table 3-32 and MV-4b).

Environmental Consequences (Utah)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT-B in Utah, the alternative route crosses 9.5 miles of areas that pose moderate impacts and 184.4 miles of areas that pose low impacts on the Project from geologic hazards (Table 3-32 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT-B in Utah, there would be 193.9 miles of low impacts on soil resources Table 3-32 and MV-3b).

The USFS evaluated whether implementation of Alternative COUT-B would be in conformance with standards, guidelines, and management objectives pertaining to the soil resources contained in applicable USFS LRMPs. The results of this evaluation are presented in the Soils Report available for review and download from the Project website. The analysis found that Alternative COUT-B could be approved in compliance with standards, guidelines, and management objectives pertaining to soils contained in applicable USFS LRMPs.

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT-B in Utah, there would be 172.6 miles of low impacts on mineral resources (Table 3-32 and MV-4b).

Alternative COUT-C (Agency and Applicant Preferred Alternative)

Affected Environment (Colorado)

Geologic Hazards

Alternative COUT-C in Colorado does not cross any areas with moderate or high impacts from geologic hazards (Table 3-32 and MV-2b).

Soil Resources

Alternative COUT-C in Colorado crosses 1.7 miles of lands designated as Prime or Unique Farmland soils, 1.5 miles of soils moderately susceptible to water erosion, and 2.4 miles of soils moderately susceptible to wind erosion (Table 3-32 and MV-3b).

Mineral Resources

Alternative COUT-C in Colorado crosses 10.3 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 21.2 miles of potential mineral resources (Table 3-32 and MV-4b).

Environmental Consequences (Colorado)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT-C in Colorado, the alternative route crosses 24.3 miles of areas that pose low impacts on the Project from geologic hazards (Table 3-32 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT-C in Colorado, there would be 24.3 miles of low impacts on soil resources (Table 3-32 and MV-3b).

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 along Alternative COUT-C in Colorado, there would be 21.2 miles of low impacts on mineral resources (Table 3-32 and MV-4).

Affected Environment (Utah)

Geologic Hazards

Alternative COUT-C in Utah crosses 0.3 mile of areas with Quaternary faults, 2.3 miles of areas with moderate flood susceptibility, and 35.1 miles of areas with high landslide susceptibility and 48.3 miles of areas with moderate landslide susceptibility (Table 3-32 and MV-2b).

Soil Resources

Alternative COUT-C in Utah crosses 3.1 miles of lands designated as Prime or Unique Farmland soils, 6.0 miles of soils highly susceptible to water erosion and 16.2 miles of soils moderately susceptible to water erosion, and no soils highly susceptible to wind erosion and 20.1 miles of soils moderately susceptible to wind erosion (Table 3-32 and MV-3b).

Mineral Resources

Alternative COUT-C in Utah crosses 25.0 miles of active mines or producing wells; 106.9 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 164.4 miles of potential mineral resources (Table 3-32 and MV-4b).

Environmental Consequences (Utah)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT-C in Utah, the alternative route crosses 2.6 miles of areas that pose moderate impacts and 188.2 miles of areas that pose low impacts on the Project from geologic hazards (Table 3-32 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT-C in Utah, there would be 190.8 miles of low impacts on soil resources (Table 3-32 and MV-3b).

The USFS evaluated whether implementation of Alternative COUT-C would be in conformance with standards, guidelines, and management objectives pertaining to the soil resources contained in applicable USFS LRMPs. The results of this evaluation are presented in the Soils Report available for review and download from the Project website. The analysis found that Alternative COUT-C could be approved in compliance with standards, guidelines, and management objectives pertaining to soils contained in applicable USFS LRMPs.

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT-C in Utah, there would be 169.5 miles of low impacts on mineral resources (Table 3-32 and MV-4b).

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

Affected Environment

The area where the Bears Ears to Bonanza transmission line would be relocated generally has low susceptibility to landslides. The transmission line would cross a localized area with high landslide susceptibility near the easternmost portion of the area. The entire area is considered to have low susceptibility to flooding, and there are no faults or epicenters in the area.

Soils in this area are predominantly soils with moderate susceptibility to wind and water erosion. A localized portion of the area bisected by U242R has soils with low susceptibility to wind and water

erosion. There is a small area of prime farmland south of C188 and C188R in the area but it would not be crossed by the transmission line right-of-way.

The entire area is classified as a potential mineral resource and the relocated line would cross oil and gas leases on the eastern and western edges. There are no active mines or producing wells in the study area.

Environmental Consequences

It is not likely that the relocation of the Bears Ears to Bonanza 345kV transmission line would affected from geological hazards based on the absence of faults or epicenters in the relocation area. Similarly, based on low susceptibility of landslides in the area, it is not likely the relocation of the Bears Ears to Bonanza 345kV transmission line would trigger landslides during construction activities.

Impacts on soils with wind and water erosion susceptibility would be moderate. However, prime farmlands in the vicinity would be affected.

There could be impacts on oil and gas leases by hindering future well development.

Alternative COUT-H

Affected Environment (Colorado)

Geologic Hazards

Alternative COUT-H in Colorado crosses 1.2 miles of areas with moderate landslide susceptibility (Table 3-32 and MV-2b).

Soil Resources

Alternative COUT-H in Colorado crosses 1.7 miles of lands designated as Prime or Unique Farmland soils, 1.5 miles of soils moderately susceptible to water erosion, and 2.4 miles of soils moderately susceptible to wind erosion (Table 3-32 and MV-3b).

Mineral Resources

Alternative COUT-H in Colorado crosses 13.5 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases and 21.9 miles of potential mineral resources (Table 3-32 and MV-4b).

Environmental Consequences (Colorado)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT-H in Colorado, the alternative route crosses 25.0 miles of areas that pose low impacts on the Project from geologic hazards (Table 3-32 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT-H in Colorado there would be 25.0 miles of low impacts on soil resources (Table 3-32 and MV-3b).

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT-H in Colorado, there would be 21.9 miles of low impacts on mineral resources (Table 3-32 and MV-4b).

Affected Environment (Utah)

Geologic Hazards

Alternative COUT-H in Utah crosses 2.7 mile of areas with potential mine subsidence, 0.7 mile of areas with Quaternary faults, 2.3 miles of areas with moderate flood susceptibility, and 36.2 miles of areas with moderate landslide susceptibility (Table 3-32 and MV-2b).

Soil Resources

Alternative COUT-H in Utah crosses 3.7 miles of lands designated as Prime or Unique Farmland soils, 0.6 mile of soils highly susceptible to water erosion and 20.4 miles of soils moderately susceptible to water erosion, and no soils highly susceptible to wind erosion and crosses 18.1 miles of soils moderately susceptible to wind erosion (Table 3-32 and MV-3b).

Mineral Resources

Alternative COUT-H in Utah crosses 25.3 miles of active mines or producing wells; 107.3 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 158.2 miles of potential mineral resources (Table 3-32 and MV-4b).

Environmental Consequences (Utah)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT-H in Utah, the alternative route crosses 3.0 miles of areas that pose moderate impacts and 172.6 miles of areas that pose low impacts on the Project from geologic hazards (Table 3-32 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT-H in Utah, there would be 175.6 miles of low impacts on soil resources (Table 3-32 and MV-3b).

The USFS evaluated whether implementation of Alternative COUT-H would be in conformance with standards, guidelines, and management objectives pertaining to the soil resources contained in applicable USFS LRMPs. The results of this evaluation are presented in the Soils Report available for review and download from the Project website. The analysis found that Alternative COUT-H could be approved in compliance with standards, guidelines, and management objectives pertaining to soils contained in applicable USFS LRMPs.

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT-H in Utah, there would be 158.2 miles of low impacts on mineral resources (Table 3-32 and MV-4b).

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

The affected environment and environmental consequences for the relocation of the Bears Ears to Bonanza 345kV transmission line on Alternative COUT-H would be the same as Alternative COUT-C.

Alternative COUT-I

Affected Environment (Colorado)

Geologic Hazards

Alternative COUT-I in Colorado crosses 1.2 miles of areas with moderate landslide susceptibility (Table 3-32 and MV-2b).

Soil Resources

Alternative COUT-I in Colorado crosses 1.7 miles of lands designated as Prime or Unique Farmland soils, 1.5 miles of soils moderately susceptible to water erosion, and 2.4 miles of soils moderately susceptible to wind erosion (Table 3-32 and MV-3b).

Mineral Resources

Alternative COUT-I in Colorado crosses 13.5 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases and 21.9 miles of potential mineral resources (Table 3-32 and MV-4b).

Environmental Consequences (Colorado)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT-I in Colorado, the alternative route crosses 25.0 miles of areas that pose low impacts on the Project from geologic hazards (Table 3-32 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT-I in Colorado, there would be 25.0 miles of low impacts on soil resources (Table 3-32 and MV-3b).

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT-I in Colorado, there would be 21.9 miles of low impacts on mineral resources (Table 3-32 and MV-4b).

Affected Environment (Utah)

Geologic Hazards

Alternative COUT-I in Utah crosses 1.1 miles of areas with potential mine subsidence, 0.8 mile of areas with Quaternary faults, 3.2 miles of areas with moderate flood susceptibility and 47.5 miles of areas with moderate landslide susceptibility (Table 3-32 and MV-2b).

Soil Resources

Alternative COUT-I in Utah crosses 4.8 miles of lands designated as Prime or Unique Farmland soils, 0.4 mile of soils highly susceptible to water erosion and 26.9 miles of soils moderately susceptible to water erosion, and 1.0 mile of soils highly susceptible to wind erosion and 21.7 miles of soils moderately susceptible to wind erosion (Table 3-32 and MV-3b).

Mineral Resources

Alternative COUT-I in Utah crosses 28.1 miles of active mines or producing wells; 171.3 miles of permitted mines, coal leases, oil and gas leases, or geothermal leases; and 194.9 miles of potential mineral resources (Table 3-32 and MV-4b).

Environmental Consequences (Utah)

Geologic Hazards

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) along Alternative COUT-I in Utah, the alternative route crosses 4.0 miles of areas that pose moderate impacts and 211.2 miles of areas that pose low impacts on Project from geologic hazards (Table 3-32 and MV-2b). Construction of the Project would not be anticipated to result in impacts on geologic hazards.

Soil Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7, and 13 (Table 2-13) along Alternative COUT-I in Utah, there would be 215.2 miles of low impacts on soil resources (Table 3-32 and MV-3b).

The USFS evaluated whether implementation of Alternative COUT-I would be in conformance with standards, guidelines, and management objectives pertaining to the soil resources contained in applicable USFS LRMPs. The results of this evaluation are presented in the Soils Report available for review and download from the Project website. The analysis found that Alternative COUT-I could be approved in compliance with standards, guidelines, and management objectives pertaining to soils contained in applicable USFS LRMPs.

Mineral Resources

Following the implementation of the design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) along Alternative COUT-I in Utah, there would be 197.1 miles of low impacts on mineral resources (Table 3-32 and MV-4b.).

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

The affected environment and environmental consequences for the relocation of the Bears Ears to Bonanza 345kV transmission line on Alternative COUT-I would be the same as Alternative COUT-C.

3.2.2.5.5 Series Compensation Stations for the 500-kilovolt Transmission Line

Alternative WYCO-B (Agency and Applicant Preferred Alternative)

Siting Area A – Powder Wash

Affected Environment

Geological Hazards

Siting Area A (MV-2a and MV-2b) lies mostly in an area designated as having low susceptibility for flooding and moderate susceptibility for landslides. There are small areas of high susceptibility to flooding along Little Snake River.

Soil Resources

Siting Area A (MV-3a and MV-3b) lies mostly in areas designated as having moderate susceptibility to wind and water erosion, but there are several areas with high susceptibility to wind erosion, and low susceptibility to water erosion.

Mineral Resources

There is one coal lease, several oil and gas leases, and several producing oil and gas wells in Siting Area A (MV-4a and MV-4b).

Environmental Consequences

Geological Hazards

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13), the impacts of geological hazards on construction of the series compensation station would be low.

Soil Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7 and 13 (Table 2-13), the impacts of the Project on soil resources susceptible to wind and water erosion would be mostly low with small areas of moderate susceptibility to wind erosion.

Mineral Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13), the impacts on mineral resources from construction of the series compensation station would be low.

Siting Area B – Nine Mile Basin

Affected Environment

Geological Hazards

Siting Area B (MV-2a and MV-2b) lies mostly in an area designated as having low susceptibility for flooding and moderate susceptibility for landslides. There is one small area of high susceptibility to landslides along the southern portion of Siting Area B.

Soil Resources

Siting Area B (MV-3a and MV-3b) lies mostly in areas designated as having moderate susceptibility to wind and water erosion, but there are several areas with low susceptibility to wind and water erosion, and high susceptibility to water erosion.

Mineral Resources

There is one oil and gas lease in Siting Area B (MV-4a and MV-4b).

Environmental Consequences

Geological Hazards

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13), the impacts of geological hazards on construction of the series compensation station would be mostly low with a small area of moderate susceptibility from impact from landslides.

Soil Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7 and 13 (Table 2-13), the impacts of the Project on soil resources susceptible to wind and water erosion would be mostly low with small areas of moderate susceptibility to water erosion.

Mineral Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13), the impacts on mineral resources from construction of the series compensation station would be low.

Siting Area C – Maybell

Affected Environment

Geological Hazards

Siting Area C (MV-2a and MV-2b) lies mostly in an area designated as having low susceptibility for flooding and moderate susceptibility for landslides. There is one small area of moderate susceptibility to flooding along Yampa River.

Soil Resources

Siting Area C (MV-3a and MV-3b) lies mostly in areas designated as having moderate susceptibility to wind and water erosion, but there are several areas with moderate susceptibility to water erosion, and high susceptibility to wind erosion. There are several areas designated as Prime or Unique Farmland in Siting Area C.

Mineral Resources

There are three oil and gas lease in Siting Area C (MV-4a and MV-4b).

Environmental Consequences

Geological Hazards

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13), the impacts of geological hazards on construction of the series compensation station would be low.

Soil Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7 and 13 (Table 2-13), the impacts of the Project on soil resources susceptible to wind and water erosion would be mostly low with small areas of moderate impacts on farmlands.

Mineral Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13), the impacts on mineral resources from construction of the series compensation station would be low.

Alternative WYCO-C

Siting Area A – Powder Wash

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area A as Alternative WYCO-B.

Siting Area B – Nine Mile Basin

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area B as Alternative WYCO-B.

Siting Area C – Maybell

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area C as Alternative WYCO-B.

Alternative WYCO-D

Siting Area D – Bell Rock

Affected Environment

Geological Hazards

Siting Area D (MV-2a and MV-2b) lies mostly in an area designated as having low susceptibility for flooding and moderate susceptibility for landslides. There is one small area of high susceptibility to flooding along Sands Spring Gulch.

Soil Resources

Siting Area D (MV-3a and MV-3b) lies mostly in areas designated as having moderate susceptibility to wind and water erosion, but there are several areas with high susceptibility to wind erosion. There also are several areas designated as Prime or Unique Farmland in Siting Area D.

Mineral Resources

There are eight oil and gas leases in Siting Area D (MV-4a and MV-4b).

Environmental Consequences

Geological Hazards

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13), the impacts of geological hazards on construction of the series compensation station would be low.

Soil Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7 and 13 (Table 2-13), the impacts of the Project on soil resources susceptible to wind and water erosion would be mostly low with small areas of moderate impacts on farmlands.

Mineral Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13), the impacts on mineral resources from construction of the series compensation station would be low.

Alternative WYCO-F

Siting Area A – Powder Wash

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area A as Alternative WYCO-B.

Siting Area B – Nine Mile Basin

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area B as Alternative WYCO-B.

Siting Area C – Maybell

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area C as Alternative WYCO-B.

Alternatives COUT BAX-B, COUT BAX-C, and COUT BAX-E

Siting Area G – Green River

Affected Environment

Geological Hazards

Siting Area G (MV-2b) lies mostly in an area designated as having low susceptibility for flooding and moderate susceptibility for landslides. There is one small area of high susceptibility to flooding near the center of the siting area.

Soil Resources

Siting Area G (MV-3b) lies mostly in areas designated as having moderate susceptibility to wind and water erosion, but there are several areas with low susceptibility to wind and water erosion.

Mineral Resources

There are three oil and gas lease in Siting Area G (MV-4b).

Environmental Consequences

Geological Hazards

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13) the impacts of geological hazards on construction of the series compensation station would be low.

Soil Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7 and 13 (Table 2-13) the impacts of the Project on soil resources susceptible to wind and water erosion would be low.

Mineral Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13) the impacts on mineral resources from construction of the series compensation station would be low.

Alternative COUT-A

Siting Area F – Roosevelt

Affected Environment

Geological Hazards

Siting Area F (MV-2b) lies mostly in an area designated as having low susceptibility for flooding and moderate susceptibility for landslides. There is one area of moderate-high susceptibility to flooding near the Uinta River.

Soil Resources

Siting Area F (MV-3b) lies mostly in areas designated as having moderate susceptibility to wind and water erosion, but there are several areas with low susceptibility to wind and water erosion, and one area with high susceptibility to wind and water erosion.

Mineral Resources

There is one oil and gas lease, and several active mines in Siting Area F (MV-4b).

Environmental Consequences

Geological Hazards

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13), the impacts of geological hazards on construction of the series compensation station would be low.

Soil Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7 and 13 (Table 2-13), the impacts of the Project on soil resources susceptible to wind and water erosion would be mostly low with small areas of moderate impacts on areas with high wind and water erosion susceptibility.

Mineral Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13), the impacts on mineral resources from construction of the series compensation station would be low.

Alternative COUT-B

Siting Area F – Roosevelt

Affected Environment and Environmental Consequences

Alternative COUT-B would have the same affected environment and environmental consequences for Siting Area F as Alternative COUT-A.

Alternative COUT-C (Agency and Applicant Preferred Alternative)

Siting Area E – Bonanza

Affected Environment

Geological Hazards

Siting Area E (MV-2b) lies mostly in an area designated as having low susceptibility for flooding and moderate susceptibility for landslides.

Soil Resources

Siting Area E (MV-3b) lies mostly in areas designated as having low-moderate susceptibility to wind and water erosion, but there are several areas with high susceptibility to water erosion.

Mineral Resources

There are three oil and gas leases, and numerous oil and gas wells in Siting Area E (MV-4b).

Environmental Consequences

Geological Hazards

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measure 3 (Table 2-13), the impacts of geological hazards on construction of the series compensation station would be low.

Soil Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 1, 3, 7 and 13 (Table 2-13), the impacts of the Project on soil resources susceptible to wind and water erosion would be mostly low with small areas of moderate impacts on areas with high water erosion susceptibility.

Mineral Resources

Following the implementation of design features of the Proposed Action (Table 2-8) and Selective Mitigation Measures 2 and 7 (Table 2-13), the impacts on mineral resources from construction of the series compensation station would be low.

Alternatives COUT-H and COUT-I

Siting Area E – Bonanza

Affected Environment and Environmental Consequences

Alternatives COUT-H and COUT-I have the same affected environment and environmental consequences for Siting Area E as Alternative COUT-C.

3.2.3 Paleontological Resources

3.2.3.1 Introduction and Regulatory Framework

Paleontological resources are any fossilized remains, traces, or imprints of organisms preserved in or on the Earth's crust that are of paleontological interest and provide information about the history of life on Earth. Fossils include bones, teeth, shells, leaves, wood, and trackways buried in sedimentary deposits. Paleontological resources do not include any materials associated with an archaeological resource or any cultural item (16 U.S.C. 470aaa-4).

3.2.3.1.1 Regulatory Framework

Paleontological resources occurring on federal and state lands are afforded protection by federal and state law and regulation. Protection for paleontological resources includes requirements for: (1) the assessment of areas containing 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) the formulation and implementation of measures (e.g., permanent preservation of the discovered sites and/or permanent preservation of salvaged materials at federal- and state-approved institutions) to mitigate potentially adverse impacts. A significant paleontological resource is "any paleontological resource that is considered to be of scientific interest, including most vertebrate fossil remains and traces, and certain rare or unusual invertebrate and plant fossils" (BLM 2009b).

Federal

The FLPMA and NEPA serve as the primary federal legislation providing for the protection and conservation of paleontological resources occurring on federally administered lands. FLPMA (P.L. 94-579) provides for management and mitigation of adverse impacts on federally administered land by protecting, "the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resources, and archaeological values." NEPA recognizes the continuing responsibility of the federal government to "preserve important historic, cultural, and natural aspects of our national heritage..." (42 U.S.C. 4321 Section 101(b)(4)). The Antiquities Act of 1906 (16 U.S.C. 431-433) provides for protection of both historic and prehistoric items on federal lands.

The Paleontological Resources Preservation Act requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on federal land using scientific principles and expertise (16 U.S.C. 470aaa et seq.). The Paleontological Resources Preservation Act includes specific provisions addressing management of these resources by the BLM, NPS, USBR, FWS, and the USFS. This includes collection of scientifically significant fossils by qualified researchers who have obtained a permit.

The BLM's policy for addressing potential impacts on paleontological resources on BLM-administered lands also applies, and 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) *Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands* (WO Instructional Memorandum [IM] 2008-009), and (4) *Assessment and Mitigation of Potential Impacts to Paleontological Resources* (WO IM 2009-011).

State

The State of Wyoming enacted the Wyoming Antiquities Act in 1935 (Wyoming State Code §36-1-114 through §36-1-116), prohibiting:

> …any excavation on any prehistoric ruins, pictographs, hieroglyphs or any other ancient markings, writing or archaeological and paleontological deposits on any state or federal public land in Wyoming without first obtaining a permit from the State Board of Land Commissioners.

This law also sets out the requirements for permitting from the State Board of Land Commissioners.

The State of Colorado enacted the Colorado Antiquities Act of 1873 (Colorado State Code §24-80-401 through §24-80-411), indicating that:

> …the state of Colorado reserves to itself title to all historical, prehistorical, and archaeological resources in all lands, rivers, lakes, reservoirs, and other areas owned by the state or any county, city and county, city, town, district, or other political division of the state. Historical, prehistoric, and archaeological resources shall include all deposits, structures, or objects which provide information pertaining to the historical or prehistorical culture of people in the boundaries of the state of Colorado, as well as fossils and other remains of animals, plants, insects, and other objects of natural history within such boundaries.

Permits for paleontological work on Colorado state lands are issued by the State Historical Society of Colorado.

Utah State Code (§63-73-11 through §63-73-19) currently states that paleontological resources are important and requires the preservation of critical fossil resources on state lands. The Utah State Code mandates that those removing or excavating critical fossils on Utah state lands be qualified and permitted under joint jurisdictional cooperation from the Utah Geologic Survey, Utah Museum of Natural History, and SITLA. Utah State Code (§53B-17-603) also requires extracted fossils be curated by an approved and qualified institution.

3.2.3.2 Issues Identified for Analysis

General concern regarding potential impacts on paleontological resources was expressed as an issue during agency and public scoping for the Project.

Paleontological resources would be affected by ground-disturbing activities associated with Project construction, operation, and maintenance in the Project area. Potential impacts are associated with the disturbance, loss, or destruction of paleontological resources and the subsequent loss of scientific information.

3.2.3.3 Regional Setting

The Project is located in the Wyoming Basin and Middle Rocky Mountains physiographic provinces of the Rocky Mountains Division in Wyoming, Colorado, and Utah; as well as the Uinta Basin, Canyon Lands, and High Plateaus of the Colorado Plateaus Province in Utah and the Great Basin section of the Basin and Range Province of the Intermontane Plateaus division in Colorado and Utah (Fenneman and Johnson 1946). Paleontological resources are abundant throughout the Project area, but are especially so in the Greater Green River Basin of Wyoming, the Piceance Basin of Colorado, and the Uinta Basin of Utah.

Geologic units in the Project area range in age from the Paleozoic to the Mesozoic to the Cenozoic (Table 3-33). Sixteen recorded localities were encountered during compilation of the EIS; however, potential for other localities is likely as there currently is not one comprehensive database for paleontological localities. 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.

3.2.3.3.1 Paleozoic Rocks

The Paleozoic Era ranged from 541 to 252 million years ago, when much of what would become the western U.S. was under water. One Paleozoic geologic unit, the Madison Limestone, is exposed along the Project alternative routes in Utah and Colorado (Hintze et al. 2000; Tweto 1979). Invertebrate fossils have been recovered from the Madison Limestone.

3.2.3.3.2 Mesozoic Rocks

The Mesozoic Era ranged from 252 to 66 million years ago. Mesozoic geologic units along the Project alternative routes were deposited in a wide variety of paleoenvironments, including shallow seas, rivers, estuaries, and deserts. These geologic units have produced a wide variety of fossils, such as dinosaurs (tyrannosaur, ornithomimid, dromaeosaur, ceratopsian, ankylosaur, and hadrosaur), fish (cartilaginous and bony), amphibians, reptiles, birds, and mammals.

TABLE 3-33
GEOLOGIC UNITS AND PALEONTOLOGICAL RESOURCES IN THE PROJECT AREA

Age	Geologic Unit	Lithology	PFYC[1]			Typical Fossils Associated with this Unit	Paleontological Potential
			Wyoming	Colorado	Utah		
Cenozoic Era							
Quaternary	Alluvium and colluvium	Clay, silt, sand, and gravel on floodplains, fans, and terraces	2	2	2	Rare Pleistocene fossils	Low
Quaternary	Lacustrine deposits	Clay, silt, and fine sand with minor travertine deposits	2	–	–	Rare Pleistocene fossils	Low
Quaternary	Eolian deposits	Active and dormant sand dunes	2	3	–	Rare Pleistocene fossils	Low to Moderate/ Unknown
Quaternary	Gravels	Gravel and assorted alluvial material	–	3	–	Rare Pleistocene fossils	Low to Moderate/ Unknown
Quaternary	Older gravels	Gravel and assorted alluvial material	–	3	–	Rare Pleistocene fossils	Low to Moderate/ Unknown
Miocene	Miocene rocks	Sandstone and claystone with intermittent conglomerate	3	–	–	Mammals	Moderate/Unknown
Miocene	Browns Park Formation	Sandstone and siltstone	3	5	–	Canid, camel, pronghorn, horse	Moderate/Unknown to Very High
Oligocene	Volcanic rocks	Latite and tuff	–	–	1	–	Very Low
Oligocene	Crazy Hollow Formation	Sandstone, siltstone, and conglomerate	–	–	3	–	Moderate/Unknown
Eocene	Duchesne River Formation	Sandstone, siltstone, and mudstone	–	–	5	Significant mammalian fossil collections	Very High
Eocene	Uinta Formation	Sandstone and siltstone	–	5	5	Significant mammalian fossil collections	Very High
Eocene	Washakie Formation	Sandstone, siltstone, and claystone	5	–	–	Significant mammalian fossil collections	Very High
Eocene	Bridger Formation	Claystone and mudstone	–	5	–	Significant mammalian fossil collections	Very High
Eocene	Green River Formation	Mudstone, shale, and sandstone	5	5	4	Significant mammalian fossil collection, fish, turtles	High to Very High
Eocene	-Laney Member	Oil shale and marlstone	5	3	–	Refer to Green River Formation	Moderate/Unknown to Very High
Eocene	-Wilkins Peak Member	Mudstone, siltstone, sandstone, evaporite	5	–	–	Refer to Green River Formation	Very High
Eocene	-Parachute Creek Member	Mudstone, shale, and oil shale	–	5	–	Refer to Green River Formation	Very High
Eocene	-Tipton Shale Member	Oil shale and marlstone	5	–	–	Refer to Green River Formation	Very High
Eocene	-Luman Tongue	Oil shale, carbonaceous shale, and sandstone	5	–	–	Refer to Green River Formation	Very High

TABLE 3-33
GEOLOGIC UNITS AND PALEONTOLOGICAL RESOURCES IN THE PROJECT AREA

Age	Geologic Unit	Lithology	PFYC[1]			Typical Fossils Associated with this Unit	Paleontological Potential
			Wyoming	Colorado	Utah		
Eocene	-Lower Part	Mudstone, shale, and sandstone	–	5	–	Refer to Green River Formation	Very High
Paleocene-Eocene	Wasatch Formation	Sandstone with variegated claystone and siltstone	5	5	4	Significant mammalian fossil collections	High to Very High
Paleocene-Eocene	-Cathedral Bluffs Tongue	Claystone, mudstone, and sandstone	5	3	–	Refer to Wasatch Formation	Moderate/Unknown to Very High
Paleocene-Eocene	Flagstaff Formation	Limestone and mudstone	–	–	4	Mammal	High
Paleocene	Hanna Formation	Sandstone, shale, and conglomerate	5	–	–	Significant mammalian fossil collections	Very High
Paleocene	Fort Union Formation	Sandstone, shale, and thin coal beds	3	3	–	Significant mammalian fossil collections	Moderate/Unknown
Cretaceous-Paleocene	North Horn Formation	Sandstone, siltstone, and limestone	–	–	4	Turtle, lizard, pterosaur, dinosaur, mammal	High
Mesozoic Era							
Cretaceous-Paleocene	Ferris Formation	Sandstone and shale	5	–	–	Shark, bony fish, turtle, crocodile, dinosaur	Very High
Cretaceous	Lance Formation	Sandstone with shale and conglomerate lenses	5	–	–	Dinosaur	Very High
Cretaceous	Laramie Formation	Shale, claystone, sandstone and major coal beds	–	3	–	Dinosaur	Moderate/Unknown
Cretaceous	Medicine Bow Formation	Sandstone, shale, and coal	3	–	–	–	Moderate/Unknown
Cretaceous	Lewis Shale	Marine shale with sandstone beds	3	3	–	Ammonite	Moderate/Unknown
Cretaceous	Mesaverde Group	Sandstone, shale, and coal beds	3	5	4	Ammonite, dinosaur	Very High/Moderate/ Unknown to High
Cretaceous	Williams Fork Formation	Sandstone, shale, and major coal beds	–	5	–	Dinosaur	Very High
Cretaceous	Iles Formation	Sandstone, shale, and coal	–	5	–	Ammonites, bivalves	Very High
Cretaceous	Hunter Canyon Formation	Sandstone and shale	–	3	–	–	Moderate/Unknown
Cretaceous	Price River Formation	Sandstone, siltstone, and conglomerate	–	–	4	Dinosaur trackways	High
Cretaceous	Indianola Formation	Sandstone, siltstone, and conglomerate	–	–	3	–	Moderate/Unknown

TABLE 3-33
GEOLOGIC UNITS AND PALEONTOLOGICAL RESOURCES IN THE PROJECT AREA

Age	Geologic Unit	Lithology	PFYC[1]			Typical Fossils Associated with this Unit	Paleontological Potential
			Wyoming	Colorado	Utah		
Cretaceous	Mancos Shale	Shale and sandstone	–	3	3	Plant fragment, trace fossil, ammonite, shark teeth, mosasaur	Moderate/Unknown
Lower Cretaceous	Mt. Garfield Formation and Sego Sandstone	Sandstone, shale, and coal	–	3	–	–	Moderate/Unknown
Lower Cretaceous	Sego Sandstone, Buck Tongue, and Castlegate Sandstone	Sandstone and shale	–	3	–	–	Moderate/Unknown
Cretaceous	Steele Shale	Marine shale with bentonite	3	–	–	–	Moderate/Unknown
Cretaceous	Niobrara Formation	Limestone and shale	5	–	–	Fish, mosasaur, plesiosaur	Very High
Cretaceous	Dakota Sandstone, Burro Canyon, Cedar Mountain Formations	Sandstone, shale, and conglomerate	–	5	5	Fossil leaves, dinosaur	High to Very High
Jurassic	Morrison Formation	Mudstone, sandstone, and limestone	–	5	5	Petrified wood, bivalve, crocodile, dinosaur	Very High
Jurassic	Arapien Shale	Shale	–	–	3	–	Moderate/Unknown
Jurassic	Summerville Formation.	Shale and siltstone	–	–	3	Dinosaur, trace fossils	Moderate/Unknown
Jurassic	Entrada Formation	Sandstone	–	–	2	Dinosaur trackways	Low
Jurassic	Carmel Formation	Shale	–	–	2	Bivalves, trackways	Low
Jurassic	Glen Canyon Group	Sandstone	–	–	3	Dinosaur trackways and fossils	Moderate/Unknown
Triassic	Ankareh Shale	Shale	–	–	3	–	Moderate/Unknown
Paleozoic Era							
Mississippian	Madison Limestone	Limestone	–	3	–	Invertebrate fossils	Moderate/Unknown

SOURCES: Green 1992; Green and Drouilard 1994; Gunnell and Bartels 1999; Hamblin and Bilbey 1999; Higgins 2003; Hintze et al. 2000; Honey and Izett 1988; Kass 1999; Kirkland et al. 1999; Rasmussen et al. 1999a; Rasmussen et al. 1999b; Robinson et al. 2004; University of California-Santa Barbara 2012
NOTE: [1]Potential fossil yield classification (PFYC) numbers represent class levels of potential (1 = very low, 2 = low, 3 = moderate or unknown, 4 = high, 5 = very high). For more explanation, refer to Section 3.2.3.4.

3.2.3.3.3 Cenozoic Rocks

The Cenozoic Era ranges from 66 million years ago to the present. Several formations of Cenozoic age occur along the Project alternative routes that were deposited in a wide variety of paleoenvironments, including huge basin lake systems, rivers, and streams. These geologic units have produced some of the world's most extensive collections of Cenozoic fossils, including mammals (multituberculates, rodents, primates, carnivores, perissodactyls, and artiodactyls), fish, amphibians, reptiles, and birds.

3.2.3.4 Study Methodology

3.2.3.4.1 Inventory

Information for the paleontological inventory was obtained from a review of the scientific literature and geologic maps and from record searches at paleontological institutions and governmental agencies. Agencies and institutions contacted include the USGS, BLM, Utah Geological Survey, University of Wyoming Department of Geology and Geophysics, University of Colorado Museum of Natural History, and the Paleobiology Database maintained by the University of California at Santa Barbara. Fieldwork was not conducted as part of this inventory.

Information about the geological units and recorded fossil localities were used to identify the paleontological potential of areas within 1 mile of the reference centerline. The number of fossil localities compiled for the EIS represent only a sample of the localities that may exist in the study corridor in these formations because of the number of fossil localities that could exist in other institutions outside of the region. Paleontological potential levels were assigned to each geological unit using the PFYC system adopted by the BLM in 2007 for assessing paleontological potential on federal land (BLM 2008g). 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 geologic formation, member, or other distinguishable map unit, preferably at the most detailed level possible because of the direct relationship that exists between paleontological resources and the geologic units in which fossils are entombed. By knowing the geology of a particular area and the fossil productivity of particular geologic units, it is possible to predict where fossils likely would be found. Each class is defined as follows (WO IM 2008-009):

Class 1 – Very Low. Geologic units that are not likely to contain recognizable fossil remains.

- Units that are igneous or metamorphic, excluding reworked volcanic ash units.
- Units that are Precambrian in age or older.

(1) Management concern for paleontological resources in Class 1 units is usually negligible or not applicable.
(2) Assessment or mitigation is usually unnecessary except in very rare or isolated circumstances.

The probability for impacting any fossils is negligible. Assessment or mitigation of paleontological resources is usually unnecessary. The occurrence of significant fossils is non-existent or extremely rare.

Class 2 – Low. Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils.

- Vertebrate or significant invertebrate or plant fossils not present or very rare.
- Units that are generally younger than 10,000 years before present.
- Recent aeolian deposits.
- Sediments that exhibit significant physical and chemical changes (i.e., diagenetic alteration).

(1) Management concern for paleontological resources is generally low.
(2) Assessment or mitigation is usually unnecessary except in rare or isolated circumstances.

The probability for impacting vertebrate fossils or scientifically significant invertebrate or plant fossils is low. Assessment or mitigation of paleontological resources is not likely to be necessary. Localities containing important resources may exist, but would be rare and would not influence the classification. These important localities would be managed on a case-by-case basis.

Class 3 – Moderate or **Unknown**. Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential.

- Often marine in origin with sporadic known occurrences of vertebrate fossils.
- Vertebrate fossils and scientifically significant invertebrate or plant fossils known to occur intermittently; predictability known to be low.

(or)

- Poorly studied and/or poorly documented. Potential yield cannot be assigned without ground reconnaissance.

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, and opportunities may exist for hobby collecting. The potential for a project to be sited on or impact a significant fossil locality is low, but is somewhat higher for common fossils.

Class 3b – Unknown Potential. Units exhibit geologic features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and field surveys may uncover significant finds. The units in this Class may eventually be placed in another Class when sufficient survey and research is performed. The unknown potential of the units in this Class should be carefully considered when developing any mitigation or management actions.

(1) Management concern for paleontological resources is moderate; or cannot be determined from existing data.
(2) Surface-disturbing activities may require field assessment to determine appropriate course of action.

This classification includes a broad range of paleontological potential. It includes geologic units of unknown potential, as well as units of moderate or infrequent occurrence of significant fossils. Management considerations cover a broad range of options as well, and could include predisturbance surveys, monitoring, or avoidance. Surface-disturbing activities will require sufficient assessment to determine whether significant paleontological resources occur in the area of a proposed action, and

whether the action could affect the paleontological resources. These units may contain areas that would be appropriate to designate as hobby collection areas due to the higher occurrence of common fossils and a lower concern about affecting significant paleontological resources.

Class 4 – High. Geologic units containing 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. Surface disturbing activities may adversely affect paleontological resources in many cases.

Class 4a. Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two acres. Paleontological resources may be susceptible to adverse impacts from surface disturbing actions. Illegal collecting activities may affect some areas.

Class 4b. These are areas underlain by geologic units with high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts on the bedrock resulting from the activity.

- Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.
- Areas of exposed outcrop are smaller than two contiguous acres.
- Outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.
- Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

(1) Management concern for paleontological resources in Class 4 is moderate to high, depending on the proposed action.
(2) A field survey by a qualified paleontologist is often needed to assess local conditions.
(3) Management prescriptions for resource preservation and conservation through controlled access or special management designation should be considered.
(4) Class 4 and Class 5 units may be combined as Class 5 for broad applications, such as planning efforts or preliminary assessments, when geologic mapping at an appropriate scale is not available. Resource assessment, mitigation, and other management considerations are similar at this level of analysis, and impacts and alternative routes can be addressed at a level appropriate to the application.

The probability for impacting significant paleontological resources is moderate to high, and is dependent on the proposed action. Mitigation considerations must include assessment of the disturbance, such as removal or penetration of protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access resulting in greater looting potential. If impacts on significant fossils can be anticipated, on-the-ground surveys prior to authorizing the surface disturbing action will usually be necessary. On-site monitoring or spot-checking may be necessary during construction activities.

Class 5 – Very High. Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation.

Class 5a. Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two contiguous acres. Paleontological resources are highly susceptible to adverse impacts from surface disturbing actions. Unit is frequently the focus of illegal collecting activities.

Class 5b. These are areas underlain by geologic units with very high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has very high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts on the bedrock resulting from the activity.

- Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.
- Areas of exposed outcrop are smaller than two contiguous acres.
- Outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.
- Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

(1) Management concern for paleontological resources in Class 5 areas is high to very high.
(2) A field survey by a qualified paleontologist is usually necessary prior to surface disturbing activities or land tenure adjustments. Mitigation will often be necessary before and/or during these actions.
(3) Official designation of areas of avoidance, special interest, and concern may be appropriate.

The probability for impacting significant fossils is high. Vertebrate fossils or scientifically significant invertebrate fossils are known or can reasonably be expected to occur in the impacted area. On-the-ground surveys prior to authorizing any surface disturbing activities will usually be necessary. On-site monitoring may be necessary during construction activities.

3.2.3.4.2 Impact Assessment and Mitigation Planning

The methodology for assessing the potential impacts on paleontological resources associated with implementing the Project includes: (1) identifying the types of potential effects on paleontological resources that could result from the construction, operation, and maintenance of the proposed transmission line and associated facilities; (2) developing criteria for assessing the intensity of potential effects on paleontological resources based on the relative sensitivity of paleontological resources associated with each geologic unit that could be affected by the Project; and (3) using the resource sensitivity level assigned to a geologic unit as an indication of the intensity of impacts on paleontological resources associated with implementation of the Project.

Types of Potential Environmental Effects

The construction, operation, and maintenance of the Project could result in both direct and indirect adverse effects on paleontological resources. Potential direct effects associated with construction activities could include the loss of paleontological resources as a result of ground-disturbing activities such as excavation, blasting, and construction of facilities, staging areas, and road construction or road

improvement. Potential direct effects associated with the operation and maintenance of the facilities and the presence of the transmission line are not anticipated.

Indirect effects associated with the construction, operation, and maintenance of the Project could include loss of paleontological resources resulting from increases in the following:

- Access of the general public to sensitive geologic formations and unauthorized collection or vandalism from the construction of permanent access roads
- Erosion associated with construction activities that exposes new fossils

Mitigation Planning and Effectiveness

The loss of paleontological resources due to construction and ground-disturbing activities resulting from implementation of the Project would be the primary potential adverse environmental effect. As a design feature of the Proposed Action (Table 2-8), a Paleontological Resources Treatment Plan (PRTP) would be developed in consultation with the appropriate land-management agencies to mitigate potential adverse impacts on paleontological resources. The PRTP would include requirements for: (1) a preconstruction survey to describe and collect paleontological resources (found on the surface), (2) monitoring of ground-disturbing activities during construction to collect paleontological resources found below the surface, (3) curation of any fossils collected during the survey or monitoring, and (4) deposition of the paleontological resources into a federally approved repository for future scientific study and education. Without preparation and implementation of a PRTP, impacts on paleontological resources would be high along these routes, as many areas would contain paleontological resources.

Criteria for Assessing Intensity of Impacts

Criteria for assessing the relative sensitivity of paleontological resources associated with each geologic unit that could be affected by the Project include PFYC and density of recorded fossil localities. Literature research, institutional record searches, and PFYC provided the information necessary to assign a sensitivity of moderate/unknown 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 implementation of prescribed treatments where sensitivities are determined to be high or moderate, or 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.** The geologic unit has a high potential for containing significant paleontological resources. In these cases, the geologic 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 of 4 or 5 were considered to have a high sensitivity level.
- **Moderate/unknown Sensitivity Level.** The geologic 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 geologic units may contain sufficient paleontological localities to suggest that exposures of the unit in the Project area would have at least a moderate potential for yielding fossil remains. Areas with a PFYC of 3 were considered to have a moderate or undetermined sensitivity level.
- **Low Sensitivity Level.** The geologic 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, geologic units with few or no prior recorded fossil

localities could prove fossiliferous during construction. Areas identified as having a PFYC of 1 or 2 were considered to have a low sensitivity level.

Effects Analysis

The resource sensitivity level assigned to a geologic unit was used to indicate the intensity of impacts on paleontological resources associated with implementation of the Project.

3.2.3.5 Results

3.2.3.5.1 No Action Alternative

Under this alternative, the environment would remain as it presently exists.

3.2.3.5.2 Impacts Common to All Action Alternatives

There are no impacts on paleontological resources that would be anticipated to be common to all action alternative routes.

3.2.3.5.3 345-kilovolt Ancillary Transmission Components

The 345kV ancillary components are in the Quaternary Alluvium, a geologic unit with a low sensitivity level for paleontological resources.

3.2.3.5.4 500-kilovolt Transmission Line Components

Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO)

Alternative WYCO-B (Agency and Applicant Preferred Alternative)

Affected Environment (Wyoming)

Alternative WYCO-B in Wyoming crosses 17 geologic units. Of these geologic units, Quaternary alluvium and colluvium, Quaternary lacustrine deposits, Quaternary eolian deposits, and Quaternary gravels have a low PFYC (Table 3-33). The Miocene rocks, Laney and Tipton Shale members of the Green River Formation, Fort Union Formation, Medicine Bow Formation, and Steele Shale have a moderate/unknown PFYC. The Washakie Formation, Wasatch Formation, Hanna Formation, Ferris Formation, Lance Formation, Mesaverde Group, and Niobrara Formation have a high PFYC. There are 1.8 miles of high locality density and 0.3 mile of moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-34 and MV-5a). There are 89.0 miles of high sensitivity and 35.8 miles of moderate sensitivity.

TABLE 3-34
COMPARISON OF PALEONTOLOGICAL SENSITIVITY FOR THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES

Alternative Route	Total Miles	Sensitivity (miles)[1]			Approximated Known Fossil Locality Density (miles)[2]		
		Low	Moderate/ Unknown	High	Low	Moderate	High
WYCO-B (Agency and Applicant Preferred Alternative)	206.3	19.3	76.3	110.7	204.2	0.3	1.8
Wyoming	*141.0*	*16.2*	*35.8*	*89.0*	*138.9*	*0.3*	*1.8*
Colorado	*65.3*	*3.1*	*40.5*	*21.7*	*65.3*	*0.0*	*0.0*
WYCO-C	210.0	18.9	75.9	115.2	207.9	0.3	1.8
Wyoming	*144.7*	*15.8*	*35.4*	*93.5*	*142.6*	*0.3*	*1.8*
Colorado	*65.3*	*3.1*	*40.5*	*21.7*	*65.3*	*0.0*	*0.0*
WYCO-D	249.4	23.8	93.8	131.8	248.2	1.2	0.0
Wyoming	*134.9*	*17.0*	*50.2*	*67.7*	*133.7*	*1.2*	*0.0*
Colorado	*114.5*	*6.8*	*43.6*	*64.1*	*114.5*	*0.0*	*0.0*
WYCO-F	218.8	18.0	76.3	124.5	216.7	0.3	1.8
Wyoming	*153.5*	*14.9*	*35.8*	*102.8*	*151.4*	*0.3*	*1.8*
Colorado	*65.3*	*3.1*	*40.5*	*21.7*	*65.3*	*0.0*	*0.0*

NOTES:
[1]Sensitivity: Low = PFYC 1 and 2, Moderate/Unknown = PFYC 3, and High = PFYC 4 and 5
[2]Approximated known fossil localities: Low = 0 to 5 localities/square mile, Moderate = 6 to 15 localities/square mile, and High = greater than 15 localities/square mile
PFYC = Potential fossil yield classification

Environmental Consequences (Wyoming)

Alternative WYCO-B in Wyoming crosses 57.5 miles of high, 16.4 miles of moderate, and 6.8 miles of low sensitivity for paleontological resources on BLM-administered land; 1.4 miles of high, 1.0 mile of moderate, and 2.1 mile of low sensitivity on state land; and 30.1 miles of high, 18.3 miles of moderate, and 7.2 miles of low sensitivity on private land (Table 3-34 and MV-5a). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3, 4, or 5) would be surveyed prior to construction to support development of the 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. Thus, impacts on paleontological resources associated with implementation of the Project along with the alternative route would be low.

Affected Environment (Colorado)

Alternative WYCO-B in Colorado crosses 12 geologic units. Of these geologic units, Quaternary alluvium and colluvium and older Quaternary gravels have a low PFYC (Table 3-33). The Laney Member of the Green River Formation, Cathedral Bluffs Tongue, Mancos Shale, and the Sego Sandstone and Buck Tongue members of the Mancos Shale have a moderate/unknown PFYC. The Browns Park Formation, Bridger Formation, Williams Fork Formation, Wasatch Formation, and Iles Formation have a high PFYC. There are no areas of high or moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-34 and MV-5b).

Environmental Consequences (Colorado)

Alternative WYCO-B in Colorado crosses 15.5 miles of high, 30.9 miles of moderate, and 1.9 miles of low sensitivity for paleontological resources on BLM-administered land; 0.7 mile of high, 7.6 miles of moderate, and 0.5 mile of low sensitivity on state land; and 5.5 miles of high, 2.0 miles of moderate, and

0.7 mile of low sensitivity on private land (Table 3-34 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or moderate/unknown sensitivity (i.e., PFYC 3, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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 WYCO-C

Affected Environment (Wyoming)

Alternative WYCO-C in Wyoming crosses 17 geologic units. Of these geologic units, Quaternary alluvium and colluvium, Quaternary lacustrine deposits, Quaternary eolian deposits, and Quaternary gravels have a low PFYC (Table 3-33). The Miocene rocks, Laney and Tipton members of the Green River Formation, Fort Union Formation, Medicine Bow Formation, and Steele Shale have a moderate/unknown PFYC. The Washakie Formation, Wasatch Formation, Hanna Formation, Ferris Formation, Lance Formation, Mesaverde Group, and Niobrara Formation have a high PFYC. There are 1.8 miles of high locality density and 0.3 mile of moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-34 and MV-5a).

Environmental Consequences (Wyoming)

Alternative WYCO-C in Wyoming crosses 58.2 miles of high, 16.0 miles of moderate, and 5.3 miles of low sensitivity for paleontological resources on BLM-administered land; 1.8 miles of high, 1.0 mile of moderate, and 1.8 mile of low sensitivity on state land; 33.5 miles of high, 18.3 miles of moderate, and 8.6 miles of low sensitivity on private land; and 0.1 mile of low sensitivity on other land jurisdictions (Table 3-34 and MV-5a). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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.

Affected Environment (Colorado)

Alternative WYCO-C in Colorado crosses 12 geologic units. Of these geologic units, Quaternary alluvium and colluvium and older Quaternary gravels have a low PFYC (Table 3-33). The Laney and Wilkins Peak members of the Green River Formation, Cathedral Bluffs Tongue of the Wasatch Formation, Mancos Shale, and the Sego Sandstone and Buck Tongue members of the Mancos Shale have a moderate/unknown PFYC. The Browns Park Formation, Bridger Formation, Williams Fork Formation, and Iles Formation have a high PFYC. There are no areas of high or moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-34 and MV-5b).

Environmental Consequences (Colorado)

Alternative WYCO-C in Colorado crosses 15,5 miles of high, 30.9 miles of moderate, and 1.9 miles of low sensitivity for paleontological resources on BLM-administered land; 0.7 mile of high, 7.6 miles of moderate, and 0.7 mile of low sensitivity on state land; and 5.5 miles of high, 2.0 miles of moderate, and 0.7 mile of low sensitivity on private land (Table 3-34 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with very high, high or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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 WYCO-D

Affected Environment (Wyoming)

Alternative WYCO-D in Wyoming crosses 13 geologic units. Of these geologic units, Quaternary alluvium and colluvium, Quaternary lacustrine deposits, and Quaternary gravels have a low PFYC (Table 3-33). The Miocene rocks, Fort Union Formation, Medicine Bow Formation, Lewis Shale, and Steele Shale have a moderate/unknown PFYC. The Wasatch Formation, Hanna Formation, Ferris Formation, Lance Formation, and Niobrara Formation have a high PFYC. There are 1.2 miles of moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-34 and MV-5a).

Environmental Consequences (Wyoming)

Alternative WYCO-D in Wyoming crosses 36.6 miles of high, 24.8 miles of moderate, and 6.2 miles of low sensitivity for paleontological resources on BLM-administered land; 2.6 miles of high, 1.4 mile of moderate, and 2.3 miles of low sensitivity on state land; 28.5 miles of high, 24.0 miles of moderate, and 8.4 miles of low sensitivity on private land; and 0.1 mile of low sensitivity on other land jurisdictions (Table 3-34 and MV-5a). As a design feature of the Proposed Action (Table 2-8), areas with very high, high, or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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.

Affected Environment (Colorado)

Alternative WYCO-D in Colorado crosses 10 geologic units. Of these geologic units, Quaternary alluvium and colluvium and Quaternary eolian deposits have a low PFYC (Table 3-33). The Fort Union Formation, Laramie Formation, Lewis Shale, and Mancos Shale have a moderate/unknown PFYC. The Browns Park Formation, Wasatch Formation, Williams Fork Formation, and Iles Formation have a high PFYC. There are no areas of high or moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-34 and MV-5b).

Environmental Consequences (Colorado)

Alternative WYCO-D in Colorado crosses 21.7 miles of high, 15.7 miles of moderate, and 1.5 miles of low sensitivity for paleontological resources on BLM-administered land; 12.2 miles of high, 3.2 miles of moderate, and 2.0 miles of low sensitivity on state land; 3.7 miles of high on local lands, and 26.5 miles of high, 24.7 miles of moderate, and 3.3 miles of low sensitivity on private land (Table 3-34 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with very high, high, or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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 WYCO-F

Affected Environment (Wyoming)

Alternative WYCO-F in Wyoming crosses 16 geologic units. Of these geologic units, Quaternary alluvium and colluvium, Quaternary lacustrine deposits, and Quaternary gravels have a low PFYC (Table 3-33). The Miocene rocks, Tipton and Luman Tongue members of the Green River Formation, Fort Union Formation, Medicine Bow Formation, Lewis Shale, and Steele Shale have a moderate/unknown PFYC. The Wasatch Formation, Hanna Formation, Ferris Formation, Lance

Formation, Mesaverde Group, and Niobrara Formation have a high PFYC. There are 1.8 miles of high locality density and 0.3 mile of moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-34 and MV-5a).

Environmental Consequences (Wyoming)

Alternative WYCO-F in Wyoming crosses 71.2 miles of high, 16.4 miles of moderate, and 5.8 miles of low sensitivity for paleontological resources on BLM-administered land; 1.8 miles of high, 1.0 mile of moderate, and 1.8 miles of low sensitivity on state land; 29.8 miles of high, 18.3 miles of moderate, and 7.2 miles of low sensitivity on private land; and 0.3 mile of moderate sensitivity and 0.1 mile of low sensitivity on other land jurisdictions (Table 3-34 and MV-5a). As a design feature of the Proposed Action (Table 2-8), areas with very high, high, or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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.

Affected Environment (Colorado)

Alternative WYCO-F in Colorado crosses eight geologic units. Of these geologic units, Quaternary alluvium and colluvium and older Quaternary gravels have a low PFYC (Table 3-33). The Laney Member of the Green River Formation, Cathedral Bluffs Tongue of the Wasatch Formation, and the Mancos Shale have a moderate/unknown PFYC. The Browns Park Formation, Bridger Formation, and Williams Fork Formation have a high PFYC. There are no areas of high or moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-34 and MV-5b).

Environmental Consequences (Colorado)

Alternative WYCO-F in Colorado crosses 15.5 miles of high, 30.9 miles of moderate, and 1.9 miles of low sensitivity for paleontological resources on BLM-administered land; 0.7 mile of high, 7.6 miles of moderate, and 0.5 mile of low sensitivity on state land; and 5.5 miles of high, 2.0 miles of moderate, and 0.7 mile of low sensitivity on private land (Table 3-34 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with very high, high, or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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.

Colorado to Utah – U.S. Highway 40 to Baxter Pass to Clover (COUT BAX)

Alternative COUT BAX-B

Affected Environment (Colorado)

Alternative COUT BAX-B in Colorado crosses 12 geologic units. Of these geologic units, Quaternary alluvium and colluvium has a low PFYC (Table 3-33). The Hunter Canyon Formation, Mancos Shale, Mt. Garfield Formation and Sego Sandstone, the Sego and Castlegate sandstones, and the Sego Sandstone have a moderate/unknown PFYC. The Lower Part of the Green River Formation, Wasatch Formation, Williams Fork Formation, Iles Formation, and the Dakota Sandstone and Burro Canyon formations have a high PFYC. There are 2.3 miles of moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-35 and MV-5b).

TABLE 3-35
COMPARISON OF PALEONTOLOGICAL SENSITIVITY FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO BAXTER PASS TO CLOVER (COUT BAX) ALTERNATIVE ROUTES

Alternative Route	Total Miles	Sensitivity (miles)[1]			Known Fossil Locality Density (miles)[2]		
		Low	Moderate/ Unknown	High	Low	Moderate	High
COUT BAX-B	279.9	68.2	122.9	88.8	277.6	2.3	0.0
Colorado	*87.0*	*7.6*	*23.9*	*55.5*	*84.7*	*2.3*	*0.0*
Utah	*192.9*	*60.6*	*99.0*	*33.3*	*192.9*	*0.0*	*0.0*
COUT BAX-C	290.4	69.5	130.8	90.1	288.1	2.3	0.0
Colorado	*87.0*	*7.6*	*23.9*	*55.5*	*84.7*	*2.3*	*0.0*
Utah	*203.4*	*61.9*	*106.9*	*34.6*	*203.4*	*0.0*	*0.0*
COUT BAX-E	292.2	64.2	137.6	90.4	289.9	2.3	0.0
Colorado	*87.0*	*7.6*	*23.9*	*55.5*	*84.7*	*2.3*	*0.0*
Utah	*205.2*	*56.6*	*113.7*	*34.9*	*205.2*	*0.0*	*0.0*

NOTES:
[1]Sensitivity: Low = PFYC 1 and 2, Moderate/Unknown = PFYC 3, and High = PFYC 4 and 5
[2]Known fossil localities: Low = 0 to 5 localities/square mile, Moderate = 6 to 15 localities/square mile, and High = greater than 15 localities/square mile
PFYC = Potential fossil yield classification

Environmental Consequences (Colorado)

Alternative COUT BAX-B in Colorado crosses 46.3 miles of high, 15.7 miles of moderate, and 7.4 miles of low sensitivity for paleontological resources on BLM-administered land; and 8.8 miles of high, 8.2 miles of moderate, and 0.2 mile of low sensitivity on private land (Table 3-35 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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.

Affected Environment (Utah)

Alternative COUT BAX-B in Utah crosses 19 geologic units. Of these geologic units, Quaternary alluvium and colluvium, Quaternary eolian deposits, older Quaternary gravels, and Oligocene volcanic rocks have a low PFYC (Table 3-33). The Crazy Hollow Formation; North Horn Formation; Indianola Formation; Mancos Shale; Arapien Shale; Summerville, Entrada, and Carmel formations; and the Glen Canyon Group have a moderate/unknown PFYC. The Duchesne River Formation, Uinta Formation, Flagstaff Formation, Mesaverde Group, Dakota Sandstone and Cedar Mountain formations, and the Morrison Formation have a high PFYC. There are no areas of high or moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-35 and MV-5b).

Environmental Consequences (Utah)

Alternative COUT BAX-B in Utah crosses 6.6 miles of high, 68.1 miles of moderate, and 28.5 miles of low sensitivity for paleontological resources on BLM-administered land; 12.9 miles of high, 0.3 mile of moderate, and 3.7 miles of low sensitivity on USFS-administered land; 5.3 miles of high, 19.3 miles of moderate, and 6.1 miles of low sensitivity on state land; and 8.5 miles of high, 11.3 miles of moderate, and 22.3 miles of low sensitivity on private land (Table 3-35 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or moderate/unknown sensitivity (i.e., PFYC 3, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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 COUT BAX-C

Affected Environment (Colorado)

Alternative COUT BAX-C in Colorado crosses the same geologic formations as Alternative COUT BAX-B in Colorado. Like Alternative COUT BAX-B, there are 2.3 miles of moderate locality density within 1 mile of the reference centerline (Table 3-35 and MV-5b).

Environmental Consequences (Colorado)

Alternative COUT BAX-C in Colorado crosses 46.5 miles of high, 15.7 miles of moderate, and 7.4 miles of low sensitivity for paleontological resources on BLM-administered land; and 9.0 miles of high, 8.2 miles of moderate, and 0.2 mile of low sensitivity on private land (Table 3-35 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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.

Affected Environment (Utah)

Alternative COUT BAX-C in Utah crosses the same geologic formations as Alternative COUT BAX-B in Utah. Like Alternative COUT BAX-B, there are no areas of high or moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-35 and MV-5b).

Environmental Consequences (Utah)

Alternative COUT BAX-C in Utah crosses 10.2 miles of high, 69.2 miles of moderate, and 30.4 miles of low sensitivity for paleontological resources on BLM-administered land; 12.9 miles of high, 0.3 mile of moderate, and 3.7 miles of low sensitivity on USFS-administered land; 3.0 miles of high, 26.1 miles of moderate, and 5.5 miles of low sensitivity on state land; and 8.5 miles of high, 11.3 miles of moderate, and 22.3 miles of low sensitivity on private land (Table 3-35 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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 COUT BAX-E

Affected Environment (Colorado)

Alternative COUT BAX-E in Colorado crosses the same geologic formation as Alternative COUT BAX-B in Colorado. Like Alternative COUT BAX-B, there are 2.3 miles of moderate locality density within 1 mile of the reference centerline (Table 3-35 and MV-5b).

Environmental Consequences (Colorado)

Alternative COUT BAX-E in Colorado crosses 46.3 miles of high, 15.7 miles of moderate, and 7.4 miles of low sensitivity for paleontological resources on BLM-administered land; and 8.8 miles of high, 8.2 miles of moderate, and 0.2 mile of low sensitivity on private land (Table 3-35 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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.

Affected Environment (Utah)

Alternative COUT BAX-E in Utah crosses 14 geologic units. Of these geologic units, Quaternary alluvium and colluvium, Quaternary eolian deposits, and Oligocene volcanic rocks have a low PFYC (Table 3-33). The North Horn Formation, Indianola Formation, Mancos Shale, and Arapien Shale have a moderate/unknown PFYC. The Duchesne River Formation, Uinta Formation, Green River Formation, Flagstaff Formation, Mesaverde Group, Dakota Sandstone and Cedar Mountain formations, and Morrison Formation have a high PFYC. There are no areas of high or moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-35 and MV-5b).

Environmental Consequences (Utah)

Alternative COUT BAX-E in Utah crosses 9.0 miles of high, 79.7 miles of moderate, and 32.8 miles of low sensitivity for paleontological resources on BLM-administered land; 7.7 miles of high sensitivity on USFS-administered land; 1.0 miles of high, 20.1 miles of moderate, and 5.8 miles of low sensitivity on state land; and 17.2 miles of high, 13.9 miles of moderate, and 18.0 miles of low sensitivity on private land (Table 3-35 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the 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.

Colorado to Utah – U.S. Highway 40 to Central Utah to Clover (COUT)

Alternative COUT-A

Affected Environment (Colorado)

Alternative COUT-A in Colorado crosses three geologic units. Of these geologic units, the Mancos Shale and the Sego and Castlegate sandstones have a moderate/unknown PFYC (Table 3-33). The Mesaverde Group has a high PFYC. There are no areas of high or moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-36 and MV-5b).

TABLE 3-36
COMPARISON OF PALEONTOLOGICAL SENSITIVITY
FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT)
ALTERNATIVE ROUTES

Alternative Route	Total Miles	Sensitivity (miles)[1]			Known Fossil Locality Density (miles)[2]			
		Low	Moderate/ Unknown	High	Unknown	Low	Moderate	High
COUT-A	207.9	67.5	16.8	123.6	31.5	172.8	2.4	1.2
Colorado	*24.3*	*0.0*	*6.6*	*17.7*	*0.0*	*24.3*	*0.0*	*0.0*
Utah	*183.6*	*67.5*	*10.2*	*105.9*	*31.5*	*148.5*	*2.4*	*1.2*
COUT-B	218.2	59.0	16.8	142.4	31.5	183.1	2.4	1.2
Colorado	*24.3*	*0.0*	*6.6*	*17.7*	*0.0*	*24.3*	*0.0*	*0.0*
Utah	*193.9*	*59.0*	*10.2*	*124.7*	*31.5*	*158.8*	*2.4*	*1.2*
COUT-C (Agency and Applicant Preferred Alternative)	208.2	41.2	18.9	148.1	31.5	166.2	9.9	0.6
Colorado	*25.0*	*0.0*	*8.7*	*16.3*	*0.0*	*25.0*	*0.0*	*0.0*
Utah	*183.2*	*41.2*	*10.2*	*131.8*	*31.5*	*141.2*	*9.9*	*0.6*
COUT-H	200.6	33.2	25.3	142.1	15.6	174.5	9.9	0.6
Colorado	*25.0*	*0.0*	*8.7*	*16.3*	*0.0*	*25*	*0.0*	*0.0*
Utah	*175.6*	*33.2*	*16.6*	*125.8*	*15.6*	*149.5*	*9.9*	*0.6*

TABLE 3-36
COMPARISON OF PALEONTOLOGICAL SENSITIVITY
FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT)
ALTERNATIVE ROUTES

Alternative Route	Total Miles	Sensitivity (miles)[1]			Known Fossil Locality Density (miles)[2]			
		Low	Moderate/ Unknown	High	Unknown	Low	Moderate	High
COUT-I	240.2	59.3	44.0	136.9	15.6	214.1	9.9	0.6
Colorado	*25.0*	*0.0*	*8.7*	*16.3*	*0.0*	*25.0*	*0.0*	*0.0*
Utah	*215.2*	*59.3*	*35.3*	*120.6*	*15.6*	*189.1*	*9.9*	*0.6*

NOTES:
[1]Sensitivity: Low = PFYC 1 and 2, Moderate/Unknown = PFYC 3, and High = PFYC 4 and 5
[2]Known fossil localities: Low = 0 to 5 localities/square mile, Moderate = 6 to 15 localities/square mile, and High = greater than 15 localities/square mile
PFYC = Potential fossil yield classification

Environmental Consequences (Colorado)

Alternative COUT-A in Colorado crosses 11.3 miles of high and 4.9 miles of moderate sensitivity for paleontological resources on BLM-administered land; 2.3 miles of high and 0.2 mile of moderate sensitivity on state land; and 4.3 miles of high and 1.5 miles of moderate sensitivity on private land (Table 3-36 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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.

Affected Environment (Utah)

Alternative COUT-A in Utah crosses 13 geologic units. Of these geologic units, Quaternary alluvium and colluvium, older Quaternary alluvium, and Oligocene volcanic rocks have a low PFYC (Table 3-33). The North Horn Formation, Indianola Formation, Arapien Shale, and Ankareh Shale have a moderate/unknown PFYC. The Duchesne River Formation, Uinta Formation, Green River Formation, Wasatch Formation, Flagstaff Formation, and Price River Formation have a high PFYC. There are 1.2 miles of high locality density and 2.4 miles of moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-36 and MV-5b).

Environmental Consequences (Utah)

Alternative COUT-A in Utah crosses 26.4 miles of high and 12.6 miles of low sensitivity for paleontological resources on BLM-administered land; 19.2 miles of high, 0.1 mile of moderate, and 0.2 mile of low sensitivity on USFS-administered land; 10.8 miles of high, 1.9 miles of moderate, and 7.9 miles of low sensitivity on state land; and 49.5 miles of high, 8.2 miles of moderate, and 46.8 miles of low sensitivity on private land (Table 3-36 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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 COUT-B

Affected Environment (Colorado)

Alternative COUT-B in Colorado crosses the same geologic formations as Alternative COUT-A in Colorado. Like Alternative COUT-A, there are no areas with high or moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-36 and MV-5b).

Environmental Consequences (Colorado)

In Colorado, Alternative COUT-B would have similar impacts on paleontological resources as Alternative COUT-A with minor variations in the areas with high or moderate sensitivity (Table 3-36 and MV-5b).

Affected Environment (Utah)

Alternative COUT-B in Utah crosses the same geologic units as Alternative COUT-A (Table 3-36 and MV-5b).

Environmental Consequences (Utah)

Alternative COUT-B

Alternative COUT-B in Utah crosses 26.9 miles of high and 12.6 miles of low sensitivity for paleontological resources on BLM-administered land; 17.4 miles of high, 0.1 mile of moderate, and 0.8 mile of low sensitivity on USFS-administered land; 13.0 miles of high, 1.9 miles of moderate, and 7.6 miles of low sensitivity on state land; 4.8 miles of high and 3.0 miles of low sensitivity on tribal land; and 62.6 miles of high, 8.2 miles of moderate, and 35.0 miles of low sensitivity on private land (Table 3-36 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the 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 COUT-C (Agency and Applicant Preferred Alternative)

Affected Environment (Colorado)

Alternative COUT-C in Colorado crosses the same geologic units as Alternative COUT-A. Like Alternative COUT-A, there are no areas with high or moderate locality density within 1 mile of the reference centerline for these alternative routes (Table 3-36 and MV-5b).

Environmental Consequences (Colorado)

Alternative COUT-C in Colorado crosses 11.3 miles of high and 4.9 miles of moderate sensitivity for paleontological resources on BLM-administered land; 2.1 miles of high and 0.2 mile of moderate sensitivity on state land; and 4.3 mile of high and 1.5 miles of moderate sensitivity on private land (Table 3-36 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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.

Affected Environment (Utah)

Alternative COUT-C in Utah crosses 14 geologic units. Of these geologic units, the Quaternary alluvium and colluvium, older Quaternary alluvium, and Oligocene volcanic rocks have a low PFYC (Table 3-33). The North Horn Formation, Indianola Formation, Arapien Shale, and Ankareh Shale have a moderate/unknown PFYC. The Duchesne River Formation, Uinta Formation, Green River Formation, Wasatch Formation, Flagstaff Formation, Mesaverde Group, and the Price River Formation have a high PFYC. There are 1.8 miles of high locality density and 10.4 miles of moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-36 and MV-5b).

Environmental Consequences (Utah)

Alternative COUT-C in Utah crosses 71.9 miles of high and 9.9 miles of low sensitivity for paleontological resources on BLM-administered land; 7.5 miles of high, 0.1 mile of moderate, and 0.8 mile of low sensitivity on USFS-administered land; 23.3 miles of high, 1.9 miles of moderate, and 7.8 miles of low sensitivity on state land; 1.4 miles of high and 0.2 mile of low sensitivity on tribal land; and 37.1 miles of high, 8.2 miles of moderate, and 20.7 miles of low sensitivity on private land (Table 3-36 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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.

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

The Bears Ears to Bonanza 345kV transmission line relocation crosses geological units having high (PFYC 4) and very high (PFYC 5) sensitivity for paleontological resources and could impact paleontological resources along much of the route. If the project goes forward, a paleontological survey would be conducted in those geological units with high and very high sensitivity for paleontological resources.

Alternative COUT-H

Affected Environment (Colorado)

Alternative COUT-H in Colorado crosses the same geologic units as Alternative COUT-A. Like Alternative COUT-A, there are no areas with high or moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-36 and MV-5b).

Environmental Consequences (Colorado)

Alternative COUT-H in Colorado crosses 12.0 miles of high and 6.1 miles of moderate sensitivity for paleontological resources on BLM-administered land; 2.0 miles of high and 0.2 mile of moderate sensitivity on state land; and 2.3 mile of high and 2.4 miles of moderate sensitivity on private land (Table 3-36 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3b, 4, and 5) would be surveyed prior to construction to support development of the PRTP, which would 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.

Affected Environment (Utah)

Alternative COUT-H in Utah crosses 13 geologic units. Of these geologic units, the Quaternary alluvium and colluvium, older Quaternary alluvium, and Oligocene volcanic rocks have a low PFYC (Table 3-33). The North Horn Formation, Indianola Formation, Mancos Shale, and the Arapien Shale have a moderate/unknown PFYC. The Duchesne River Formation, Uinta Formation, Green River Formation, Wasatch Formation, Flagstaff Formation, and Mesaverde Group have a high PFYC. There are 0.6 miles of high locality density and 9.9 miles of moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-36 and MV-5b).

Environmental Consequences (Utah)

Alternative COUT-H in Utah crosses 61.2 miles of high, 1.9 miles of moderate, and 14.0 miles of low sensitivity for paleontological resources on BLM-administered land; 7.7 miles of high sensitivity on USFS-administered land; 13.9 miles of high, 7.2 miles of moderate, and 2.3 miles of low sensitivity on state land; 1.4 miles of high and 0.2 mile of low sensitivity on tribal land; and 41.6 miles of high, 7.5 miles of moderate, and 16.7 miles of low sensitivity on private land (Table 3-36 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or moderate/unknown sensitivity (i.e., PFYC 3, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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.

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

The affected environment and environmental consequences for the relocation of the Bears Ears to Bonanza 345kV transmission line on Alternative COUT-H would be the same as Alternative COUT-C.

Alternative COUT-I

Affected Environment (Colorado)

Alternative COUT-I in Colorado crosses the same geologic units as Alternative COUT-A. Like Alternative COUT-A, there are no areas with high or moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-36 and MV-5b).

Environmental Consequences (Colorado)

Alternative COUT-I in Colorado crosses 18.1 miles of high and 6.1 miles of moderate sensitivity for paleontological resources on BLM-administered land; 2.0 miles of high and 0.2 mile of moderate sensitivity on state land; and 2.3 mile of high and 2.4 miles of moderate sensitivity on private land (Table 3-36 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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.

Affected Environment (Utah)

Alternative COUT-I in Utah crosses 13 geologic units. Of these geologic units, the Quaternary alluvium and colluvium, older Quaternary alluvium, and Oligocene volcanic rocks have a low PFYC (Table 3-33). The North Horn Formation, Indianola Formation, Mancos Shale, and the Arapien Shale have a moderate/unknown PFYC. The Duchesne River Formation, Uinta Formation, Green River Formation, Wasatch Formation, Flagstaff Formation, and Mesaverde Group have a high PFYC. There are 0.6 mile of

high locality density and 9.9 miles of moderate locality density within 1 mile of the reference centerline for this alternative route (Table 3-36 and MV-5b).

Environmental Consequences (Utah)

Alternative COUT-I in Utah crosses 58.5 miles of high, 23.5 miles of moderate, and 21.8 miles of low sensitivity for paleontological resources on BLM-administered land; 12.9 miles of high, 0.3 miles of moderate, and 3.7 miles of low sensitivity on USFS-administered land; 14.9 miles of high, 6.2 miles of moderate, and 12.7 miles of low sensitivity on state land; 1.4 miles of high and 0.2 mile of low sensitivity on tribal land; and 32.9 miles of high, 5.3 miles of moderate, and 20.7 miles of low sensitivity on private land (Table 3-36 and MV-5b). As a design feature of the Proposed Action (Table 2-8), areas with high or unknown sensitivity (i.e., PFYC 3b, 4, or 5) would be surveyed prior to construction to support development of the PRTP, which would 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.

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

The affected environment and environmental consequences for the relocation of the Bears Ears to Bonanza 345kV transmission line on Alternative COUT-I would be the same as Alternative COUT-C.

3.2.3.5.5 Series Compensation Stations for the 500-kilovolt Transmission Line

Alternative WYCO-B (Agency and Applicant Preferred Alternative)

Siting Area A – Powder Wash

Affected Environment

Siting Area A (MV-5a and MV-5b) is located in the Wasatch Formation that has a high PFYC of 5, Miocene Rocks that has a moderate PFYC of 3, and the Cathedral Bluffs Tongue of the Wasatch Formation that has a moderate PFYC of 3. There are no fossil localities previously reported in Siting Area A.

Environmental Consequences

Siting Area A (MV-5 a and MV-5b) includes 33,688 acres. Implementation of the PRTP would occur before and during construction, resulting in low impacts on paleontological resources.

Siting Area B – Nine Mile Basin

Affected Environment

Siting Area B (MV-5 a and MV-5b) is located in the Bridger, Wasatch, and Green Formations that have a high PFYC of 5 and Quaternary Alluvium that has a low PFYC of 2. There are no fossil localities previously recorded in Siting Area B.

Environmental Consequences

Siting Area B (MV-5 a and MV-5b) includes 36,264 acres. Implementation of the PRTP would occur before and during construction, resulting in low impacts on paleontological resources.

Siting Area C – Maybell

Affected Environment

Siting Area C (MV-5a and MV-5b) is located in the Browns Park Formation that has a high PFYC of 5, the Mancos Shale that has a moderate PFYC of 3, and Quaternary alluvium that has a low PFYC of 2. There are two previously recorded fossil localities in Siting Area C.

Environmental Consequences

Siting Area C (MV-5 a and MV-5b) includes 37,859 acres. Implementation of the PRTP would occur before and during construction, resulting in low impacts on paleontological resources.

Alternative WYCO-C

Siting Area A – Powder Wash

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area A as Alternative WYCO-B.

Siting Area B – Nine Mile Basin

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area B as Alternative WYCO-B.

Siting Area C – Maybell

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area C as Alternative WYCO-B.

Alternative WYCO-D

Siting Area D – Bell Rock

Affected Environment

Siting Area D (MV-5 a and MV-5b) is located in the Lewis Shale, which has a PFYC of 3, the Browns Park Formation which has a PFYC of 5, and Quaternary Alluvium, which has a PFYC of 2. There are no fossil localities previously reported in Siting Area D.

Environmental Consequences

Siting Area D (MV-5a and MV-5b) includes 26,976 acres. Implementation of the PRTP would occur before and during construction of the Series Compensation Station.

Alternative WYCO-F

Siting Area A – Powder Wash

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area A as Alternative WYCO-B.

Siting Area B – Nine Mile Basin

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area B as Alternative WYCO-B.

Siting Area C – Maybell

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area C as Alternative WYCO-B.

Alternative COUT BAX-B, COUT BAX-C, and COUT BAX-E

Siting Area G – Green River

Affected Environment

Siting Area G (MV-5b) is located in the Mancos Shale, which has a moderate PFYC of 3 and Quaternary Alluvium that has a low PFYC of 2. There are no fossil localities previously reported in Siting Area G

Environmental Consequences

Siting Area G (MV-5b) includes 21,135 acres. Implementation of the PRTP would occur before and during construction, resulting in low impacts on paleontological resources

Alternative COUT-A

Siting Area F – Roosevelt

Affected Environment

Siting Area F (MV-5b) is located in T3 sediments assigned to Duchesne River, Uinta and Bridger Formations that have high PFYCs of 5 and Quaternary Alluvium that has a low PFYC of 2. There are no fossil localities previously reported in Siting Area F.

Environmental Consequences

Siting Area F (MV-5b) includes 36,624 acres. Implementation of the PRTP would occur before and during construction, resulting low impacts on paleontological resources.

Alternative COUT-B

Siting Area F – Roosevelt

Affected Environment and Environmental Consequences

Alternative COUT-B would have the same affected environment and environmental consequences for Siting Area F as Alternative COUT-A.

Alternative COUT-C (Agency and Applicant Preferred Alternative)

Siting Area E – Bonanza

Affected Environment

Siting Area E (MV-5b) is located in T3 sediments assigned to Duchesne River, Uinta and Bridger Formations, which have PFYCs of 5, and Quaternary Alluvium, which has a PFYC of 2. There are numerous (greater than 50) fossil localities previously reported in Siting Area E.

Environmental Consequences

Siting Area E (MV-5b) includes 31,802 acres. Implementation of the PRTP would occur before and during construction, resulting in low impacts on paleontological resources.

Alternatives COUT-H and COUT-I

Siting Area E – Bonanza

Affected Environment and Environmental Consequences

Alternatives COUT-H and COUT-I have the same affected environment and environmental consequences for Siting Area E as Alternative COUT-C.

3.2.4 Water Resources

3.2.4.1 Introduction and Regulatory Framework

Water resources include rivers and streams, lakes, ponds, and reservoirs, and other waters such as wetlands, riparian areas, springs, wells, ditches and canals. The main focus of this section is to identify water resources and assess their susceptibility to Project-related impacts that could persist following implementation of design features of the Proposed Action and selective mitigation measures.

3.2.4.1.1 Regulatory Framework

Federal

- The 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 Clean Water Act (CWA), codified generally in 33 U.S.C. 1251 et. seq. The CWA's objective is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The following sections of the CWA may influence construction and maintenance of the Project:
    - Section 301: Effluent Limitations from Point Sources indicates the volume of pollutants generated by a known source or point source is limited by specific water resources as described in Section 303(d). 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 designates water quality standards by the state set levels of allowable pollutants called Total Maximum Daily Load (TMDL). This pollutant allotment criterion is designated for a specific waterbody relative to its particular usage (e.g., recreation, water supply, aquatic life, and agriculture). A water quality criterion (numeric pollutant concentrations and narrative requirements) also is 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 in the TMDL permit.
- Section 303: Water Quality Standards and Implementation Plans, Designation of Impaired Waters indicates 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 will affect the impaired water, modification to the state construction general permit could be required.
- Section 311: Oil and Hazardous Substances Liability provides the framework for determining whether an oil spill to inland and coastal waters and/or their adjoining shorelines should be reported to the federal government. In particular, the regulation requires the person in charge of a facility or vessel responsible for discharging oil that may be "harmful to the public health or welfare" to report the spill to the federal government. The regulation establishes the criteria for determining whether an oil spill may be harmful to public health or welfare, thereby triggering reporting requirements.
- Section 319: Effluent Limitations from Nonpoint Sources was created following the 1987 amendments to the CWA for management of nonpoint-source pollution. Section 319 regulates the discharge of pollutants from various sources, which accumulate 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 requires that an application for a federally permitted activity that may result in a discharge into a water of the U.S. must obtain a water quality certification from the state with jurisdiction, certifying the action will not violate state or federal water quality standards.
- Section 402: National Pollutant Discharge Elimination System (NPDES) regulates water-quality standards specifically by issuing and monitoring construction-related permits for discharges into waters of the State (described in more detail under the State Regulations section).
- Section 404: Dredge or Fill in waters of the United States regulates the dredging or filling of any material in a water of the U.S. under the regulatory jurisdiction of the U.S. Army Corps of Engineers (USACE). If the Project requires the dredge or fill in a water of the U.S. as defined in 33 CFR Part 328.3 of the CWA, it may be necessary to obtain a federal permit to conduct the work. As a provision of the federal permitting process, mitigation for the permanent loss of jurisdictional wetlands or other waters of the U.S. may be required by the USACE and EPA.
- Programmatic General Permit 40: Minimal Impact Activities under the Stream Alteration Program for the State of Utah was issued by the District Engineer of the Sacramento District

of the USACE for certain activities in waters of the U.S. that have been authorized under the State of Utah's Stream Alteration Program. This permit is designed to eliminate duplication and expedite authorization of the activities that fall under the USACE Regulatory Program that have been authorized through a Stream Alteration Permit. This permit applies to all waters of the U.S. that are considered to be part of the surface tributary system and over which the State Engineer has regulatory authority under the Stream Alteration Program. Limits of the state of Utah's jurisdiction are defined in UAC R655-13, Stream Alteration. This permit does not apply to springs, lakes, fens, pool and riffle areas, wetlands, and some ephemeral waterbodies. Nor does it cover discharge or fill activities to waters of the U.S. on tribal lands or in emergency situations.

- Safe Drinking Water Act was originally passed by Congress in 1974 to protect public health by regulating the quality of drinking water. The law was amended in 1986 and 1996, requiring many actions to protect drinking water and its sources, which include rivers, lakes, reservoirs, springs, and groundwater wells. Under the 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 2012b). 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.
- National Flood Insurance Program is administered by 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 U.S., 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 in Special Flood Hazard Areas, provided development complies with local floodplain management ordinances, which must meet the minimum federal requirements. Not all jurisdictions along the alternative routes have been mapped for flood zones under the National Flood Insurance Program.
- BLM RMP and Management Framework Plan for the Rawlins Field Office in Wyoming (2008) specify regulations and goals for the management of BLM-administered lands and set restrictions to protect fish and wildlife and the habitats on which they depend.
- BLM RMPs and Management Framework Plans for Colorado, including White River (1997, as amended), Little Snake (2011, as amended), and Grand Junction (2015) specify regulations and goals for management of BLM-administered land and set restrictions to protect fish and wildlife and the habitats on which they depend.
- BLM RMPs and Management Framework Plans for Utah, including those developed for the Richfield (2008), Fillmore (1987), Moab (2008), Price (2008), and Vernal (2008) Field Offices, as well as the Salt Lake District (1990), specify regulations and goals for management of BLM-administered land and set restrictions to protect fish and wildlife and the habitats on which they depend.
- Utah BLM Riparian Policy (IM 2005-091) 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 (BLM 2010a).
- Under the Federal Antidegradation Policy, the EPA requires each state and Tribal Nation to develop, adopt, and retain a statewide antidegradation policy regarding water quality standards and establish procedures for its implementation through the water-quality management process.

The State antidegradation policy and implementation procedures must be consistent with the detailed three-tier management components of Sections 131.13(a)(1), 131.12(a)(2), and 131.12(a)(3) of 40 CFR 131.12.

- The Platte River Recovery Implementation Program of 1997 is unique partnership formed by Colorado, Wyoming, Nebraska, and the Department of Interior with the goal of developing a shared approach for managing the Platte River. The Platte River Recovery Implementation Program brings together the states (Wyoming, Colorado, and Nebraska), federal government, water users, and environmental groups to work collaboratively to improve and maintain the associated habitats for the designated species. The Program is intended to address the ESA concerns including loss of habitat in Central Nebraska by managing key land and water resources in the central Platte region and in the process avoiding harm to the lower Platte River stretch.
- Upper Colorado Endangered Fish Recovery Program of 1999 considers any amount of surface water removed from the Upper Colorado River System above the confluence of the Gunnison River to be a depletion of water and amounts greater than 0.1 acre-feet/year require formal consultation with the FWS for downstream impacts on threatened and endangered species.
- National Forest LRMPs, including Ashley (1986, as amended), Manti-La Sal (1986, as amended), and Uinta (2003, as amended) National Forests, as well as Standards and Guidelines detailed in the forest plans, require Project compliance with protective measures that ensure water resources and associated aquatic, biological, and geologic components are being maintained or improved. LRMPs also identify project restrictions to protect fish, wildlife, and management indicator species (MIS) for each forest.
- The URMCC is an Executive branch agency of the federal government. The URMCC was authorized under the Central Utah Project Completion Act of 1992 (Utah State P.L. 102-575). The Act set terms and conditions for completing the Central Utah Project (CUP), which diverts, stores, and delivers large quantities of water from numerous Utah rivers. The URMCC is responsible for designing, funding, and implementing projects to offset the impacts on fish, wildlife, and related recreation resources caused by CUP and other federal reclamation projects in Utah. Lands owned and managed by the URMCC for CUP mitigation commitments are located in the Project area.
- NPS Organic Act, passed in 1916 (16 U.S.C. 1), established the NPS as an agency under the direction of the Secretary of the Interior with the stated purpose of promoting use of national park lands while protecting them from impairment. Specifically, the Act declares that the NPS has a dual mission, both to conserve park resources and provide for their use and enjoyment "in such a manner and by such means as will leave them unimpaired" for future generations (16 U.S.C. 1).
- NPS Management Policies 2006 sets the framework and provides direction for all management decisions relating to national park lands. This document states the NPS "will use all available authorities to protect lands and resources within units of the national park system." NPS personnel are required to be knowledgeable about and adhere to laws, regulations, and policies pertinent to NPS management included in this document.
- NPS Director's Order 12 (DO-12 and Handbook; 66 FR 7507) describes the NEPA process and describes the responsibility of the NPS regarding participation in or coordination of NEPA procedures for actions occurring on NPS land. This order outlines the NPS's requirement of affirmatively stating whether or not impairment [as defined by the Organic Act and the 2006 Management Policies document] to park resources would result from a proposed action and provides guidelines for assessing intensity of impacts.

State

Wyoming

- WDEQ, Water Quality Division, Wyoming Surface Water Quality Standards and Water Quality Rules and Regulations (WDEQ 2013) include stipulations for reclamation plan development; turbidity testing, reporting, and compliance in waters supporting municipalities with drinking water, and rules and regulations regarding spills of potentially hazardous liquids. Section 23(a) of this document sets limits for turbidity increases. Temporary variances to these limits may be authorized by the administrator of the Water Quality Division under Section 23(c)(2).
- Wyoming Environmental Quality Act (Wyo. Stat. 35-11-101 through 35-11-1904) sets regulations on surface- and subsurface-disturbing activities to prevent, reduce, and eliminate pollution; to preserve and enhance the air and water, and reclaim the land of Wyoming; to plan the development, use, reclamation, preservation, and enhancement of the air, land, and water resources of the state; to preserve and exercise the primary responsibilities and rights of the state of Wyoming; and to retain for the state the control over its air, land, and water and to secure cooperation between agencies of the state, agencies of other states, interstate agencies, and the federal government in carrying out these objectives.
- Wyoming Pollutant Discharge Elimination System (WYPDES) as provided under the federal CWA provides that the discharge of any pollutants from a point source into surface waters of the U.S. must be regulated under the WYPDES Program. Through this program, administered by the WDEQ, operators of a point-source discharge are required to obtain a WYPDES discharge permit.
- The 2007 Wyoming Framework Water Plan, Volume I, is an inventory of the state's water resources and related lands, a summary of the state's present water uses, a projection of future water needs, and an identification of alternative decisions to meet the indicated future water needs. Volume II provides future water resource planning direction to the State of Wyoming.
- Carbon County Flood Damage Prevention Resolution includes county-specific regulations adopted by Carbon County that would require a floodplain development permit if channel modification (fill or grading in the floodplain) was required for the Project. Resolution 1983-11, as amended by Resolution 1989-10. FIRM Community Panel 560008.

Colorado

- Colorado Water Quality Control Commission, a subset of the CDPHE, is responsible for regulating Surface Water Quality Standards, Ground Water Quality Standards, Point Source Discharge Permits, Watershed Protection Control Regulations, CWA Section 401 Water Quality Certifications and Regulations, and Implementation of CWA Section 303(d) Requirements.
- Rules and Regulations for Regulatory Floodplains in Colorado are promulgated pursuant to the authority granted to the Colorado Water Control Board in Sections 24-4-103, 24-65.1-101(1)(c)(I), 24-65.1-202(2)(a)(I), 24-65.1-302(2)(a), 24-65.1-403(3), 30-28-111(1)–(2), 31-23-301(1)–(3), 37-60-106(1) and 37-60-106(1)(c)–(g), (j) and (k) of 2010. The purpose of these rules is to provide uniform standards for regulatory floodplains in Colorado, to provide standards for activities that may affect regulatory floodplains in Colorado, and to stipulate the process by which floodplains will be designated and approved by the Colorado Water Control Board. The rules for regulatory floodplains are of statewide concern to the State of Colorado and the Colorado Water Control Board to prevent flooding and the negative impacts of floods, as well as to ensure public health, safety, welfare, and property by limiting development in floodplains. These rules also assist the Colorado Water Control Board and communities in Colorado in developing sound floodplain management practices and implementing the National Flood Insurance Program. These

rules shall apply throughout the State of Colorado, without regard to whether a community participates in the National Flood Insurance Program. These rules shall also apply to activities conducted by state agencies and to federal activities that are fully or partially financed by state funds. These rules also apply to projects or studies for which the Colorado Water Control Board has made a loan or grant pursuant to Sections 37-60-120(2) and 37-60-121(1)(b)(VII), and (IX)(C).

Utah

- 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, Hydrostatic Testing, and Dewatering likely will be required during construction of the Project.
- Utah State Executive Order. 11988: Floodplain Management requires that if structures are to be placed in a FEMA-designated flood-hazard area, a floodplain modification permit may be required.
- Utah Division of Water Quality: Utah State Stream Alteration Permit requires the issuance of a State Stream Alteration Permit and likely will require a USACE Sections 404 and 401 permit or a Programmatic General Permit 40, if applicable, if work is to be done to the bed and banks of a named intermittent or perennial stream.

3.2.4.2 Issues Identified for Analysis

Issues related to water resources were identified during the scoping process to identify, refine, and evaluate alternative routes and to direct the level of analysis needed to assess (1) how the Project would affect water quality and (2) what short- and long-term potential impacts on water resources would be expected from implementation of the Project.

3.2.4.3 Regional Setting

Alternative routes considered for the Project span 3 states, 6 ecoregions, and 23 subbasins with elevations ranging from 3,838 to 13,478 feet above mean sea level and average annual precipitation ranging from 8.5 to 29.2 inches per year (EPA 2010b; Oregon State University 2012; USGS 1999; USGS and USDA NRCS 2012). Water resources throughout the Project area reflect the diversity of the landscape in their location, distribution, scale, type, abundance, and condition.

3.2.4.3.1 Hydrologic Unit Code and the Watershed Boundary Database

For this discussion, water resources occurring in the Project area are spatially referenced by the Watershed Boundary Database (WBD) and Hydrologic Unit Code (HUC). The WBD is maintained by the USGS and can be accessed through the NRCS Geospatial Data Gateway (USGS 2009). Prior to the development of the WBD, the USGS developed a standardized system for organizing and collecting hydrologic data in the mid-1970s. This system divided and subdivided the country into progressively smaller hydrologic units based on surface features and classified them into four levels: regions, subregions, accounting units, and cataloging units (USGS and NRCS 2012).

A hydrologic unit is a drainage area delineated to nest in a multi-level, hierarchical drainage system. Its boundaries are defined by hydrographic and topographic criteria that

> delineate an area of land upstream from a specific point on a river, stream or similar surface waters. A hydrologic unit can accept surface water directly from upstream drainage areas, and indirectly from associated surface areas such as remnant, non-contributing, and diversions to form a drainage area with single or multiple outlet points. Hydrologic units are only synonymous with classic watersheds when their boundaries include all the source area contributing surface water to a single defined outlet point (USGS 2009).

The WBD is similar to the original HUC system developed by the USGS and establishes a baseline drainage boundary framework, accounting for all land and surface areas determined solely on science-based hydrologic principles. The WBD differs from the original system by differentiating surface-water drainage areas into six distinct levels rather than four. These six levels include regions (2-digit HUC), subregions (4-digit HUC), basins (6-digit HUC), subbasins (8-digit HUC), watersheds (10-digit HUC), and subwatersheds (12-digit HUC).

During consultation with land managers (i.e., BLM, USFS, and county soil and water conservation districts), representatives from the cooperating agencies indicated their preference to work with the standard fourth-level, 8-digit HUC system. The standard 8-digit HUC is broadly used and is applicable to this Project.

In most cases, water resources can be traced from their source in the upper reaches of a drainage area to a larger waterbody, namely an ocean. In some cases, however, waters are contained in a closed basin where there is no hydrologic connection to an ocean. In a closed basin, water either percolates into a groundwater system or evaporates into the atmosphere; such is the case for the Great Divide Closed Basin in Wyoming.

Using the WBD and preliminary Project designs, GIS analysis identified 23 subbasins crossed by alternative routes considered for the Project. Subbasins found in the Project area have vastly different attributes, including mean annual precipitation, drainage area, elevation ranges, and relative aspect (cardinal direction in which the watershed is oriented); all of which play a pivotal role in determining what ecological community or communities are supported in any given drainage area. Table 3-37 lists the subbasins in the Project area and provides attributes specific to each.

TABLE 3-37
SUBBASINS OCCURRING IN THE PROJECT AREA

Hydrologic Unit Code	Subbasin Name	Subbasin Acreage	Mean Annual Precipitation (inches)	Ecotype Present	Elevation Range (feet)[1]
10180002	Upper North Platte	1,898,532	20.3	Southern Rockies	6,357 to 12,002
10180003	Pathfinder-Seminoe Reservoirs	661,009	13.2	Wyoming Basin	5,835 to 9,315
10180004	Medicine Bow	925,377	16.1	Southern Rockies	6,353 to 12,018
14010005	Colorado Headwaters-Plateau	2,450,331	19.4	Colorado Plateaus	4,310 to 11,450
14030001	Westwater Canyon	931,172	12.6	Colorado Plateaus	4,097 to 9,683
14030005	Upper Colorado-Kane Springs	1,455,306	12.7	Colorado Plateaus	3,838 to 12,648
14040200	Great Divide Closed Basin	2,459,882	9.3	Wyoming Basin	6,383 to 10,024
14050001	Upper Yampa	1,679,817	28.0	Southern Rockies	6,114 to 12,346
14050002	Lower Yampa	1,005,178	16.8	Colorado Plateaus	5,058 to 10,840
14050003	Little Snake	1,960,679	18.2	Colorado Plateaus	5,612 to 10,981

TABLE 3-37 SUBBASINS OCCURRING IN THE PROJECT AREA					
Hydrologic Unit Code	**Subbasin Name**	**Subbasin Acreage**	**Mean Annual Precipitation (inches)**	**Ecotype Present**	**Elevation Range (feet)[1]**
14050004	Muddy	644,970	13.4	Southern Rockies	6,242 to 8,462
14050007	Lower White	1,743,660	13.0	Colorado Plateaus	4,641 to 9,050
14060001	Lower Green-Diamond	627,343	10.9	Colorado Plateaus	4,641 to 9,742
14060003	Duchesne	1,713,446	19.5	Colorado Plateaus	4,641 to 13,478
14060004	Strawberry	744,712	21.2	Colorado Plateaus	5,484 to 10,571
14060005	Lower Green-Desolation Canyon	1,244,615	13.0	Colorado Plateaus	4,136 to 10,171
14060006	Willow	610,238	15.0	Colorado Plateaus	4,638 to 9,502
14060007	Price	1,206,454	14.0	Colorado Plateaus	4,139 to 10,440
14060008	Lower Green	1,194,429	8.8	Colorado Plateaus	3,867 to 9,492
14060009	San Rafael	1,555,982	12.8	Colorado Plateaus	3,992 to 11,286
16020201	Utah Lake	860,111	18.8	Central Basin and Range	4,480 to 11,913
16020202	Spanish Fork	615,961	23.7	Central Basin and Range	4,480 to 11,024
16030004	San Pitch	550,593	19.4	Central Basin and Range	5,032 to 11,188

SOURCES: Environmental Protection Agency 2010b; Oregon State University 2012; U.S. Geological Survey 1999, 2009, 2010a
NOTE: [1]Elevation is represented as feet above mean sea level

3.2.4.3.2 Water Resource Categories in the Project Area

For this discussion, water resources in the Project area are grouped into three categories: specially designated waters, wetlands and riparian areas, and lentic and lotic waters.

Specially Designated Waters

State-listed Impaired Waters

State-listed impaired waters (impaired waters) crossed by the alternative routes were identified during the water resources inventory. Understanding where pollutants originate is a developing science in the field of water quality management. As authorized by the EPA under the CWA, the NPDES controls water pollution by regulating point sources that discharge pollutants into waters of the U.S. Point sources are discrete conveyances such as pipes or man-made ditches that can be traced back to the original source. Since its introduction in 1972, the NPDES is responsible for significant improvements to our Nation's water quality (EPA 2012b).

State water quality control agencies, including the Utah Division of Water Quality, CDPHE, and the WDEQ, are required to monitor water quality in state waters and report the status of those waters to the EPA. Wyoming, Colorado, and Utah are responsible for submitting CWA Section 305(b) water quality monitoring reports. In these reports, the state has an opportunity to present problematic waters that are in need of proactive management prescriptions to improve water quality by mandating point-source discharge limitations through the EPA. The EPA reviews the Section 305(b) monitoring reports and determines if additional support to improve water quality is necessary.

If the EPA agrees that effluent levels are excessive, the water will then be listed under Section 303(d) of the CWA as impaired waters[1]. Once a water of the U.S. has been included on the Section 303(d) list, a TMDL report documenting point-source pollutants, water-quality trends, and management objectives is created. TMDLs are monitored biannually by the responsible agency to ensure effluent limitations are not being exceeded and management goals for improving water quality are being met. If it is determined that management objectives are not being met and that Section 303(d)-listed impaired waters are showing a declining trend in water quality, the TMDL report will be revised as appropriate to provide additional management objectives to meet water quality standards.

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 a Proposed Action and a number of voluntary incentive programs (U.S. General Accounting Office 1999). Determining the source of a particular type of nonpoint-source pollution (e.g., sedimentation, discharge of nutrients, or pathogen-harboring effluent) is highly problematic. The States of Utah, Wyoming, and Colorado are responsible for collecting and disclosing data from statistical modeling and physical investigation of potential sources of nonpoint-source pollutants in their bi-annual Section 305(d) monitoring reports. Data gathered on potential nonpoint-source pollutants are often integrated into TMDLs where management objectives can be developed specifically for nonpoint-source pollutants. Appendix I includes the name (if assigned a name) and reach code of impaired waters identified during the inventory as well as the Project link number where they are located.

Outstanding National Resource Waters

Outstanding national resource waters (outstanding waters) are designated pursuant to Water Quality Standards Regulation Section 131.12(a)(3) of the National Antidegradation Policy. Listing waters as outstanding is done to protect the physical and biological integrity of waters and to maintain water quality. Outstanding waters are those surface waters in which no further water quality degradation by point-source discharges other than from dams will be allowed. Nonpoint sources of pollution shall be controlled through the implementation of appropriate design features.

Outstanding waters are designated by the state as significant resources for a number of different reasons, including but not limited to habitat for sensitive aquatic species, sources of municipal water, prime or relatively undisturbed habitats, or waters that have a high degree of aesthetic or educational appeal.

Wyoming, Colorado and Utah have designated specific waters, or a suite of waters, in a specified boundary (political and physical), as outstanding. In Wyoming, the main stem of the North Platte River from the mouth of Sage Creek (approximately 15 stream miles downstream of Saratoga, Wyoming) upstream to the Colorado state line is designated as an outstanding water. All surface waters located in the boundaries of national parks and congressionally designated wilderness areas (designated as of January 1, 1999) are considered outstanding waters. In Utah, numerous waters in the Green River Subbasin, the Provo River Subbasin, and the Sevier River Subbasin, as well as all surface waters listed as Category 2 waters under Utah State Code R317-2-12.2 and geographically located within the outer boundaries of

[1]The term 303(d) list is short for the list of impaired and threatened waters (stream/river segments, lakes) that the CWA (in section 303(d)) requires all states to submit for EPA approval. States list water bodies as impaired when monitoring indicates they are not meeting their water quality standards. If the state believes a water body may not meet its water quality standards in the future, the state may also choose to add the water body to the 303(3) list as threatened. If evidence indicates the water body is impaired of threatened due to the excess loading of a pollutant, the CWA requires the state to develop a TMDL for the water body, specific to that pollutant. Regulations say states must evaluate "all existing and readily available information" in developing their 303(d) lists (www.epa.gov/region8/water/tmdl).

national forests, are considered outstanding waters. Outstanding waters crossed by alternative routes considered for the Project were identified during the water resources inventory.

Wetlands and Riparian Areas

Palustrine Forested Wetlands

Palustrine forested wetlands in the Project area are typically associated with perennial water sources and confined to a narrow riparian band with soils and hydrology adequate for the establishment, recruitment, and persistence of forested wetlands. Because of the unique habitat features and biochemical processing functions associated with palustrine forested wetlands, the EPA and USACE regard these communities as highly valuable commodities due to (1) their functionality for protecting and improving water quality through dissipation of flood velocity and demobilization of waterborne sediment, (2) the deposition of organic material into the stream and underlying soil, and (3) the provision of habitat that is used by a multitude of species dependent on these wetlands for all or a portion of their life stages (e.g., obligates, semi-obligates). Due to the infrequency and high value of this wetland type throughout the Project area, these wetlands have been included in the Specially Designated Waters category. Appendix I includes the name (if assigned a name) and reach code of palustrine forested wetlands identified during the inventory as well as the Project link number where they are located.

For the discussion of wetlands, the FWS uses wetland classification codes (based on the Cowardin Code system (Cowardin et al. 1979), which consist of a series of letter and number codes that have been developed to adapt the national wetland classification system to map form. These alpha-numeric codes correspond to the classification nomenclature that best describes the habitat (for example, PEMC refers to the **P**alustrine [system], **EM**ergent [class], and [**C**]Seasonally Flooded [water regime modifier]) (FWS 2012a). The Cowardin Code system is the method adopted for discussion of this resource.

There is a high level of variety in the composition, distribution, and abundance of wetlands and riparian areas across the Project area; and water resources hydrologically connected to wetland and riparian areas are affected indirectly by the condition of those vegetation components. Wetlands and riparian areas function similarly in their capacity to maintain or even improve water quality by filtering waterborne sediments and cycling nutrients into the soil. The fibrous root systems and perennial nature of most wetland and riparian communities provide soil stabilizing structure to the upper soil strata, reducing the likelihood that high flows and heavy rain events would wash away topsoil. Wetlands and riparian areas serve as vectors for the percolation of surface water into groundwater systems (groundwater recharge), a process responsible for maintaining stable inputs into groundwater aquifers.

Wetlands and riparian areas also provide a high level of biotic nutrient exchange through the provision of detritus and large wood debris that promote productive, living, breathing soils. Abiotic processes also are commonplace in the vegetation and groundcover associated with wetlands and riparian areas. Highly dense scrub/shrub and forested wetlands attenuate flood flows, thus reducing the erosive potential of high-velocity runoff events. Canopy cover comprised of mature scrub/shrub, forested wetlands, and riparian areas shade water resources, maintaining—and in some cases improving—the quality and quantity of water through temperature control. It is because of these functions and values provided by intact, undisturbed wetlands and riparian areas that they are included in this section and are analyzed on the basis that loss or modification of these vegetation communities would have indirect, adverse effects on water quality.

Quantitative analysis of the potential Project-related modifications of vegetation associated with wetlands and riparian areas are discussed in Section 3.2.5.5 of this document. While a discussion of the potential impacts on the vegetative communities is vital to providing an analysis of the full suite of potential Project effects, it does not relate the modification of those communities to water quality.

By definition, riparian means occurring next to water. It is a common misunderstanding that all riparian vegetation is inherently wetland vegetation because it occurs near water. Many water resources in the Project area support riparian vegetation, but the water source may be available for plant uptake on a short-term, intermittent basis or on a long-term, perennial basis. On a perennial river or stream, it is common to find wetland plants in the riparian zone; but when streams are intermittent or ephemeral, water is available for plant uptake only briefly each year or may not be present in drought years. In these circumstances, upland vegetation existing near the margins of intermittent or ephemeral waters would be of a noticeably different composition from the surrounding plant communities or would have a noticeably different growth form or relative vigor due to the presence or absence of water, which can vary in any given year. While these plants are not what many consider to be riparian species, they are discernible from the surrounding plant communities and thus are considered riparian vegetation in a riparian area.

Wetlands are defined by the USACE (33 CFR 203) and the EPA (40 CFR230) as "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." For an area to be classified as a wetland, the following characteristics must be present (Environmental Laboratory 1987):

(1) Vegetation consisting of predominantly hydrophytic species (i.e., species that can persist and reproduce in anaerobic soil conditions)

(2) Soils classified as hydric (saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation) or having characteristics associated with reducing soil conditions (an environment conducive to the removal of oxygen and chemical reduction of ions in the soils).

(3) Evidence that the area is inundated either permanently or periodically or soil is saturated to the surface at some time during the growing season.

Whether it is groundwater, surface water, springs, seeps, or an anthropogenic source (irrigation), wetlands exist where adequate hydrology is present. Wetlands are present throughout the Project area and can range from mud flats and playas to emergent wetlands, scrub/shrub wetlands, and forested wetlands.

Wetland and riparian data were derived mainly from two sources: the National Wetlands Inventory (NWI) (FWS 2012a) and the Southwest Region Gap Analysis Program (SWReGAP) (USGS 2010b, 2010). The NWI was established by the FWS in 1974 to conduct a nationwide inventory of wetlands in the U.S. for providing information on the distribution of wetlands, thus aiding in wetland conservation efforts. The SWReGAP data provide regional assessments of natural land-cover types to facilitate the application of this information to land-management activities. These data were combined and overlaid on preliminary Project designs as a basis to identify potential impacts from alternative routes considered for the Project.

Wetlands and riparian areas are found throughout the Project area and include palustrine scrub/shrub wetlands, palustrine emergent wetlands, swamps, marshes, and estuaries. Riparian areas consist of those mapped by the SWReGAP and those wetland habitats classified as the Cowardin littoral subclass (Appendix I). Even though wetlands and riparian areas are found throughout the Project area, they are limited in their range and diversity due to low annual precipitation; short growing seasons; cold, long winters; and hot, dry summers. Appendix I includes the name (if assigned a name) and reach code of wetlands and riparian areas identified during the inventory as well as the Project link number where they are located.

Lentic and Lotic Waters

Lentic Waters – Lakes, Reservoirs, and Ponds

Lentic waters are characterized as having standing or relatively still water contained in a closed or semi-closed impoundment. Lentic waters in the Project area include lakes, reservoirs, and ponds that are categorized by the Cowardin system (Cowardin et al. 1979) as lacustrine deepwater habitat systems. Lentic waters are highly variable throughout the Project area; many are man-made, serving the purpose of storing water for municipal and agricultural uses and controlling floods. There are many natural lentic waters ranging from the high alpine lakes of the Duchesne subbasin to warm water lakes and ponds of the Little Snake, Provo, and Lower Green river subbasins, as well as unique lentic waters such as the ephemeral desert playas of the Great Divide closed-basin subbasin.

Lentic waters exhibit a high degree of spatial and temporal heterogeneity that generally can be broken into three zones: the pelagic or open water zone, the benthic zone or bed and banks zone, and the profundal zone (the zone in which light does not penetrate) (Kalff 2002). These zones support local intrazonal and somewhat interactive interzonal abiotic physical and chemical interactions that lend to a wide variety of biotic interactions among plants, animals, and micro-organisms inhabiting the different zones (Brown 1987). Some perennial lentic waters are named; whereas, most intermittent or ephemeral lentic waters are not named. Appendix I includes the name (if assigned a name) and reach code of lentic waters identified during the inventory as well as the Project link number where they are located.

Lotic Waters – Rivers, Streams, and Deepwater Habitats

Lotic waters are characterized as having flowing water in a state of continual physical change (Giller and Malmqvist 1998). Lotic waters in the Project area include rivers, streams (perennial, intermittent, and ephemeral), and canals and ditches. These waters vary greatly throughout the Project area, mainly due to variations in terrain, aspect, geology, and precipitation specific to the drainage areas from which they originate. At a finer scale, lotic waters exhibit a high degree of spatial and temporal heterogeneity (microhabitats) that support a wide variety of biotic interactions among plants, animals, and micro-organisms, as well as abiotic physical and chemical interactions (Campbell et al. 2009).

Deepwater habitats are permanently flooded lands lying below the deepwater boundary of wetlands. These habitats include environments where surface water is permanent and often deep so that water, rather than air, is the principal medium in which the most organisms live, regardless of whether they are attached to the substrate. As with wetlands, dominant plants are hydrophytes; however, the substrates are considered non-soil because the water is too deep to support emergent vegetation (U.S. Soil Conservation Service 1999). Wetlands and deepwater habitats are defined separately because, traditionally, the term wetland has not included deep permanent water; however, both must be considered in an ecological approach to classification (Cowardin et al. 1979).

Most of the significant lotic waters found in the Project area have conventional names (e.g., Medicine Bow River or Red Creek), but the majority of intermittent and ephemeral streams do not. Rather than relying solely on conventional names, lotic waters can be identified using two highly interconnected datasets, the WBD HUC and the National Hydrography Dataset (NHD). As discussed previously, the HUC identifies where a water resource exists spatially in a drainage area. The NHD on the other hand comprises digital vector data features such as lakes, ponds, streams, rivers, canals, dams, and stream gauges. The NHD enables GIS technologies to take advantage of attributes embedded in the NHD to generate specialized information. These analyses are possible because the NHD contains a flow network that allows for tracing water downstream or upstream. It also uses an address system based on reach codes and linear referencing to link specific information to the WBD HUC. Appendix I includes the name (if assigned a name) and reach code of lotic waters identified during the inventory as well as the Project link number where they are located.

Springs and Wells

Springs and wells are significant sources of water for municipalities, homesteads, livestock, and wildlife in the Project area. Springs are defined as places where groundwater flows naturally to the Earth's surface. Given their flowing characteristic, springs are considered lotic waters. Springs are found throughout the Project area in many forms typically categorized by the volume of water emanating from a particular site. Springs common to the Project area are those that have infiltrated the Earth's surface through cracks or fissures. Typically, springs result from a pressure differential in an aquifer created by perched groundwater aquifers or aquifers that occur at a higher elevation than a permeable area, which water can easily infiltrate (Bates and Jackson 1987). For this discussion, wells are limited to water wells developed for municipal and agricultural applications. Appendix I includes the name (if assigned a name) and reach code of springs and wells identified during the inventory as well as the Project link number where they are located.

3.2.4.4 Study Methodology

3.2.4.4.1 Inventory

Information for the water resources inventory was obtained from scientific literature, governmental agencies, and institutions, including but not limited to the BLM, USFS, NRCS, EPA, FWS, FEMA, USGS, Utah Division of Water Resources and other state agencies. All water resources inventoried within the 2-mile study corridor and located within 328 feet (100 meters) of an alternative route centerline were included in the impact assessment.

BLM Riparian Management Policy specifies that surface-disturbing activities within 328 feet of riparian areas in Utah and Colorado are required to meet exception criteria defined by the BLM. Exception criteria include measures that can be employed to protect riparian resources and habitats by avoiding or minimizing stormwater runoff, sedimentation, and disturbance of riparian vegetation and habitats. In Wyoming, surface-disturbing activities within 500 feet of all perennial waters and/or wetland and riparian areas would be required to meet criteria outlined in the BLM Rawlins Field Office RMP (BLM 2008b).

To provide a consistent area of analysis and compare the potential effects of all alternative routes considered for the Project, the analysis conducted for the EIS included all water resources located within 328-feet of the alternative routes Project-wide regardless of the land ownership or jurisdiction. Water resource protection measures, including avoidance of surface disturbance in proximity to water resources, would be applied based on the results of preconstruction surveys. In some areas (e.g., Wyoming), avoidance areas for surface disturbance required by agency plans and policies may exceed the area encompassed by the 328-foot analysis area. All water resources requiring avoidance based on agency plans and policies would be identified during preconstruction surveys and the appropriate avoidance buffer would be applied and documented in the POD.

3.2.4.4.2 Impact Assessment and Mitigation Planning

The methodology developed for assessing potential impacts on water resources associated with the alternative routes considered for the Project were developed by the BLM in coordination with the cooperating agencies, including the following:

- Identifying particular sensitivity, abundance, and value of inventoried water resources
- Identifying types of potential effects on water resources that could result from construction; operation, and maintenance of the Project
- Developing criteria for assessing the level of potential effects on water resources
- Determining initial impacts on water resources

- Identifying appropriate design features of the Proposed Action (Table 2-8) to minimize potential adverse effects on water resources
- Determining where selective mitigation measures should be applied, disclosing residual impacts on water.

Types of Potential Environmental Effects

Placement and design of Project facilities would be done to avoid water resources to the extent feasible. However, in areas where ground-disturbing activities associated with construction, operation, and maintenance of the Project could not be avoided, direct and indirect effects on water resources could occur. This analysis assumes the amount of surface disturbance required to construct all of the transmission line towers described in Section 2.1 would be identical. Therefore, the impacts on water resources would be the same regardless of the tower type selected.

Water Use

Section 2.4.5.3 discusses water use for the Project. Water used for geotechnical studies, construction, operation, and maintenance of the Project would be acquired from municipal sources or through temporary transfer of existing agricultural water rights. No measurable changes to water levels of downstream hydrological systems are expected. All alternative routes would require water use within the Platte River Basin and the Colorado River Basin and would be subject to consultation under Section 7 of the ESA. The Applicant has not identified the specific sources and volumes of water that would be used for each alternative route at this time. Compliance with regulations regarding water use within these river basins will be addressed through the Section 7 consultation process.

Groundwater Resources

The potential for the Project to affect groundwater as a result of contamination, consumptive use, or altered infiltration rates were issues identified for additional analysis in comments on the Draft EIS.

The risk for groundwater contamination exists where geotechnical boreholes or excavations for structural foundations encounter groundwater. Groundwater well data from the USGS National Water Information System (USGS 2015b) shows that groundwater depths in the Project area vary from just below ground level to depths of 200 feet or more. The majority of the Project area is located in upland areas where groundwater is unlikely to be encountered during activities associated with the Project. However, shallow groundwater exists in some low-lying areas over major aquifers, along floodplains, and in river bottoms.

A geotechnical investigation, conducted as one of the initial phases of construction, would be used to characterize the geologic composition where Project facilities are proposed and identify areas of shallow groundwater. In general, drilling depths for geotechnical investigations are anticipated to be 50 to 60 feet. If competent bedrock is encountered, coring would be advanced an additional 5 to 15 feet. Foundation depths for project facilities and towers range from 15 to 45 feet. Temporary piezometers may be installed in areas where high groundwater is encountered and information collected would be used to better understand seasonal groundwater fluctuations and inform structure design considerations.

State statutes for drinking water protection and standards for abandoning drill holes would be adhered to wherever groundwater is encountered (Design Feature 35). Hazardous material would not be discharged onto the ground or into streams or drainage areas and refueling and storing potentially hazardous materials would not occur within a 328-foot (100-meter) radius of a water body in Utah and Colorado (500-foot [153-meter] radius in Wyoming), a 200-foot radius of all identified private water wells, and a 400-foot radius of all identified municipal or community water wells. Spill prevention and containment measures would be incorporated as needed (Design Feature 30). The Water Protection Plan, to be

developed for the Construction POD, will contain standard measures that would be implemented for avoiding potential adverse effects on groundwater resources. These design features and protection plans are anticipated to sufficiently protect groundwater resources; therefore, impacts on groundwater resources as the result of contamination is not assessed further.

Water used for the construction of the Project would be procured from existing municipal sources, from commercial sources, or under a temporary water-use agreement with landowners holding existing water rights. No new water rights or water wells would be required. Therefore, water necessary for the construction of Project is not anticipated to affect existing groundwater levels.

Section 3.2.2.4.2 provides a detailed analysis of potential effects the Project could have on earth resources. Compaction and water ponding are soil disturbances that result in the loss of soil structure, possibly leading to a decrease in water infiltration rates and groundwater recharge. Compaction of soils would be mitigated where access roads are temporary but could remain on permanent access roads and at towers. The Water Protection Plan, to be developed for the Construction POD, will contain standard measures that would be implemented for avoiding potential adverse effects on groundwater as a result of soil disturbance. A Reclamation, Revegetation, and Monitoring Framework Plan identifying reclamation stipulations designed to alleviate soil compaction and ponding also would be developed and incorporated into the POD. Overall, soil compaction and water ponding would be minimized by the design features of the Proposed Action for environmental protection and resource protection plans. Water infiltration and groundwater recharge occurs at a landscape scale and the area affected by the Project would result in negligible changes in infiltration rates and effects on groundwater resources.

Direct Effects

Construction, operation, and maintenance of the Project could result in direct effects on water quality. Construction of permanent and temporary access roads would require crossing water resources. Road construction or improvement could require temporary removal of riparian vegetation, grading of banks, and/or the placement of fill such as washed rock, native substrate, bridge pilings, culverts, wing walls, etc. to support a bridge or other stream crossing structures. Modification of water resources (i.e., channelization of waterways, removal of wetland and riparian vegetation, dredging of bed materials, temporary diversions, or impoundments) could be required for Project construction, operation, or maintenance but any such activity would be avoided unless constructability standards preclude such avoidance. Project facilities or access roads crossing or located near water resources would be constructed within the minimum footprint required to safely and effectively conduct construction activities while maintaining water conveyance and the stability of riparian areas, stream beds, and stream banks. Improving existing roads and water crossings would require the application of stabilization measures to maintain Project conformance with state and federal water quality standards not currently implemented or required along existing roads.

Indirect Effects

In areas where Project facilities could not completely avoid water resources, short-term, indirect effects also could occur. Indirect effects could include an increased potential for erosion-caused sedimentation to be discharged into a waterbody from destabilization of soils, removal of vegetation, or modification of stream geomorphology. Following proper implementation of design features of the Proposed Action, selective mitigation measures and site-specific design features detailed in the POD, short-term indirect effects on water resources would be mitigated or reduced to minor levels. Long-term, indirect effects are not likely to occur following stabilization and reclamation of areas disturbed by construction activities.

The CWA requires that any work performed in the bed and banks and below the plane of the ordinary high water mark (i.e., direct effects) in waters of the U.S. (including wetlands [33 CFR 328.3]) would

require USACE authorization under 33 CFR 404. Dredging or filling any waters of the U.S. requires mitigation of impacts, which can range from preconstruction avoidance and minimization during the design phase to mitigation for the permanent loss of waters of the U.S. Mitigation requirements for potential Project impacts on waters of the U.S. are addressed through design features of the Proposed Action, which specify that impacts on water resources are avoided or minimized to the extent practicable. Unavoidable impacts over an allowable threshold specified by the CWA permits required for the Project would be offset by additional mitigation. Impacts on water resources would be largely limited to new roads and crossings or improvements to existing roads and crossings. Other impacts on water resources could result from vegetation-management activities necessary to meet safety standards.

Additionally, potential impacts on state-listed or outstanding waters should be differentiated from impacts on nonlisted waters and waters not classified as outstanding. Of the 20 waters on the CWA Section 303(d) list of impaired waters inventoried in the study corridor, 9 have an EPA-approved TMDL limitation designated for the source or sources of impairment. If the Project, for any reason, causes the discharge of materials to these waters and contributes to the maximum-allowable TMDL, such as the discharge of sediment from erosion, fugitive dust, or incidental fallback to an impaired water listed for sediment or total dissolved solids; the Project would be in violation of that TMDL and Sections 319, 401, and 402 of the CWA.

Outstanding waters also are protected under the National Antidegradation Policy by each state with additional avoidance buffers and stipulations that differentiate them from the standard CWA provisions. Stipulations are defined by the appropriate State Department of Environmental Quality.

Temporary stream crossings would be used either to cross water resources with little to no stream flow or would only be needed for the construction phase of the Project. Types of temporary stream crossings may include (1) dry crossings with no bank or channel improvement, (2) dry crossings requiring mechanically grading banks to a slope sufficient to drive equipment and building materials across, (3) placement of temporary fill such as washed rock, log bunks, culverts, etc. that would be removed following the completion of work requiring the crossing, or (4) temporary span structures. While temporary, these crossings would have the potential to affect riparian and in-stream stability. The erosion and sedimentation potential would increase as a parallel function of the type, duration, and spatial extent of surface disturbance. Depending on the type of stream crossing method used, it may be necessary to obtain a stream alteration permit from the state and/or a Section 404 CWA permit from the USACE. Temporary modifications of channel morphology would be re-graded to as close to preconstruction contours as possible once the temporary crossing is decommissioned. Permanent stabilization measures would be implemented in conformance with state and federal water quality regulations.

Additional indirect effects would be due to ground-disturbing activities such as clearing, grubbing, and blading to remove vegetation for safe workspaces. These activities would mobilize fugitive dust and destabilize soils in some places. Mobilization of fugitive dust and erosion may result in the discharge of sediment to water resources. Increased sedimentation indirectly related to ground-disturbing activities potentially could degrade the functional capacity of water resources, including wetlands and riparian areas, by discharging higher rates of sediment into the system than can be attenuated, filtered, and/or immobilized under normal circumstances. These effects would only be seen where unexpected circumstance such as dramatic or non-typical climactic events compromise the integrity and functionality of erosion-control design features or where design features are not properly installed and maintained.

Other indirect effects on water resources could be attributed to accidental spills of environmentally harmful substances such as petroleum products, concrete waste, herbicides/pesticides, or incidental stabilization of native materials. Indirect effects on springs would be similar to those described for perennial lentic and lotic waters, and impacts on wells could include accidental physical damage to well

structures during construction. Another potential indirect effect could be attributed to the accidental introduction of aquatic invasive species. Following design features of the Proposed Action, implementation of selective mitigation measures, and application of additional site-specific mitigation, potential indirect effects on water resources could be completely mitigated.

Road improvements necessary for construction of the Project would yield some indirect beneficial effects on water resources. Where applicable, existing roads would be utilized and improved to safely and effectively transport building materials and construction equipment to construction sites. Where existing roads are used for Project development rather than constructing new access roads, comparative surface disturbance and subsequent indirect effects on water resources would be reduced. Existing stream crossings may need to be upgraded to accommodate larger vehicles. Improvements to crossing structures could result in temporary minor discharges of sediment but could reduce long-term impacts associated with Project maintenance as well as public traffic.

Mitigation Planning and Effectiveness

Design features of the Proposed Action effective in reducing impacts on water resources include Design Features 1, 2, 9, 16, 17, 18, 26, 27, 28, 30, 33, 34, 36, 37, and 38. In addition to the design features, the BLM or the appropriate land-management agency would implement resource avoidance measures as needed to meet resource-management objectives if water resources are located near a geotechnical boring location as described in Section 2.4.2.2. Resource-avoidance measures for the geotechnical investigation could include (1) monitoring geotechnical investigation activities, (2) adjusting activities to occur outside of seasonal restrictions, (3) using alternative access or drilling methods, (4) relocating the borehole, or (5) abandoning the geotechnical site.

- **Design Feature 1 (minimization of clearing).** In construction areas where recontouring is not required, vegetation would be left in place wherever possible, and the original contour would be maintained to avoid excessive root damage and allow for resprouting in accordance with the reclamation plan. Vegetation not consistent with minimum clearance distances between trees and transmission lines must be removed to ensure line safety and reliability (required by the NERC Transmission Vegetation Management Program).
- **Design Feature 2 (surface recontouring and reclamation).** In construction areas where there is ground disturbance 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 not limited to, returning disturbed areas to their natural contour, reseeding, installing cross drains for erosion control, placing water bars in the road, and filling ditches. Seeding methods typically would include drill seeding, where practicable; however, the federal land-management agency may recommend broadcast seeding as an alternative method in some cases.

  A Reclamation, Revegetation, and Monitoring Framework Plan identifying reclamation stipulations (e.g., topsoil stripping and storage, alleviation of soil compaction in construction areas, timing of reclamation activities, species lists, monitoring methods, standards for reclamation success, bond-release criteria, etc.) would be developed and incorporated into the POD, which would be approved by the affected federal land-management agency prior to the issuance of a right-of-way grant, special-use authorization, etc.
- **Design Feature 9 (protection of sensitive features).** Based on results of preconstruction surveys and results of Section 7 consultation, wetlands, riparian areas, springs, wells, watercourses, or rare/slow regenerating vegetation communities would be flagged and structures would be placed to allow spanning of these resources, where feasible, and within the limits of standard structure design.

- **Design Feature 16 (removal of non-biodegradable debris).** During and after construction of the transmission line, the right-of-way would be free of non-biodegradable debris. Slash would be left in place or disposed of in accordance with requirements of the land-management agency or landowner.
- **Design Feature 17 (topsoil salvaging).** In disturbed temporary work areas, the topsoil would be salvaged/segregated and distributed and contoured evenly over the surface of the disturbed area after completion of construction. The soil surface would be seeded with an agency-approved seed mix and left rough to help reduce the potential for weeds and erosion.
- **Design Feature 18 (overland access).** Grading would be minimized by driving overland in areas approved in advance by the land-management agency in predesignated work areas whenever possible.
- **Design Feature 26 (vehicle access restriction).** All vehicle movement outside the right-of-way would be restricted to predesignated access, contractor-acquired access, public roads, or overland travel approved in advance by the applicable land-management agency, unless authorized by the CIC during construction.
- **Design Feature 27 (construction activity access restriction).** The spatial limits of construction activities, including vehicle movement, 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.
- **Design Feature 28 (personnel instruction).** Prior to construction, the CIC would instruct all personnel on the protection of cultural, paleontological, ecological, and other natural resources such as (a) federal and state laws regarding antiquities, paleontological resources, and plants and wildlife, including collection and removal; (b) the importance of these resources; (c) the purpose and necessity of protecting them; and (d) reporting and procedures for stop work.
- **Design Feature 30 (disposal of hazardous material).** Hazardous material would not be discharged onto the ground or into streams or drainage areas. Enclosed containment would be provided for all waste. All construction waste (i.e., trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials) would be removed to a disposal facility authorized to accept such materials within 1 week of Project completion. A Spill Pollution Prevention, Containment, and Countermeasures Plan Framework will be developed as part of the POD.

  Refueling and storing potentially hazardous materials would not occur within 328-foot (100-meter) radius of a water body in Utah and Colorado (500-foot [153-meter] radius in Wyoming), 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.
- **Design Feature 33 (surface disturbance in proximity to water resources).** Consistent with BLM Riparian Management Policy, surface-disturbing activities within 328 feet (100 meters) of riparian areas (defined as areas of land directly influenced by permanent surface or subsurface water having visible vegetation or physical characteristics reflective of permanent water influence, including wetlands, stream banks, and shores of ponds or lakes) in Utah and Colorado would be required to meet exception criteria defined by the BLM, such as acceptable measures to protect riparian resources and habitats by avoiding or minimizing stormwater runoff, sedimentation, and disturbance of riparian vegetation, habitats, and wildlife species. In Wyoming, surface-disturbing activities within 500 feet of all perennial waters and/or wetland and riparian areas and 100 feet of all ephemeral channels also would be required to meet exception criteria in association with the BLM Rawlins Field Office RMP (BLM 2008b). Mitigation measures would

be developed on a site-specific basis, in consultation with the affected federal land-management agency, and incorporated into the final POD.

If any disturbance is anticipated within 20 feet of the edge of a riparian area or other wetland habitat, a silt fence or certified weed-free wattle would be installed along the travel route on the wetland side unless the wetland is up-gradient.

- **Design Feature 34 (prevention of aquatic invasive species).** Interagency-developed methods of avoidance, inspection, and sanitization as described in the *Operational Guidelines for Aquatic Invasive Species Prevention and Equipment Cleaning* (USFS 2009a) would be adhered to. If control of fugitive dust near sensitive water bodies is necessary, water would be obtained from treated municipal sources or drafted from sources known to contain no aquatic invasive species. Support vehicles, drill rigs, water trucks, and drafting equipment would be inspected and sanitized, as necessary, following interagency-approved operational guidelines.
- **Design Feature 36 (crossing of dry washes).** Crossings of dry washes would be made during dry conditions, when possible. Repeated crossings would be limited to the extent possible but made at the same locations, if possible.
- **Design Feature 37 (crossing of riparian areas).** If a riparian crossing were required during wet periods with saturated soil conditions, vehicles would not be allowed to travel when soils are moist enough for deep rutting (4 or more inches deep) to occur unless prefabricated equipment pads were installed over the saturated areas or other measures were implemented to prevent rutting. Equipment with low-ground-pressure tires, wide tracks, or balloon tires would be used when possible.
- **Design Feature 38 (crossing of canals or ditches).** Canal and/or ditch crossings would require placement of temporary bridges or improvement of existing crossings.

In addition to the design features of the Proposed Action for environmental protection, selective mitigation measures would be applied where feasible to reduce potential high and moderate adverse impacts on water resources. Once an alternative route is selected, the Applicant 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. As described in Appendix J, BLM would require the Applicant to monitor the implementation and effectiveness of conservation measures (i.e., design features of the Proposed action for environmental protection, selective mitigation measures, and other measures implemented to avoid, minimize, and mitigate for resource impacts) and would implement adaptive management for water resources, as needed. Detailed monitoring requirements would be outlined in a Water Resources Protection Plan, which would be developed with the BLM and cooperating agencies and included in the POD.

- **Selective Mitigation Measure 1 (minimize/avoid disturbance to sensitive soils and vegetation).** In areas where soils and vegetation are particularly sensitive to disturbance, existing roads/two-tracks to be used for construction and maintenance would not be widened or otherwise upgraded to the extent practicable. To allow construction equipment access to work areas where the equipment would extend beyond the width of the existing roads, the construction equipment would straddle the road traveling on the road's shoulder only where terrain and soil conditions would allow for safe operation/transport of the equipment (cranes, cement trucks, etc.). Land-management agencies would work with the Applicant to determine the extent these existing roads could be modified versus fully upgraded to ensure the roads/two-tracks are passable and safe for the equipment and construction and maintenance personnel. This selective mitigation measure would be applied in the following areas:
  - On soils moderately to highly susceptible to accelerated wind or water erosion and on Prime or Unique Farmland where existing access would be improved

- Within 328 feet (100 meters) (Utah and Colorado) or 500 feet (153 meters) (Wyoming) of streams, wetlands, water, and riparian vegetation communities
- In other locations, where required to comply with law, regulation, or BLM or other agency policy based on the results of preconstruction biological resource surveys.

- **Selective Mitigation Measure 2 (sensitive resource avoidance).** No blading of new access roads would occur in proximity to certain areas of sensitive resources during Project construction or maintenance. Existing crossings and existing or overland access routes would be used in these particular areas. Methods such as "matting" could be used to stabilize access to work areas in these sensitive areas. To minimize ground disturbance, overland routes must be flagged with easily seen markers and the route must be approved in advance by the associated land-management agency. This selective mitigation measure would be applied in the following areas:
  - Within 328 feet (100 meters) (Utah and Colorado) or 500 feet (153 meters) (Wyoming) of streams, wetlands, water, and riparian vegetation communities
  - Designated critical habitat for Colorado River fish species (bonytail, Colorado pikeminnow, humpback chub, and razorback sucker)
  - Occupied least chub habitat
  - Where flat terrain and vegetation would allow for cross-country access to avoid crossing riparian corridors
  - In other locations, where required to comply with law, regulation, or BLM or other agency policy based on the results of preconstruction biological resource surveys.
- **Selective Mitigation Measure 7 (span and/or avoid sensitive features).** Within the limits of standard tower design and in conformance with engineering and the Applicant's requirements, structures would be located to allow conductors to clearly span identified sensitive features. Structures would be placed so as to avoid sensitive features, including, but not limited to, wetlands, riparian areas, water courses, hazardous substance remediation, and cultural sites, to the extent possible. Avoidance measures may include selective tower placement, spanning sensitive features, or realigning access routes. This selective mitigation measure would be applied to the following areas:
  - On soils moderately susceptible to accelerated wind or water erosion (access levels 2, 5, and 6) or highly susceptible to accelerated wind or water erosion (access levels 2, 3, 4, 5, and 6) and on Prime or Unique Farmland (access levels 2, 3, 4, 5, and 6)
  - Wetland, water, and riparian vegetation communities
  - Designated critical Potential habitat for Colorado River fish species (bonytail, Colorado pikeminnow, humpback chub, and razorback sucker) and least chub
  - In other locations, where required to comply with law, regulation, or BLM or other agency policy based on the results of preconstruction biological resource surveys.
  - Steep terrain where structures would be skylined, or extensive earthwork would be required, without necessitating a significant realignment
  - Where land uses including residences, commercial buildings, oil/gas well pads, cemeteries, flood control facilities, pipelines, wastewater treatment plants and communication facilities could be spanned/avoided
  - Where existing utilities and center-pivot irrigated fields could be spanned/avoided

Application of this mitigation measure would reduce soil destabilization and soil compaction near specially designated water resources, which would reduce construction-related erosion and downstream sedimentation.

Selective Mitigation Measure 11 (minimize right-of-way clearing). Clearing of the right-of-way would be minimized to avoid sensitive resources and reduce visual contrast. In select areas, the width of vegetation clearing in the right-of-way may be modified (within the limits of PacifiCorp Vegetation Management Standards and standard tower design), and/or current land uses would be allowed to continue unabated, provided the use meets applicable standards. This selective mitigation measure would be applied to the following areas:

- Existing agricultural lands
- Future and proposed parks
- Wetland, water, and riparian vegetation communities

3.2.4.4.3 Effects Analysis

Resource Vulnerability

The level of a potential impact on water resources was assigned based on the overall vulnerability of a water resource to ground-disturbing activities. Resource vulnerability was categorized as high, moderate, or low, depending on a resource's (1) value to the landscape; (2) sensitivity to impacts; (3) quality and functional capacity as a component of the environment; and (4) abundance, distribution, and range in the Project area. Table 3-38 illustrates the resource vulnerability model developed for water resources.

TABLE 3-38
WATER RESOURCE VULNERABILITY MODEL

Water Resource (Data Sources)	Potential Resource Vulnerability				Overall Vulnerability
	Resource Value	Resource Sensitivity	Resource Quality	Resource Quantity	
Specially Designated Waters					
Impaired waters	High	High	Low	Low	High
Outstanding waters	High	High	High	Low	High
Palustrine forested wetlands	High	High	High	Low	High
Palustrine emergent wetlands	Moderate	Low	Moderate	Moderate	Moderate
Palustrine scrub/shrub wetlands	Moderate	Moderate	Moderate	Moderate	Moderate
Riparian areas	Moderate	Moderate	Moderate	Low	Moderate
Swamps, marshes and estuaries	Moderate	Moderate	Moderate	Low	Moderate
Lakes, reservoirs and ponds	Moderate	Low	Moderate	Moderate	Moderate
Perennial streams and rivers	Moderate	Moderate	Moderate	Moderate	Moderate
Intermittent streams	Moderate	Moderate	Low	High	Moderate
Ephemeral streams and washes	Low	Low	Low	High	Moderate
Canals and ditches	Low	Low	Low	High	Low
Wells and springs	Moderate	Moderate	Moderate	Moderate	Moderate

SOURCES: Impaired Waters: (Environmental Protection Agency 2012c, d, e); Outstanding Waters: Utah and Wyoming Wetlands: National Wetlands Inventory Dataset (U.S. Fish and Wildlife Service 2012a); Riparian Areas: Southwest Regional Gap land-cover dataset (U.S. Geological Survey 2010c); Lentic and Lotic Waters: National Hydrography Dataset (U.S. Geological Survey 2010a).

Criteria for Assessing Level of Impacts

Criteria were developed to assess the level of potential impacts (both initial and residual) on water resources associated with the Project (Table 3-39). These criteria focused on the abundance of a particular water resource in the region; the vulnerability of that resource; the time in which, if affected, those

resources would return to predisturbance conditions; the potential for permanent loss of water resource components such as riparian and wetland vegetation; federal and state statutes applicable to water resources; and the varying degree of importance a water resource has to the greater ecosystem.

TABLE 3-39
CRITERIA FOR ASSESSING LEVEL OF INITIAL IMPACTS ON WATER RESOURCES

Level of Impact	Description
High	▪ Permanent loss of palustrine forested wetlands ▪ Permanent loss of greater than 0.5 acre of any wetland or water of the United States (U.S.) ▪ Deposition of materials into Sections 303(d) or 305(b)-listed impaired waters ▪ Deposition of materials into state-listed Class 1: Outstanding Waters ▪ Modification of natural springs or existing wells
Moderate	▪ Permanent loss of palustrine scrub/shrub wetlands ▪ Permanent loss of greater than 0.1 acre of any wetland or water of the U.S. ▪ Permanent increase of sedimentation to water resources
Low	▪ Permanent loss of palustrine emergent wetlands ▪ Temporary loss of palustrine scrub/shrub wetlands ▪ Temporary dredge/fill in waters of the U.S. ▪ Temporary increases in sedimentation to nearby water resources
No Identifiable	▪ Temporary impacts on water resources in the range of natural variability under normal circumstances

Assessment of Initial Impacts

Water resources are primarily affected by sedimentation from ground-disturbing activities, such as construction of access roads, ancillary facilities, and tower structures. An access model was used (Sections 2.5.1.2) to estimate potential ground disturbance per alternative route. Table 2-10 illustrates the access levels modeled for the Project, as well as the estimated area of disturbance for each access level. Table 2-11 presents the estimated ground disturbance for each alternative route.

The level of initial impacts resulting from construction, operation, and maintenance of the Project are ranked as high, moderate, low or no identifiable. These impact levels are derived by comparing each water resource's vulnerability to impacts (Table 3-38) in conjunction with the level of impact expected from Project-related disturbance (Table 3-39). For purposes of the analysis and consistency between resources, initial impacts are expected to result in the same level of impacts on water resources directly crossed as water resources indirectly crossed by an alternative route centerline.

Residual Impacts

Table 3-40 summarizes the methodology used to estimate potential initial and residual impacts on water resources directly or indirectly crossed by alternative routes. Initial impacts are based on vulnerability of a resource to potential impacts following the successful application of design features of the Proposed Action. Residual impacts are impacts anticipated to occur after properly implemented selective mitigation measures are applied to minimize potentially adverse effects on those resources.

TABLE 3-40
SUMMARY OF INITIAL IMPACTS AND RESIDUAL IMPACTS ON WATER RESOURCES

Water Resource (data source)	Overall Resource Vulnerability	Design Features of the Proposed Action	Initial Impact	Selective Mitigation Measure	Residual Impact
Impaired waters	High	1, 9, 17, 26, 27, 28, 30, 33, 34	Moderate	1, 2, 7, 11	Low
Outstanding waters	High	1, 9, 17, 26, 27, 28, 30, 33, 34	Moderate	1, 2, 7, 11	Low
Palustrine forested wetlands	High	2, 9, 16, 17, 26, 27, 28, 30, 33, 34, 37	High	1, 2, 7, 11	Low/Moderate
Palustrine emergent wetlands	Low	1, 2, 9, 17, 18, 26, 28, 33, 34, 37	Low	–	Low
Palustrine scrub/ shrub wetlands	Moderate	1, 2, 9, 16, 17, 26, 28, 30, 33, 34, 37	Moderate	–	Low/Moderate
Riparian areas	Moderate	1, 2, 9, 16, 17, 26, 27, 28, 30, 33, 34, 37	Low	–	Low
Swamps, marshes, and estuaries	Moderate	1, 2, 9, 16, 17, 26, 27, 28, 30, 33, 34, 37	Low	–	Low
Lakes, reservoirs, and ponds	Moderate	1, 9, 17, 27, 30, 33, 34	Low	–	Low
Perennial streams and rivers	Moderate	1, 2, 9, 17, 27, 28, 30, 33, 34	Moderate	–	Low/Moderate
Intermittent streams	Moderate	1, 2, 9, 17, 18, 27, 28, 30, 33, 34, 36, 37	Low	–	Low
Ephemeral streams and washes	Moderate	1, 2, 9, 17, 18, 27, 28, 30, 33, 34, 36	Low	–	Low
Canals and ditches	Low	2, 9, 17, 27, 30, 33, 34, 38	Low	–	Low
Wells and springs	Moderate	1, 2, 9, 17, 30, 32, 33, 34	Low	–	Low

3.2.4.5 Results

All alternative routes considered for the Project could affect water resources that are directly or indirectly crossed. Impacts on perennial waters could include sedimentation from ground disturbance, temporary and permanent fill associated with development of access routes, removal of riparian vegetation, bank alteration, or accidental contamination associated with spills of environmentally harmful material. Impacts on intermittent waters would be similar to impacts on perennial water features, although intermittent features typically have less associated riparian vegetation and would be more prone to erosion and sedimentation.

The BLM received comments on the Draft EIS requesting clarification regarding whether the Project would potentially contribute to the sources of impairment or affect designated beneficial uses for impaired waters in the Project area. Table I-1 in Appendix I is a list of impaired waters directly or indirectly crossed by alternative routes and includes the cause and source of impairments and their designated beneficial uses. Most impaired waters crossed by alternative routes identify sedimentation and increases in total suspended or dissolved solids as the causes of impairment. Grazing and agriculture are identified as the sources of impairment for a few impaired waters; however, sources of impairment for the majority of impaired waters are largely unknown or are attributed to undisclosed point and nonpoint sources. The Project would be designed and constructed in a way that minimizes or eliminates impacts on water resources, including spanning or avoiding impaired waters and their tributaries. Proper implementation of design features and selective mitigation measures for water resources (Table 3-40) is expected to prevent

the introduction of chemicals or contaminants into any impaired water. Construction activities occurring in the vicinity of impaired waters could result in increased risk of sedimentation into impaired waters and introduction of other contaminants (e.g., dissolved solids, naturally occurring minerals in soils). This risk would be mostly limited to heavy precipitation and runoff events where construction activities are located near impaired waters. Proper implementation of design features (1, 2, 9, 16, 17, 18, 26, 27, 28, 30, 33, 34, 36, 37, and 38) and selective mitigation measures (1, 2, 7, and 11) detailed in Section 3.2.4.4.2 combined with reclamation monitoring would reduce the risk of sedimentation reaching impaired waters to a discountable level. Therefore, it is not anticipated that the Project would contribute to the sources of impairment or affect designated beneficial uses for impaired waters in the Project area.

The USFS evaluated whether implementation of the Project would be in conformance with standards, guidelines, and management objectives pertaining to water resources contained in applicable USFS LRMPs. The analysis found that the Project could be approved in compliance with standards, guidelines, and management objectives pertaining to water resources contained in applicable USFS LRMPs.

3.2.4.5.1 No Action Alternative

Under this alternative, the environment would remain as it presently exists.

3.2.4.5.2 Impacts Common to All Action Alternatives

There are no quantifiable impacts on water resources that would be common to all alternative routes. However, low and moderate residual impacts could occur as a result of construction of temporary and permanent Project facilities associated with all alternative routes in proximity to water resources. While Project facilities would be sited as far away from the physical banks of any major waterway, construction and maintenance of the Project would result in some degree of ground disturbance. Removal of vegetation from the uplands and possibly from the riparian areas on the periphery of perennial streams and rivers, as well as soil compaction and decompaction from construction, operation, and maintenance, would result in greater potential for erosion and sedimentation into perennial streams and rivers or their tributaries. It is expected that through proper implementation of design features of the Proposed Action, selective mitigation measures, and additional site-specific mitigation measures detailed in the POD, residual impacts on most water resources would be reduced to low levels. However, palustrine forested wetlands, palustrine scrub/shrub wetlands, and perennial streams and rivers could be subject to both low and moderate residual impacts.

3.2.4.5.3 345-kilovolt Ancillary Transmission Components

The 345kV segments would be constructed in uplands currently being utilized for agriculture and livestock grazing. Construction of these three segments would not affect specially designated waters, impaired waters, wetlands or riparian areas, lentic waters, wells, or springs. The segments would affect nine unnamed intermittent lotic waters, which are tributaries of Currant Creek and the Burraston Ponds (MV-6b).

3.2.4.5.4 500-kilovolt Transmission Line Components

Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO)

The following sections identify water resources that could be affected by the Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO) alternative routes and summarize residual impacts that could result from the construction, operation, and maintenance of the Project. A discussion of water resources located along each alternative route is presented in the alternative route summaries that follow.

Alternative WYCO-B (Agency and Applicant Preferred Alternative)

Affected Environment (Wyoming)

Table 3-41 summarizes the number of direct and indirect crossings of water resources by Alternative WYCO-B in Wyoming in each affected subbasin. Direct crossings are water resources directly crossed by the alternative route centerline. Indirect crossings occur where the 328-foot buffer around a water resource is crossed by the alternative route centerline. Some water resources are crossed multiple times. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-42 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative WYCO-B in Wyoming. Some water resources are crossed multiple times. Alternative WYCO-B would cross the North Platte River in Wyoming, which is listed as a specially designated outstanding water, and Medicine Bow River (MV-6a). Notable waters of particular concern to the BLM Rawlins Field Office located along Alternative WYCO-B include Barrel Springs Draw, Big Ditch, Coal Gulch, Hanna Draw, Hartt Cabin Draw, Saint Mary's Creek, Sand Creek, South Barrel Springs Draw, and Windmill Draw. These intermittent streams are subject to avoidance criteria described in the BLM Rawlins Field Office RMP (BLM 2008b).

Environmental Consequences (Wyoming)

Table 3-43 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative WYCO-B in Wyoming. Following proper implementation of selective mitigation measures, a 0.3 mile of moderate residual impacts on water resources associated with implementation of Alternative WYCO-B in Wyoming would occur. Moderate residual impacts could result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to the Medicine Bow and North Platte rivers.

Temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative WYCO-B in Wyoming could result in 52.2 miles of low residual impacts on water resources (Table 3-43 and MV-6a).

Affected Environment (Colorado)

Table 3-41 summarizes the number of direct and indirect crossings of water resources by Alternative WYCO-B in Colorado in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-42 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative WYCO-B in Colorado. Alternative WYCO-B could potentially affect state-listed impaired waters associated with West Evacuation Creek, Douglas Creek, as well as the Yampa and Little Snake rivers (MV-6b).

TABLE 3-41
NUMBER OF WATER TYPES BY SUBBASIN CROSSED BY
THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES

Water Type	State	Subbasins																	
		Great Basin Closed Basin		Little Snake		Lower White		Lower Yampa		Medicine Bow		Muddy		Pathfinder-Seminoe Reservoirs		Upper North Platte		Upper Yampa	
		Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Alternative WYCO-B (Agency and Applicant Preferred Alternative)																			
Impaired waters	Wyoming	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	0	–	–	–	–	–	–	–	–	–	–	–	–
Outstanding waters	Wyoming	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Palustrine emergent wetlands	Wyoming	1	5	–	–	–	–	–	–	–	–	1	–	–	2	1	1	–	–
	Colorado	–	–	–	–	–	2	–	3	–	–	–	–	–	–	–	–	–	–
Palustrine scrub/ shrub wetlands	Wyoming	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Riparian	Wyoming	9	8	9	13	–	–	–	–	1	4	6	6	3	5	16	12	–	–
	Colorado	–	–	2	1	–	–	1	–	–	–	–	–	–	–	–	–	–	–
Swamps, marshes, and estuaries	Wyoming	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lakes, reservoirs, and ponds	Wyoming	1	4	–	–	–	–	–	–	–	–	–	2	–	2	2	1	–	–
	Colorado	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Perennial streams and rivers	Wyoming	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–	–	–
	Colorado	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
Intermittent streams	Wyoming	52	24	45	33	–	–	–	–	18	6	36	5	18	8	58	10	–	–
	Colorado	–	–	81	17	29	6	19	6	–	–	–	–	–	–	–	–	–	–
Ephemeral streams and washes	Wyoming	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Canals and ditches	Wyoming	1	2	–	–	–	–	–	–	–	–	2	1	–	–	–	3	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Wells and springs	Wyoming	–	–	1	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total by subbasin		64	45	140	65	29	10	21	9	20	10	45	14	21	17	79	27	–	–

TABLE 3-41
NUMBER OF WATER TYPES BY SUBBASIN CROSSED BY
THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES

Water Type	State	Subbasins																	
		Great Basin Closed Basin		Little Snake		Lower White		Lower Yampa		Medicine Bow		Muddy		Pathfinder-Seminoe Reservoirs		Upper North Platte		Upper Yampa	
		Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Alternative WYCO-C																			
Impaired Waters	Wyoming	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	1	0	–	–	–	–	–	–	–	–	–	–
Outstanding waters	Wyoming	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Palustrine emergent wetlands	Wyoming	2	2	–	–	–	–	–	–	–	–	1	–	–	2	1	1	–	–
	Colorado	–	–	–	–	0	2	0	3	–	–	–	–	–	–	–	–	–	–
Palustrine scrub/ shrub wetlands	Wyoming	0	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Riparian	Wyoming	5	5	6	6	–	–	–	–	1	4	9	13	3	5	16	12	–	–
	Colorado	–	–	2	1	–	–	1	0	–	–	–	–	–	–	–	–	–	–
Swamps, marshes, and estuaries	Wyoming	0	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lakes, reservoirs, and ponds	Wyoming	1	3	–	–	–	–	–	–	–	–	–	–	–	2	2	1	–	–
	Colorado	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Perennial streams and rivers	Wyoming	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–	–	–
	Colorado	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
Intermittent streams	Wyoming	44	20	46	21	–	–	–	–	18	6	70	21	18	8	58	10	–	–
	Colorado	–	–	81	17	29	6	19	6	–	–	–	–	–	–	–	–	–	–
Ephemeral streams and washes	Wyoming	–	–	2	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Canals and ditches	Wyoming	–	1	–	–	–	–	–	–	–	–	–	–	–	–	0	3	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total by subbasin		52	33	138	48	29	8	22	9	20	10	80	34	21	17	79	27	–	–

TABLE 3-41
NUMBER OF WATER TYPES BY SUBBASIN CROSSED BY
THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES

Water Type	State	Subbasins																	
		Great Basin Closed Basin		Little Snake		Lower White		Lower Yampa		Medicine Bow		Muddy		Pathfinder-Seminoe Reservoirs		Upper North Platte		Upper Yampa	
		Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Alternative WYCO-D																			
Impaired waters	Wyoming	–	–	–	–	–	–	–	–	–	–	7	4	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–
Outstanding waters	Wyoming	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Palustrine emergent wetlands	Wyoming	1	1	–	–	–	–	–	–	–	3	–	3	–	6	1	1	–	–
	Colorado	–	–	–	–	–	2	–	5	–	–	–	–	–	–	–	–	–	–
Palustrine scrub/ shrub wetlands	Wyoming	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Riparian	Wyoming	6	8	–	–	–	–	–	–	7	6	24	24	3	5	16	11	–	–
	Colorado	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	11	11
Swamps, marshes, and estuaries	Wyoming	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lakes, reservoirs, and ponds	Wyoming	0	1	–	–	–	–	–	–	1	–	1	8	–	5	2	1	–	–
	Colorado	–	–	1	–	–	–	2	–	–	–	–	–	–	–	–	–	3	12
Perennial streams and rivers	Wyoming	–	–	–	–	–	–	–	–	1	–	12	5	–	–	1	–	–	–
	Colorado	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	12	2
Intermittent streams	Wyoming	36	16	8	0	–	–	–	–	23	8	57	13	22	3	62	12	–	–
	Colorado	–	–	34	14	29	6	65	24	–	–	–	–	–	–	–	–	66	30
Canals and ditches	Wyoming	–	1	–	–	–	–	–	–	1	3	–	–	–	–	–	3	–	–
	Colorado	–	–	4	5	–	–	1	–	–	–	–	–	–	–	–	–	2	–
Wells and springs	Wyoming	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5	3
Total by subbasin		43	28	49	20	29	8	69	29	33	20	101	57	25	20	83	28	100	58

TABLE 3-41
NUMBER OF WATER TYPES BY SUBBASIN CROSSED BY
THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES

Water Type	State	Subbasins																	
		Great Basin Closed Basin		Little Snake		Lower White		Lower Yampa		Medicine Bow		Muddy		Pathfinder-Seminoe Reservoirs		Upper North Platte		Upper Yampa	
		Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Alternative WYCO-F																			
Impaired waters	Wyoming	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
Outstanding waters	Wyoming	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Palustrine emergent wetlands	Wyoming	1	5	–	–	–	–	–	0	–	–	–	1	–	2	1	1	–	–
	Colorado	–	–	–	–	–	2	–	3	–	–	–	–	–	–	–	–	–	–
Palustrine scrub/ shrub wetlands	Wyoming	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Riparian	Wyoming	9	8	7	6	–	–	–	–	1	4	13	15	3	5	16	12	–	–
	Colorado	–	–	2	1	–	–	1	–	–	–	–	–	–	–	–	–	–	–
Swamps, marshes, and estuaries	Wyoming	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lakes, reservoirs, and ponds	Wyoming	1	4	–	–	–	–	–	–	–	–	–	1	0	2	2	1	–	–
	Colorado	–	–	–	1	–	–	–	–	–	–	–	–	–	–	0	0	–	–
Perennial streams and rivers	Wyoming	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	–	–	–
	Colorado	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
Intermittent streams	Wyoming	52	24	43	16	–	–	–	–	18	6	66	7	18	8	58	10	–	–
	Colorado	–	–	81	17	29	6	19	6	–	–	–	–	–	–	–	–	–	–
Ephemeral streams and washes	Wyoming	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Canals and ditches	Wyoming	1	2	–	–	–	–	–	–	–	–	–	1	–	–	–	3	–	–
	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total by subbasin		64	45	137	41	29	8	22	9	20	10	79	25	21	17	79	27	–	–

TABLE 3-42
NUMBER OF WATER TYPES CROSSED BY THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES

Alternative Route	Impaired Waters		Outstanding Waters		Palustrine Forested Wetland		Palustrine Emergent Wetlands		Palustrine Scrub/ Shrub Wetlands		Riparian		Swamps, Marshes, and Estuaries		Lakes, Reservoirs, and Ponds		Perennial Streams and Rivers		Intermittent Streams		Ephemeral Streams and Washes		Canals and Ditches		Wells and Springs	
	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
WYCO-B (Agency and Applicant Preferred Alternative)	1	–	1	–	–	–	3	13	–	1	47	49	–	1	3	10	4	–	356	115	1	–	3	6	1	–
Wyoming	–	–	1	–	–	–	3	8	–	1	44	48	–	1	3	9	2	–	227	86	1	–	3	6	1	–
Colorado	1	–	–	–	–	–	–	5	–	0	3	1	–	–	–	1	2	–	129	29	–	–	–	–	–	–
WYCO-C	1	–	1	–	–	–	4	10	–	1	43	46	–	1	3	7	4	–	383	115	2	2	–	4	–	–
Wyoming	–	–	1	–	–	–	4	5	–	1	40	45	–	1	3	6	2	–	254	86	2	2	–	4	–	–
Colorado	1	–	–	–	–	–	–	5	–	–	3	1	–	–	–	1	2	–	129	29	–	–	–	–	–	–
WYCO-D	8	4	1	–	–	–	2	21	–	1	68	66	–	1	10	27	28	7	402	126	–	–	8	12	5	3
Wyoming	7	4	1	–	–	–	2	14	–	1	56	54	–	1	4	15	14	5	208	52	–	–	1	7	–	–
Colorado	1	–	–	–	–	–	–	7	–	–	12	12	–	0	6	12	14	2	194	74	–	–	7	5	5	3
WYCO-F	1	–	1	–	–	–	2	14	–	1	52	51	–	1	3	9	4	–	384	100	3	–	1	6	–	–
Wyoming	–	–	1	–	–	–	2	9	–	1	49	50	–	1	3	8	2	–	255	71	3	–	1	6	–	–
Colorado	1	–	–	–	–	–	–	5	–	–	3	1	–	–	–	1	2	–	129	29	–	–	–	0	–	–

TABLE 3-43
RESIDUAL IMPACTS ON ALL WATER RESOURCES FOR THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES

Alternative Route	Total Miles	Total Miles of Residual Impacts		
		None	Low	Moderate
WYCO-B (Agency and Applicant Preferred Alternative)	206.3	131.2	74.4	0.7
Wyoming	*141.0*	*88.5*	*52.2*	*0.3*
Colorado	*65.3*	*42.7*	*22.2*	*0.4*
WYCO-C	210.0	133	76.0	1.0
Wyoming	*144.7*	*90.3*	*53.8*	*0.6*
Colorado	*65.3*	*42.7*	*22.2*	*0.4*
WYCO-D	249.4	159.7	87.0	2.7
Wyoming	*134.9*	*86*	*47.7*	*1.2*
Colorado	*114.5*	*73.7*	*39.3*	*1.5*
WYCO-F	218.8	141.8	76.1	0.9
Wyoming	*153.5*	*99.1*	*53.9*	*0.5*
Colorado	*65.3*	*42.7*	*22.2*	*0.4*

Environmental Consequences (Colorado)

Table 3-43 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative WYCO-B in Colorado. Following proper implementation of selective mitigation measures 0.4 mile of moderate residual impact on water resources associated with implementation of Alternative WYCO-B in Colorado would occur. Moderate residual impacts would result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to perennial streams and rivers.

Temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative WYCO-B in Colorado could result in 22.2 miles of low residual impacts on water resources (Table 3-43 and MV-6b).

Alternative WYCO-C

Affected Environment (Wyoming)

Table 3-41 summarizes the number of direct and indirect crossings of water resources by Alternative WYCO-C in Wyoming in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-42 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative WYCO-C in Wyoming. Alternative WYCO-C would cross the North Platte River in Wyoming, which is designated as an outstanding water, and Medicine Bow River (MV-6a).

Environmental Consequences (Wyoming)

Table 3-43 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative WYCO-C in Wyoming. Surface-disturbing activities along Alternative WYCO-C could affect highly erodible, high salinity soils. Some mobilization and transfer of sodium and

phosphorus rich soils into the North Platte River, Muddy Creek, Red Creek, Little Snake, Yampa, and White rivers could occur. The water quality of impaired or outstanding waters and wetlands could be affected by surface-disturbing activities. Alternative WYCO-C also could increase erosion and sedimentation in subbasins above municipalities in and around Hanna, Wyoming.

Following proper implementation of selective mitigation measures, 0.6 mile of moderate residual impacts on water resources associated with implementation of Alternative WYCO-C in Wyoming would occur. Moderate residual impacts would result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to the North Platte River.

Temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative WYCO-C in Wyoming would result in 53.8 miles of low residual impacts on water resources (Table 3-43 and MV-6a).

Affected Environment (Colorado)

Table 3-41 summarizes the number of direct and indirect crossings of water resources by Alternative WYCO-C in Colorado in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-42 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative WYCO-C in Colorado. Alternative WYCO-C would have the same affected environment as Alternative WYCO-B in Colorado as they share a common alignment (MV-6b).

Environmental Consequences (Colorado)

Table 3-43 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative WYCO-C in Colorado. Alternative WYCO-C would have the same environmental consequences as Alternative WYCO-B in Colorado as they share a common alignment (Table 3-43 and MV-6b).

Alternative WYCO-D

Affected Environment (Wyoming)

Table 3-41 summarizes the number of direct and indirect crossings of water resources by Alternative WYCO-D in Wyoming in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-42 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative WYCO-D in Wyoming. Alternative WYCO-D would cross the Medicine Bow and North Platte rivers, which are designated as outstanding waters, and two state-listed impaired waters associated with Muddy Creek-1 and Muddy Creek-2 (MV-6a). Other notable waters of particular concern to the BLM Rawlins Field Office located along Alternative WYCO-D include Antelope Creek, Big Ditch, Coal Gulch, Cottonwood Creek, Jim Creek, Pine Draw, Robber's Gulch, Soup Hole Wash, Saint Mary's Creek, South Pine Draw, and Standpipe Draw (MV-6a). These intermittent streams are subject to avoidance criteria described in the BLM Rawlins Field Office RMP (BLM 2008b).

Environmental Consequences (Wyoming)

Table 3-43 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative WYCO-D in Wyoming. Following proper implementation of selective mitigation measures, 1.2 miles moderate residual impact on water resources associated with implementation of Alternative WYCO-D in Wyoming would occur. Moderate residual impacts would result from permanent increases in sedimentation from the indirect effects of ground disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to perennial streams.

Temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative WYCO-D in Wyoming would result in 47.7 miles of low residual impacts resulting from crossing specially designed waters, wetlands and riparian areas, lotic waters, and lentic waters (Table 3-43 and MV-6a).

Affected Environment (Colorado)

Table 3-41 summarizes the number of direct and indirect crossings of water resources by Alternative WYCO-D in Colorado in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-42 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative WYCO-D. Alternative WYCO-D could affect state-listed impaired waters associated with West Evacuation Creek, Douglas Creek, and the Yampa River (MV-6b). Other notable waters of particular concern to the BLM Rawlins Field Office located along Alternative WYCO-D include Elkhead, Little Cottonwood, South Fork Fortification, Fortification, and Little Bear creeks; the Little Snake River; and Culverwell Reservoir.(MV-6b).

Environmental Consequences (Colorado)

Table 3-43 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative WYCO-D in Wyoming. Following proper implementation of selective mitigation measures, 1.5 miles of moderate residual impacts on water resources associated with implementation of Alternative WYCO-D in Colorado would occur. Moderate residual impacts would result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to perennial streams.

Temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative WYCO-D in Colorado would result in 39.3 miles of low residual impacts as a result of crossing wetlands and riparian areas, lotic waters, and lentic waters (Table 3-43 and MV-6b.

Alternative WYCO-F

Affected Environment (Wyoming)

Table 3-41 summarizes the number of direct and indirect crossings of water resources by Alternative WYCO-F in Wyoming in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-42 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative WYCO-F in Wyoming. Alternative WYCO-F would cross the North Platte River, which is designated as an outstanding water, and the Medicine Bow River (MV-6a). Notable waters of particular concern to the BLM Rawlins Field Office along Alternative WYCO-F include Antelope Creek, Big Ditch, Coal Gulch, Cottonwood Creek, Jim Creek, Pine Draw, Robber's Gulch, Soup Hole Wash, Saint Mary's Creek, South Pine Draw, and Standpipe Draw. These intermittent streams would be subject to avoidance criteria described in the BLM Rawlins Field Office RMP (BLM 2008b).

Environmental Consequences (Wyoming)

Table 3-43 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative WYCO-F in Wyoming. Following proper implementation of selective mitigation measures, 0.4 mile moderate residual impact on water resources associated with implementation of Alternative WYCO-F in Wyoming would occur. Moderate residual impacts would result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to perennial streams.

Temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative WYCO-F in Wyoming would result in 53.9 miles of low residual impacts as a result of crossings specially designated waters, wetlands and riparian areas, and lotic waters (Table 3-43 and MV-6a).

Affected Environment (Colorado)

Table 3-41 summarizes the number of direct and indirect crossings of water resources by the Alternative WYCO-F in Colorado in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-42 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative WYCO-F in Colorado. Alternative WYCO-F would have the same affected environment as Alternative WYCO-B in Colorado as they share a common alignment (MV-6b).

Environmental Consequences (Colorado)

Table 3-43 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative WYCO-F in Colorado. Alternative WYCO-F would have the same environmental consequences as Alternative WYCO-B in Colorado as they share a common alignment (Table 3-43 and MV-6b).

Colorado to Utah – U.S. Highway 40 to Baxter Pass to Clover (COUT BAX)

The following sections identify water resources that could be affected by the Wyoming to Colorado – Aeolus to U.S. Highway 40 (COUT BAX) alternative routes and summarize residual impacts that could result from the construction, operation, and maintenance of the Project. A discussion of notable water resources located along each alternative route is presented in the alternative route summaries that follow.

Alternative COUT BAX-B

Affected Environment (Colorado)

Table 3-44 summarizes the number of direct and indirect crossings of water resources by the COUT BAX-B alternative route in each affected subbasin. Direct crossings are water resources directly crossed by the alternative route centerline. Indirect crossings occur where the 328-foot buffer around a water resource is crossed by the alternative route centerline. Some water resources are crossed multiple times. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located (MV-6b).

Table 3-45 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative COUT BAX-B in Colorado. Alternative COUT BAX-B in Colorado could potentially affect state-listed impaired waters associated with Evacuation Creek, West Evacuation Creek, and Douglas Creek (MV-6b). COUT BAX-B would cross one palustrine scrub/shrub wetland. Other notable water resources crossed by Alternative COUT BAX-B include the White River, Douglas Creek, and Whiskey Creek and Box Elder and Villard Flats reservoirs (Table 3-45 and MV-6b).

Environmental Consequences (Colorado)

Table 3-46 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT BAX-B in Colorado. Following proper implementation of selective mitigation measures, 2.6 miles moderate residual impacts on water resources associated with implementation of Alternative COUT BAX-B in Colorado would occur. Moderate residual impacts could result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to perennial streams.

Moderate residual impacts resulting from the implementation of Alternative COUT BAX-B could be attributed to permanent modification of existing wetlands, including potential impacts on palustrine scrub/shrub wetlands. Wetlands in this area provide functions and services that maintain water quality through filtering sediment; attenuating run-off flows from gaining momentum and eroding topsoil; and through abiotic and biotic assimilation of nutrients and particles, which produces organic soil components and gives off oxygen.

Temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative COUT BAX-B in Colorado could result in 41.3 miles of low residual impacts on water resources (Table 3-46 and MV-6b).

Affected Environment (Utah)

Table 3-44 summarizes the number of direct and indirect crossings of water resources by Alternative COUT BAX-B in Utah in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

TABLE 3-44
NUMBER OF WATER TYPES BY SUBBASIN CROSSED BY
THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO BAXTER PASS TO CLOVER (COUT BAX) ALTERNATIVE ROUTES

Water Type	State	Subbasins																	
		Colorado Headwaters-Plateau		Lower Green		Lower White		Price		San Pitch		San Rafael		Upper Colorado-Kane Springs		Utah Lake		Westwater Canyon	
		Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Alternative COUT BAX-B																			
Impaired waters	Colorado	–	–	–	–	101	28	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	48	8	–	–	–	–	21	3
Outstanding waters	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	21	9	–	–	9	2	–	–
Palustrine emergent wetlands	Colorado	1	1	–	–	5	9	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Palustrine scrub and shrub wetlands	Colorado	–	–	–	–	2	1	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Riparian	Colorado	1	5	–	–	1	4	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	1	4	–	–	–	–	2	2	9	2	–	–	7	5	2	3
Lakes, reservoirs, and ponds	Colorado	–	6	–	–	3	6	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	3	–	–	–	–	–	2	–	5	–	–	–	1	–	2
Perennial streams	Colorado	–	–	–	–	41	3	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	3	–	–	–	–	–	3	–	3	2	–	–	4	4	1	–
Intermittent streams	Colorado	147	61	–	–	92	40	–	–	–	–	–	–	–	–	–	–	1	1
	Utah	–	–	79	9	–	–	–	–	61	41	64	8	2	–	23	8	65	15
Wells and springs	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	1	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–
Canals and ditches	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	1	–	4	2	–	–	–	–	–	–
Total by subbasin		149	73	84	16	245	91	–	–	67	45	151	36	2	–	43	20	90	25

TABLE 3-44
NUMBER OF WATER TYPES BY SUBBASIN CROSSED BY
THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO BAXTER PASS TO CLOVER (COUT BAX) ALTERNATIVE ROUTES

Water Type	State	Subbasins																	
		Colorado Headwaters-Plateau		Lower Green		Lower White		Price		San Pitch		San Rafael		Upper Colorado-Kane Springs		Utah Lake		Westwater Canyon	
		Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Alternative COUT BAX-C																			
Impaired waters	Colorado	–	–	–	–	101	28	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	48	8	–	–	–	–	21	3
Outstanding waters	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	21	9	–	–	9	2	–	–
Palustrine emergent wetlands	Colorado	1	1	–	–	5	9	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Palustrine scrub and shrub wetlands	Colorado	–	–	–	–	2	1	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Riparian	Colorado	1	5	–	–	1	4	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	2	2	–	–	–	–	2	2	9	2	–	–	7	5	2	3
Intermittent streams	Colorado	147	61	–	–	92	40	–	–	–	–	–	–	–	–	–	–	1	1
	Utah	–	–	77	14			8	3	61	41	63	9	2	–	23	8	65	15
Lakes, reservoirs, and ponds	Colorado	–	6	–	–	3	6	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	2	–	–	–	–	–	2	–	5	–	–	–	1	–	2
Perennial streams	Colorado	–	–	–	–	41	3	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	3	–	–	–	–	–	3	–	3	2	–	–	4	4	1	–
Canals and ditches	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	1	–	–	–	–	1	1	–	4	2	–	–	–	–	–	–
Wells and springs	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–
Total by subbasin		149	73	83	18	245	91	8	4	67	45	150	37	2	–	43	20	90	25

TABLE 3-44
NUMBER OF WATER TYPES BY SUBBASIN CROSSED BY
THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO BAXTER PASS TO CLOVER (COUT BAX) ALTERNATIVE ROUTES

Water Type	State	Subbasins																	
		Colorado Headwaters-Plateau		Lower Green		Lower White		Price		San Pitch		San Rafael		Upper Colorado-Kane Springs		Utah Lake		Westwater Canyon	
		Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Alternative COUT BAX-E																			
Impaired waters	Colorado	–	–	–	–	101	28	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	10	3	–	–	5	3	–	–	–	–	21	3
Outstanding waters	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	5	1	3	1	7	5	–	–	9	2	–	–
Palustrine emergent wetlands	Colorado	1	1	–	–	5	9	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	1
Palustrine scrub and shrub wetlands	Colorado	–	–	–	–	2	1	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
Riparian	Colorado	1	5	–	–	1	4	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	2	2	–	–	8	9	–	1	–	–	–	–	7	5	2	3
Lakes, reservoirs, and ponds	Colorado	–	6	–	–	3	6	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	2	–	–	1	3	–	4	–	1	–	–	–	1	–	2
Perennial streams	Colorado	–	–	–	–	41	3	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	3	–	–	–	12	6	3	1	1	–	–	–	4	9	1	–
Intermittent streams	Colorado	147	61	–	–	92	40	–	–	–	–	–	–	–	–	–	–	1	1
	Utah	–	–	59	12	–	–	108	32	34	15	4	3	2	–	29	9	65	15
Canals and ditches	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	1	–	–	–	2	2	6	–	–	–	–	–	–	–	–	–
Wells and springs	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–
Total by subbasin		149	73	65	16	245	91	148	60	46	22	18	12	2	–	49	26	90	25

TABLE 3-45
NUMBER OF WATER TYPES CROSSED BY THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO BAXTER PASS TO CLOVER (COUT BAX) ALTERNATIVE ROUTES

Alternative Route	Impaired Waters		Outstanding Waters		Palustrine Forested Wetland		Palustrine Emergent Wetlands		Palustrine Scrub/ Shrub Wetlands		Riparian		Swamps, Marshes, and Estuaries		Lakes, Reservoirs, and Ponds		Perennial Streams and Rivers		Intermittent Streams		Ephemeral Streams and Washes		Canals and Ditches		Wells and Springs	
	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
COUT BAX-B	170	39	30	11	–	–	6	11	2	1	23	25	–	–	3	25	55	9	534	183	–	–	5	2	3	0
Colorado	101	28	–	–	–	–	6	10	2	1	2	9	–	–	3	12	41	3	240	102	–	–	–	–	–	–
Utah	69	11	30	11	–	–	0	1	–	–	21	16	–	–	0	13	14	6	294	81	–	–	5	2	3	0
COUT BAX-C	170	39	30	11	–	–	6	11	2	1	24	23	–	–	3	24	55	9	539	192	–	–	6	3	2	0
Colorado	101	28	–	–	–	–	6	10	2	1	2	9	–	–	3	12	41	3	240	102	–	–	–	–	–	–
Utah	69	11	30	11	–	–	0	1	–	–	22	14	–	–	0	12	14	6	299	90	–	–	6	3	2	0
COUT BAX-E	137	37	24	9	–	–	6	15	3	1	21	29	–	–	4	25	65	19	541	188	–	–	9	2	2	0
Colorado	101	28	–	–	–	–	6	10	2	1	2	9	–	–	3	12	41	3	240	102	–	–	–	–	–	–
Utah	36	9	24	9	–	–	0	5	1	0	19	20	–	–	1	13	24	16	301	86	–	–	9	2	2	0

TABLE 3-46 RESIDUAL IMPACTS ON ALL WATER RESOURCES FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO BAXTER PASS TO CLOVER (COUT BAX) ALTERNATIVE ROUTES				
		Total Miles of Residual Impacts		
Alternative Route	**Total Miles**	**None**	**Low**	**Moderate**
COUT BAX-B	279.9	179.5	95.6	4.8
Colorado	*87.0*	*43.1*	*41.3*	*2.6*
Utah	*192.9*	*136.4*	*54.3*	*2.2*
COUT BAX-C	290.4	187.9	97.7	4.8
Colorado	*87.0*	*43.1*	*41.3*	*2.6*
Utah	*203.4*	*144.8*	*56.4*	*2.2*
COUT BAX-E	292.2	182.4	104	5.8
Colorado	*87.0*	*43.1*	*41.3*	*2.6*
Utah	*205.2*	*139.3*	*62.7*	*3.2*

Table 3-45 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative COUT BAX-B in Utah. Alternative COUT BAX-B in Utah could affect outstanding waters including; Maple Gulch, Mariunus, Booths, Dry, Forbs, Rocky Ridge, and Salt Spring canyons; Cottonwood, Deer, Whetstone, Indian, and North Fork Coal creeks and 1 outstanding spring. State-listed, impaired waters associated with Cottonwood Wash, Huntington Creek-1, Price River (Woodside to Soldier Creek), and Westwater Creek could be affected. Other notable water resources located along Alternative COUT BAX-B include; Thompson and Floy washes; Deer, Pleasant, Coal Fork, Indian, Hop, Salt, West, Currant, and Huntington creeks; the Green and San Pitch rivers; and Water Hollow (Table 3-45 and MV-6b).

Environmental Consequences (Utah)

Table 3-46 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT BAX-B in Utah. Following proper implementation of selective mitigation measures, 2.2 miles of moderate residual impacts on water resources associated with implementation of Alternative COUT BAX-B in Utah would occur. Moderate residual impacts could result from permanent increases in sedimentation from the indirect effects of ground disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to perennial streams.

Temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative COUT BAX-B in Utah could result in 54.3 miles of low residual impacts on water resources.(Table 3-46 and MV-6b)

Alternative COUT BAX-C

Affected Environment (Colorado)

Table 3-44 summarizes the number of direct and indirect crossings of water resources by Alternative COUT BAX-C in Colorado in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-45 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative COUT BAX-C in Utah. Alternative COUT BAX-C would have the same affected environment as Alternative COUT BAX-B in Colorado as they share a common alignment (MV-6b).

Environmental Consequences (Colorado)

Table 3-46 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT BAX-C in Colorado. Alternative COUT BAX-C would have the same environmental consequences as Alternative COUT BAX-B in Colorado as they share a common alignment (Table 3-46 and MV-6b).

Affected Environment (Utah)

Table 3-44 summarizes the number of direct and indirect crossings of water resources Alternative COUT BAX-C in Utah in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-45 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative COUT BAX-C. Alternative COUT BAX-C in Utah could affect specially designated waters, including Maple Gulch, Mariunus, Booths, Dry, Forbs, Rocky Ridge, and Salt Spring canyons; Cottonwood, Deer, Whetstone, Indian, and North Fork Coal creeks and one outstanding spring. State-listed, impaired waters associated with Cottonwood Wash, Huntington Creek-1, the Price River (Woodside to Soldier Creek), and Westwater Creek could be affected. Alternative COUT BAX-C crosses riparian and wetland areas including one palustrine scrub/shrub wetland. Other notable waters located along Alternative COUT BAX-C include Thompson and Floy washes; Deer, Pleasant, Coal Fork, Indian, Hop, Salt, West, Currant, and Huntington creeks; Green and San Pitch rivers; and Water Hollow(Table 3-45 and MV-6b).

Environmental Consequences (Utah)

Table 3-46 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT BAX-C in Utah. Following proper implementation of selective mitigation measures, 2.2 miles of moderate residual impacts on water resources associated with implementation of Alternative COUT BAX-C in Utah would occur. Moderate residual impacts would result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to perennial streams.

Temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative COUT BAX-C in Utah could result in 56.4 miles of low residual impacts water resources (Table 3-46 and MV-6b).

Alternative COUT BAX-E

Affected Environment (Colorado)

Table 3-44 summarizes the number of direct and indirect crossings of water resources by Alternative COUT BAX-E in Colorado in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-45 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative COUT BAX-E in Colorado alternative route. Alternative COUT BAX-E would have the same affected environment as Alternative COUT BAX-B in Colorado as they share a common alignment (MV-6b).

Environmental Consequences (Colorado)

Table 3-46 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT BAX-E in Colorado. Alternative COUT BAX-E would have the same environmental consequences as Alternative COUT BAX-E as they share a common alignment (MV-6b).

Affected Environment (Utah)

Table 3-44 summarizes the number of direct and indirect crossings of water resources by Alternative COUT BAX-E in Utah in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-45 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative COUT BAX-E in Utah. Alternative COUT BAX-E in Utah could affect specially designated waters, including Boarding House Gulch; Gooseberry, Upper Huntington, Cottonwood, Maple Fork, and White Pine Fork creeks; Swens, Burnout, North Fork Swens, Forbs, Rocky Ridge, and Salt Spring canyons and state-listed impaired waters associated with Cottonwood Wash, Deer Creek, Gordon Creek (and its tributaries), Huntington Creek-1, the Price River-5, Price River (Woodside to Soldier Creek), and Westwater Creek. One palustrine scrub/shrub wetland could also be affected. Other notable water resources that could be affected by Alternative COUT BAX-E include the San Pitch, Green and Price rivers; Currant, Hop, Upper Huntington, Cottonwood, White Pine Fork, Mud, Gooseberry, and Miller creeks; Mud Water, Bob Wright, and Trail canyons; Floy, Water Hollow, and Thompson washes (Table 3-45 and MV-6b).

Environmental Consequences (Utah)

Table 3-46 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT BAX-E in Utah. Following proper implementation of selective mitigation measures, 3.2 miles of moderate residual impacts on water resources associated with implementation of Alternative COUT BAX-E in Utah would occur. Moderate residual impacts would result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to perennial streams.

Moderate impacts resulting from implementation of Alternative COUT BAX-E could be attributed to direct or indirect modification of existing wetlands, including palustrine scrub/shrub Wetlands. Wetlands in this area provide functions and services that maintain water quality through filtering sediment, attenuating run-off flows from gaining momentum and eroding topsoil and through abiotic and biotic assimilation of nutrients and particles, which produces organic soil components and gives off oxygen.

Temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative COUT BAX-E in Utah could result in 62.7 miles of low residual impacts on water resources (Table 3-46 and MV-6b)

Colorado to Utah – U.S. Highway 40 to Central Utah to Clover (COUT)

The following sections identify water resources that could be affected by the Wyoming to Colorado – Aeolus to U.S. Highway 40 (COUT) alternative routes and summarize residual impacts that could result from the construction, operation, and maintenance of the Project. A discussion of notable water resources located along each alternative route is presented in the alternative route summaries that follow.

Alternative COUT-A

Affected Environment (Colorado)

Table 3-47 summarizes the number of direct and indirect crossings of water resources by Alternative COUT-A in Colorado in each affected subbasin. Direct crossings are water resources that are directly crossed by an alternative route centerline. Indirect crossings occur where the 328-foot buffer around a water resource is crossed by the alternative route centerline. Some water resources are crossed multiple times. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-48 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative COUT-A in Colorado. Alternative COUT-A in Colorado could affect state-listed, impaired waters associated with West Evacuation Creek and Douglas Creek and Box Elder Reservoir No. 2 (MV-6b).

Environmental Consequences (Colorado)

Table 3-49 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT-A in Colorado. Following proper implementation of selective mitigation measures, Alternative COUT-A in Colorado could result in 0.1 mile of moderate residual impacts on water resources. Alternative COUT-A would result in 9.5 miles of low residual impacts.

Affected Environment (Utah)

Table 3-47 summarizes the number of direct and indirect crossings of water resources by Alternative COUT-A in Utah in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-48 summarizes the number of direct and indirect crossings of each water resource type crossed by the COUT-A alternative route. Alternative COUT-A in Utah could affect specially designated waters, including outstanding waters a, the Duchesne and Strawberry rivers; French and Tank hollows; Center, Buffalo, Right Fork Timber, Cox, Blind, Forbs, Rocky Ridge, and Salt Spring canyons; Sheep and Tie Fork creeks. Alternative COUT-A in Utah could affect state-listed, impaired waters associated with Dry Gulch Creek, Lake Fork-1, Soldier Creek-1, Thistle Creek-1, and the Uinta River. Alternative COUT A crosses several wetland and riparian areas.

Other notable water resources located along Alternative COUT-A include Baser, Big Sand, and Red washes; Blind Canyon, Water Hollow; Currant, Dry Gulch, Hop, Lake Fork, Left Fork Spencer, Montes, Red, Salt, Sheep, Soldier, Thistle, Tie Fork, and West creeks; Duchesne, Green, Lake Fork, Strawberry, and Uinta rivers.

Alternatives COUT-A and COUT-B (through a shared common alignment) directly cross a palustrine forested wetland associated with the Green River. This crossing is the only direct or indirect crossing of a palustrine forested wetland for all alternative routes.

TABLE 3-47
NUMBER OF WATER TYPES BY SUBBASIN CROSSED BY
THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES

Water Type	State	Subbasins																					
		Duchesne		Lower Green-Desolation Canyon		Lower Green-Diamond		Lower White		Price		San Pitch		San Rafael		Spanish Fork		Strawberry		Utah Lake		Willow	
		Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Alternative COUT A																							
Impaired waters	Colorado	–	–	–	–	–	–	15	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	107	38	–	–	–	–	–	–	–	–	–	–	–	–	2	0	53	18	–	–	–	–
Outstanding waters	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	1	0	–	–	–	–	–	–	–	–	–	–	–	–	32	6	12	7	9	2	–	–
Palustrine forested overstory	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	1	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Palustrine emergent wetlands	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	35	20	–	–	4	0	–	–	–	–	–	–	–	–	–	–	1	12	–	–	–	–
Palustrine scrub and shrub wetlands	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	7	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0	1	–	–	–	–
Riparian	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	20	14	–	–	2	2	–	–	–	–	–	–	–	–	21	11	49	27	12	8	–	–
Lakes, reservoirs, and ponds	Colorado	–	–	–	–	–	–	0	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	5	13	–	–	1	2	–	–	–	–	–	–	–	–	0	1	1	16	0	2	–	–
Perennial streams	Colorado	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	10	10	–	–	2	0	–	–	–	–	–	–	–	–	11	3	3	1	4	5	–	–
Intermittent streams	Colorado	–	–	–	–	–	–	52	17	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	72	33	–	–	38	4	13	3	–	–	–	–	–	–	38	3	49	18	39	8	–	–
Canals and ditches	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	4	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–
Wells and springs	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	0	–	–	–	–	–	–
Total by subbasin		261	133	–	–	48	8	81	29	–	–	–	–	–	–	105	24	169	100	64	25	–	–

TABLE 3-47
NUMBER OF WATER TYPES BY SUBBASIN CROSSED BY
THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES

Water Type	State	Subbasins																					
		Duchesne		Lower Green-Desolation Canyon		Lower Green-Diamond		Lower White		Price		San Pitch		San Rafael		Spanish Fork		Strawberry		Utah Lake		Willow	
		Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Alternative COUT B																							
Impaired waters	Colorado	–	–	–	–	–	–	15	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	152	52	–	–	–	–	–	–	–	–	–	–	–	–	2	0	–	–	–	–	–	–
Outstanding waters	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	46	38	–	–	–	–	–	–	1	0	–	–	–	–	29	2	–	–	9	2	–	–
Palustrine forested overstory	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Palustrine emergent wetlands	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	36	26	–	–	4	–	–	–	0	1	–	–	–	–	–	–	–	–	–	–	–	–
Palustrine scrub and shrub wetlands	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	17	4	–	2	–	–	–	–	1	2	–	–	–	–	–	–	–	–	–	–	–	–
Riparian	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	29	20	–	–	2	2	–	–	1	2	–	–	–	–	13	8	–	–	12	8	–	–
Swamps, marshes, and estuaries	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	1	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lakes, reservoirs, and ponds	Colorado	–	–	–	–	–	–	0	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	2	16	–	2	1	2	–	–	0	3	–	–	–	–	0	2	–	–	0	2	–	–
Perennial streams	Colorado	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	36	31	5	9	2	–	–	–	11	6	–	–	–	–	9	1	–	–	4	5	–	–
Intermittent streams	Colorado	–	–	–	–	–	–	52	17	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	95	49	12	3	38	4	13	3	42	7	–	–	–	–	42	5	–	–	39	8	–	–
Canals and ditches	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	8	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Wells and springs	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	4	0	–	–	–	–	–	–	2	0	–	–	–	–	2	0	–	–	–	–	–	–
Total by subbasin		426	243	17	16	48	8	81	29	58	21	–	–	–	–	97	18	–	–	64	25	–	–

TABLE 3-47
NUMBER OF WATER TYPES BY SUBBASIN CROSSED BY
THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES

Water Type	State	Subbasins																					
		Duchesne		Lower Green-Desolation Canyon		Lower Green-Diamond		Lower White		Price		San Pitch		San Rafael		Spanish Fork		Strawberry		Utah Lake		Willow	
		Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Alternative COUT-C (Agency and Applicant Preferred Alternative)																							
Impaired waters	Colorado	–	–	–	–	–	–	20	10	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	14	3
Outstanding waters	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	1	–	–	–	–	–	–	–	–	–	–	–	29	2	–	–	9	2	–	–
Palustrine emergent wetlands	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	2	2	2	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Palustrine scrub and shrub wetlands	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Riparian	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	2	1	–	–	–	–	–	–	–	–	–	–	13	8	–	–	12	8	1	1
Lakes, reservoirs, and ponds	Colorado	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	4	1	1	3	3	–	1	–	–	–	–	–	2	–	–	–	2	–	1
Perennial streams	Colorado	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	8	2	–	–	1	1	10	8	–	–	–	–	9	1	–	–	4	5	1	–
Intermittent streams	Colorado	–	–	–	–	–	–	57	21	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	67	27	10	1	60	21	12	9	–	–	–	–	42	5	–	–	39	8	13	1
Canals and ditches	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Wells and springs	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–
Total by subbasin		–	–	80	39	13	2	141	59	22	18	–	–	–	–	97	18	–	–	64	25	29	8
Alternative COUT H (Applicant Preferred Alternative)																							
Impaired waters	Colorado	–	–	–	–	–	–	20	10	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	11	5	–	–	5	3	–	–	–	–	–	–	14	3
Outstanding waters	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	1	–	–	–	–	–	5	1	3	1	7	5	–	–	–	–	9	2	–	–

TABLE 3-47
NUMBER OF WATER TYPES BY SUBBASIN CROSSED BY
THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES

Water Type	State	Subbasins																					
		Duchesne		Lower Green-Desolation Canyon		Lower Green-Diamond		Lower White		Price		San Pitch		San Rafael		Spanish Fork		Strawberry		Utah Lake		Willow	
		Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Palustrine emergent wetlands	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	2	2	–	–	–	3	1	1	–	–	–	–	–	–	–	–	–	–	–	1
Palustrine scrub and shrub wetlands	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Riparian	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	2	2	–	–	–	–	4	4	–	1	–	–	–	–	–	–	7	5	1	1
Lakes, reservoirs, and ponds	Colorado	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	6	–	–	3	3	–	–	–	4	–	1	–	–	–	–	–	1	–	1
Perennial streams	Colorado	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	4	4	–	–	1	–	9	14	3	1	1	–	–	–	–	–	4	9	1	–
Intermittent streams	Colorado	–	–	–	–	–	–	57	21	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	68	23	–	–	60	21	42	11	34	15	4	3	–	–	–	–	29	9	13	1
Canals and ditches	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	1	–	–	–	–	–	–	6	–	–	–	–	–	–	–	–	–	–	1
Wells and springs	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–
Total by subbasin		–	–	77	39	–	–	142	62	72	36	46	23	17	12	–	–	–	–	49	26	29	8
Alternative COUT I																							
Impaired waters	Colorado	–	–	–	–	–	–	20	10	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	–	–	45	10	–	–	–	–	–	–	14	3
Outstanding waters	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	1	–	–	–	–	–	–	–	–	–	21	9	–	–	–	–	9	2	–	–
Palustrine emergent wetlands	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	2	2	–	–	–	3	–	2	–	–	–	–	–	–	–	–	–	–	–	1
Palustrine scrub and shrub wetlands	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–

TABLE 3-47
NUMBER OF WATER TYPES BY SUBBASIN CROSSED BY
THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES

Water Type	State	Subbasins																					
		Duchesne		Lower Green-Desolation Canyon		Lower Green-Diamond		Lower White		Price		San Pitch		San Rafael		Spanish Fork		Strawberry		Utah Lake		Willow	
		Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
Riparian	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	2	2	–	–	–	–	3	6	2	2	2	–	–	–	–	–	7	5	1	1
Lakes, reservoirs, and ponds	Colorado	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	6	–	–	3	3	–	3	–	2	–	1	–	–	–	–	–	1	–	1
Perennial streams	Colorado	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	4	4	–	–	1	–	19	5	3	–	4	3	–	–	–	–	4	4	1	–
Intermittent streams	Colorado	–	–	–	–	–	–	57	21	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	68	23	–	–	60	21	82	26	61	41	41	6	–	–	–	–	23	8	13	1
Canals and ditches	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	1	–	–	–	–	7	–	1	–	3	1	–	–	–	–	–	–	–	1
Wells and springs	Colorado	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Utah	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–
Total by subbasin		–	–	77	39	–	–	142	62	111	42	67	45	118	30	–	–	–	–	43	20	29	8

TABLE 3-48
NUMBER OF WATER TYPES CROSSED BY THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES

Alternative Route	Impaired Waters		Outstanding Waters		Palustrine Forested Wetland		Palustrine Emergent Wetlands		Palustrine Scrub/ Shrub Wetlands		Riparian		Swamps, Marshes, and Estuaries		Lakes, Reservoirs, and Ponds		Perennial Streams and Rivers		Intermittent Streams		Ephemeral Streams and Washes		Canals and Ditches		Wells and Springs	
	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
COUT-A	177	62	54	15	1	–	40	32	7	5	104	62	–	–	7	36	31	20	301	86	–	–	5	2	1	–
Colorado	15	6	–	–	–	–	–	–	–	–	–	–	–	–	–	2	1	1	52	17	–	–	–	–	–	–
Utah	162	56	54	15	1	–	40	32	7	5	104	62	–	–	7	34	30	19	249	69	–	–	5	2	1	–
COUT-B	169	58	85	42	1	–	40	27	18	8	57	40	1	3	3	29	68	53	333	96	–	–	8	4	8	–
Colorado	15	6	–	–	–	–	–	–	–	–	–	–	–	–	–	2	1	1	52	17	–	–	–	–	–	–
Utah	154	52	85	42	1	–	40	27	18	8	57	40	1	3	3	27	67	52	281	79	–	–	8	4	8	–
COUT-C (Agency and Applicant Preferred Alternative)	36	13	39	4	–	–	2	6	–	3	28	18	–	–	3	15	34	17	290	92	–	–	–	2	2	–
Colorado	20	10	–	–	–	–	–	–	–	–	–	–	–	–	–	2	1	1	57	21	–	–	–	–	–	–
Utah	16	3	39	4	–	–	2	6	–	3	28	18	–	–	3	13	33	16	233	71	–	–	–	2	2	–
COUT-H	50	21	25	9	–	–	3	7	–	2	14	13	–	–	3	18	24	29	307	104	–	–	6	2	1	–
Colorado	20	10	–	–	–	–	–	–	–	–	–	–	–	–	–	2	1	1	57	21	–	–	–	–	–	–
Utah	30	11	25	9	–	–	3	7	–	2	14	13	–	–	3	16	23	28	250	83	–	–	6	2	1	–
COUT-I	79	23	31	11	–	–	2	8	–	2	17	16	–	–	3	19	37	17	405	147	–	–	11	3	2	–
Colorado	20	10			–	–	–	–	–	–	–	–	–	–	–	2	1	1	57	21	–	–	–	–	–	–
Utah	59	13	31	11	–	–	2	8	–	2	17	16	–	–	3	17	36	16	348	126	–	–	11	3	2	–

TABLE 3-49 RESIDUAL IMPACTS ON ALL WATER RESOURCES FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES				
		Total Miles of Residual Impacts		
Alternative Route	**Total Miles**	**None**	**Low**	**Moderate**
COUT-A	207.9	128	75.3	4.6
Colorado	24.3	14.7	9.5	0.1
Utah	183.6	113.3	65.8	4.5
COUT-B	218.2	132.9	76.1	9.2
Colorado	24.3	14.7	9.5	0.1
Utah	193.9	118.2	66.6	9.1
COUT-C (Agency and Applicant Preferred Alternative)	208.2	141.2	62.5	4.5
Colorado	25.0	14.6	10.3	0.1
Utah	183.2	126.6	52.2	4.4
COUT-H	200.6	130.7	66.7	3.2
Colorado	25.0	14.6	10.3	0.1
Utah	175.6	116.1	56.4	3.1
COUT-I	240.2	155.9	79.4	4.9
Colorado	25.0	14.6	10.3	0.1
Utah	215.2	141.3	69.1	4.8

Environmental Consequences (Utah)

Table 3-49 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT-A in Utah. Following proper implementation of selective mitigation measures, COUT-A-1 could result in 68.5 miles of low residual impacts and 4.5 miles of moderate residual impacts on water resources. Moderate residual impacts would result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to perennial streams.

Moderate impacts resulting from this alternative route also could be attributed to direct or indirect modification of existing wetlands, including a palustrine forested wetland associated with the Green River. Wetlands in this area provide functions and services that maintain water quality through filtering sediment' attenuating run-off flows from gaining momentum and eroding topsoil; and through abiotic and biotic assimilation of nutrients and particles, which produces organic soil components and gives off oxygen.

Alternative COUT-B

Affected Environment (Colorado)

Table 3-47 summarizes the number of direct and indirect crossings of water resources by Alternative COUT-B in Colorado in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-48 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative COUT-B in Colorado. Alternative COUT-B would have the same affected environment as Alternative COUT-A in Colorado as they share a common alignment.

Environmental Consequences (Colorado)

Table 3-49 summarizes the combined total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT-B in Colorado. Alternative COUT-B would have the same environmental consequences as Alternative COUT-A in Colorado as they share a common alignment (MV-6b).

Affected Environment (Utah)

Table 3-47 summarizes the number of direct and indirect crossings of water resources by Alternative COUT-B in Utah in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-48 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative COUT-B in Utah. Alternative COUT-B in Utah could affect specially designated waters, including Blind, Cox, Forbs, Garner, Heslington, Hicks, Quitchampau, Rocky Ridge, Salt Spring, Trapper and Wire Fence canyons; Broad, Clem, Jolie, Mine, North Lost, South Lost, Trail, and Water hollows; Indian, Left Fork Spencer, Sheep, Sowers, Tabbyune, and Tie Fork creek. Alternative COUT-B could affect state-listed, impaired waters associated with Dry Gulch Creek, Duchesne River-3, Lake Fork-1, the Price River (Woodside to Soldier Creek), Soldier Creek-1, Thistle Creek-1, and Uinta River-2. Alternative COUT B crosses several wetland and riparian areas. Notable waters located along Alternative COUT-B include; Montes, Dry Gulch, Hop, Kyune, Sowers, Argyle, Horse, Willow, Beaver, Indian, Soldier, Sheep, Tie Fork, Thistle, Left Fork Spencer, and Currant creeks; Price, Lake Fork, Duchesne, and Uinta rivers; Jack and Blind canyons; Baser, Big Sand, Cottonwood, and Red washes (Table 3-48 and MV-6b).

Alternatives COUT- B and COUT- A (through a shared common alignment) directly cross a palustrine forested wetland associated with the Green River. This crossing is the only direct or indirect crossing of a palustrine forested wetland for all alternative routes.

Environmental Consequences (Utah)

Table 3-49 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT-B in Utah. Following proper implementation of selective mitigation measures, 9.1 miles of moderate residual impacts on water resources associated with implementation of Alternative COUT-B in Utah would occur. Moderate residual impacts would result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to perennial streams and wetlands.

Moderate impacts resulting from this alternative route also could be attributed to direct or indirect modification of existing wetlands, including a palustrine forested wetland associated with the Green River. Wetlands in this area provide functions and services that maintain water quality through filtering sediment; attenuating run-off flows from gaining momentum and eroding topsoil; and through abiotic and biotic assimilation of nutrients and particles, which produces organic soil components and gives off oxygen.

Temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative COUT-B in Utah could result in 66.6 miles of low residual impacts on water resources (Table 3-49 and MV-6b).

Alternative COUT-C (Agency and Applicant Preferred Alternative)

Affected Environment (Colorado)

Table 3-47 summarizes the number of direct and indirect crossings of water resources by Alternative COUT-C in Colorado in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-48 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative COUT-C in Colorado. Alternative COUT-C in Colorado could affect state-listed, impaired waters associated with West Excavation Creek and Douglas Creek, as well as wetlands and riparian areas, lotic waters, lentic waters and several intermittent or ephemeral streams (Table 3-48 and MV-6b).

Environmental Consequences (Colorado)

Table 3-49 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT-C in Colorado. Following proper implementation of selective mitigation measures, temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative COUT-C in Colorado, could result in 10.3 miles of low residual impacts and 0.1 mile of moderate residual impacts on water resources.

Affected Environment (Utah)

Table 3-47 summarizes the number of direct and indirect crossings of water resources by Alternative COUT-C in Utah in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-48 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative COUT-C in Utah. Alternative COUT-C in Utah could affect outstanding waters including, Blind, Cox, Forbs, Garner, Heslington, Hicks, Rocky Ridge, and Salt Spring canyons; Indian, Left Fork Spencer, Tie Fork, and Sheep creeks; Water Hollow, and the Price River. Alternative COUT-C in Utah could affect state-listed impaired waters associated with the Price River (Woodside to Soldier Creek), Soldier Creek-1, Thistle Creek-1, and Willow Creek. Alternative COUT-C could affect several wetland and riparian areas. Other notable water resources located along Alternative COUT-C in Utah include Beaver, Currant, Hop, Horse, Indian, Kyune, Lake Fork, Left Fork Spencer, Minnie Maud, Salt, Sheep, Soldier, Summit, Thistle, Tie Fork, West, and Willow creeks; Blind and Jack canyons; Price and White rivers; and Water Hollow (Table 3-48 and MV-6b).

Environmental Consequences (Utah)

Table 3-49 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT-C in Utah. Following proper implementation of selective mitigation measures, 4.4 miles of moderate residual impacts on water resources associated with implementation of Alternative COUT-C in Utah would occur. Moderate residual impacts would result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to perennial streams, as well as impacts on palustrine scrub/shrub wetlands (MV-6b).

Moderate impacts resulting from this alternative route also could be attributed to direct or indirect modification of existing wetlands. Wetlands in this area provide functions and services that maintain

water quality through filtering sediment; attenuating run-off flows from gaining momentum and eroding topsoil; and through abiotic and biotic assimilation of nutrients and particles, which produces organic soil components and gives off oxygen.

Temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative COUT-C in Utah could result in 52.2 miles of low residual impacts on water resources (Table 3-49 and MV-6b).

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

The 345kV Bears Ears to Bonanza transmission line relocation is located in the Lower White subbasin, which is associated with both specially designated impaired waters and intermittent streams. The components that would be relocated indirectly cross one intermittent stream.

Based on the impact assessment criteria for assessing the level of impacts on water resources, there would be no identifiable impacts from relocating the transmission line components on water resources. The types of impacts associated with relocating the transmission line would be similar to the effects of construction of the 500kV transmission line. The types of effects that may occur regarding water resources are described in Section 3.2.4.4.2.

Alternative COUT-H

Affected Environment (Colorado)

Table 3-47 summarizes the number of direct and indirect crossings of water resources by Alternative COUT-H in Colorado in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-48 summarizes the number of direct and indirect crossings of each water resource type crossed by the COUT-H alternative route. Alternative COUT-H shares a common alignment with Alternative COUT-C in Colorado. Alternative COUT-H would have the same affected environment as Alternative COUT-C in Colorado as they are a common alignment (Table 3-48 and MV-6b).

Environmental Consequences (Colorado)

Table 3-49 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT-H in Colorado. Alternative COUT-H would have the environmental consequences as Alternative COUT-C as they share a common alignment (MV-6b).

Affected Environment (Utah)

Table 3-47 summarizes the number of direct and indirect crossings of water resources by Alternative COUT-H in Utah in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-48 summarizes the number of direct and indirect crossings of each water resource type crossed Alternative COUT-H in Utah. Alternative COUT-H in Utah could affect specially designated waters including impaired waters associated with Dry Gulch Creek, Duchesne River-3, Lake Fork-1, Price River-Woodside to Soldier Creek, Thistle Creek-1, and Uinta River-2, and outstanding waters including Boarding House, Burnout, Swens, North Fork Swens, Forbs, Rocky Ridge, and Salt Spring canyons;

Upper Huntington, Cottonwood, Maple Fork, White Pine Fork, and Gooseberry creeks. Other notable water resources located along Alternative COUT-H in Utah include Argyle, Cottonwood, Currant, Gooseberry, Hop, Minnie Maud, Mud, North Fork Gordon, Salt, Summit, Upper Huntington, West, White Pine Fork, and Willow creeks; Boarding House, Deep, Mathis, and Trail canyons; and the Green, Price, and San Pitch rivers (Table 3-48 and MV-6b).

Environmental Consequences (Utah)

Table 3-49 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT-H in Utah. Following proper implementation of selective mitigation measures, 3.1 miles of moderate residual impacts on water resources associated with implementation of Alternative COUT-H in Utah could occur. Moderate residual impacts would result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to perennial streams, as well as outstanding waters.

Moderate impacts associated with Alternative COUT-H could be attributed to direct or indirect modification of palustrine scrub/shrub wetlands. Palustrine scrub/shrub wetlands in this area provide functions and services that maintain water quality through filtering sediment; attenuating run-off flows from gaining momentum and eroding topsoil; and through abiotic and biotic assimilation of nutrients and particles, which produces organic soil components and gives off oxygen.

Temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative COUT-H in Utah would result in 56.4 miles of low residual impacts on water resources (Table 3-49 and MV-6b).

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

Impacts on water resources from the Bears Ears to Bonanza 345kV transmission line relocation would be the same as Alternative COUT-C.

Alternative COUT-I

Affected Environment (Colorado)

Table 3-47 summarizes the number of direct and indirect crossings of water resources by Alternative COUT-I in Colorado in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-48 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative COUT-I in Colorado. Alternative COUT-I would have the same affected environment as Alternative COUT-C in Colorado as they share a common alignment (Table 3-48 and MV-6b).

Environmental Consequences (Colorado)

Table 3-49 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT-I in Colorado. Alternative COUT-I would have the same environmental consequences as Alternative COUT-C as they share a common alignment (Table 3-49 and MV-6b).

Affected Environment (Utah)

Table 3-47 summarizes the number of direct and indirect crossings of water resources by Alternative COUT-I in Utah in each affected subbasin. Appendix I includes the name (if assigned a name) and reach code of water resources identified during the inventory as well as the Project link number where they are located.

Table 3-48 summarizes the number of direct and indirect crossings of each water resource type crossed by Alternative COUT-I in Utah. Alternative COUT-I in Utah could affect specially designated waters including outstanding waters associated with Maple Gulch, Mariunus, Booths, Dry, North Fork Coal, Forbs, Rocky Ridge, and Salt Spring canyons; Cottonwood, Deer, Whetstone, and Indian creeks. Alternative COUT-I in Utah could affect state-listed impaired waters associated with Dry Gulch Creek, Duchesne River-3, Lake Fork-1, Price River (Woodside to Soldier Creek), Thistle Creek-1, and Uinta River-2. Other noatable water resources located along Alternative COUT-I in Utah include Argyle, Cedar, Coal, Coal Fork, Currant, Deer, Hop, Huntington, Indian, Miller, Minnie Maud, Pleasant, Salt, Soldier, Summit, West, and Willow creeks; Green, Price, San Pitch, and White rivers; Marsing Wash, and Water Hollow (Table 3-48 and MV-6b).

Environmental Consequences (Utah)

Table 3-49 summarizes the total miles of residual impacts on all water resources directly or indirectly crossed by Alternative COUT-I Utah. Following proper implementation of selective mitigation measures, 4.8 miles of moderate residual impacts on water resources associated with implementation of Alternative COUT-I in Utah would occur. Moderate residual impacts would result from permanent increases in sedimentation from the indirect effects of surface disturbance and subsequent erosion and sedimentation associated with operation and maintenance of the Project in proximity to perennial streams.

Potential moderate impacts resulting from Alternative COUT-I also could be attributed to direct or indirect modification of palustrine scrub/shrub wetlands. Palustrine scrub/shrub wetlands in this area provide functions and services that maintain water quality through filtering sediment; attenuating run-off flows from gaining momentum and eroding topsoil; and through abiotic and biotic assimilation of nutrients and particles, which produces organic soil components and gives off oxygen.

Temporary increases in erosion and sedimentation as well as temporary removal or modification of wetland and riparian vegetation associated with construction, operation, and maintenance of Alternative COUT-I in Utah could result in 69.1 miles of low residual impacts on water resources (Table 3-49 and MV-6b).

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

Impacts on water resources from the Bears Ears to Bonanza 345kV transmission line relocation would be the same as Alternative COUT-C.

3.2.4.5.5 Series Compensation Stations for the 500-kilovolt Transmission Line

Alternative WYCO-B (Agency and Applicant Preferred Alternative)

Siting Area A – Powder Wash

Affected Environment

Siting Area A (MV-6a and MV-6b) is located on the Wyoming/Colorado state line in the Little Snake Subbasin, where the landscape is dominated by sagebrush, grassland, and pinyon-juniper habitats. The siting area is located on the south slope of the Powder Rim and is primarily comprised of the Cherokee

Creek and Powder Wash drainages. Siting Area A contains perennial and intermittent lentic and lotic systems, riparian areas, and wetlands that are located in drainages that convey water south into the Little Snake River

Environmental Consequences

The effects on water resources from the construction of the Powder Wash series compensation station are included in the disturbance analysis for Alternative WYCO-B (Section 3.2.4.5.4). Placement and design of the station would be done in a manner that would avoid water resources to the extent feasible. Areas where ground-disturbing activities associated with construction, operation, and maintenance of the series compensation station could not be avoided would result in low impacts on water resources. Following proper implementation of design features of the Proposed Action, selective mitigation measures, and site-specific design features detailed in the POD, potential impacts on water resources would be mitigated or reduced to minor levels.

Siting Area B – Nine Mile Basin

Affected Environment

Siting Area B (MV-6a and MV-6b) is located in Colorado in the Little Snake Subbasin, where the landscape is dominated by sagebrush, grassland, and pinyon-juniper habitats. The siting area is generally located in the Nine Mile Basin where Shafer's Draw, Nipple Gulch, and South Nipple Gulch convey water into the Little Snake River. Siting Area B contains perennial and intermittent lentic and lotic systems and is situated along approximately 14 miles of the Little Snake River.

Environmental Consequences

The effects on water resources from the construction of the Nine Mile Basin series compensation station are included in the disturbance analysis for Alternative WYCO-B (Section 3.2.4.5.4). Placement and design of the station would be done in a manner that would avoid water resources to the extent feasible. Areas where ground-disturbing activities associated with construction, operation, and maintenance of the station could not be avoided would result in low impacts on water resources. Following proper implementation of design features of the Proposed Action, selective mitigation measures and site-specific design features detailed in the POD, potential impacts on water resources would be mitigated or reduced to minor levels.

Siting Area C – Maybell

Affected Environment

Siting Area C (MV-6a and MV-6b) is located in Colorado in the Little Snake and Lower Yampa subbasins, where the landscape is dominated by sagebrush, grassland, and pinyon-juniper habitats that are adjacent to agricultural areas. Siting Area C contains perennial and intermittent streams, wetlands, riparian areas, and specially designated waters that convey water to the Yampa River. Siting Area C area is situated along an approximately 6-mile portion of the Yampa River that is listed as an impaired on the CWA Section 303(d) list.

Environmental Consequences

The effects on water resources from the construction of the Maybell series compensation station are included in the disturbance analysis for Alternative WYCO-B (Section 3.2.4.5.4). Placement and design of the station would be done in a manner that would avoid water resources to the extent feasible. Areas where ground-disturbing activities associated with construction, operation, and maintenance of the station

could not be avoided would result in low impacts on water resources. Following proper implementation of design features of the Proposed Action, selective mitigation measures, and site-specific design features detailed in the POD, potential impacts on water resources would be mitigated or reduced to minor levels.

Alternative WYCO-C

Siting Area A – Powder Wash

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area A as Alternative WYCO-B.

Siting Area B – Nine Mile Basin

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area B as Alternative WYCO-B.

Siting Area C – Maybell

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area C as Alternative WYCO-B.

Alternative WYCO-D

Siting Area D – Bell Rock

Affected Environment

Siting Area D (MV-6a and MV-6b) is located in Colorado in the Lower Yampa Subbasin, where the landscape is dominated by sagebrush and grassland habitats that are adjacent to agricultural areas. Siting Area D contains perennial and intermittent lentic and lotic systems, wetlands, riparian areas, and a spring that are located in watersheds that convey water to the Yampa River. Siting Area D is situated along an approximately 1.5 mile portion of the Yampa River that is not listed as an impaired water on the CWA Section 303(d) list.

Environmental Consequences

The effects on water resources from the construction of the Bell Rock series compensation station are included in the disturbance analysis for Alternative WYCO-B (Section 3.2.4.5.4). Placement and design of the station would be done in a manner that would avoid water resources to the extent feasible. Areas where ground-disturbing activities associated with construction, operation, and maintenance of the station could not be avoided would result in low impacts on water resources. Following proper implementation of design features of the Proposed Action, selective mitigation measures, and site-specific design features detailed in the POD, potential impacts on water resources would be mitigated or reduced to minor levels.

Alternative WYCO-F

Siting Area A – Powder Wash

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area A as Alternative WYCO-B.

Siting Area B – Nine Mile Basin

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area B as Alternative WYCO-B.

Siting Area C – Maybell

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area C as Alternative WYCO-B.

Alternatives COUT BAX-B, COUT BAX-C, and COUT BAX-E

Siting Area G – Green River

Affected Environment

Siting Area G (MV-6a and MV-6b) is located in the Lower Green subbasin, just west of the town of Green River, Utah, where the landscape is dominated by sagebrush and salt desert habitats. The Green River series compensation station siting area contains intermittent lotic systems, wetlands, and riparian areas. Saleratus Wash supports a large contiguous wetlands and riparian areas. Cottonwood and Fivemile washes also could be affected but these drainages receive sparse precipitation and thus have little riparian vegetation associated with them. Siting Area G is located in the upper reaches of watersheds that convey water to the Green River.

Environmental Consequences

The effects on water resources from the construction of the Green River series compensation station are included in the disturbance analysis for Alternatives COUT BAX-B, COUT BAX-C, and COUT BAX-E (Section 3.2.4.5.4). Placement and design of the station would be done in a manner that would avoid water resources to the extent feasible. Areas where ground-disturbing activities associated with construction, operation, and maintenance of the station could not be avoided would result in low level impacts on water resources. Following proper implementation of design features of the Proposed Action, selective mitigation measures, and site-specific design features detailed in the POD, potential impacts on water resources would be mitigated or reduced to minor levels.

Alternative COUT-A

Siting Area F – Roosevelt

Affected Environment

Siting Area F (MV-6a and MV-6b) is located in the Duchesne subbasin just south of the town of Roosevelt, Utah, where the landscape is dominated by sagebrush and salt desert habitats that are adjacent to agricultural and residential areas. Siting Area F contains a large number of perennial and intermittent

lentic lotic systems including Dry Gulch, Cottonwood, and Montes creeks, Lateral C Canal, the Uinta River, Bottle Hollow Reservoir, riparian areas, and many areas supporting wetlands located in drainages that convey water into the Uinta River and shortly thereafter, into the Duchesne River. This portion of the Uinta River is listed as impaired on the CWA Section 303(d) list. Additionally, Siting Area F is located in proximity to residential communities and agricultural areas that utilize local water resources for irrigation and drinking water.

Environmental Consequences

The effects on water resources from the construction of the Roosevelt series compensation station are included in the disturbance analysis for Alternative COUT-A (Section 3.2.4.5.4). Placement and design of the station would be done in a manner that would avoid water resources to the extent feasible. Areas where ground-disturbing activities associated with construction, operation, and maintenance of the station could not be avoided would result in low impacts on water resources. Following proper implementation of design features of the Proposed Action, selective mitigation measures, and site-specific design features detailed in the POD, potential impacts on water resources would be mitigated or reduced to minor levels.

Alternative COUT-B

Siting Area F – Roosevelt

Affected Environment and Environmental Consequences

Alternative COUT-B would have the same affected environment and environmental consequences for Siting Area F as Alternative COUT-A.

Alternative COUT-C (Agency and Applicant Preferred Alternative)

Siting Area E – Bonanza

Affected Environment

Siting Area E (MV-6a and MV-6b) is located in the Lower White subbasin in Utah, where the landscape is sparsely vegetated and semi-arid and dominated by sagebrush and salt desert shrub habitats. Siting Area E contains few intermittent lentic and lotic systems and is generally located in the Coyote Wash drainage that conveys water into the White River.

Environmental Consequences

The effects on water resources from the construction of the Bonanza series compensation station are included in the disturbance analysis for Alternatives COUT-C (Section 3.2.4.5.4). Placement and design of the station would be done in a manner that would avoid water resources to the extent feasible. Areas where ground-disturbing activities associated with construction, operation, and maintenance of the station could not be avoided would result in low impacts on water resources. Following proper implementation of design features of the Proposed Action, selective mitigation measures, and site-specific design features detailed in the POD, potential impacts on water resources would be mitigated or reduced to minor levels.

Alternatives COUT-H and COUT-I

Siting Area E – Bonanza

Affected Environment and Environmental Consequences

Alternatives COUT-H and COUT-I have the same affected environment and environmental consequences for Siting Area E as Alternative COUT-C.

3.2.5 Vegetation

3.2.5.1 Introduction and Regulatory Framework

This section describes the existing condition of vegetation resources in the study area and addresses potential effects on vegetation resources that could result from construction, operation, and maintenance of the Project.

Implementation of the Project would be consistent with statutes, regulations, plans, programs, and policies of affiliated tribes, federal agencies, and state and local governments.

3.2.5.1.1 Regulatory Framework

Federal

Federal legislation applicable to vegetation resources in the alternative route study corridors listed in this section includes FLPMA, Executive Order 13112, the Carson-Foley Act, and the NFMA of 1976. Pertinent Instructional Bulletins, IMs, RMPs, LRMPs, and federally issued resource management manuals also are listed in this section.

- FLPMA (43 U.S.C. 1701) as amended, consolidates and articulates BLM and USFS management responsibilities and governs most uses of 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.
- Executive Order 13112 requires that federal agencies prevent the introduction and spread of invasive species, detect and respond rapidly to control such species, monitor invasive species populations, and restore native species and habitat conditions in ecosystems that have been invaded. In addition, the order requires a federal agency "not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species."
- The Carlson-Foley Act (43 U.S.C. 1241) directs federal land-management agencies to destroy noxious weeds growing on land under their jurisdiction and provides a legal framework for reimbursement of expenses to state or local agencies for weed control on federal land.
- The NFMA, 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 NFMA requires that each national forest develop 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 MIS (36 CFR 219.19). MIS were selected because their population changes were believed to indicate the effects of management activities on habitats or 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.
- USFS Manual 2900, Invasive Species Management, sets forth National Forest System policy, responsibilities, and direction for the prevention, detection, control, and restoration of effects from aquatic and terrestrial invasive species (including vertebrates, invertebrates, plants, and pathogens).
- EPA Executive Order 11990, Protection of Wetlands, ordered in 1977, provides additional support to NEPA, as amended (42 U.S.C. 4321 et seq.), 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.

- Federal Noxious Weed Act of 1974 (P.L. 93-629) (76 U.S.C. 2801 et seq.) directs the management of undesirable plants on federal lands, including prohibiting the transport of noxious weeds into the U.S. and between states. This legislation also outlines how noxious weed infestations are to be quarantined and controlled on federal lands.
- 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 in the clearing limits of rights-of-way.
- BLM RMPs and Management Framework Plans for Wyoming, including Rawlins Field Office (2008); for Colorado, including White River (1997, as amended), Little Snake (2011), and Grand Junction (2015) Field Offices; for Utah, including Richfield (2008), Fillmore (1987), Moab (2008), Price (2008) and Vernal (2008) Field Offices, and Salt Lake District (1990), specify regulations and goals for management of BLM-administered land and set restrictions to protect fish and wildlife and the habitats on which they depend. Many of these documents also describe the locations and approximate quantities of known noxious weed species in the jurisdictional boundaries of the field offices.
- The BLM Utah-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.
- BLM Manual 1740-1 – Integrated Vegetation Management (2008) and BLM Manual 1740-2 – Renewable Resource Improvement and Treatment Guidelines and Procedures (1987) outline policies, objectives, and standards focused primarily on planning, analyzing, constructing, maintaining, replacing, or modifying renewable resource improvements and treatments such as for forestry, invasive species, and range management.
- LRMPs, for the Ashley (1986, as amended), Manti-La Sal (1986, as amended), and Uinta (2003, as amended) National Forests identify goals for forest health and constraints on resource uses to meet these goals.
- NPS Organic Act, passed in 1916 (16 U.S.C. 1), established the NPS as an agency under the direction of the Secretary of the Interior with the stated purpose of promoting use of national park lands while protecting them from impairment. Specifically, the Act declares that the National Park Service has a dual mission, both to conserve park resources and provide for their use and enjoyment "in such a manner and by such means as will leave them unimpaired" for future generations (16 U.S.C. 1).
- NPS Management Policies 2006 sets the framework and provides direction for all management decisions relating to national park lands. This document states the NPS "will use all available authorities to protect lands and resources within units of the national park system." NPS personnel are required to be knowledgeable about and adhere to laws, regulations, and policies pertinent to NPS management included in this document.
- NPS Director's Order 12 (DO-12 and Handbook; 66 FR 7507) describes the NEPA process and describes the responsibility of the NPS regarding participation in or coordination of NEPA procedures for actions occurring on NPS land. This order outlines the NPS's requirement of affirmatively stating whether or not impairment [as defined by the Organic Act and the 2006 Management Policies document] to park resources would result from a proposed action and provides guidelines for assessing intensity of impacts.

State

Wyoming

- Wyoming Weed and Pest Control Act (WWPC) (Title 11, Chapter 5, Article 1) officially designates the authority of the State of Wyoming to require the control of designated pests and weeds.

Colorado

- Colorado Noxious Weed Act (Title 35 Article 5.5) officially designates the authority of the State of Colorado to require the control of designated pests and weeds.

Utah

- 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.

3.2.5.2 Issues Identified for Analysis

Table 3-50 lists the issues identified for analysis of impacts on vegetation resources. These issues were identified during scoping and in coordination with agency personnel.

TABLE 3-50
VEGETATION ISSUES IDENTIFIED FOR ANALYSIS

Issue Identified	Analysis Considerations
Potential spread of noxious weeds: ▪ New surface disturbance, which creates conditions for noxious weed invasion ▪ Project activities in areas already infested by noxious weeds, potentially increasing transportation of propagules	▪ Extent of land potentially disturbed by Project construction, operation, and maintenance activities ▪ Extent of noxious weed-infested land potentially disturbed by Project construction, operation, and maintenance activities
Loss and fragmentation of native vegetation communities	▪ Extent of native vegetation communities potentially disturbed by Project construction, operation, and maintenance activities ▪ Ability of affected vegetation communities to recover following reclamation in context of ecological or climate constraints
Compliance with specific forest plan standards and guides	Site-specific forest plan standards referenced with potential Project construction, operation, and maintenance activities

3.2.5.3 Regional Setting

The Project area is in the Wyoming Basin, Southern Rockies, Colorado Plateaus, Wasatch and Uinta Mountains, and Central Basin and Range Level III ecoregions (EPA 2010b). The Project area is situated in the Platte River, Colorado River, and Great Basin watersheds and traverses a number of prominent landform features. The Wasatch Range runs north-to-south near the westernmost end of the Project area, the Uinta Mountains are located in the northwest section, and the Rocky Mountains are along the easternmost end. Elevations in the Project area range from approximately 3,838 to 13,478 feet (1,190 to 3,730 meters) above mean sea level.

Characteristics of the ecoregions crossed by the Project are provided in the following paragraphs, which include lists of characteristic species, as adapted from *North American Terrestrial Ecoregions—Level III* (Commission for Environmental Cooperation 2011).

The Wyoming Basin Ecoregion is in the northernmost extent of the Project area, mainly in Sweetwater and Carbon counties in Wyoming, Moffat and Routt counties in Colorado, and Daggett County in Utah. The ecoregion is classified as a cold desert with warm to hot summers and cold winters. Major rivers in the Wyoming Basin include the North Platte and Yampa rivers. Topographically, this ecoregion is an extensive intermontane basin with scattered low mountains and hills. Arid shrublands and grasslands are the dominant vegetation types throughout. Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), black sagebrush (*Artemisia nova*), prairie sagewort (*Artemisia frigida*), rabbitbrush (*Chrysothamnus* and *Ericameria* spp.), western wheatgrass (*Pascopyrum smithii*), needle and thread (*Hesperostipa comata*), blue grama (*Bouteloua gracilis*), and prairie junegrass (*Koeleria macrantha*) are the dominant vegetation species in sagebrush steppes. Greasewood (*Sarcobatus vermiculatus*), Gardner's saltbush (*Atriplex gardneri*), shadscale saltbush (*Atriplex confertifolia*), and bud sagebrush (*Picrothamnus desertorum*) are the dominant species in desert shrublands at lower elevations. Big sagebrush (*Artemisia tridentata*) and pinyon- (*Pinus* spp.) juniper (*Juniperus* spp.) woodland predominate at higher elevations.

The Southern Rockies Ecoregion is along the eastern extent of the Project area mainly in Carbon County in Wyoming and Moffat, Routt, and Rio Blanco counties in Colorado. Although small areas of the Project area do overlap, no alternative route alignments cross this ecoregion. The ecoregion is classified as part of the Western Cordillera and has warm to cool summers and severe winters (deep snowpack occurs at high elevations) with no pronounced dry season. Topographically, this ecoregion is composed of rugged mountains and extreme elevation changes. Lowest elevation extents are generally vegetated with heavily grazed grasslands and shrublands with sagebrush (*Artemisia* spp.), mountain mahogany (*Cercocarpus* spp.), pinyon-juniper, or Gambel oak (*Quercus gambelii*) woodlands being common throughout. Juniper-oak, Douglas-fir (*Pseudotsuga menziesii*), ponderosa pine (*Pinus ponderosa*), and quaking aspen woodlands occur at low to mid-elevations. Coniferous forests with Engelmann spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), and quaking aspen occur at middle to high elevations. Alpine vegetation communities occur at high elevations with cushion plants, sedges, and stunted spruce (*Picea* spp.), fir (*Abies* spp.), and pine (*Pinus* spp.) being common.

The Colorado Plateaus Ecoregion, which encompasses the majority of the central part of the Project area, is mainly in Moffat, Rio Blanco, Garfield, and Mesa counties in Colorado and Uintah, Duchesne, Carbon, Emery, and Grand counties in Utah. The ecoregion is a cold desert and has a dry, mid-latitude steppe climate marked by hot summers with low humidity and cool to cold dry winters. Rivers flowing through the Colorado Plateaus include the Green, Duchesne, Lake Fork, Uinta, and White rivers. The Colorado Plateau Ecoregion is characterized by its diverse topography, which includes benches, mesas, buttes, salt valleys, cliffs, and canyons formed from thick layers of highly erodible sedimentary rock. Vegetation of the area is likewise variable. Arid grasslands and shrublands are common at the lowest elevations with blackbrush (*Coleogyne ramosissima*), shadscale saltbush, fourwing saltbush (*Atriplex canescens*), and galleta grass (*Pleuraphis* spp.) being the dominant vegetation species. Higher valleys are predominantly vegetated with Wyoming big sagebrush, black sagebrush, and pinyon-juniper woodlands. At the highest elevations, Gambel oak, mountain mahogany, and Douglas-fir are common.

The Wasatch and Uinta Mountains Ecoregion is near the westernmost section of the Project area in Wasatch, Utah, Sanpete, Uintah, Carbon, Emery, Daggett, Duchesne, and Juab counties in Utah. Project alternative routes do not occur in Uintah, Daggett, and Duchesne counties in this ecoregion. Climate of this ecoregion, which is part of the Western Cordillera, is characterized by severe winters in which some mountain peaks and canyons receive large amounts of powder snowfall and avalanches commonly occur. Summers are warm to hot without a pronounced dry season. The Sevier River drains the Pahvant Range,

San Pitch Mountains, and Wasatch Plateau before it flows into the Central Basin and Range Ecoregion. Topography of this ecoregion is primarily high mountains with narrow crests interspersed with high-elevation valleys and dissected plateaus. Sagebrush, grasses, and pinyon-juniper woodlands occur in valleys, and these species as well as maple (*Acer* spp.), Gambel oak, and ponderosa pine are dominant at middle elevations.

The Central Basin and Range Ecoregion is in Juab and Utah counties in Utah and includes the Clover Substation and terminus of all Project alternative routes. The ecoregion is a cold desert and has dry hot summers and mild winters. Most of the rainfall occurs during convective thunderstorms in the warm season; in winter, precipitation is mostly in the form of snowfall. Topography of this ecoregion is characterized by xeric basins, salt flats, and scattered low and high mountains. Wyoming big sagebrush, shadscale saltbush, winterfat (*Krascheninnikovia lanata*), black sagebrush, rabbitbrush, jointfir (*Ephedra* spp.), Indian ricegrass (*Achnatherum hymenoides*), and squirreltail (*Elymus elymoides*) are common in xeric basins. In highly saline areas, greasewood, Nuttall's saltbush (*Atriplex nuttallii*), seepweed (*Suaeda* spp.), and alkali sacaton (*Sporobolus airoides*) become dominant. Lower mountains are vegetated with singleleaf pinyon (*Pinus monophylla*), Utah juniper (*Juniperus osteosperma*), sagebrush, antelope bitterbrush (*Purshia tridentata)*, serviceberry (*Amelanchier* spp.), snowberry (*Symphoricarpos* spp.), and bluebunch wheatgrass (*Pseudoroegneria spicata*). High mountains may contain Douglas-fir, white fir (*Abies concolor*), limber pine (*Pinus flexilis*), whitebark pine (*Pinus albicaulis*), and quaking aspen.

3.2.5.4 Study Methodology

3.2.5.4.1 Inventory

Vegetation Communities

A total of 86 National Land Cover Gap Analysis Project (GAP) land-cover categories identified by the GAP dataset[2] occur in the Project area (USGS 2010b) (refer to Appendix J for detailed descriptions of these land-cover categories). For the purposes of this EIS, the 86 GAP land-cover categories were consolidated and reclassified into 16 primary vegetation communities (Appendix J, Table J-1) based on similarities in species composition, vegetative structure, and topographic positioning.

Each vegetation community is described below and illustrated in MV-7a and MV-7b. These descriptions are adapted from NatureServe's Ecological System classification descriptions (NatureServe 2014) for the GAP land-cover categories in each vegetation community (Appendix J, Table J-1). Descriptions of land-cover categories in the Agriculture and Developed/Disturbed vegetation communities were adapted from the National Land Cover Dataset 2001 legend (Homer et al. 2004). Full descriptions of land-cover categories in each primary vegetation community can be found in Appendix J.

Agriculture

This vegetation community is composed of the Cultivated Cropland and Pasture/Hay GAP land-cover categories. Agriculture lands are considered those used for the production of annual and perennial crops for human consumption, livestock grazing, or the production of seed or hay crops. This vegetation community is generally found in valley bottoms near rural and suburban areas.

[2]The GAP dataset combines data from several regional land cover projects to create a seamless data set across the contiguous U.S. In the Project area, data is compiled from both the Northwest Regional GAP and the Southwest Regional GAP (USGS 2010b, c). Both datasets were developed using satellite imagery and other spatial datasets to model vegetation (Lowry et al. 2005; University of Idaho 2012).

Alpine

This vegetation community is composed of the North American Alpine Ice Field, Rocky Mountain Alpine Bedrock and Scree, Rocky Mountain Alpine Dwarf-Shrubland, Rocky Mountain Alpine Fell-Field, Rocky Mountain Alpine-Montane Wet Meadow, and Rocky Mountain Dry Tundra GAP land-cover categories. These land-cover categories are found at the highest elevations above the tree line in mountain ranges. These sites are generally exposed to wind erosion and experience a long-term or relatively permanent cover of snow and ice. Many areas are barren with a high cover of rock and scree. Short growing seasons and extreme climatic conditions limit vegetation growth; plant species are generally dwarf or mat-forming forbs, graminoids, lichens, and shrubs.

Aspen

This vegetation community is composed of the Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland and Rocky Mountain Aspen Forest and Woodland GAP land-cover categories. This vegetation community occurs in montane areas and is dominated by quaking aspen with less than a 25-percent conifer species component. The distribution of this land-cover type is limited by soil moisture and the growing season. Aspen woodlands are found across the western U.S. but are especially common in the mountains of the Colorado Plateau, Rocky Mountains, and the Great Basin. They occur on clay-rich, moist soils on mountain slopes. The shrubs, herbs, and grasses found in aspen forests are very diverse. In some areas, quaking aspen forests are a mix of deciduous and coniferous trees with one or more conifer species such as ponderosa pine, Douglas-fir, subalpine fir, Engelmann spruce, or lodgepole pine also occurring. This vegetation community originates and is maintained by stand-replacing disturbances, such as avalanches, crown fire, insect outbreak, windthrow, and vegetation management practices.

Barren/Sparsely Vegetated

This vegetation community is composed of the Colorado Plateau Mixed Bedrock Canyon and Tableland, Inter-Mountain Basins Active and Stabilized Dune, Inter-Mountain Basins Cliff and Canyon, Inter-Mountain Basins Playa, Inter-Mountain Basins Shale Bad Land, Rocky Mountain Cliff, Canyon and Massive Bedrock, and Western Great Plains Cliff and Outcrop GAP land-cover categories. This diverse group of land-cover categories is generally described as having a very low cover of vegetation and a high cover of bare soil, rock outcrops, exposed bedrock, or sand. These land-cover types are subject to erosion, low precipitation, saline or sodic soils, coarse-textured and shifting substrates, or other extreme abiotic conditions that create barriers to vegetation establishment. Sparse vegetation is often found only in crevices, rock cracks, and pockets in exposed rock where water and wind-blown soil accumulates.

Big Sagebrush

This vegetation community is composed of the Inter-Mountain Basins Big Sagebrush Shrubland, Inter-Mountain Basins Big Sagebrush Steppe, and Inter-Mountain Basins Montane Sagebrush Steppe GAP land-cover categories. The big sagebrush vegetation community occurs on well-drained, nonalkaline soils at middle elevations and is dominated by basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*), Wyoming big sagebrush, and/or mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). Typical co-dominant species include antelope bitterbrush, mountain snowberry (*Symphoricarpos oreophilus*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), and rubber rabbitbrush (*Ericameria nauseosa*). Big sagebrush occurs in valleys and foothills throughout the study corridors. Varied native bunchgrasses almost always occur when not displaced by cheatgrass (*Bromus tectorum*). Higher in the mountains, big sagebrush shrublands become very wildflower rich and often occur in a matrix with montane and subalpine woodlands. In many areas, wildfires can maintain an open herbaceous-rich steppe condition.

Developed/Disturbed

This vegetation community is composed of the Developed, High, Medium, and Low Intensity; Developed, Open Space; Disturbed, Non-specific; Disturbed/Successional, Recently Chained Pinyon-Juniper; Quarries, Mines, Gravel Pits and Oil Wells; Recently Burned; and Recently Logged Areas GAP land-cover categories. These land-cover types are modified either for human use (e.g., housing, parks, and commercial/industrial developments), or through human activities (e.g., chaining, burning, or logging of vegetation; quarrying or mining of landscapes).

Grassland

This vegetation community is composed of the Inter-Mountain Basins Semi-Desert Grassland, Northern Rocky Mountain Lower Montane, Foothill and Valley Grassland, Northwestern Great Plains Mixed Grass Prairie, Rocky Mountain Subalpine-Montane Mesic Meadow, Southern Rocky Mountain Montane-Subalpine Grassland, and Western Great Plains Sand Prairie GAP land-cover categories. Grasslands are found on a variety of landforms, generally in low precipitation zones. Distribution and vegetative composition of this vegetation community is generally influenced by livestock grazing and fire activity.

Invasive

This vegetation community is composed of the Introduced Upland Vegetation-Annual Grassland; Introduced Upland Vegetation-Perennial Grassland and Forbland; and Introduced Upland Vegetation-Treed GAP land-cover categories as well as mapped noxious weed occurrences supplied by BLM and USFS Field Offices and Ranger Districts. This vegetation community is dominated by invasive non-native grass and forb species. The Introduced Upland Vegetation-Treed GAP land-cover type is a spontaneous, self-perpetuating non-native forest not immediately the result of planting, cultivation, or human maintenance. Invasive vegetation communities occur throughout the study corridors.

Montane Forest

This vegetation community is composed of the Middle Rocky Mountain Montane Douglas-fir Forest and Woodland, Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest, Northern Rocky Mountain Mesic Montane Mixed Conifer Forest, Rocky Mountain Lodgepole Pine Forest, Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland, Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland, Rocky Mountain Subalpine-Montane Limber-Bristlecone Pine Woodland, Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland, and Southern Rocky Mountain Mesic Montane Mixed Conifer Forest and Woodland GAP land-cover categories. These land-cover categories exist in a wide range of aspects and moisture regimes. The species compositions in these land-cover categories are diverse, but all are dominated by one or more coniferous tree species such as Douglas-fir, ponderosa pine, lodgepole pine, Engelmann spruce, or subalpine fir.

Mountain Shrub

This vegetation community is composed of the Harvested Forest-Shrub Regeneration, Inter-Mountain Basins Curl-leaf Mountain Mahogany Woodland and Shrubland, Northern Rocky Mountain Montane-Foothill Deciduous Shrubland, Northern Rocky Mountain Subalpine Deciduous Shrubland, Rocky Mountain Gambel Oak-Mixed Montane Shrubland, and Rocky Mountain Lower Montane-Foothill Shrubland GAP land-cover categories. These land-cover categories are dominated by woody shrub species such as curl-leaf mountain mahogany (*Cercocarpus ledifolius*), alderleaf mountain mahogany (*Cercocarpus montanus*), antelope bitterbrush, Gambel oak, choke cherry (*Prunus virginiana*), ninebark (*Physocarpus* spp.), hawthorn (*Crataegus* spp.), mock orange (*Philadelphus* spp.), smooth sumac (*Rhus*

glabra), and serviceberry. These shrublands generally occur on rocky outcrops, steep slopes, and toeslopes with shallow, rocky soils that limit the establishment of forests and woodlands.

Pinyon-Juniper

This vegetation community is composed of the Colorado Plateau Pinyon-Juniper Shrubland, Colorado Plateau Pinyon-Juniper Woodland, Great Basin Pinyon-Juniper Woodland, Inter-Mountain Basins Juniper Savanna, Rocky Mountain Foothill Limber Pine-Juniper Woodland, and Southern Rocky Mountain Pinyon-Juniper Woodland GAP land-cover categories. Two-needle pinyon (*Pinus edulis*), singleleaf pinyon, and Utah juniper are the most common trees in these land-cover categories. Understory and shrub species vary by region, but include black sagebrush, big sagebrush, green rabbitbrush (*Chrysothamnus viscidiflorus*), blackbrush, sagebrush, mountain mahogany, cliffrose (*Purshia* spp.), antelope bitterbrush, and Gambel oak.

Ponderosa Pine

This vegetation community is composed of the Northern Rocky Mountain Foothill Conifer Wooded Steppe, and Southern Rocky Mountain Ponderosa Pine Woodland GAP land-cover categories. This vegetation community occurs on dunes, rocky ridges, scablands, or broken rock where conditions prevent a typical forest or woodland from developing, but enough trees become established to form a savanna or open woodland. Ponderosa pine is the predominant conifer with Douglas-fir, two-needle pinyon, and juniper often present in the tree canopy.

Riparian

This vegetation community is composed of the Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland, Introduced Riparian and Wetland Vegetation, Northwestern Great Plains Riparian, Rocky Mountain Bigtooth Maple Ravine Woodland, Rocky Mountain Lower Montane Riparian Woodland and Shrubland, Rocky Mountain Subalpine-Montane Riparian Shrubland, Rocky Mountain Subalpine-Montane Riparian Woodland, Western Great Plains Floodplain, and Western Great Plains Riparian Woodland and Shrubland GAP land-cover categories as well as NWI-mapped riparian areas. When NWI data coincided with GAP data, both data sets were used. NWI data was used in areas where GAP data reported upland land-cover types and NWI reported wetland or riparian cover types. GAP data were used in areas where both NWI and GAP reported wetland or riparian land-cover types, or where GAP reported wetland or riparian cover types and NWI reported upland vegetation.

The GAP land-cover categories used to define the riparian vegetation community occur in varying landscape situations but are always adjacent to flowing water such as streams and rivers. Common trees in riparian areas are narrowleaf cottonwood (*Populus angustifolia*), black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), alder (*Alnus* spp.), birch (*Betula* spp.), Fremont cottonwood (*Populus fremontii*), various willows (Goodding's [*Salix gooddingii*], arroyo [*S. lasiolepis*], Booth's [*S. boothii*], narrowleaf [*S. exigua*], Lemmon's [*S. lemmonii*], yellow [*S. lutea*]) and conifers such as white fir and Douglas-fir. Shrubs such as silver sagebrush (*Artemisia cana*), rose (*Rosa* spp.), snowberry, and redosier dogwood (*Cornus sericea*) are common understory species. Maple ravine woodland riparian areas are dominated by bigtooth maple (*Acer grandidentatum*) but may include mixed stands codominated by Gambel oak, scattered conifers, box elder (*Acer negundo*) or quaking aspen.

Shrub/Shrub Steppe

This vegetation community is composed of the Colorado Plateau Blackbrush-Mormon-tea Shrubland, Colorado Plateau Mixed Low Sagebrush Shrubland, Great Basin Xeric Mixed Sagebrush Shrubland, Inter-Mountain Basins Greasewood Flat, Inter-Mountain Basins Mat Saltbush Shrubland, Inter-Mountain

Basins Mixed Salt Desert Scrub, Inter-Mountain Basins Semi-Desert Shrub Steppe, Southern Colorado Plateau Sand Shrubland, and Wyoming Basins Dwarf Sagebrush Shrubland and Steppe GAP land-cover categories. These land-cover types generally occur in drier sites with shallow, rocky soils such as alluvial fans or hillslopes. Many shrub species occur in these land-cover types, including blackbrush, Mormon tea (*Ephedra viridis*), spiny hopsage (*Grayia spinosa*), Bigelow sagebrush (*Artemisia bigelovii*), Wyoming big sagebrush, little sagebrush (*Artemisia arbuscula*), shadscale saltbush, jointfir, goldenbush (*Ericameria* spp.), Shockley's desert-thorn (*Lycium shockleyi*), bud sagebrush, greasewood, and horsebrush (*Tetradymia* spp.).

Water

This vegetation community is composed of the Open Water (Fresh) GAP land-cover category. This category includes all areas of open water with generally less than 25 percent cover of vegetation or soil. Specifically, this refers to inland waters of streams, rivers, ponds, and lakes.

Wetland

This vegetation community is composed of the Great Plains Prairie Pothole, Inter-Mountain Basins Interdunal Swale Wetland, North American Arid West Emergent Marsh, Rocky Mountain Subalpine-Montane Fen, Western Great Plains Closed Depression Wetland, Western Great Plains Open Freshwater Depression Wetland, and Western Great Plains Saline Depression Wetland GAP land-cover categories as well as NWI-mapped wetland areas. These wetland-cover types are highly diverse, but all are inundated or saturated during a significant portion of the growing season and support hydrophytic vegetation and/or hydric soil conditions.

Noxious Weeds

In addition to the GAP land-cover categories used to define invasive vegetation communities in the Project area, distribution information available from BLM field office management documents, where available, was used to determine the presence of noxious weeds in the Project area. Noxious weed information for each state is summarized in the following subsections.

Wyoming

- Wyoming Designated Noxious Weeds (Wyo. Stat. 11-5-102 [a][xi]) and Prohibited Noxious Weeds (Wyo. State. 11-12-104) lists designate 25 noxious weed species (Appendix J, Table J-2). These species are managed under the WWPC Act (Title 11, Chapter 5, Article 1). The Wyoming BLM also recognizes and adheres to control of weeds listed on the National BLM Invasive Species of Concern list.
- BLM Rawlins Field Office – The BLM Rawlins Field Office RMP EIS confirms the presence of 18 of the 25 Wyoming state-listed noxious weeds in the field office (BLM 2008b) (Appendix J, Table J-2). These species on public lands in Wyoming are managed under the BLM Rawlins Field Office *Noxious Weed Prevention Plan* (BLM 2008b). The current, untreated, weed-infested area is estimated at 20,000 acres, but most of the BLM Rawlins Field Office has not been inventoried for noxious and invasive species (BLM 2008b).

Colorado

- The official Colorado state list of noxious weeds consists of 76 species (Colorado Department of Agriculture 2012) (Appendix J, Table J-3). No additional noxious weeds are designated for the individual Colorado counties that occur in the Project area.

- BLM Little Snake Field Office – In the field office area, especially in the last 10 years, there has been an increase in noxious and invasive weeds, including salt cedar, halogeton, Canada thistle, and cheatgrass. These problems are most evident in the oil and gas production fields and other locations where native vegetation has been disturbed (BLM 2011b). Specific information about the presence of noxious weed species in this field office is not currently available.
- BLM White River Field Office – A key element of management on the White River Field Office is the preventive measure of designating weed-free zones where few or no noxious weeds presently occur. The weed-free zones are estimated to comprise approximately 19 percent of the White River Field Office and are located in the north-central and northeast portions of the White River Field Office (BLM 2015b). Specific information about the presence of noxious weed species in this field office is not currently available.
- BLM Grand Junction Field Office – The Grand Junction Field Office is in the process of producing an updated RMP. Detailed information about noxious weed occurrence is not currently available for this field office; however, noxious weed inventories have been conducted and a large-scale noxious weed map has been prepared (BLM n.d.[a]). According to this map, at least 20 of the 72 Colorado state-listed noxious weed species are currently known in the field office (BLM n.d.[a]) (Appendix J, Table J-3).

Utah

- The official state list of noxious weeds consists of 27 species (Utah Department of Agriculture and Food 2010) (Appendix J, Table J-4). Carbon, Duchesne, Grand, Juab, and Uintah counties add an additional four designated noxious weed species (Utah Department of Agriculture and Food 2009) (Appendix J, Table J-4).
- BLM Vernal Field Office – There are more than 23,000 acres of noxious and undesirable weeds in the Vernal Field Office (BLM 2008h). The *Vernal Field Office Proposed Resource Management Plan and Final Environmental Impact Statement* confirms the presence of 16 of the 27 state-listed noxious weed species and one of the county-listed species in the field office (BLM 2008h) (Appendix J, Table J-4). Cheatgrass, though not a state-listed noxious weed, is a major concern in the field office; approximately 55,700 acres of land in the field office have more than 60 percent cheatgrass cover (BLM 2008h).
- BLM Moab Field Office – The Moab Field Office is located in arid lands of the Colorado Plateau. There are 35 weed species of primary concern to the Moab Field Office, 21 which are state-listed noxious weeds and 2 which are county-listed noxious weeds (BLM 2008c) (Appendix J, Table J-4). Most of the noxious and invasive plants in the Moab Field Office are concentrated in wetland and riparian areas (BLM 2008c).
- BLM Price Field Office – The Price Approved RMP (BLM 2008d) includes management prescriptions for 14 noxious weeds identified as occurring in the field office during the planning process (Appendix J, Table J-4). Eleven of these species are Utah state-listed noxious weeds, two are county-listed noxious weeds for counties in the Project area, and one is a county-listed noxious weed for counties outside the Project area.
- BLM Salt Lake Field Office – The Project crosses only very small areas of public land in the extreme southeast corner of the Salt Lake Field Office. No information on noxious weed occurrence in this area is currently available.
- BLM Richfield Field Office – Eleven species from the state list are present in the Richfield Field Office (BLM 2008e) (Appendix J, Table J-4). This field office also monitors for county-listed noxious weeds and BLM-designated new and invading weeds and other species deemed to have

the potential to invade field office ecosystems. Other non-listed species, such as cheatgrass, are likewise given consideration when making management decisions.

- BLM Fillmore Field Office – The Fillmore Field Office has documented the presence of 10 weeds on the Utah state noxious weed list. Noxious weed inventories have been completed throughout the field office in both Millard and Juab counties. There are approximately 2,000 acres treated for noxious and invasive weeds in the Fillmore Field Office annually. During 1996 and 1997, Squarrose knapweed was estimated to be present on 200,000 acres in Juab, Utah, and Tooele counties (Probert 2013).
- National Forests – The Ashley, Manti-La Sal, and Uinta National Forests adhere to the Utah state list of noxious weed species (T. Miller 2013). Several Utah state-listed noxious weeds are known to occur within USFS boundaries in the Project area (Appendix J, Table J-5).

3.2.5.4.2 Impact Assessment and Mitigation Planning

The methodology used to assess potential impacts on vegetation resources for the purpose of interdisciplinary comparison of alternative routes is presented in Section 2.7.1. In general, the analysis included (1) identifying the types of potential effects on vegetation resources that could result from construction, operation, and maintenance of the proposed transmission line and associated facilities; (2) assessing intensity and extent of initial impacts on vegetation resources present in the study corridors; (3) identifying appropriate selective mitigation measures (Table 2-13) for minimizing some potential adverse effects and determining specific areas where selective mitigation measures should be applied; and (4) disclosing intensity and extent of potential residual impacts on vegetation resources (i.e., impacts anticipated after application of selective mitigation measures). Design features of the Proposed Action for environmental protection (Table 2-8) were considered when assessing both initial and residual impacts. Additional discussion of the methods used in analyzing effects of the Project on vegetation resources to support interdisciplinary comparison of alternative routes are discussed in the Effects Analysis section.

Supplemental analyses were necessary to address some of the issues raised by the public and the agencies during scoping. Quantitative or qualitative analyses were performed, depending on information available, to evaluate potential impacts of the Project on vegetation resources or to meet the requirements of relevant law, regulation, or policy. The methods for these supplemental analyses are discussed in the Effects Analysis section.

Types of Potential Effects

The construction, operation, and maintenance of the Project would result in both direct and indirect effects on vegetation resources, which are described in the following sections. This analysis assumes the estimated extent of surface disturbance required to construct all of the transmission line tower types described in Section 2.1 would be the same. Therefore, the impacts on vegetation communities would be the same regardless of the tower type selected.

Direct Effects

Direct adverse impacts would occur in any area where native or desirable vegetation communities would be removed or damaged due to Project activities. In the short-term, removal of vegetation could increase soil erosion (Quinton et al. 1997) and increase the susceptibility of an area to colonization by invasive species (Hobbs and Huenneke 1992). Revegetation of native or desirable vegetation communities would occur in areas where disturbance is temporary, such as with construction of temporary work areas (site-specific reclamation requirements will be provided in a Reclamation, Revegetation, and Monitoring Framework Plan to be included in the POD). However, rehabilitation of native or desirable vegetation communities to a predisturbance state is unlikely in the short-term and is not assured in the long-term.

Recovery of native or desirable vegetation communities following disturbance, especially those in arid ecosystems, may take decades, centuries, or longer (Coffin et al. 1996; Foster et al. 2003; Morris et al. 2011). Additionally, alterations to soil structure and chemistry, nutrient dynamics, hydrology, and plant species composition following disturbance often cause ecosystems to cross thresholds into alternate stable states not likely to resemble historic or preferred conditions (Hobbs et al. 2009).

Long-term removal of native or desirable vegetation would occur with construction of any new permanent Project features such as roads or transmission line towers. Additionally, vegetation in the right-of-way would be managed using the wire-zone border-zone method (Appendix B), which would include clearing of tall vegetation to allow for safe operation of the transmission line. Areas cleared of tall growing vegetation would be revegetated with native or desirable species, many of which would already be components of the understory. However, the structure of these communities would be permanently altered and habitat values and/or ecosystem services of these communities may be affected.

Potential loss of the market value of timber resources due to vegetative clearing would be minimal in the short-term, as the Applicant would be required to reimburse the BLM and USFS for the market value of timber cleared for the Project. However, clearing would result in a long-term direct loss of the market value of forest commodity materials as timber resources would not be allowed to re-establish in areas permanently cleared or maintained free of tall growing vegetation for safe operation of the transmission line.

Indirect Effects

Project-related construction activities and resulting increased vehicle use on new and improved access roads in the Project area, both by construction machinery and private vehicles, is likely to alter the ecological conditions in the Project area in the short- and long-term. Seeds may be transported by being lodged directly in vehicles, transported in mud attached to vehicles, and in hay or seed mixes used to reclaim disturbed areas. Clearing and transport of trees infested by bark beetles may inadvertently cause the spread of this species. Indirect impacts of the Project on vegetation communities also could include a potential decrease in population connectivity through reduced gene flow and pollinator movement.

In the long-term, increased presence of highly flammable annual invasive species such as cheatgrass, in conjunction with ignition risk from increased vehicle use, could increase wildfire frequencies (Whisenant 1990) and sizes (Balch et al. 2012). Frequent fires further increase the susceptibility of an area to invasion by and continued dominance of cheatgrass, creating a positive feedback loop.

Mitigation Planning and Effectiveness

In addition to the design features of the Proposed Action for environmental protection, selective mitigation measures would be applied where feasible to reduce potential high and moderate adverse impacts on biological resources or where required to comply with law, regulation, or agency policy. Once an alternative route is selected, the Applicant 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. Design features of the Proposed Action for environmental protection have been incorporated by the Applicant into the Project description and would be applied to the entire Project. As described in Appendix J, the BLM would require the Applicant to monitor the implementation and effectiveness of conservation measures (i.e., design features of the Proposed action for environmental protection; selective mitigation measures; and other measures implemented to avoid, minimize, and mitigate for resource impacts) and would implement adaptive management for biological resources, as needed. Detailed monitoring requirements would be outlined in a biological resource monitoring plan, which would be developed with the BLM and cooperating agencies and included in the POD. This plan

also will include monitoring requirements for federally listed wildlife species that are identified through the Section 7 consultation process.

Design Features 1, 2, 5, 9, 14, 16, 17, 18, 26, 27, 30, and 33 are applicable to vegetation resources and are described in this section. In addition to listed design features, the BLM or the appropriate land-management agency would implement resource avoidance measures as needed to meet resource-management objectives if sensitive resources are located near a geotechnical boring location as described in Section 2.4.2.2. Resource-avoidance measures for the geotechnical investigation would include (1) monitor geotechnical investigation activities, (2) adjust activities to occur outside of seasonal restrictions, (3) use alternative access or drilling methods, (4) relocate the borehole, and (5) abandon the geotechnical site.

- **Design Feature 1 (minimization clearing)**. Vegetation would be left in place wherever possible where recontouring is not required. This would minimize disturbance to vegetation communities from Project activities.
- **Design Feature 2 (surface recontouring and reclamation)**. Areas subject to ground disturbance would be recontoured and reclaimed as required by the landowner or land-management agency. This would generally include reclamation of disturbed areas by establishing stable contours, spreading stockpiled topsoil, and revegetation using a seed mix appropriate for the environmental conditions in which the disturbance has occurred (approved by the BLM or USFS, as appropriate, or as negotiated by individual landowners). A Reclamation, Revegetation, and Monitoring Framework Plan that includes site-specific methods (e.g., topsoil stripping and storage, timing of reclamation activities, seed mixes, monitoring methods, standards for reclamation success, bond release criteria, etc.) would be included in the POD. This design feature would minimize the temporal scope of disturbance, decrease the likelihood that a disturbance area would be colonized by invasive species, and provide the best opportunity for disturbed areas to provide other beneficial ecological or socioeconomic services (e.g., wildlife habitat, livestock forage).
- **Design Feature 5 (creation of a noxious weed management plan)**. A Noxious Weed Management Plan would be developed and approved by the BLM, USFS, and county weed management officer and incorporated into the POD. This plan would be based on the principles and procedures outlined in the BLM Integrated Weed Management Manual 9015 and Forest Service Noxious Weed Management Manual 2080. This plan would include prescriptions for specific measures to treat, avoid, and reduce the spread of noxious weeds in the Project area during construction. A Reclamation, Revegetation, and Monitoring Framework Plan will also be developed to support the POD, which will specify protocols, timelines, and objectives for monitoring of noxious weed populations, if needed. Implementation of this design feature would minimize the spread of noxious weed species in the Project area and the associated negative ecological effects of invasive species such as increased wildfire risk (Balch et al. 2012) and the competitive exclusion of native and desirable plant species.
- **Design Feature 9 (avoidance of special status plants and habitat)**. Special status plants and habitat identified during preconstruction surveys would be identified in the POD and flagged and spanned by Project structures, where feasible and within the limits of standard structure design. Where avoidance is not feasible, special status plants and their habitats would be treated in accordance with applicable law, regulation, and agency policy. This design feature also would apply to riparian, water, wetland, and other rare or slow-regenerating vegetation types. Application of this design feature would allow sensitive vegetation to remain undisturbed whenever possible.
- **Design Feature 14 (creation of a Fire Protection Plan).** 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. This design feature would minimize disturbance to vegetation communities from fire.

- **Design Feature 16 (removal of non-biodegradable debris).** During and after construction of the transmission line, the right-of-way would be free of non-biodegradable debris. Slash would be left in place or disposed of in accordance with requirements of the land-management agency or landowner.
- **Design Feature 17 (topsoil salvaging).** In disturbed temporary work areas, the topsoil would be salvaged/segregated and distributed and contoured evenly over the surface of the disturbed area after construction completion. The soil surface would be seeded and left rough to help reduce potential for weeds and wind erosion. This design feature would minimize the risk of weed invasion in disturbed temporary work areas that could spread into adjacent vegetation communities.
- **Design Feature 18 (overland access).** Grading would be minimized by driving overland in areas approved in advance by the land-management agency in predesignated work areas whenever possible.
- **Design Feature 26 (vehicle access restriction)**. All construction vehicle movement would be restricted to predesignated access, contractor acquired access, public roads, or approved overland travel. This design feature would minimize disturbance to vegetation communities from excess overland travel and the associated potential spread of noxious weeds and an increase in the risk of wildfire.
- **Design Feature 27 (construction activity access restriction)**. All Project-related construction activities would be limited to within a predetermined spatial extent. This design feature would minimize disturbance to vegetation communities from construction activities and the associated potential increased spread of noxious weeds and wildfire risk.
- **Design Feature 30 (hazardous materials restrictions)**. Hazardous materials would be contained and removed to a disposal facility and not drained into the ground, streams, or drainages. Refueling and storing potentially hazardous materials would not occur within 328 feet of waterbodies (500 feet in Wyoming), 200 feet of identified private water wells, and 400 feet of municipal or community water wells. A Spill Pollution Prevention, Containment, and Countermeasures Plan Framework, will be developed as part of the POD. This design feature would avoid degradation and loss of vegetation communities due to the introduction of contaminants into the environment.
- **Design Feature 33 (disturbance buffers for activities near riparian areas)**. Ground-disturbing activities in Utah and Colorado within 328 feet (100 meters), 500 feet in Wyoming, of a riparian area would be required to meet exception criteria defined by the BLM, and mitigation measures would be developed on a site-specific basis in consultation with the affected federal land-management agency and incorporated into the POD. If any disturbance were anticipated within 20 feet of the edge of a riparian area or other wetland habitat, a silt fence or certified weed-free wattle would be installed along the travel route on the wetland side unless the wetland is up-gradient. This design feature would minimize impacts on riparian areas.

Selective Mitigation Measures 1, 2, 4, and 7 would be implemented to reduce potential high or moderate impacts on riparian and wetland vegetation communities. Selective Mitigation Measures 11 and 13 could be implemented to reduce impacts on vegetation under special circumstances as identified during preconstruction surveys, though specific areas to which these measures would be applied have not been identified. These selective mitigation measures are described and discussed in this section.

- **Selective Mitigation Measure 1 (minimization of disturbance to sensitive soils and vegetation)**. In areas where soils or vegetation are particularly sensitive to disturbance (e.g., soils that are highly or moderately susceptible to water or wind erosion), existing trails and roads would not be widened or otherwise upgraded unless it is needed for travel safety as determined by the land-management agency. This mitigation measure would minimize stream sedimentation and habitat loss and degradation in sensitive riparian and wetland vegetation communities by reducing the amount of ground disturbance that would occur in these areas.
- **Selective Mitigation Measure 2 (avoidance of sensitive resources)**. No blading of new access roads would occur in certain resource areas (e.g., perennial streams, riparian areas, and wetlands). Existing roads or overland access would be used in these areas. This mitigation measure would minimize stream sedimentation and habitat loss and degradation in riparian and wetland vegetation communities by avoiding disturbance in these sensitive areas.
- **Selective Mitigation Measure 4 (minimization of tree clearing)**. Tree clearing in and adjacent to the right-of-way would be minimized to the extent practicable to satisfy conductor-clearance requirements. Trees and other vegetation would be removed selectively to blend the edge of the right-of-way into adjacent vegetation patterns (i.e., edge feathering) as practicable and appropriate. In riparian vegetation communities, only trees greater than 5 feet tall would be selectively removed prior to initial construction. In contrast, all vegetation with the potential to grow greater than 5 feet tall would be removed in the wire zone of the right-of-way prior to construction in other vegetation communities. This mitigation measure would limit disturbance riparian vegetation communities by reducing the number of trees cleared in Project corridors.
- **Selective Mitigation Measure 7 (spanning or avoiding of sensitive features)**. Project structures would be located to allow conductors to span or avoid identified sensitive features such as wetlands, riparian areas, and water courses. This mitigation measure would minimize stream sedimentation and habitat degradation in sensitive riparian and wetland vegetation communities. Avoiding or spanning these resources also would lower the risk of the introduction of weeds and invasive species, reduce overall habitat fragmentation in the Project area, and minimize tree clearing in sensitive riparian areas.
- **Selective Mitigation Measure 11 (minimization of right-of-way clearing).** 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 resource 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. This would minimize impacts on specific vegetation areas where the need is identified during creation of site-specific design.
- **Selective Mitigation Measure 13 (overland access).** The Construction Contractor would use overland access to the greatest extent possible in areas where no grading would be needed to access work areas (refer to Table 2-13 for greater detail). This mitigation measure would minimize the amount of permanent or temporary vegetation clearing for access roads.

Effects Analysis

Methods for Analysis to Support Interdisciplinary Comparison of Alternative Routes

Criteria for Assessing Level of Impacts

Criteria were developed in collaboration with the Agency Interdisciplinary Team to assess the level of a potential effect on vegetation resources associated with implementation of the Project and to compare the impacts between alternative routes (Table 3-51). Impact criteria were based on considerations of relative

abundance of each vegetative community, regeneration time, nature and magnitude of anticipated impacts, and additional protections for vegetation (including laws and statutes).

TABLE 3-51
CRITERIA FOR ASSESSING LEVEL OF DIRECT IMPACTS ON VEGETATION RESOURCES

Level of Impacts	Description
High	▪ Loss or adverse modification of very rare native vegetation communities ▪ Loss or adverse modification of vegetation communities crucial for ecosystem function and biodiversity
Moderate-high	▪ Loss or adverse modification of rare, uncommon native vegetation communities or common vegetation communities with a canopy greater than 5 feet ▪ Disturbance to very rare vegetation communities ▪ Disturbance of vegetation communities that regenerate very slowly following reclamation
Moderate	▪ Loss or adverse modification of uncommon native vegetation communities ▪ Disturbance to rare native vegetation communities ▪ Disturbance of vegetation communities that regenerate slowly following reclamation
Low-moderate	▪ Loss or adverse modification of somewhat uncommon native vegetation communities ▪ Disturbance to common native vegetation communities ▪ Disturbance of vegetation communities that regenerate somewhat rapidly following reclamation
Low	▪ Loss or adverse modification of common native vegetation communities ▪ Loss or adverse modification of vegetation communities that are not a component of the natural landscape ▪ Disturbance of vegetation communities that regenerate rapidly following reclamation

Initial Impacts

The level of potential effects on vegetation resources (i.e., specific cover types) that could result from implementation of the Project is used as the basis for assessing initial impacts. Design features of the Proposed Action would reduce impacts on vegetation resources and were considered when assessing potential impacts on specific resources. Based on the level of a potential effect on a vegetation resource, initial impacts were assigned (Table 3-52) using the criteria presented in Table 3-51.

TABLE 3-52
SUMMARY OF INITIAL AND RESIDUAL IMPACTS BY VEGETATION COMMUNITY

Vegetation Community	Design Feature	Initial Impacts	Location-specific Selective Mitigation Measures	Residual Impact
Agriculture	1, 2, 5, 14, 16, 17, 18, 26, 27, 30	Low-moderate	–	Low
Alpine	1, 2, 5, 9, 14, 16, 17, 18, 26, 27, 30,	Moderate	–	Moderate
Aspen	1, 2, 5, 9, 14, 16, 17, 18, 26, 27, 30,	Moderate	–	Moderate
Barren (less than 10 percent cover)	1, 2, 5, 14, 16, 17, 18, 26, 27, 30,	Moderate	–	Moderate
Big sagebrush	1, 2, 5, 14, 16, 17, 18, 26, 27, 30,	Moderate	–	Moderate
Developed/ disturbed	1, 2, 5, 14, 16, 17, 18, 26, 27, 30,	Low	–	Low
Grassland	1, 2, 5, 14, 16, 17, 18, 26, 27, 30,	Moderate	–	Moderate
Invasive	1, 2, 5, 14, 16, 17, 18, 26, 27, 30,	Low	–	Low
Montane forest	1, 2, 5, 14, 16, 17, 18, 26, 27, 30,	Moderate	–	Moderate
Mountain shrub	1, 2, 5, 14, 16, 17, 18, 26, 27, 30,	Moderate	–	Moderate

TABLE 3-52 SUMMARY OF INITIAL AND RESIDUAL IMPACTS BY VEGETATION COMMUNITY				
Vegetation Community	**Design Feature**	**Initial Impacts**	**Location-specific Selective Mitigation Measures**	**Residual Impact**
Pinyon-juniper	1, 2, 5, 14, 16, 17, 18, 26, 27, 30,	Low-moderate	–	Low-moderate
Ponderosa pine	1, 2, 5, 14, 16, 17, 18, 26, 27, 30,	Moderate-high	–	Moderate-high
Riparian	1, 2, 5, 9, 14, 16, 17, 18, 26, 27, 30, 33	High	1, 2, 4, 7	Moderate-high
Shrub/shrub steppe	1, 2, 5, 14, 16, 17, 18, 26, 27, 30,	Low-moderate	–	Low-moderate
Water	1, 2, 5, 9, 14, 17, 26, 27, 30, 33	High	1, 2, 4, 7	Moderate
Wetland	1, 2, 5, 9, 14, 17, 26, 27, 30, 33	High	1, 2, 4, 7	Moderate

A low initial impact was assigned to the developed/disturbed and invasive vegetation communities 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 areas. Vegetation in these communities regenerates rapidly and has been introduced through previous human activities.

A low-moderate initial impact was assigned to the agriculture, pinyon-juniper, and the shrub/shrub steppe vegetation communities; and a moderate initial impact was assigned to the alpine, aspen, big sagebrush, barren, grassland, montane forest, and mountain shrub vegetation communities. A moderate-high initial impact was assigned to ponderosa pine vegetation communities. Large trees in some of these vegetation communities would be permanently cleared as required to meet the Project's safety standards, further impacting the ability of these areas to function as wildlife habitat.

A high initial impact was assigned to the riparian, water, and wetland vegetation communities. Riparian and wetland vegetation communities are among the most rare vegetation communities in the arid west. Without mitigation, riparian communities crossed by right-of-way corridors could be permanently altered (i.e., cleared of vegetation with the potential to reach heights greater than 5 feet in the wire zone and 25 feet in the border zone) to meet the Project's operational safety standards (Appendix B).

Residual Impacts

Selective mitigation measures are applied to reduce the level of impacts associated with Project construction and maintenance. Residual impacts are anticipated impacts on vegetation resources after the application of selective mitigation measures described in the Mitigation Planning and Effectiveness section. The level of potential residual impacts on vegetation resources associated with implementation of the Project was assessed using the criteria presented in Table 3-51. A summary of anticipated initial and residual impacts on vegetation resources, as well as the selective mitigation measures applied, are presented in Table 3-52.

Application of selective mitigation measures is expected to reduce the level of anticipated impacts on the water and wetland vegetation communities from high to moderate and on the riparian vegetation community from high to moderate-high. Impacts on specific vegetation communities resulting from Project activities are discussed in this section.

Agriculture

Loss of this vegetation community could have negative economic impacts as areas permanently converted from agriculture use to transmission line structures would no longer be available for the production of crops or livestock.

Alpine, Big Sagebrush, Grassland, and Shrub/Shrub Steppe

Loss of these vegetation communities would be detrimental to wildlife and special status plant species that inhabit them, many of which have highly restricted ranges (Appendix J). The loss of vegetation in these communities also would negatively affect their ability to function for other desirable uses, such as forage and rangeland for livestock.

Aspen, Montane Forest, Mountain Shrub, Pinyon-Juniper, and Ponderosa Pine

In addition to permanent losses of these vegetation communities due to access road and transmission line facility construction, tall vegetation in these vegetation communities would be cleared in the right-of-way if it interferes with safe operation of the transmission line. Though these areas would be revegetated with ecologically appropriate species, many of which are already understory component species, the structure of these communities would be permanently altered. Subsequently, these communities may not provide equivalent habitat or ecosystem services. Permanent alterations of these vegetation communities could be detrimental to wildlife and special status plant species that inhabit wooded areas (Appendix J). The loss of vegetation in these communities also would affect their ability to function for other desirable uses, such as forage and rangeland for livestock.

Barren/Sparsely Vegetated

Reduction in acreages of this vegetation community, which may be particularly sensitive to disturbance due to its unique soil conditions (e.g., extreme salinity or alkalinity, high composition of sand or rocks), would be detrimental to associated wildlife and special status plant species (Appendix J). The loss of vegetation in these communities also would affect their ability to function for other desirable uses, such as forage and rangeland for livestock.

Developed/Disturbed and Invasive

Loss of these vegetation communities would not be expected to result in adverse impacts on other resources as it is assumed site reclamation and revegetation with native or desirable species would occur as soon as is practicable for areas not permanently converted to roads, transmission line tower pads, or other Project facilities (Design Feature 2).

Riparian

Selective Mitigation Measures 1, 2, 4, and 7 would be applied in riparian vegetation communities to reduce impacts from high to moderate-high (refer to criteria for assessing level of impacts on vegetation resources in Table 3-51). The application of Selective Mitigation Measures 1, 2, and 7 would require avoidance of riparian areas and limitations to the construction or improvement of access roads in these areas wherever practicable. The application of Selective Mitigation Measure 4 would require that only trees greater than 5 feet tall be cleared in the wire-zone of the right-of-way in riparian areas, as well as in water and wetland vegetation communities with woody vegetation. In contrast, clearing of all vegetation with the potential to reach 5 feet or greater would occur in other vegetation communities.

If riparian vegetation communities are crossed by the Project, tall vegetation (greater than 5 feet) would be cleared in the wire zone of the right-of-way in these communities. The plant community composition

and structure of these cleared areas would be permanently altered, and this new plant community may not provide equivalent habitat or ecosystem services. Alterations of the structure of riparian vegetation communities could be detrimental to wildlife and special status plant species that depend on these areas (Appendix J) and the ability of these areas to provide ecological and socioeconomic services. In addition, disturbance such as from construction of new road crossings in riparian areas, if necessary, could increase soil loss and subsequently decrease downstream water quality.

Water and Wetland

Selective Mitigation Measures 1, 2, 4, and 7 would be applied in water and wetland vegetation communities to reduce impacts from high to moderate (refer to criteria for assessing level of impacts on vegetation resources in Table 3-51). The application of Selective Mitigation Measures 1, 2, and 7 would require avoidance of water and wetland vegetation communities and limitations to the construction or improvement of access roads in these areas wherever practicable. The application of Selective Mitigation Measure 4 would require that only trees greater than 5 feet tall be cleared in the wire-zone of the right-of-way in these vegetation communities, as well as in riparian vegetation communities with woody vegetation. In contrast, clearing of all vegetation with the potential to reach 5 feet or greater would occur in other vegetation communities.

If these vegetation communities are crossed by the Project, acreage losses and disturbances in water and wetland vegetation communities would be detrimental to wildlife and special status plant species that depend on these areas (Appendix J). Disturbance in water and wetland areas also could adversely affect water quality and the ability of these vegetation communities to provide ecosystem services such as water filtration.

Methods for Additional Analysis of Potential Impacts

In addition to the analysis conducted to allow interdisciplinary comparison of alternative routes, additional analyses were required to adequately address some issues raised by the public and the agencies during scoping regarding potential impacts on vegetation resources or to meet the requirements of relevant law, regulation, or policy.

The total loss of vegetative cover (in acres) due to Project Features was estimated to provide an overview of the extent of potential impacts on vegetative resources. The analysis was completed by estimating the total disturbance due to construction of features such as roads, transmission line towers, and other Project facilities over the entire length of an alternative route and divided by the total length of an alternative route to calculate the average rate of disturbance per mile. This rate was then used to estimate the extent of loss of vegetative cover (in acres) that would occur with each specific length of vegetation community crossed by an alternative route.

As the amount of vegetation disturbance per mile varies by alternative route, the same length of vegetation community crossed by different alternative routes could have fluctuations in disturbance per vegetation community.

The estimated area (in acres) of vegetation clearing (i.e., removal of tall vegetation and the subsequent conversion of forested vegetation communities to other community types) was calculated by multiplying lengths of crossings of vegetation communities assumed to have tall vegetation (aspen, montane forest, mountain shrub, pinyon-juniper, and riparian) by the width of the right-of-way (250 feet). Though only vegetation with the potential to reach heights greater than 5 feet in the wire zone and 25 feet in the border zone would be cleared during the construction, operation, and maintenance of the Project, the edges of these areas would be feathered to blend with surrounding landscape patterns (Selective Mitigation

Measure 4). It is assumed for the purposes of analysis that all vegetation in the 250-foot right-of-way would be cleared in these communities.

3.2.5.5 Results

Disturbance of vegetation communities would occur with implementation of any of the action alternative routes considered. Loss of vegetation would occur through direct removal of vegetation, result from conversion to access roads or transmission line structures, and by vegetative conversion (i.e., clearing of taller vegetation in the transmission line right-of-way). The application of selective mitigation measures would reduce the level of impacts in some of these vegetation communities (Section 3.2.5.4 and Table 3-52). The types of potential effects on vegetation communities that could occur under all alternative routes and the degree to which these effects would be mitigated or avoided are described in Section 3.2.5.4.

3.2.5.5.1 No Action Alternative

Under this alternative, the environment would remain as it presently exists.

3.2.5.5.2 Impacts Common to All Action Alternatives

There are no impacts common to all action alternative routes for vegetation resources.

3.2.5.5.3 345-kilovolt Ancillary Transmission Components

The 345kV ancillary transmission line components would be located in an area between the Mona and Clover substations west of the town of Mona. Most of the 345kV ancillary transmission line components would be in an existing right-of-way. Vegetation communities crossed by these components are predominantly agriculture and big sagebrush with lesser extents of pinyon-juniper, invasive, and shrub/shrub steppe.

3.2.5.5.4 500-kilovolt Transmission Line Components

Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO)

Environmental Setting

The WYCO alternative routes are from Aeolus, Wyoming, to U.S. Highway 40 in Colorado (Map 2-3a). The majority of alternative routes are in the Wyoming Basin Ecoregion but cross into the Colorado Plateaus Ecoregion as it proceeds southwest of the area around Maybell, Colorado.

Alternative WYCO-B (Agency and Applicant Preferred Alternative)

Affected Environment (Wyoming)

Alternative WYCO-B in Wyoming is located entirely in the Wyoming Basin Ecoregion and predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities. Smaller areas of barren/sparsely vegetated, developed/disturbed, grassland, invasive, pinyon-juniper, riparian, water, and wetland vegetation communities also are crossed by this alternative route (Table 3-53 and MV-7a).

Environmental Consequences (Wyoming)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative WYCO-B in Wyoming after application of selective mitigation measures is shown in Table 3-54. The numbers in this

table represent the miles of vegetation communities in each residual impact category crossed by the centerline of each alternative route.

TABLE 3-53
ALTERNATIVE ROUTE COMPARISON FOR VEGETATION RESOURCES INVENTORY DATA FOR THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES

Alternative Route	Total Miles	Vegetation Community (miles crossed)														
		Agriculture	Alpine	Aspen	Barren/Sparsely Vegetated	Big Sagebrush	Developed/Disturbed	Grassland	Invasive	Montane Forest	Mountain Shrub	Pinyon-Juniper	Shrub/Shrub Steppe	Riparian	Water	Wetland
WYCO-B (Agency and Applicant Preferred Alternative)	206.3	0.5	0.0	0.0	4.9	112.0	1.3	2.8	1.2	0.0	0.0	7.6	72.0	2.6	0.8	0.6
Wyoming	*141.0*	*0.0*	*0.0*	*0.0*	*2.6*	*75.8*	*0.5*	*0.6*	*0.1*	*0.0*	*0.0*	*0.5*	*57.3*	*2.4*	*0.6*	*0.6*
Colorado	*65.3*	*0.5*	*0.0*	*0.0*	*2.3*	*36.2*	*0.8*	*2.2*	*1.1*	*0.0*	*0.0*	*7.1*	*14.7*	*0.2*	*0.2*	*0.0*
WYCO-C	210.0	0.5	0.0	0.0	3.4	109.4	1.3	2.8	1.2	0.0	0.0	7.4	79.7	1.9	1.2	1.2
Wyoming	*144.7*	*0.0*	*0.0*	*0.0*	*1.1*	*73.2*	*0.5*	*0.6*	*0.1*	*0.0*	*0.0*	*0.3*	*65.0*	*1.7*	*1.0*	*1.2*
Colorado	*65.3*	*0.5*	*0.0*	*0.0*	*2.3*	*36.2*	*0.8*	*2.2*	*1.1*	*0.0*	*0.0*	*7.1*	*14.7*	*0.2*	*0.2*	*0.0*
WYCO-D	249.4	17.5	0.0	0.0	0.7	167.0	2.4	7.8	1.2	0.0	0.2	4.7	43.2	3.2	0.7	0.8
Wyoming	*134.9*	*0.0*	*0.0*	*0.0*	*0.5*	*92.9*	*1.4*	*0.6*	*0.0*	*0.0*	*0.0*	*0.5*	*35.5*	*2.2*	*0.5*	*0.8*
Colorado	*114.5*	*17.5*	*0.0*	*0.0*	*0.2*	*74.1*	*1.0*	*7.2*	*1.2*	*0.0*	*0.2*	*4.2*	*7.7*	*1.0*	*0.2*	*0.0*
WYCO-F	218.8	0.5	0.0	0.0	2.8	131.4	1.2	2.8	1.2	0.0	0.0	7.4	67.7	2.2	0.8	0.8
Wyoming	*153.5*	*0.0*	*0.0*	*0.0*	*0.5*	*95.2*	*0.4*	*0.6*	*0.1*	*0.0*	*0.0*	*0.3*	*53.0*	*2.0*	*0.6*	*0.8*
Colorado	*65.3*	*0.5*	*0.0*	*0.0*	*2.3*	*36.2*	*0.8*	*2.2*	*1.1*	*0.0*	*0.0*	*7.1*	*14.7*	*0.2*	*0.2*	*0.0*

TABLE 3-54
ALTERNATIVE ROUTE COMPARISON FOR VEGETATION RESOURCES RESIDUAL IMPACTS FOR THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES

Alternative Route	Total Miles	Residual Impacts (miles crossed)			
		Low	Low-Moderate	Moderate	Moderate-High
WYCO-B (Agency and Applicant Preferred Alternative)	206.3	3.0	79.6	121.1	2.6
Wyoming	*141.0*	*0.6*	*57.8*	*80.2*	*2.4*
Colorado	*65.3*	*2.4*	*21.8*	*40.9*	*0.2*
WYCO-C	210.0	3.0	87.1	118.0	1.9
Wyoming	*144.7*	*0.6*	*65.3*	*77.1*	*1.7*
Colorado	*65.3*	*2.4*	*21.8*	*40.9*	*0.2*
WYCO-D	249.4	21.1	47.9	177.2	3.2
Wyoming	*134.9*	*1.4*	*36.0*	*95.3*	*2.2*
Colorado	*114.5*	*19.7*	*11.9*	*81.9*	*1.0*
WYCO-F	218.8	2.9	75.1	138.6	2.2
Wyoming	*153.5*	*0.5*	*53.3*	*97.7*	*2.0*
Colorado	*65.3*	*2.4*	*21.8*	*40.9*	*0.2*

Impacts are primarily moderate due to the predominance of big sagebrush vegetation communities crossed by this alternative route (Tables 3-53 and 3-54; refer to Table 3-52 for residual impacts by vegetation community). Moderate impacts also would occur where the alternative route crosses water, barren/sparsely vegetated, grassland, and wetland vegetation communities. Low-moderate impacts would occur where this alternative crosses shrub/shrub steppe and pinyon juniper vegetation communities. Moderate-high impacts would occur where this alternative route crosses riparian and wetland vegetation communities (Tables 3-53 and 3-54).

Results of Additional Analysis of Potential Impacts

Alternative WYCO-B in Wyoming would result in permanent loss of vegetative cover due to access road and transmission line construction. These losses would occur predominantly in the big sagebrush and shrub/shrub steppe vegetation communities with smaller areas of loss in barren/sparsely vegetated, developed/disturbed, grassland, invasive, pinyon-juniper, riparian, water, and wetland vegetation communities (Table 3-55).

TABLE 3-55
LONG-TERM SURFACE DISTURBANCE FOR THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES

Alternative Route	Vegetation Community Disturbed (acres)														
	Agriculture	Alpine	Aspen	Barren/Sparsely Vegetated	Big Sagebrush	Developed/Disturbed	Grassland	Invasive	Montane Forest	Mountain Shrub	Pinyon-Juniper	Shrub/Shrub Steppe	Riparian	Water	Wetland
WYCO-B (Agency and Applicant Preferred Alternative)	8	0	0	77	1,767	21	44	19	0	0	120	1,136	41	12	9
Wyoming	*0*	*0*	*0*	*41*	*1,196*	*8*	*9*	*2*	*0*	*0*	*8*	*904*	*38*	*9*	*9*
Colorado	*8*	*0*	*0*	*36*	*571*	*13*	*35*	*17*	*0*	*0*	*112*	*232*	*3*	*3*	*0*
WYCO-C	8	0	0	53	1,724	21	44	19	0	0	117	1,256	30	19	19
Wyoming	*0*	*0*	*0*	*17*	*1,154*	*8*	*9*	*2*	*0*	*0*	*5*	*1,024*	*27*	*16*	*19*
Colorado	*8*	*0*	*0*	*36*	*571*	*13*	*35*	*17*	*0*	*0*	*112*	*232*	*3*	*3*	*0*
WYCO-D	272	0	0	11	2,599	37	121	19	0	3	73	673	50	11	13
Wyoming	*0*	*0*	*0*	*8*	*1,446*	*22*	*9*	*0*	*0*	*0*	*8*	*553*	*34*	*8*	*13*
Colorado	*272*	*0*	*0*	*3*	*1,153*	*16*	*112*	*19*	*0*	*3*	*65*	*120*	*16*	*3*	*0*
WYCO-F	8	0	0	44	2,062	19	44	19	0	0	116	1,063	35	13	12
Wyoming	*0*	*0*	*0*	*8*	*1,494*	*6*	*9*	*2*	*0*	*0*	*5*	*832*	*31*	*9*	*12*
Colorado	*8*	*0*	*0*	*36*	*568*	*13*	*35*	*17*	*0*	*0*	*111*	*231*	*3*	*3*	*0*

NOTE: Acres in the table are rounded and, therefore, columns may not sum exactly.

Vegetative clearing (the removal of vegetative biomass with the potential to reach heights greater than 5 feet in the wire zone and 25 feet in the border zone of the right-of-way; refer to Appendix B) would be required for Alternative WYCO-B in Wyoming. Vegetative clearing would occur in pinyon-juniper and riparian vegetation communities (Table 3-56).

TABLE 3-56
AREA OF VEGETATION CLEARING FOR THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES

Alternative Route	Total Vegetation Clearing (acres)	Vegetation Clearing (acres)				
		Aspen	Montane Forest	Mountain Shrub	Pinyon-Juniper	Riparian
WYCO-B (Agency and Applicant Preferred Alternative)	325	0	0	0	242	*83*
Wyoming	*92*	*0*	*0*	*0*	*16*	*76*
Colorado	*232*	*0*	*0*	*0*	*226*	*6*
WYCO-C	296	0	0	0	235	60
Wyoming	*64*	*0*	*0*	*0*	*10*	*54*
Colorado	*232*	*0*	*0*	*0*	*226*	*6*
WYCO-D	258	0	0	6	150	102
Wyoming	*86*	*0*	*0*	*0*	*16*	*70*
Colorado	*172*	*0*	*0*	*6*	*134*	*32*
WYCO-F	305	0	0	0	235	70
Wyoming	*73*	*0*	*0*	*0*	*10*	*64*
Colorado	*232*	*0*	*0*	*0*	*226*	*6*

NOTE: Acres in the table are rounded and, therefore, columns and rows may not sum exactly.

Affected Environment (Colorado)

Alternative WYCO-B in Colorado begins in the Wyoming Basin Ecoregion and enters the Colorado Plateaus Ecoregion as it approaches U.S. Highway 40 and predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities. Smaller areas of agriculture, barren/sparsely vegetated, developed/disturbed, grassland, invasive, pinyon-juniper, riparian, and water vegetation communities also are crossed by this alternative route in Colorado (Table 3-53 and MV-7a).

Environmental Consequences (Colorado)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative WYCO-B in Colorado after application of selective mitigation measures is shown in Table 3-54. Impacts are primarily moderate due to the predominance of big sagebrush vegetation communities crossed by this alternative route (Tables 3-53 and 3-54). Moderate impacts also would occur where this alternative route crosses water, barren/sparsely vegetated, and grassland vegetation communities. Low-moderate impacts would occur where this alternative crosses shrub/shrub steppe and pinyon juniper vegetation communities. High-moderate impacts would occur where this alternative crosses riparian vegetation communities.

Results of Additional Analysis of Potential Impacts

Alternative WYCO-B in Colorado would result in permanent loss of vegetative cover due to access road and transmission line construction (Table 3-55). These losses would occur predominantly in big sagebrush and shrub/shrub steppe vegetation communities, with smaller areas of loss in agriculture, barren/sparsely vegetated, developed/disturbed, grassland, invasive, pinyon-juniper, riparian, and water vegetation communities (Table 3-55).

Vegetation clearing would occur primarily in pinyon-juniper vegetation communities with lesser extents occurring in riparian vegetation communities (Table 3-56).

Alternative WYCO-C

Affected Environment (Wyoming)

Alternative WYCO-C in Wyoming is entirely in the Wyoming Basin Ecoregion and predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities (Table 3-53). Smaller areas of barren/sparsely vegetated, developed/disturbed, grassland, invasive, pinyon-juniper, riparian, water, and wetland vegetation communities also are crossed by this alternative route (Table 3-53 and MV-7a).

Environmental Consequences (Wyoming)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative WYCO-C in Wyoming after application of selective mitigation measures is shown in Table 3-54. Impacts are primarily moderate due to the predominance of big sagebrush vegetation communities crossed by this alternative route (Tables 3-53 and 3-54; refer to Table 3-52 for residual impacts by vegetation communities). Moderate impacts also would occur where this alternative route crosses water, barren/sparsely vegetated, and wetland vegetation communities. Low-moderate impacts would occur where this alternative crosses shrub/shrub steppe and pinyon juniper vegetation communities. Moderate-high impacts would occur where this alternative route crosses riparian and wetland vegetation communities (Tables 3-53 and 3-54).

Results of Additional Analysis of Potential Impacts

Alternative WYCO-C in Wyoming would result in permanent loss of vegetative cover due to access road and transmission line construction (Table 3-55). These losses would occur predominantly in the big sagebrush and shrub/shrub steppe vegetation communities with smaller areas of loss in barren/sparsely vegetated, developed/disturbed, grassland, invasive, pinyon-juniper, riparian, water, and wetland vegetation communities (Table 3-55).

Vegetation clearing would occur in pinyon-juniper and riparian vegetation communities (Table 3-56).

Affected Environment (Colorado)

Alternative WYCO-C in Colorado is mostly in the Wyoming Basin Ecoregion but enters the Colorado Plateaus Ecoregion as it approaches U.S. Highway 40 and predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities. Smaller areas of agriculture, barren/sparsely vegetated, developed/disturbed, grassland, invasive, pinyon-juniper, riparian, and water vegetation communities also are crossed by this alternative route in Colorado (Table 3-53 and MV-7a).

Environmental Consequences (Colorado)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative WYCO-C in Colorado after application of selective mitigation measures is shown in Table 3-54. Impacts are primarily moderate due to the predominance of big sagebrush vegetation communities crossed by this alternative route (Tables 3-53 and 3-54). Moderate impacts also would occur where this alternative route crosses water, barren/sparsely vegetated, and grassland vegetation communities. Low-moderate impacts would occur where this alternative crosses shrub/shrub steppe and pinyon juniper vegetation communities. High-moderate impacts would occur where this alternative crosses riparian vegetation communities.

Results of Additional Analysis of Potential Impacts

Alternative WYCO-C in Colorado would result in permanent loss of vegetative cover due to access road and transmission line construction. These losses would occur predominantly in big sagebrush and shrub/shrub steppe vegetation communities with smaller areas of loss in agriculture, barren/sparsely vegetated, developed/disturbed, grassland, invasive, pinyon-juniper, riparian, and water vegetation communities (Table 3-55).

Vegetation clearing would occur primarily in pinyon-juniper vegetation communities with lesser extents occurring in riparian vegetation communities (Table 3-56).

Alternative WYCO-D

Affected Environment (Wyoming)

Alternative WYCO-D in Wyoming is entirely in the Wyoming Basin Ecoregion and predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities. Smaller areas of barren/sparsely vegetated, developed/disturbed, grassland, pinyon-juniper, riparian, water, and wetland vegetation communities also are crossed by this alternative route (Table 3-53 and MV-7a).

Environmental Consequences (Wyoming)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative WYCO-D in Wyoming after application of selective mitigation measures is shown in Table 3-54. Impacts are primarily moderate due to the predominance of big sagebrush vegetation communities crossed by this alternative route (Tables 3-53 and 3-54; refer to Table 3-52 for residual impacts by vegetation communities). Moderate impacts also would occur where this alternative route crosses water, barren/sparsely vegetated, grassland, and wetland vegetation communities. Low-moderate impacts would occur where this alternative crosses shrub/shrub steppe and pinyon juniper vegetation communities. Moderate-high impacts would occur where this alternative route crosses riparian and wetland vegetation communities (Tables 3-53 and 3-54).

Results of Additional Analysis of Potential Impacts

Alternative WYCO-D in Wyoming would result in permanent loss of vegetative cover due to access road and transmission line construction. These losses would occur predominantly in the big sagebrush and shrub/shrub steppe vegetation communities with smaller areas of loss in barren/sparsely vegetated, developed/disturbed, grassland, pinyon-juniper, riparian, water, and wetland vegetation communities (Table 3-55).

Vegetation clearing would occur in pinyon-juniper and riparian vegetation communities (Table 3-56).

Affected Environment (Colorado)

Alternative WYCO-D in Colorado is mostly in the Wyoming Basin Ecoregion but enters the Colorado Plateaus Ecoregion as it approaches U.S. Highway 40. This alternative route predominantly crosses big sagebrush but crosses more acres of agriculture than all other WYCO alternative routes in Colorado (Table 3-53 and MV-7a).

Environmental Consequences (Colorado)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative WYCO-D in Colorado after application of selective mitigation measures is shown in Table 3-54. Impacts are primarily moderate due to the dominance of big sagebrush vegetation communities crossed by this alternative route (Tables 3-53 and 3-54; refer to Table 3-52 for residual impacts by vegetation community). Moderate impacts also would occur where this alternative route crosses water, grassland, and mountain shrub vegetation communities. Low-moderate impacts would occur where this alternative crosses shrub/shrub steppe and pinyon juniper vegetation communities. High-moderate impacts would occur where this alternative crosses riparian vegetation communities. (Tables 3-53 and 3-54).

Results of Additional Analysis of Potential Impacts

Alternative WYCO-D in Colorado would result in permanent loss of vegetative cover due to access road and transmission line construction. These losses would occur predominantly in big sagebrush and shrub/shrub steppe vegetation communities with smaller areas of loss in barren/sparsely vegetated, developed/disturbed, grassland, invasive, mountain shrub, pinyon-juniper, riparian, and water vegetation communities (Table 3-55).

Vegetation clearing would occur primarily in pinyon-juniper vegetation communities and lesser extents would occur in riparian and mountain shrub vegetation communities (Table 3-56).

Alternative WYCO-F

Affected Environment (Wyoming)

Alternative WYCO-F in Wyoming is entirely in the Wyoming Basin Ecoregion and predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities. Smaller areas of barren/sparsely vegetated, developed/disturbed, grassland, invasive, pinyon-juniper, riparian, water, and wetland vegetation communities also are crossed by this alternative route (Table 3-53 and MV-7a).

Environmental Consequences (Wyoming)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative WYCO-F in Wyoming after application of selective mitigation measures is shown in Table 3-54. Impacts are primarily moderate due to the predominance of big sagebrush vegetation communities crossed by this alternative route (Tables 3-53 and 3-54; refer to Table 3-52 for residual impacts by vegetation community). Moderate impacts also would occur where this alternative route crosses water, barren/sparsely vegetated, grassland, and wetland vegetation communities. Low-moderate impacts would occur where this alternative crosses shrub/shrub steppe and pinyon juniper vegetation communities. Moderate-high impacts occur where this alternative route crosses riparian and wetland vegetation communities (Tables 3-53 and 3-54).

Results of Additional Analysis of Potential Impacts

Alternative WYCO-F in Wyoming would result in permanent loss of vegetative cover due to access road and transmission line construction. These losses would occur predominantly in the big sagebrush and shrub/shrub steppe vegetation communities with smaller areas of loss in barren/sparsely vegetated, developed/disturbed, grassland, invasive, pinyon-juniper, riparian, water, and wetland vegetation communities (Table 3-55). Vegetation clearing would occur in pinyon-juniper and riparian vegetation communities (Table 3-56).

Affected Environment (Colorado)

Alternative WYCO-F in Colorado is mostly in the Wyoming Basin Ecoregion but enters the Colorado Plateaus Ecoregion as it approaches U.S. Highway 40 and predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities. Smaller areas of agriculture, barren/sparsely vegetated, developed/disturbed, grassland, invasive, pinyon-juniper, riparian, and water vegetation communities also are crossed by this alternative route in Colorado (Table 3-53 and MV-7a).

Environmental Consequences (Colorado)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative WYCO-F in Colorado after application of selective mitigation measures is shown in Table 3-54. Impacts are primarily moderate due to the predominance of big sagebrush vegetation communities crossed by this alternative route (Tables 3-53 and 3-54). Moderate impacts also would occur where this alternative route crosses water, barren/sparsely vegetated, and grassland vegetation communities. Low-moderate impacts would occur where this alternative crosses shrub/shrub steppe and pinyon juniper vegetation communities. High-moderate impacts would occur where this alternative crosses riparian vegetation communities.

Results of Additional Analysis of Potential Impacts

Alternative WYCO-F in Colorado would result in permanent loss of vegetative cover due to access road and transmission line construction. These losses would occur predominantly in big sagebrush and shrub/shrub steppe vegetation communities with smaller areas of loss in agriculture, barren/sparsely vegetated, developed/disturbed, grassland, invasive, pinyon-juniper, riparian, and water vegetation communities (Table 3-55).

Colorado to Utah – U.S. Highway 40 to Baxter Pass to Clover (COUT BAX)

Environmental Setting

The COUT BAX alternative routes are from U.S. Highway 40 in Colorado to Clover, Utah, by way of Baxter Pass. The COUT BAX alternative routes travel south of the Uintah and Ouray Indian Reservation and pass through Green River, Utah (Map 2-3b). The alternative routes are predominantly in the Colorado Plateaus Ecoregion but cross into the Wasatch and Uinta Mountains and Central Basin and Range ecoregions as it approaches Mona, Utah.

Alternative COUT BAX-B

Affected Environment (Colorado)

Alternative COUT BAX-B in Colorado is entirely in the Colorado Plateaus Ecoregion and predominantly crosses big sagebrush, pinyon-juniper, and shrub/shrub steppe vegetation communities (Table 3-57 and MV-7b). Smaller areas of alpine, aspen, barren/sparsely vegetated, developed/disturbed, grassland, invasive, montane forest, mountain shrub, riparian, and water vegetation communities also are crossed by this alternative route.

TABLE 3-57
ALTERNATIVE ROUTE COMPARISON FOR VEGETATION RESOURCES INVENTORY DATA FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO BAXTER PASS TO CLOVER (COUT BAX) ALTERNATIVE ROUTES

Alternative Route	Total Miles	Vegetation Community (miles crossed)														
		Agriculture	Alpine	Aspen	Barren/Sparsely Vegetated	Big Sagebrush	Developed/Disturbed	Grassland	Invasive	Montane Forest	Mountain Shrub	Pinyon-Juniper	Shrub/Shrub Steppe	Riparian	Water	Wetland
COUT BAX-B	279.9	8.2	0.5	8.3	19.4	47.5	2.7	6.5	3.9	7.5	12.8	41.8	119.0	1.5	0.3	0.0
Colorado	*87.0*	*0.0*	*0.1*	*1.1*	*1.6*	*32.7*	*0.6*	*0.7*	*2.1*	*0.2*	*5.0*	*22.1*	*20.5*	*0.2*	*0.1*	*0.0*
Utah	*192.9*	*8.2*	*0.4*	*7.2*	*17.8*	*14.8*	*2.1*	*5.8*	*1.8*	*7.3*	*7.8*	*19.7*	*98.5*	*1.3*	*0.2*	*0.0*
COUT BAX-C	290.4	8.2	0.5	8.3	19.2	49.7	2.7	6.7	3.7	7.5	12.8	43.5	125.4	2.0	0.2	0.0
Colorado	*87.0*	*0.0*	*0.1*	*1.1*	*1.6*	*32.7*	*0.6*	*0.7*	*2.1*	*0.2*	*5.0*	*22.1*	*20.5*	*0.2*	*0.1*	*0.0*
Utah	*203.4*	*8.2*	*0.4*	*7.2*	*17.6*	*17.0*	*2.1*	*6.0*	*1.6*	*7.3*	*7.8*	*21.4*	*104.9*	*1.8*	*0.1*	*0.0*
COUT BAX-E	292.2	7.1	0.3	10.6	18.5	50.2	2.5	5.3	3.6	2.8	15.8	39.7	133.6	1.9	0.3	0.0
Colorado	*87.0*	*0.0*	*0.1*	*1.1*	*1.6*	*32.7*	*0.6*	*0.7*	*2.1*	*0.2*	*5.0*	*22.1*	*20.5*	*0.2*	*0.1*	*0.0*
Utah	*205.2*	*7.1*	*0.2*	*9.5*	*16.9*	*17.5*	*1.9*	*4.6*	*1.5*	*2.6*	*10.8*	*17.6*	*113.1*	*1.7*	*0.2*	*0.0*

Environmental Consequences (Colorado)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative COUT BAX-B in Colorado after application of selective mitigation measures is shown in Table 3-58. Impacts are primarily low-moderate due to the predominance of shrub/shrub steppe and pinyon-juniper vegetation communities crossed by this alternative route (Tables 3-57 and 3-58; refer to Table 3-52 for residual impacts by vegetation community). Moderate impacts would occur where this alternative route crosses big sagebrush, water, alpine, aspen, barren/sparsely vegetated, grassland, montane forest, and mountain shrub vegetation communities. Moderate-high impacts would occur where this alternative route crosses riparian vegetation.

TABLE 3-58
ALTERNATIVE ROUTE COMPARISON FOR VEGETATION RESOURCES RESIDUAL IMPACTS FOR COLORADO TO UTAH – U.S. HIGHWAY 40 TO BAXTER PASS TO CLOVER (COUT BAX) ALTERNATIVE ROUTES

Alternative Route	Total Miles	Residual Impacts (miles crossed)			
		Low	Low-Moderate	Moderate	Moderate-High
COUT BAX-B	279.9	14.8	160.8	102.8	1.5
Colorado	*87.0*	*2.7*	*42.6*	*41.5*	*0.2*
Utah	*192.9*	*12.1*	*118.2*	*61.3*	*1.3*
COUT BAX-C	290.4	14.6	168.9	104.9	2.0
Colorado	*87.0*	*2.7*	*42.6*	*41.5*	*0.2*
Utah	*203.4*	*11.9*	*126.3*	*63.4*	*1.8*
COUT BAX-E	292.2	13.2	173.3	103.8	1.9
Colorado	*87.0*	*2.7*	*42.6*	*41.5*	*0.2*
Utah	*205.2*	*10.5*	*130.7*	*62.3*	*1.7*

Results of Additional Analysis of Potential Impacts

Alternative COUT BAX-B in Colorado would result in permanent loss of vegetative cover due to access road and transmission line construction. These losses would occur predominantly in the big sagebrush, pinyon-juniper, mountain shrub, and shrub/shrub steppe vegetation communities with smaller areas of loss in alpine aspen, barren/sparsely vegetated, developed/disturbed, grassland, invasive, montane forest, riparian, and water vegetation communities (Table 3-59).

TABLE 3-59
LONG-TERM SURFACE DISTURBANCE FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO BAXTER PASS TO CLOVER (COUT BAX) ALTERNATIVE ROUTES

Alternative Route	Vegetation Community Disturbed (acres)														
	Agriculture	Alpine	Aspen	Barren/Sparsely Vegetated	Big Sagebrush	Developed/Disturbed	Grassland	Invasive	Montane Forest	Mountain Shrub	Pinyon-Juniper	Shrub/Shrub Steppe	Riparian	Water	Wetland
COUT BAX-B	137	8	139	325	796	45	109	65	126	215	701	1,995	25	5	0
Colorado	*0*	*2*	*18*	*27*	*548*	*10*	*12*	*35*	*3*	*84*	*371*	*344*	*3*	*2*	*0*
Utah	*137*	*7*	*121*	*298*	*248*	*35*	*97*	*30*	*122*	*131*	*330*	*1,651*	*22*	*3*	*0*
COUT BAX-C	137	8	138	320	828	45	112	62	123	213	724	2,088	33	3	0
Colorado	*0*	*2*	*18*	*27*	*545*	*10*	*12*	*35*	*3*	*83*	*368*	*341*	*3*	*2*	*0*
Utah	*137*	*7*	*120*	*293*	*283*	*35*	*100*	*27*	*122*	*130*	*356*	*1,747*	*30*	*2*	*0*
COUT BAX-E	117	5	175	306	829	41	88	60	46	261	656	2,207	31	5	0
Colorado	*0*	*2*	*18*	*26*	*540*	*10*	*12*	*35*	*3*	*83*	*365*	*339*	*3*	*2*	*0*
Utah	*117*	*3*	*157*	*279*	*289*	*31*	*76*	*25*	*43*	*178*	*291*	*1,869*	*28*	*3*	*0*

NOTE: Acres in the table are rounded and, therefore, columns may not sum exactly.

Vegetation clearing for Alternative COUT BAX-B would occur primarily in pinyon-juniper and mountain shrub vegetation communities and lesser extents would occur in aspen, montane forest, and riparian vegetation communities (Table 3-60).

TABLE 3-60
AREA OF VEGETATION CLEARING FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO BAXTER PASS TO CLOVER (COUT BAX) ALTERNATIVE ROUTES

Alternative Route	Total Vegetation Clearing (acres)	Vegetation Clearing (acres)				
		Aspen	Montane Forest	Mountain Shrub	Pinyon-Juniper	Riparian
COUT BAX-B	2,288	264	239	407	1,330	48
Colorado	*910*	*35*	*6*	*159*	*703*	*6*
Utah	*1,378*	*229*	*232*	*248*	*627*	*41*
COUT BAX-C	2,358	264	239	407	1,384	64
Colorado	*910*	*35*	*6*	*159*	*703*	*6*
Utah	*1,448*	*229*	*232*	*248*	*681*	*57*
COUT BAX-E	2,253	337	89	503	1,263	60
Colorado	*910*	*35*	*6*	*159*	*703*	*6*
Utah	*1,343*	*302*	*83*	*344*	*560*	*54*

NOTE: Acres in the table are rounded and, therefore, columns may not sum exactly.

Affected Environment (Utah)

Alternative COUT BAX-B in Utah is in the Colorado Plateaus, Wasatch and Uinta Mountains, and Central Basin and Range ecoregions. This alternative route predominantly crosses shrub/shrub steppe, but also large areas of barren/sparsely vegetated, big sagebrush, and pinyon-juniper vegetation communities. Smaller areas of agriculture, alpine, aspen, developed/disturbed, grassland, invasive, montane forest, mountain shrub, riparian, and water vegetation communities also are crossed by this alternative route (Table 3-57 and MV-7b).

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative COUT BAX-B in Utah after application of selective mitigation measures is shown in Table 3-58. Impacts are primarily low-moderate due to the predominance of shrub/shrub steppe and pinyon-juniper vegetation communities crossed by this alternative route (Tables 3-57 and 3-58; refer to Table 3-52 for residual impacts by vegetation community). Moderate impacts would occur where this alternative route crosses big sagebrush, water, alpine, aspen, barren/sparsely vegetated, grassland, montane forest, and mountain shrub vegetation communities. Moderate-high impacts would occur where this alternative route crosses riparian vegetation communities.

Results of Additional Analysis of Potential Impacts

Alternative COUT BAX-B in Utah would result in permanent loss of vegetative cover due to access road and transmission line construction. These losses would occur predominantly in agriculture, aspen, barren/sparsely vegetated, big sagebrush, montane forest, mountain shrub, pinyon-juniper, and shrub/shrub steppe vegetation communities with smaller areas of loss in, alpine, developed/disturbed, grassland, invasive, riparian, and water vegetation communities (Table 3-59).

Vegetation clearing would occur primarily in aspen, montane forest, mountain shrub, and pinyon-juniper vegetation communities and a lesser extent would occur in riparian vegetation communities (Table 3-60).

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT BAX-B would be in conformance with standards, guidelines, and management objectives pertaining to vegetation resources contained in the applicable USFS LRMPs. The results of this evaluation are contained in the Administrative Record. The evaluation found that Alternative COUT BAX-B could be approved in compliance with standards, guidelines, and management objectives pertaining to vegetation resources contained in applicable USFS LRMPs (USFS 2015a).

Alternative COUT BAX-C

Affected Environment and Environmental Consequences (Colorado)

The affected environment and environmental consequences of Alternative COUT BAX-C in Colorado would be the same as those for Alternative COUT BAX-B in Colorado.

Affected Environment (Utah)

Alternative COUT BAX-C in Utah is in the Colorado Plateaus, Wasatch and Uinta Mountains, and Central Basin and Range ecoregions. This alternative route predominantly crosses shrub/shrub steppe but also large areas of barren/sparsely vegetated, big sagebrush, and pinyon-juniper vegetation communities.

Smaller areas of agriculture, alpine, aspen, developed/disturbed, grassland, invasive, montane forest, mountain shrub, riparian, and water vegetation communities also are crossed by this alternative route (Table 3-57 and MV-7b).

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative COUT BAX-C in Utah after application of selective mitigation measures is shown in Table 3-58. Impacts are primarily low-moderate due to the predominance of shrub/shrub steppe and pinyon-juniper vegetation communities crossed by this alternative route (Tables 3-57 and 3-58; refer to Table 3-52 for residual impacts by vegetation community). Moderate impacts would occur where this alternative route crosses big sagebrush, water, alpine, aspen, barren/sparsely vegetated, grassland, montane forest, and mountain shrub vegetation communities. Moderate-high impacts would occur where this alternative route crosses riparian vegetation communities.

Results of Additional Analysis of Potential Impacts

Alternative COUT BAX-C in Utah would result in permanent loss of vegetative cover due to access road and transmission line construction. These losses would occur predominantly in agriculture, aspen, barren/sparsely vegetated, big sagebrush, grassland, montane forest, mountain shrub, pinyon-juniper, and shrub/shrub steppe vegetation communities with smaller areas in alpine, developed/disturbed invasive riparian, and water vegetation communities (Table 3-59).

Vegetation clearing would occur primarily in the aspen, montane forest, mountain shrub, and pinyon-juniper vegetation communities and a lesser extent would occur in riparian vegetation communities (Table 3-60).

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT BAX-C would be in conformance with standards, guidelines, and management objectives pertaining to vegetation resources contained in the applicable USFS LRMPs. The results of this evaluation are contained in the Administrative Record. The evaluation found that Alternative COUT BAX-C could be approved in compliance with standards, guidelines, and management objectives pertaining to vegetation resources contained in applicable USFS LRMPs (USFS 2015a).

Alternative COUT BAX-E

Affected Environment and Environmental Consequences (Colorado)

The affected environment and environmental consequences of Alternative COUT BAX-E in Colorado would be the same as those for Alternative COUT BAX-B in Colorado.

Affected Environment (Utah)

Alternative COUT BAX-E in Utah is in the Colorado Plateaus, Wasatch and Uinta Mountains, and Central Basin and Range ecoregions. This alternative route predominantly crosses shrub/shrub steppe, but also large areas of barren/sparsely vegetated, big sagebrush, and pinyon-juniper vegetation communities. Small areas of agriculture alpine, aspen, developed/disturbed, grassland, invasive, montane forest, mountain shrub, riparian, and water vegetation communities also are crossed (Table 3-57 and MV-7b).

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative COUT BAX-E in Utah after application of selective mitigation measures is shown in Table 3-58. Impacts are primarily low-moderate due to the predominance of shrub/shrub steppe and pinyon-juniper vegetation communities crossed by this alternative route (Tables 3-57 and 3-58; refer to Table 3-52 for residual impacts by vegetation community). Moderate impacts would occur where this alternative route crosses big sagebrush, water, alpine, aspen, barren/sparsely vegetated, grassland, montane forest, and mountain shrub vegetation communities. Moderate-high impacts would occur where this alternative route crosses riparian vegetation communities.

Results of Additional Analysis of Potential Impacts

Alternative COUT BAX-E in Utah would result in permanent loss of vegetative cover due to access road and transmission line construction. These losses would occur predominantly in agriculture, aspen, barren/sparsely vegetated, big sagebrush, mountain shrub, pinyon-juniper, and shrub/shrub steppe vegetation communities with smaller areas of loss alpine, developed/disturbed, grassland, invasive, montane forest, riparian, and water vegetation communities (Table 3-59).

Vegetation clearing would occur primarily in the aspen, mountain shrub, and pinyon-juniper vegetation communities and a lesser extent would occur in montane forest and riparian vegetation communities (Table 3-60).

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT BAX-E would be in conformance with standards, guidelines, and management objectives pertaining to vegetation resources contained in the applicable USFS LRMPs. The results of this evaluation are contained in the Administrative Record. The evaluation found that Alternative COUT BAX-E could be approved in compliance with standards, guidelines, and management objectives pertaining to vegetation resources contained in applicable USFS LRMPs (USFS 2015a).

Colorado to Utah – U.S. Highway 40 to Central Utah to Clover (COUT)

Environmental Setting

The COUT alternative routes are from U.S. Highway 40 in Colorado to Clover, Utah, by way of the Uinta Basin (Map 2-3b). The alternative routes are predominantly in the Colorado Plateaus Ecoregion but cross into the Wasatch and Uinta Mountains and Central Basin and Range ecoregions as it approaches Mona, Utah.

Alternative COUT-A

Affected Environment (Colorado)

Alternative COUT-A in Colorado is entirely in the Colorado Plateaus Ecoregion and predominantly crosses big sagebrush communities (Table 3-61 and MV-7b). Smaller areas of developed/disturbed, invasive, pinyon-juniper, and shrub steppe vegetation communities also are crossed by these alternative routes.

TABLE 3-61
ALTERNATIVE ROUTE COMPARISON
FOR VEGETATION RESOURCES INVENTORY DATA
FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTE

Alternative Route	Total Miles	Vegetation Community (miles crossed)														
		Agriculture	Alpine	Aspen	Barren/Sparsely Vegetated	Big Sagebrush	Developed/Disturbed	Grassland	Invasive	Montane Forest	Mountain Shrub	Pinyon-Juniper	Shrub/Shrub Steppe	Riparian	Water	Wetland
COUT-A	207.9	21.2	0.6	6.7	5.0	83.2	1.9	0.7	7.8	3.0	17.7	27.5	26.2	3.4	0.3	2.7
Colorado	*24.3*	*0.0*	*0.0*	*0.0*	*0.0*	*16.5*	*0.1*	*0.0*	*3.4*	*0.0*	*0.0*	*0.2*	*4.1*	*0.0*	*0.0*	*0.0*
Utah	*183.6*	*21.2*	*0.6*	*6.7*	*5.0*	*66.7*	*1.8*	*0.7*	*4.4*	*3.0*	*17.7*	*27.3*	*22.1*	*3.4*	*0.3*	*2.7*
COUT-B	218.2	16.6	1.5	4.1	7.3	81.1	1.0	3.4	8.2	3.5	20.8	34.4	30.2	2.6	0.4	3.1
Colorado	*24.3*	*0.0*	*0.0*	*0.0*	*0.0*	*16.5*	*0.1*	*0.0*	*3.4*	*0.0*	*0.0*	*0.2*	*4.1*	*0.0*	*0.0*	*0.0*
Utah	*193.9*	*16.6*	*1.5*	*4.1*	*7.3*	*64.6*	*0.9*	*3.4*	*4.8*	*3.5*	*20.8*	*34.2*	*26.1*	*2.6*	*0.4*	*3.1*
COUT-C (Agency and Applicant Preferred Alternative)	208.2	6.1	0.2	11.0	9.9	61.1	1.3	4.4	6.2	3.5	22.2	35.5	45.7	0.7	0.3	0.1
Colorado	*25.0*	*0.0*	*0.0*	*0.0*	*0.0*	*18.3*	*0.3*	*0.0*	*2.1*	*0.0*	*0.0*	*0.2*	*4.1*	*0.0*	*0.0*	*0.0*
Utah	*183.2*	*6.1*	*0.2*	*11.0*	*9.9*	*42.8*	*1.0*	*4.4*	*4.1*	*3.5*	*22.2*	*35.3*	*41.6*	*0.7*	*0.3*	*0.1*
COUT-H	200.6	8.6	0.7	16.0	9.5	57.2	1.5	4.5	6.2	6.4	12.0	30.8	46.1	0.5	0.5	0.1
Colorado	*25.0*	*0.0*	*0.0*	*0.0*	*0.0*	*18.3*	*0.3*	*0.0*	*2.1*	*0.0*	*0.0*	*0.2*	*4.1*	*0.0*	*0.0*	*0.0*
Utah	*175.6*	*8.6*	*0.7*	*16.0*	*9.5*	*38.9*	*1.2*	*4.5*	*4.1*	*6.4*	*12.0*	*30.6*	*42.0*	*0.5*	*0.5*	*0.1*
COUT-I	240.2	9.6	1.8	13.9	10.8	63.1	6.4	5.9	6.4	9.4	9.9	33.6	68.5	0.5	0.3	0.1
Colorado	*25.0*	*0.0*	*0.0*	*0.0*	*0.0*	*18.3*	*0.3*	*0.0*	*2.1*	*0.0*	*0.0*	*0.2*	*4.1*	*0.0*	*0.0*	*0.0*
Utah	*215.2*	*9.6*	*1.8*	*13.9*	*10.8*	*44.8*	*6.1*	*5.9*	*4.3*	*9.4*	*9.9*	*33.4*	*64.4*	*0.5*	*0.3*	*0.1*

Environmental Consequences (Colorado)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative COUT-A in Colorado after application of selective mitigation measures is shown in Table 3-62. Impacts are primarily moderate due to the predominance of big sagebrush vegetation communities crossed by this alternative route (Tables 3-61 and 3-62; refer to Table 3-52 for residual impacts by vegetation community). Moderate impacts also would occur where this alternative route crosses barren/sparsely vegetated vegetation communities. Low-moderate impacts would occur where this alternative crosses shrub/shrub steppe and pinyon juniper vegetation communities. Moderate-high impacts would occur where this alternative route crosses riparian vegetation communities.

TABLE 3-62 ALTERNATIVE ROUTE COMPARISON FOR VEGETATION RESOURCES RESIDUAL IMPACTS FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES					
		Residual Impacts (miles crossed)			
Alternative Route	**Total Miles**	**Low**	**Low-Moderate**	**Moderate**	**Moderate-High**
COUT-A	207.9	30.9	53.7	119.9	3.4
Colorado	*24.3*	*3.5*	*4.3*	*16.5*	*0.0*
Utah	*183.6*	*27.4*	*49.4*	*103.4*	*3.4*
COUT-B	218.2	25.8	64.6	125.2	2.6
Colorado	*24.3*	*3.5*	*4.3*	*16.5*	*0.0*
Utah	*193.9*	*22.3*	*60.3*	*108.7*	*2.6*
COUT-C (Agency and Applicant Preferred Alternative)	208.2	13.6	81.2	112.7	0.7
Colorado	*25.0*	*2.4*	*4.3*	*18.3*	*0.7*
Utah	*183.2*	*11.2*	*76.9*	*94.4*	*0.7*
COUT-H	200.6	16.3	76.9	106.9	0.5
Colorado	*25.0*	*2.4*	*4.3*	*18.3*	*0.0*
Utah	*175.6*	*13.9*	*72.6*	*88.6*	*0.5*
COUT-I	240.2	22.4	102.1	115.2	0.5
Colorado	*25.0*	*2.4*	*4.3*	*18.3*	*0.0*
Utah	*215.2*	*20.0*	*97.8*	*96.9*	*0.5*

Results of Additional Analysis of Potential Impacts

Alternative COUT-A in Colorado would result in permanent loss of vegetative cover due to access road and transmission line construction. These losses would occur predominantly in big sagebrush vegetation communities, smaller areas of loss in developed/disturbed, invasive, pinyon-juniper, and shrub/shrub steppe vegetation communities (Table 3-63).

TABLE 3-63 LONG-TERM SURFACE DISTURBANCE FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES															
	Vegetation Community Disturbed (acres)														
Alternative Route	**Agriculture**	**Alpine**	**Aspen**	**Barren/Sparsely Vegetated**	**Big Sagebrush**	**Developed/Disturbed**	**Grassland**	**Invasive**	**Montane Forest**	**Mountain Shrub**	**Pinyon-Juniper**	**Shrub/Shrub Steppe**	**Riparian**	**Water**	**Wetland**
COUT-A	376	11	119	89	1,476	34	12	138	53	314	488	465	60	5	48
Colorado	*0*	*0*	*0*	*0*	*293*	*2*	*0*	*60*	*0*	*0*	*4*	*73*	*0*	*0*	*0*
Utah	*376*	*11*	*119*	*89*	*1,183*	*32*	*12*	*78*	*53*	*314*	*484*	*392*	*60*	*5*	*48*
COUT-B	288	26	71	126	1,405	18	59	142	61	360	596	523	45	7	54
Colorado	*0*	*0*	*0*	*0*	*286*	*2*	*0*	*59*	*0*	*0*	*3*	*71*	*0*	*0*	*0*
Utah	*288*	*26*	*71*	*126*	*1,119*	*16*	*59*	*83*	*61*	*360*	*593*	*452*	*45*	*7*	*54*

TABLE 3-63
LONG-TERM SURFACE DISTURBANCE FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES

Alternative Route	Vegetation Community Disturbed (acres)														
	Agriculture	Alpine	Aspen	Barren/Sparsely Vegetated	Big Sagebrush	Developed/Disturbed	Grassland	Invasive	Montane Forest	Mountain Shrub	Pinyon-Juniper	Shrub/Shrub Steppe	Riparian	Water	Wetland
COUT-C (Agency and Applicant Preferred Alternative)	114	4	205	184	1,138	24	82	116	65	414	661	851	13	6	2
Colorado	*0*	*0*	*0*	*0*	*341*	*6*	*0*	*39*	*0*	*0*	*4*	*76*	*0*	*0*	*0*
Utah	*114*	*4*	*205*	*184*	*797*	*19*	*82*	*76*	*65*	*414*	*658*	*775*	*13*	*6*	*2*
COUT-H	156	13	289	172	1,035	27	81	112	116	217	558	834	9	9	2
Colorado	*0*	*0*	*0*	*0*	*331*	*5*	*0*	*38*	*0*	*0*	*4*	*74*	*0*	*0*	*0*
Utah	*156*	*13*	*289*	*172*	*704*	*22*	*81*	*74*	*116*	*217*	*554*	*760*	*9*	*9*	*2*
COUT-I	171	32	248	192	1,124	114	105	114	167	176	599	1,220	9	5	2
Colorado	*0*	*0*	*0*	*0*	*326*	*5*	*0*	*37*	*0*	*0*	*4*	*73*	*0*	*0*	*0*
Utah	*171*	*32*	*248*	*192*	*798*	*109*	*105*	*77*	*167*	*176*	*595*	*1,147*	*9*	*5*	*2*

NOTE: Acres in the table are rounded and, therefore, columns may not sum exactly.

Vegetation clearing for Alternative COUT-A would occur in pinyon-juniper vegetation communities (Table 3-64).

TABLE 3-64
AREA OF VEGETATION CLEARING FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES

Alternative Route	Total Vegetation Clearing (acres)	Vegetation Clearing (acres)				
		Aspen	Montane Forest	Mountain Shrub	Pinyon-Juniper	Riparian
COUT-A	1,855	213	95	563	875	108
Colorado	*6*	*0*	*0*	*0*	*6*	*0*
Utah	*1,849*	*213*	*95*	*563*	*869*	*108*
COUT-B	2,081	130	111	662	1,095	83
Colorado	*6*	*0*	*0*	*0*	*6*	*0*
Utah	*2,075*	*130*	*111*	*662*	*1,088*	*83*
COUT-C (Agency and Applicant Preferred Alternative)	2,320	350	111	706	1,130	22
Colorado	*6*	*0*	*0*	*0*	*6*	*0*
Utah	*2,313*	*350*	*111*	*706*	*1,123*	*22*
COUT-H	2,091	509	204	382	980	16
Colorado	*6*	*0*	*0*	*0*	*6*	*0*
Utah	*2,084*	*509*	*204*	*382*	*974*	*16*

TABLE 3-64 AREA OF VEGETATION CLEARING FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES						
		Vegetation Clearing (acres)				
Alternative Route	**Total Vegetation Clearing (acres)**	**Aspen**	**Montane Forest**	**Mountain Shrub**	**Pinyon-Juniper**	**Riparian**
COUT-I	2,141	442	299	315	1,069	16
Colorado	*6*	*0*	*0*	*0*	*6*	*0*
Utah	*2,135*	*442*	*299*	*315*	*1,063*	*16*
NOTE: Acres in the table are rounded and, therefore, columns and rows may not sum exactly.						

Affected Environment (Utah)

Alternative COUT-A in Utah are in the Colorado Plateaus, Wasatch and Uinta Mountains, and Central Basin and Range ecoregions and predominantly cross agriculture, big sagebrush, mountain shrub, pinyon-juniper, and shrub steppe vegetation communities. Smaller areas of alpine, aspen, barren/sparsely vegetated, developed/disturbed, grassland, invasive, montane forest, riparian, water, and wetland vegetation communities also are crossed by this alternative route (Table 3-61 and MV-7b).

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative COUT-A in Utah after application of selective mitigation measures is shown in Table 3-62. Impacts are primarily moderate due to the predominance of big sagebrush vegetation communities crossed by this alternative route (Tables 3-61 and 3-62; refer to Table 3-52 for residual impacts by vegetation community). Moderate impacts also would occur where this alternative route crosses water, alpine, aspen, barren/sparsely vegetated, grassland, montane forest, and mountain shrub vegetation communities. Low-moderate impacts would occur where this alternative crosses shrub/shrub steppe and pinyon juniper vegetation communities. Moderate-high impacts would occur where this alternative route crosses riparian and wetland vegetation.

Results of Additional Analysis of Potential Impacts

Alternative COUT-A in Utah would result in permanent loss of vegetative cover due to access road and transmission line construction. Total permanent loss of vegetative cover is shown in Table 3-63. These losses would occur predominantly in agriculture, aspen, big sagebrush, mountain shrub, pinyon-juniper, and shrub/shrub steppe vegetation communities with smaller areas of loss in alpine, barren/sparsely vegetated, developed/disturbed, grassland, invasive, montane forest, riparian, water, and wetland vegetation communities.

Vegetation clearing would occur in aspen, montane forest, mountain shrub, pinyon-juniper, and riparian vegetation communities (Table 3-64).

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT-A would be in conformance with standards, guidelines, and management objectives pertaining to vegetation resources contained in the applicable USFS LRMPs. The results of this evaluation are contained in the Administrative Record. The evaluation found that Alternative COUT-A could be approved in compliance with standards, guidelines, and management objectives pertaining to vegetation resources contained in applicable USFS LRMPs (USFS 2015a).

Alternative COUT-B

Affected Environment and Environmental Consequences (Colorado)

The affected environment and environmental consequences of Alternative COUT-B in Colorado would be the same as those for Alternative COUT-A in Colorado.

Affected Environment (Utah)

Alternative COUT-B in Utah is in the Colorado Plateaus, Wasatch and Uinta Mountains, and Central Basin and Range ecoregions and predominantly crosses agriculture, big sagebrush, mountain shrub, pinyon-juniper, and shrub/steppe communities (Table 3-61 and MV-7b). Smaller areas of, alpine, aspen, barren/sparsely vegetated, developed/disturbed, grassland, invasive, montane forest, riparian, water, and wetland vegetation communities also are crossed by this alternative route.

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative COUT-B in Utah after application of selective mitigation measures is shown in Table 3-62. Impacts are primarily moderate due to the predominance of big sagebrush vegetation communities crossed by this alternative route (Tables 3-61 and 3-62; refer to Table 3-52 for residual impacts by vegetation community). Moderate impacts also would occur where this alternative route crosses water, alpine, aspen, barren/sparsely vegetated, grassland, montane forest, and mountain shrub vegetation communities. Low-moderate impacts would occur where this alternative crosses shrub/shrub steppe and pinyon juniper vegetation communities. Moderate-high impacts would occur where this alternative route crosses riparian and wetland vegetation communities.

Results of Additional Analysis of Potential Impacts

Alternative COUT-B in Utah would result in permanent loss of vegetative cover due to access road and transmission line construction. Total permanent loss of vegetative cover is shown in Table 3-63. These losses would occur predominantly in agriculture, big sagebrush, mountain shrub, pinyon-juniper, and shrub/shrub steppe vegetation communities with smaller areas of vegetative cover loss occurring in alpine, aspen, barren/sparsely vegetated, developed/disturbed, grassland, invasive, montane forest, riparian, water, and wetland vegetation communities.

Results of Additional Analysis of Potential Impacts

Alternative COUT-B in Utah would result in permanent loss of vegetative cover due to access road and transmission line construction. Total permanent loss of vegetative cover is shown in Table 3-63. These losses would occur predominantly in agriculture, big sagebrush, mountain shrub, pinyon-juniper, and shrub/shrub steppe vegetation communities with smaller areas of vegetative cover loss occurring in alpine, aspen, barren/sparsely vegetated, developed/disturbed, grassland, invasive, montane forest, riparian, water, and wetland vegetation communities.

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT-B would be in conformance with standards, guidelines, and management objectives pertaining to vegetation resources contained in the applicable USFS LRMPs. The results of this evaluation are contained in the Administrative Record. The evaluation found that Alternative COUT-B could be approved in compliance with standards, guidelines,

and management objectives pertaining to vegetation resources contained in applicable USFS LRMPs (USFS 2015a).

Alternative COUT-C (Agency and Applicant Preferred Alternative)

Affected Environment (Colorado)

Alternative COUT-C in Colorado is entirely in the Colorado Plateaus Ecoregion and predominantly crosses big sagebrush communities (Table 3-61 and MV-7b). Smaller areas of developed/disturbed, invasive, pinyon-juniper, and shrub steppe vegetation communities are crossed by this alternative route in Colorado.

Environmental Consequences (Colorado)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative COUT-C in Colorado after application of selective mitigation measures is shown in Table 3-62. Impacts are primarily moderate due to the predominance of big sagebrush vegetation communities crossed by this alternative route (Tables 3-61 and 3-62; refer to Table 3-52 for residual impacts by vegetation community). Moderate impacts also would occur where this alternative route crosses barren/sparsely vegetated vegetation communities. Low-moderate impacts would occur where this alternative crosses shrub/shrub steppe and pinyon juniper vegetation communities.

Results of Additional Analysis of Potential Impacts

Alternative COUT-C in Colorado would result in permanent loss of vegetative cover due to access road and transmission line construction. These losses would occur predominantly in big sagebrush vegetation communities with smaller areas of loss occurring in developed/disturbed, invasive, pinyon-juniper, and shrub/shrub steppe vegetation communities (Table 3-63).

Vegetation clearing would occur in pinyon-juniper vegetation communities (Table 3-64).

Affected Environment (Utah)

Alternative COUT-C in Utah is in the Colorado Plateaus, Wasatch and Uinta Mountains, and Central Basin and Range ecoregions and predominantly crosses big sagebrush, mountain shrub, pinyon-juniper, and shrub steppe vegetation communities (Table 3-61 and MV-7b). Smaller areas of agriculture, alpine, aspen, barren/sparsely vegetated, developed/disturbed, grassland, invasive, montane forest, riparian, water, and wetland vegetation communities also are crossed by this alternative route.

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative COUT-C in Utah after application of selective mitigation measures is shown in Table 3-62. Impacts are primarily moderate due to the predominance of big sagebrush vegetation communities crossed by this alternative route (Tables 3-61 and 3-62; refer to Table 3-52 for residual impacts by vegetation community). Moderate impacts also would occur where this alternative route crosses water, alpine, aspen, barren/sparsely vegetated, grassland, montane forest, and mountain shrub vegetation communities. Low-moderate impacts would occur where this alternative crosses shrub/shrub steppe and pinyon juniper vegetation communities. Moderate-high impacts would occur where this alternative route crosses riparian and wetland vegetation communities.

Results of Additional Analysis of Potential Impacts

Alternative COUT-C in Utah would result in permanent loss of vegetative cover due to access road and transmission line construction. Total permanent loss of vegetative cover is shown in Table 3-63. These losses would occur predominantly in big sagebrush, mountain shrub, pinyon-juniper, and shrub/shrub steppe vegetation communities with smaller areas of vegetative cover loss occurring in agriculture, alpine, aspen, barren/sparsely vegetated, developed/disturbed, grassland, invasive, montane forest, riparian, water, and wetland vegetation communities.

Vegetation clearing would occur in Utah in aspen, montane forest, mountain shrub, pinyon-juniper, and riparian vegetation communities (Table 3-64).

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT-C would be in conformance with standards, guidelines, and management objectives pertaining to vegetation resources contained in the applicable USFS LRMPs. The results of this evaluation are contained in the Administrative Record. The evaluation found that Alternative COUT-C could be approved in compliance with standards, guidelines, and management objectives pertaining to vegetation resources contained in applicable USFS LRMPs (USFS 2015a).

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

The 345kV Bears Ears to Bonanza transmission line components that would be relocated cross pinyon-juniper woodlands, big sagebrush, and shrub/shrub steppe.

Based on the impact assessment criteria used for the EIS, impacts from relocating the transmission line components on vegetation would be low or moderate. The types of impacts associated with relocating the transmission line would be similar to the effects of construction of the 500kV transmission line. The types of potential effects that may occur are described in Section 3.2.5.4.2.

Alternative COUT-H

Affected Environment and Environmental Consequences (Colorado)

The affected environment and environmental consequences for Alternative H in Colorado are the same as for Alternative COUT-C as the routing of these alternative routes does not differ (Tables 3-62 to 3-64).

Affected Environment (Utah)

Alternative COUT-H in Utah is in the Colorado Plateaus, Wasatch and Uinta Mountains, and Central Basin and Range ecoregions and predominantly crosses aspen, big sagebrush, mountain shrub, pinyon-juniper, and shrub steppe vegetation communities (Table 3-61 and MV-7b). Smaller areas of agriculture, alpine, barren/sparsely vegetated, developed/disturbed, grassland, invasive, montane forest, riparian, water, and wetland vegetation communities also are crossed by this alternative route.

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative COUT-H in Utah after application of selective mitigation measures is shown in Table 3-62. Impacts are primarily moderate due to the predominance of big sagebrush vegetation communities crossed by this alternative route (Tables 3-61 and 3-62; refer to Table 3-52 for residual impacts by vegetation community). Moderate

impacts also would occur where this alternative route crosses water, alpine, aspen, barren/sparsely vegetated, grassland, montane forest, and mountain shrub vegetation communities. Low-moderate impacts would occur where this alternative crosses shrub/shrub steppe and pinyon juniper vegetation communities. Moderate-high impacts would occur where this alternative route crosses riparian and wetland vegetation.

Results of Additional Analysis of Potential Impacts

Alternative COUT-H in Utah would result in permanent loss of vegetative cover due to access road and transmission line construction. Total permanent loss of vegetative cover is shown in Table 3-63. These losses would occur predominantly in aspen, big sagebrush, mountain shrub, pinyon-juniper, and shrub/shrub steppe vegetation communities with smaller areas of vegetative cover loss occurring in agriculture, alpine, barren/sparsely vegetated, developed/disturbed, grassland, invasive, montane forest, riparian, water, and wetland vegetation communities.

Vegetation clearing would occur primarily in aspen, montane forest, mountain shrub, pinyon-juniper, and riparian vegetation communities (Table 3-64).

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT-H would be in conformance with standards, guidelines, and management objectives pertaining to vegetation resources contained in the applicable USFS LRMPs. The results of this evaluation are contained in the Administrative Record. The evaluation found that Alternative COUT-H could be approved in compliance with standards, guidelines, and management objectives pertaining to vegetation resources contained in applicable USFS LRMPs (USFS 2015a).

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

Impacts on vegetation from the 345kV Bears Ears to Bonanza transmission line relocation would be the same as Alternative COUT-C.

Alternative COUT-I

Affected Environment and Environmental Consequences Colorado

The affected environment and environmental consequences for Alternative I in Colorado are the same as for Alternative COUT-C as the routing of these alternative routes does not differ (Tables 3-62 to 3-64.

Affected Environment (Utah)

Alternative COUT-I in Utah is in the Colorado Plateaus, Wasatch and Uinta Mountains, and Central Basin and Range ecoregions and predominantly crosses aspen, barren/sparsely vegetated, big sagebrush, pinyon-juniper, and shrub steppe vegetation communities (Table 3-61 and MV-7b). Smaller areas of agriculture, alpine, developed/disturbed, grassland, invasive, montane forest, mountain shrub, riparian, water, and wetland vegetation communities also are crossed by this alternative route.

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The extent of potential residual impacts on vegetation communities crossed by Alternative COUT-I in Utah after application of selective mitigation measures is shown in Table 3-62. Impacts are similarly low-moderate to moderate due to the predominance of big sagebrush, shrub/shrub steppe, and pinyon-juniper

vegetation communities crossed by this alternative route (Tables 3-61 and 3-62; refer to Table 3-52 for residual impacts by vegetation community). Moderate impacts would occur where this alternative route crosses water, alpine, aspen, barren/sparsely vegetated, grassland, montane forest, and mountain shrub vegetation communities. Moderate-high impacts would occur where this alternative route crosses riparian and wetland vegetation communities.

Results of Additional Analysis of Potential Impacts

Alternative COUT-I in Utah would result in permanent loss of vegetative cover due to access road and transmission line construction. Total permanent loss of vegetative cover is shown in Table 3-63. These losses would occur predominantly in agriculture, aspen, barren/sparsely vegetated, big sagebrush, montane forest, mountain shrub, pinyon-juniper, and shrub/shrub steppe vegetation communities with smaller areas of vegetative cover loss occurring, alpine, developed/disturbed, grassland, invasive, riparian, water, and wetland vegetation communities.

Vegetation clearing would occur primarily in aspen, montane forest, mountain shrub, pinyon-juniper, and riparian vegetation communities (Table 3-64).

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT-I would be in conformance with standards, guidelines, and management objectives pertaining to vegetation resources contained in the applicable USFS LRMPs. The results of this evaluation are contained in the Administrative Record. The evaluation found that Alternative COUT-I could be approved in compliance with standards, guidelines, and management objectives pertaining to vegetation resources contained in applicable USFS LRMPs (USFS 2015a).

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

Impacts on vegetation from the 345kV Bears Ears to Bonanza transmission line relocation would be the same as Alternative COUT-C.

3.2.5.5.5 Series Compensation Stations for the 500-kilovolt Transmission Line

Alternative WYCO-B (Agency and Applicant Preferred Alternative)

Siting Area A – Powder Wash

Affected Environment

Siting Area A (MV-7a and MV-7b) would be located on the Wyoming/Colorado state line in predominately in sagebrush, grassland, and pinyon-juniper vegetation communities. Small areas of riparian vegetation communities occur within the siting area.

Environmental Consequences

The estimated area of disturbance (in acres) to vegetation communities from the Powder Wash series compensation station is included in the disturbance analysis for Alternative WYCO-B (Table 3-55). Application of Design Feature 3 would require locating the compensation station outside of sensitive riparian communities.

Siting Area B – Nine Mile Basin

Affected Environment

Siting Area B (MV-7a and MV-7b) would be located where Alternative WYCO-B diverges in Nine Mile Basin in Colorado. The Siting Area would be located in sagebrush, grassland, and pinyon-juniper vegetation communities.

Environmental Consequences

The estimated area of disturbance (in acres) to vegetation communities from the Nine Mile Basin series compensation station is included in the disturbance analysis for Alternative WYCO-B (Table 3-55).

Siting Area C – Maybell

Affected Environment

Siting Area C (MV-7a and MV-7b) would be located where Alternative WYCO-B diverges near U.S. Highway 40 in Moffat County, Colorado. Vegetation communities in this area are predominantly riparian, agricultural, big sagebrush, shrub/shrub steppe, barren/sparsely vegetated, grassland, and pinyon-juniper.

Environmental Consequences

The estimated area of disturbance (in acres) to vegetation communities from the Maybell series compensation station is included in the disturbance analysis for Alternative WYCO-B (Table 3-55). Application of Design Feature 3 would require locating the compensation station outside of sensitive riparian communities.

Alternative WYCO-C

Siting Area A – Powder Wash

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area A as Alternative.

Siting Area B – Nine Mile Basin

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area B as Alternative WYCO-B.

Siting Area C – Maybell

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area C as Alternative WYCO-B.

Alternative WYCO-D

Siting Area D – Bell Rock

Affected Environment

Siting Area D (MV-7a and MV-7b) would be located just south of U.S. Highway 40, west of Craig, Colorado. This area is dominated by sagebrush, shrub/shrub steppe and pinyon-juniper vegetation communities.

Environmental Consequences

The estimated area of disturbance (in acres) to vegetation communities from the Bell Rock series compensation station is included in the disturbance analysis for Alternative WYCO-B (Table 3-55).

Alternative WYCO-F

Siting Area A – Powder Wash

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area A as Alternative WYCO-B.

Siting Area B – Nine Mile Basin

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area B as Alternative WYCO-B.

Siting Area C – Maybell

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area C as Alternative WYCO-B.

Alternatives COUT BAX-B, COUT BAX-C, and COUT BAX-E

Siting Area G – Green River

Affected Environment

Siting Area G (MV-7a and MV-7b) would be located in an area previously disturbed by the I-70 corridor and U.S. Highway 6, approximately 5 miles west of the Green River. Vegetation communities are predominantly barren/sparsely vegetated, shrub/shrub steppe, and pinyon juniper.

Environmental Consequences

The estimated area of disturbance (in acres) to vegetation communities from the Green River series compensation station is included in the disturbance analysis for Alternatives COUT BAX-B, COUT BAX-C, and COUT BAX-E (Table 3-59).

Alternative COUT-A

Siting Area F – Roosevelt

Affected Environment

Siting Area F (MV-7b) would be located in an area previously disturbed by agriculture and U.S. Highway 40 in the vicinity of Roosevelt. Vegetation communities are predominantly agricultural land, barren, sage-brush and shrub/shrub steppe vegetation communities.

Environmental Consequences

The estimated area of disturbance (in acres) to vegetation communities from the Roosevelt series compensation station is included in the disturbance analysis for Alternative COUT-A (Table 3-63).

Alternative COUT-B

Siting Area F – Roosevelt

Affected Environment and Environmental Consequences

Alternative COUT-B would have the same affected environment and environmental consequences for Siting Area F as Alternative COUT-A.

Alternative COUT-C (Agency and Applicant Preferred Alternative)

Siting Area E – Bonanza

Affected Environment

Siting Area E (MV-7b) would be located in an area previously disturbed by oil and gas development, and the Bonanza Power Plant. Vegetation communities are predominantly big sagebrush, shrub/shrub steppe, and barren/sparsely vegetated ground.

Environmental Consequences

The estimated area of disturbance (in acres) to vegetation communities from the Bonanza series compensation station is included in the disturbance analysis for Alternative COUT-C (Table 3-63).

Alternatives COUT-H and COUT-I

Siting Area E – Bonanza

Affected Environment and Environmental Consequences

Alternatives COUT-H and COUT-I have the same affected environment and environmental consequences for Siting Area E as Alternative COUT-C.

3.2.6 Special Status Plants

3.2.6.1 Introduction and Regulatory Framework

Special status plant species are those federally listed as endangered, threatened, and candidates for protection, or proposed for protection under the ESA or those considered sensitive by either the BLM or USFS. This section addresses potential impacts on special status plants that could result from construction, operation, and maintenance of the Project.

3.2.6.1.1 Regulatory Framework

Regulations that address and govern impacts on special status plant resources include the ESA, BLM and USFS handbooks and manuals, and various BLM and USFS land-management plans. Implementation of the Project would be consistent with statutes, regulations, plans, programs, and policies of affiliated tribes, federal agencies, and state and local governments. Relevant regulations for special status plant resources are presented in this section.

Federal

- The ESA of 1973, as amended (16 U.S.C. 1531 et seq.), protects and recovers imperiled species and the ecosystems on which they depend. The ESA requires federal agencies, in consultation with the FWS, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The ESA also prohibits the take of any listed species.
- BLM Special Status Species Management Policy Manual 6840 (6840 Policy) (Rel. 6-125) provides management direction 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.
- BLM RMPs and Management Framework Plans for Wyoming, including Rawlins Field Office (2008); for Colorado, including White River (1997, as amended), Little Snake (2011), and Grand Junction (2015) Field Offices; for Utah, including Richfield (2008), Fillmore (1987), Moab (2008), Price (2008) and Vernal (2008) Field Offices, and Salt Lake District (1990) specify regulations and goals for management of BLM-administered lands and set restrictions to protect special status plants and the habitats on which they depend.
- 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." Additionally, as stated in Manual 2670, it is USFS policy "to develop and implement management practices to ensure that species do not become threatened or endangered because of USFS actions; maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands; and develop and implement management objectives for populations and/or habitat of sensitive species."
- USFS Invasive Species Management Manual 2900 sets forth National Forest System policy, responsibilities, and direction for the prevention, detection, control, and restoration of effects from aquatic and terrestrial invasive species (including vertebrates, invertebrates, plants, and pathogens).
- LRMPs for the Ashley (1986, as amended), Manti-La Sal (1986, as amended), and Uinta (2003, as amended) National Forests identify goals for forest health and constraints on resource uses to meet these goals.

- The Platte River Recovery Implementation Program was implemented in 1997 through a cooperative agreement between the USDI and States of Colorado, Nebraska, and Wyoming (Platte River Recovery Program 2008). The long-term goal of the program is to improve and maintain habitats for target species and other ESA-listed species that occur in the lower Platte River, including the western prairie fringed orchid (Platte River Recovery Program 2008).
- NPS Organic Act, passed in 1916 (16 U.S.C. 1), established the NPS as an agency under the direction of the Secretary of the Interior with the stated purpose of promoting use of national park lands while protecting them from impairment. Specifically, the Act declares that the NPS has a dual mission, both to conserve park resources and provide for their use and enjoyment "in such a manner and by such means as will leave them unimpaired" for future generations (16 U.S.C. 1).
- NPS Management Policies 2006 sets the framework and provides direction for all management decisions relating to national park lands. This document states the NPS "will use all available authorities to protect lands and resources within units of the national park system." NPS personnel are required to be knowledgeable about and adhere to laws, regulations, and policies pertinent to NPS management included in this document.
- NPS Director's Order 12 (DO-12 and Handbook; 66 FR 7507) describes the NEPA process and describes the responsibility of the NPS regarding participation in or coordination of NEPA procedures for actions occurring on NPS land. This order outlines the NPS's requirement of affirmatively stating whether or not impairment [as defined by the Organic Act and the 2006 Management Policies document] to park resources would result from a proposed action and provides guidelines for assessing intensity of impacts.

3.2.6.2 Issues Identified for Analysis

Issues related to potential effects of the Project on special status plant resources, identified during scoping and in coordination with agency personnel, are listed in Table 3-65.

TABLE 3-65
SPECIAL STATUS PLANT ISSUES IDENTIFIED FOR ANALYSIS

Issue Identified	Analysis Considerations
Potential impacts on federally listed threatened, endangered, proposed, and candidate plant species, including: ▪ Direct loss of individuals and/or habitat due to vegetation removal and soil disturbance ▪ Decreased habitat connectivity resulting in reduced pollinator movement and gene flow between populations ▪ Increased soil erosion and alterations to runoff patterns in habitat ▪ Reduced attractiveness of disturbed areas to pollinator species ▪ Herbicide drift from adjacent treated areas ▪ Increased dust creation and deposition ▪ Increased noxious weed invasion as a result of seed transport by machinery and vehicles ▪ Disturbance to habitat or individuals from foot and vehicle traffic during geotechnical surveys or species surveys ▪ Increased potential for illegal collection of individuals due to increased habitat accessibility ▪ Hydrologic alterations that could impact water availability for species that inhabit downstream wetlands	▪ Determining the number of miles of known or potential habitat crossed by Project alternative route centerlines ▪ Determining the number of known element occurrences within 1 mile of alternative route centerlines ▪ Determining the amount of potential habitat affected by Project activities, including access road construction, transmission line construction, and clearing of tall vegetation ▪ Qualitative analysis of direct threats to individuals due to Project activities and potential increased collection pressure due to increased public access to habitat

TABLE 3-65 SPECIAL STATUS PLANT ISSUES IDENTIFIED FOR ANALYSIS	
Issue Identified	**Analysis Considerations**
Potential impacts on Bureau of Land Management and U.S. Forest Service sensitive plant species, including: ▪ Direct loss of individuals and/or habitat due to vegetation removal and soil disturbance ▪ Decreased habitat connectivity resulting in reduced pollinator movement and gene flow between populations ▪ Increased soil erosion and alterations to runoff patterns in habitat ▪ Reduced attractiveness of disturbed areas to pollinator species ▪ Herbicide drift from adjacent treated areas ▪ Increased dust creation and deposition ▪ Increased noxious weed invasion as a result of seed transport by machinery and vehicles ▪ Disturbance to habitat or individuals from foot and vehicle traffic during geotechnical surveys or species surveys ▪ Increased potential for illegal collection of individuals due to increased habitat accessibility	▪ Determining the number of known element occurrences and occupied habitat areas within 1 mile of alternative route centerline corridors ▪ Qualitative analysis of direct threats to individuals due to Project activities and potential increased collection pressure due to increased public access to habitat

3.2.6.3 Regional Setting

Descriptions of ecoregions and general ecological conditions in the Project area are presented in Section 3.2.5.3. Many endemic plants (species found only in a specific geographic area) occur in the Project area due to highly variable topographic, soil, and climatic conditions. The Colorado Plateaus Ecoregion, which encompasses the majority of the central part of the Project area, is especially known for a high degree of plant endemism due to its unique climate, geography, soil types, and geologic history (Welsh 1979).

3.2.6.4 Study Methodology

3.2.6.4.1 Inventory

To assess potential impacts on special status plant resources, a list of special status plant species that potentially occur in the study corridors was compiled from several sources, including:

Federal Threatened, Endangered, and Candidate Species

- Wyoming – Carbon and Sweetwater counties (FWS 2014a)
- Colorado – Garfield, Mesa, Moffatt, and Rio Blanco counties (FWS 2014b)
- Utah – Carbon, Duchesne, Emery, Grand, Juab, Uintah, Utah, and Wasatch counties (FWS 2014c)

Bureau of Land Management Sensitive Species

- Wyoming – BLM Wyoming Sensitive Species Policy and List (Rawlins Field Office) (BLM 2010b)
- Colorado – Colorado BLM State Director's Sensitive Species List by Field Station (Little Snake, White River, Grand Junction Field Offices) (BLM 2009c)
- Utah – Interim Bureau of Land Management Sensitive Plant Species List for Utah, February 2011 (BLM 2011d)

U.S. Forest Service Sensitive Species

- Region 4 – Intermountain Region (R4) Threatened, Endangered, Proposed, and Sensitive Species Known and Suspected Distribution by Forest (USFS 2013a)

Distribution and occurrence data for special status plants were collected from the Wyoming, Colorado, and Utah state heritage programs; the BLM; and the USFS to identify special status plants known to occur or with potential habitat in the proposed Project area. Agency personnel also were consulted to further refine the list of species that potentially could occur in the Project area. Relevant published literature also was referenced to determine habitat suitability in the corridors for some species where gaps in occurrence data were identified.

The refined special status species list includes a total of 60 plant species known to occur or with the potential to occur in the Project area or with the potential to be affected indirectly by Project activities (Table 3-66). Appendix J includes detailed species descriptions, life history, and occurrence information for these species.

TABLE 3-66
SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR OR WITH POTENTIAL TO OCCUR WITHIN ALTERNATIVE ROUTE STUDY CORRIDORS

Common Name	Scientific Name	Federally Listed	Bureau of Land Management Sensitive			U.S. Forest Service Sensitive		
			Wyoming	Colorado	Utah	Ashley National Forest	Manti-La Sal National Forest	Uinta National Forest
Federally Listed Threatened, Endangered, Petitioned, or Candidate Species[1]								
Barneby ridge-cress	*Lepidium barnebyanum*	E						
Cisco milkvetch	*Astragalus sabulosus* var. *sabulosus*	P			✓			
Clay phacelia	*Phacelia argillacea*	E						
Clay reed-mustard	*Schoenocrambe argillacea*	T						
Deseret milkvetch	*Astragalus desereticus*	T						
Jones' cycladenia	*Cycladenia humilis* var. *jonesii*	T						
Pariette cactus	*Sclerocactus brevispinus*	T						
San Rafael cactus	*Pediocactus despainii*	E						
Shrubby reed-mustard	*Schoenocrambe suffrutescens*	E						
Uinta Basin hookless cactus	*Sclerocactus wetlandicus*	T						
Ute ladies'-tresses	*Spiranthes diluvialis*	T						
Western prairie fringed orchid	*Platanthera praeclara*	T						
Bureau of Land Management and U.S. Forest Service Sensitive Species[1]								
Argyle Canyon phacelia	*Phacelia argylensis*				✓			
Barneby's cat's-eye	*Cryptantha barnebyi*				✓			
Beaver Rim phlox	*Phlox pungens*		✓					

TABLE 3-66
SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR OR WITH POTENTIAL TO OCCUR WITHIN ALTERNATIVE ROUTE STUDY CORRIDORS

Common Name	Scientific Name	Federally Listed	Bureau of Land Management Sensitive			U.S. Forest Service Sensitive		
			Wyoming	Colorado	Utah	Ashley National Forest	Manti-La Sal National Forest	Uinta National Forest
Bolander's camissonia	*Camissonia bolanderi*				✓			
Caespitose cat's-eye	*Cryptantha caespitosa*			✓				
Canyon sweet-vetch	*Hedysarum occidentale* var. *canone*						✓	
Carrington daisy[2]	*Erigeron carringtoniae*						✓	
Cedar Rim thistle	*Cirsium aridum*		✓					
Creutzfeldt's cat's-eye	*Cryptantha creutzfeldtii*				✓		✓	
Debris milkvetch	*Astragalus detritalis*			✓				
Dense twinpod	*Physaria condensata*		✓					
Dolores River skeleton-plant	*Lygodesmia doloresensis*			✓	✓			
Duchesne milkvetch	*Astragalus duchesnensis*			✓				
Ephedra buckwheat	*Eriogonum ephedroides*			✓				
Ferron's milkvetch	*Astragalus musiniensis*			✓				
Gibbens' beardtongue	*Penstemon gibbensii*		✓	✓				
Goodrich's blazingstar	*Mentzelia goodrichii*				✓	✓		
Goodrich's columbine[3]	*Aquilegia scopulorum* var. *goodrichii*				✓			
Graham's beardtongue	*Penstemon grahamii*			✓	✓			
Graham's cat's-eye	*Cryptantha grahamii*				✓			
Grand Junction suncup	*Camissonia eastwoodiae*			✓				
Green River greenthread	*Thelesperma caespitosum*		✓		✓	✓		
Hairy Townsend-daisy[4]	*Townsendia strigosa* var. *prolixa*				✓			
Hamilton's milkvetch	*Astragalus hamiltonii*				✓			
Horseshoe milkvetch	*Astragalus equisolensis*			✓	✓			
Huber's pepperwort	*Lepidium huberi*				✓			
Jones' bluestar	*Amsonia jonesii*			✓				
Laramie false sagebrush	*Sphaeromeria simplex*		✓					
Large-fruited bladderpod	*Lesquerella macrocarpa*		✓					
Ligulate feverfew	*Parthenium ligulatum*			✓				
Meadow pussytoes	*Antennaria arcuata*		✓					
Narrowleaf evening primrose	*Oenothera acutissima*			✓				
Narrow-stem gilia	*Gilia stenothyrsa*			✓				
Ownbey's thistle	*Cirsium ownbeyi*		✓					
Persistent-sepal yellowcress	*Rorippa calycina*		✓					

TABLE 3-66
SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR OR WITH POTENTIAL TO OCCUR WITHIN ALTERNATIVE ROUTE STUDY CORRIDORS

Common Name	Scientific Name	Federally Listed	Bureau of Land Management Sensitive			U.S. Forest Service Sensitive		
			Wyoming	Colorado	Utah	Ashley National Forest	Manti-La Sal National Forest	Uinta National Forest
Piceance bladderpod	*Lesquerella parviflora*			✓				
Psoralea globemallow	*Sphaeralcea psoraloides*				✓			
Racemose milkvetch	*Astragalus racemosus* var. *treleasei*		✓					
Rock hymenoxys	*Hymenoxys lapidicola*				✓			
Rollins' cat's-eye	*Cryptantha rollinsii*			✓				
Spanish bayonet	*Yucca harrimaniae* var. *sterilis*				✓			
Stemless beardtongue	*Penstemon acaulis* var. *acaulis*		✓			✓		
Thompson's talinum	*Talinum thompsonii*				✓			
Twisted buckwheat	*Eriogonum contortum*			✓				
Uinta Basin spring-parsley	*Cymopterus duchesnensis*			✓				
Untermann's daisy	*Erigeron untermannii*				✓	✓		
Wheeler's angelica	*Angelica wheeleri*							✓
White River beardtongue	*Penstemon scariosus* var. *albifluvis*			✓	✓			

NOTES:
[1]Nomenclature follows (U.S. Fish and Wildlife Service 2014a, b, c) for federally listed threatened and endangered species and (NatureServe 2014) for all others.
[2]Nomenclature for Carrington daisy follows (Utah Native Plant Society 2013).
[3]Nomenclature for Goodrich's columbine follows (Welsh et al. 2008).
[4]Nomenclature for hairy Townsend-daisy follows (NatureServe 2014) for the common name, as *Townsendia strigosa* var. *prolixa* is not recognized as an official variety and (Welsh et al. 2008) provides no common name.
Federally Listed (U.S. Fish and Wildlife Service): E = Endangered; T = Threatened; C = Candidate; P = Petitioned
✓ = listed as sensitive by at least one Bureau of Land Management district or National Forest in the Project area

3.2.6.4.2 Impact Assessment and Mitigation Planning

The methodology used to assess potential impacts on special status plant resources for the purpose of interdisciplinary comparison of alternative routes is presented in Section 2.7.1. In general, the analysis included (1) identifying the types of potential effects on special status plant resources that could result from construction, operation, and maintenance of the proposed transmission line and associated facilities; (2) assessing level and extent of initial impacts on special status plant resources present in the study corridors (3) identifying appropriate selective mitigation measures for minimizing some potential adverse effects and determining specific areas where selective mitigation measures should be applied; and (4) disclosing level and extent of potential residual impacts on special status plant resources (i.e., impacts anticipated after application of selective mitigation measures). Design features of the Proposed Action for environmental protection (Table 2-8) were considered when assessing both initial and residual impacts.

Additional discussion of the methods used in analyzing effects of the Project on special status plants to support interdisciplinary comparison of alternative routes are discussed in the Effects Analysis section.

Supplemental analyses were necessary to address some of the issues raised by the public and the agencies during scoping. Quantitative or qualitative analyses were performed, depending on information available, to evaluate potential impacts of the Project on special status plant resources or to meet the requirements of relevant law, regulation, or policy. The methods for these supplemental analyses are discussed in the Effects Analysis section.

Types of Potential Effects

The construction, operation, and maintenance of the Project would result in both direct and indirect effects on special status plants, which are described in the following sections. This analysis assumes the estimated extent of surface disturbance required to construct any of the transmission line tower types described in Section 2.1 would be the same. Therefore, the impacts on special status plants would be the same regardless of the tower type selected.

Federally Listed Threatened, Endangered, and Candidate Species

Direct Effects

Construction of permanent features such as access roads, transmission line towers, and series compensation stations are likely to involve such actions as vegetation clearing, soil excavation, piling of soil material, vehicle drive-and-crush, and human foot traffic. These actions could result in losses of individual plants and degradation of habitat if present in areas where construction would occur. Disturbance to soil and vegetation in habitat for special status plants could occur as a result of overland vehicle access or foot traffic during geotechnical surveys and preconstruction special status species surveys. Overland vehicle access for geotechnical surveys will be restricted to routes designated in the POD, and special status species surveys would follow agency-approved protocol and would minimize ground disturbance to the extent possible. However, even minimal disturbance in habitat that is rare, highly erodible, or otherwise particularly sensitive could have detrimental effects on a species.

Impacts on populations and habit would persist in the long-term and would most likely be irreversible. Some impacts on unoccupied habitat could be short-term in duration if the area is to be revegetated; however, restoration of habitat to a predisturbance state that could support special status plants is unlikely in the short-term and is not assured even in the long-term. Impacts on habitat would be long-term with construction of any new permanent Project features such as roads or facilities (i.e., towers, series compensation stations).

Indirect Effects

Indirect negative impacts on special status plant populations and habitat also could occur as a result of Project-related activities. Soil disturbance and removal of vegetation increases the susceptibility of an area to colonization by invasive species (Hobbs and Huenneke 1992), which could directly threaten the survival of special status plant species in adjacent areas through competitive exclusion in both the short- and long-term. Construction in special status plant habitat could increase habitat fragmentation, which could limit gene flow between populations, decrease genetic diversity in populations, and potentially negatively impact population long-term viability (Ellstrand and Elam 1993). Clearing of vegetation during construction also could result in increased soil erosion, which could result in the deposition of soil over populations and habitat for special status plants during extreme precipitation events. Additionally, any disturbance that results in the loss of flowering plants adjacent to special status plant populations could reduce the attractiveness of an area to pollinators and subsequently limit reproductive output of

individual special status plants. Increases in fire frequencies known to result from invasion of certain invasive plant species could remove special status plant populations and habitat and favor the continued dominance of invasive species in the Project area. Drift of herbicide from the treatment of noxious weeds in adjacent areas could inadvertently cause mortality of special status plants. Increased construction-related and private vehicle use on new and existing roads could result in greater dust deposition, which would inhibit photosynthetic ability, reproductive ability, and various metabolic processes of individual plants (Farmer 1993). Increased vehicle use in the Project area also could increase access to special status plant species habitat and individuals, which may increase illegal collection of commercially desirable special status plants.

Construction activities in wetlands, waterways, and riparian areas have the potential to alter the hydrology and water quality of downstream systems, thereby potentially negatively impacting riparian- or wetland-dependent special status plant species such as Ute ladies'-tresses. Water withdrawals in the Platte River water system for Project construction and maintenance could indirectly impact Western prairie fringed orchid, which inhabits areas along the Platte River downstream of the Project. Hydrologic alterations that draw down the water table near the root zone have been identified as a potential threat to this species (FWS 1996). All alternatives would require water use within the Platte River Basin and would be subject to consultation under Section 7 of the ESA. The Applicant has not identified the specific sources and volumes of water that would be used for construction of each alternative route. Compliance with regulations regarding water use in the Platte River Basin will be addressed through the Section 7 consultation process.

Bureau of Land Management and U.S. Forest Service Sensitive Species

Short- and long-term direct and indirect effects are the same as those listed for federally listed threatened and endangered species and those proposed or candidates for listing.

Mitigation Planning and Effectiveness

In addition to the design features of the Proposed Action for environmental protection, selective mitigation measures would be applied where feasible to reduce potential high and moderate adverse impacts on biological resources or where required to comply with law, regulation, or agency policy. Once an alternative route is selected, the Applicant 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. As described in Appendix J, the BLM would require the Applicant to monitor the implementation and effectiveness of conservation measures (i.e., design features of the Proposed action for environmental protection; selective mitigation measures; and other measures implemented to avoid, minimize, and mitigate for resource impacts) and would implement adaptive management for biological resources, as needed. Detailed monitoring requirements would be outlined in a biological resource monitoring plan, which would be developed with the BLM and cooperating agencies and included in the POD. This plan also will include monitoring requirements for federally listed wildlife species that are identified through the Section 7 consultation process.

Design Features 1, 2, 3, 5, 9, 26, 27, 28, and 30 are applicable to vegetation resources and are described in this section. In addition to listed design features, the BLM or the appropriate land-management agency would implement resource avoidance measures as needed to meet resource-management objectives if sensitive resources are located near a geotechnical boring location as described in Section 2.4.2.2. Resource-avoidance measures for the geotechnical investigation would include (1) monitor geotechnical investigation activities, (2) adjust activities to occur outside of seasonal restrictions, (3) use alternative access or drilling methods, (4) relocate the borehole, and (5) abandon the geotechnical site.

- **Design Feature 1 (minimization of vegetation clearing)**. Vegetation would be left in place wherever possible where recontouring is not required. This would minimize damage to habitats and populations of special status plant species through the minimization of vegetation disturbance in general.
- **Design Feature 2 (surface recontouring and reclamation)**. Areas subject to ground disturbance would be recontoured and revegetated as required by the land-management agency or landowner. This would generally include reseeding with a seed mix (approved by the BLM or USFS, as appropriate, or as negotiated by individual landowners) appropriate to the vegetation community in which the disturbance has occurred, and establishing appropriate erosion control measures. Reseeding treatments on federally managed lands where sensitive plants occur or have the potential to occur would be established in coordination with the BLM and USFS, as appropriate. This design feature would minimize the temporal scope of disturbance and decrease the likelihood that a disturbance area would be colonized by invasive species, as well as providing the best opportunity for an area to return to functioning as habitat for special status species. A Reclamation, Revegetation, and Monitoring Framework Plan identifying reclamation requirements and stipulations would be developed and incorporated in the POD, which would be approved by the affected land-management agency prior to the issuance of a right-of-way grant or special-use authorization, respectively.
- **Design Feature 3 (management of special status species)**. Special status species would be considered in accordance with management policies set forth by land-management agencies. All actions that could affect federally listed plants would be subject to the conditions established during Section 7 consultation. Surveys for special status plants would be conducted prior to construction in suitable habitat (as designated by appropriate land-management agencies) along the proposed transmission line route and in vicinities of Project facilities to be constructed (e.g., access and spur roads, staging areas, etc.). Survey protocols accepted or recommended by FWS and state agencies would be followed, as appropriate. Actions would be taken to avoid adverse impacts on special status plant populations and habitat where identified, which may include altering the placement of roads or towers, as practicable, and special reclamation measures (e.g., seed collecting for revegetation, relocation of plants out of the right-of-way), as approved by the landowner and compliance inspection monitor. Monitoring of identified special status plant populations and habitat also may be required in cases for which this need is identified by land-management agencies. This design feature would minimize adverse impacts on special status plants through the exact identification of populations and habitats and the establishment of site-specific avoidance and monitoring objectives.
- **Design Feature 5 (establishment of a noxious weed management plan)**. A noxious weed management plan would be developed and approved by the BLM, USFS, and county weed management officer, where appropriate, and incorporated into the POD. This plan would include specific measures to be taken to reduce the spread of noxious weeds associated with Project construction activities. Implementation of this design feature would minimize the spread of noxious weed species in the Project area and the associated negative ecological effects of invasive species such as increased wildfire risk (Balch et al. 2012) and the competitive exclusion of special status plant species.
- **Design Feature 9 (avoidance of special status plants and habitat)**. Special status plants and habitat identified during preconstruction surveys would be identified during the POD development and flagged and spanned by Project structures, where feasible and within the limits of standard structure design. Where avoidance is not feasible, special status plants and their habitats would be treated in accordance with applicable law, regulation, and agency policy. Application of this design feature would allow sensitive vegetation to remain undisturbed whenever possible.

- **Design Feature 26 (vehicle access restriction)**. All construction vehicle movement would be restricted to predesignated access roads, contractor acquired access, public roads or overland travel approved by appropriate land-management agency. This design feature would minimize disturbance to special status plant habitat and populations from excess overland travel and the associated potential spread of noxious weeds and an increase in the risk of wildfire.
- **Design Feature 27 (construction activity access restriction)**. All Project-related construction activities would be limited to a predetermined spatial extent. This design feature would minimize disturbance to special status plant habitat and populations from construction activities and the associated potential increased spread of noxious weeds and wildfire risk.
- **Design Feature 28 (personnel instruction)**. All Project personnel would be instructed in the importance, purpose, necessity, and regulations of protection of natural resources. Instruction also would be given for reporting and stop work procedures in the event of a resource conflict. This would minimize impacts on special status plant habitat and populations throughout the Project corridor.
- **Design Feature 30 (hazardous materials restrictions)**. Hazardous materials would be contained and removed to a disposal facility and not drained into the ground, streams, or drainages. Refueling and storing potentially hazardous materials would not occur within 328 feet of waterbodies (500 feet in Wyoming), 200 feet of identified private water wells, and 400 feet of municipal or community water wells. A Spill Pollution Prevention, Containment, and Countermeasures Plan Framework, will be developed as part of the POD. This design feature would minimize degradation to special status plant species habitat due to Project activities.

In addition, Selective Mitigation Measures 1, 2, 3, 5, 7, 12, and 15 would be implemented to reduce potential high adverse impacts on certain federally listed plant species. These measures also may be applicable to habitat and occurrences of other special status plants including BLM- and USFS- sensitive species as identified during preconstruction surveys, though specific areas to which these measures would be applied have not been identified. These design features are described and justified in this section.

- **Selective Mitigation Measure 1 (minimization of disturbance to sensitive soils and vegetation).** Existing access roads/trails would not be widened or otherwise upgraded for construction and maintenance in areas where soils and vegetation are particularly sensitive to disturbance. Should modifications be necessary to make existing roads/trails passable and safe, the Applicant will work with the appropriate land-management agency to determine extent. This would minimize impacts on habitats for special status plant species.
- **Selective Mitigation Measure 2 (avoidance of sensitive resources)**. No blading of new access roads would occur in certain resource areas (e.g., special status plant habitats and populations) where feasible. Existing roads would be used in these areas. This mitigation measure would minimize degradation and fragmentation of special status plant species habitat.
- **Selective Mitigation Measure 3 (minimization of slope cut and fill)**. The alignment of any new access roads or cross country routes in designated areas would follow the landform contours where practicable. This mitigation would minimize ground disturbance and potential habitat fragmentation for special status plant species.
- **Selective Mitigation Measure 5 (minimization of new or improved Project accessibility)**. All new or improved access that would not be required for maintenance would be closed or rehabilitated following Project construction using the most effective and least environmentally damaging methods. This would limit public access to special status plant populations and habitat and thereby reduce continued anthropogenic disturbance in these areas, as well as potentially mitigate any habitat losses or fragmentation due to these road features.

- **Selective Mitigation Measure 7 (spanning or avoiding of sensitive features)**. Project structures would be located to allow conductors to span or avoid identified sensitive features, such as special status plant populations and habitat. This mitigation measure would reduce overall special status plant habitat destruction and fragmentation in the Project area.
- **Selective Mitigation Measure 12 (seasonal and spatial restrictions)**. Ground-disturbing activities would occur outside of the flowering season, typically late April to mid-May, in *Sclerocactus* Level 1 core habitat as defined by the FWS. This would avoid adverse impacts on *Sclerocactus* reproductive success related to fugitive dust and pollinator disturbance.
- **Selective Mitigation Measure 15 (limiting accessibility in sensitive habitats).** Where feasible, access roads that traverse sensitive habitats, habitat occupied by federally listed endangered, threatened, proposed threatened, or petitioned plant species, would be gated or otherwise blocked in cooperation with appropriate land-management agencies to limit public access. This would minimize impacts on habitats for special status plant species.

Conservation measures to address direct and indirect effects on special status plant species would be incorporated into the Biological Resources Conservation Plan and the Wildlife Resources Conservation Plan to be developed for the POD. The purpose of this plan will be to assist the BLM, USFS, and Applicant personnel in meeting their obligations to protect biological resources during construction, operation, and maintenance of the Project. All relevant BLM requirements (including monitoring) will be included in this plan, and compliance of the Project with stipulations in this plan will be required.

Effects Analysis

Methods for Analysis to Support Interdisciplinary Comparison of Alternative Routes

Criteria for Assessing Intensity of Impacts

Criteria were developed in collaboration with the Agency Interdisciplinary Team to assess the level of a potential effect on federally listed or candidate plants associated with implementation of the Project and to compare the impacts between alternative routes (Table 3-67). Impact criteria were based on considerations of relative abundance of populations, magnitude of anticipated impacts, additional protections (including laws and statutes), and existing conditions.

TABLE 3-67
CRITERIA FOR ASSESSING LEVEL OF IMPACTS ON FEDERALLY LISTED OR CANDIDATE PLANTS

Level of Impacts	Description
High	▪ Impacts that would severely limit the long-term sustainability of populations (e.g., impacts on only known population) ▪ Loss of or negative impacts on occupied habitat or large portions of suitable habitat for local species ▪ Loss or adverse modification of designated critical habitat
Moderate	▪ Impacts that would have adverse effects on species but would not severely limit the long-term sustainability of populations (e.g., impacts on plant populations somewhat more widely distributed than local species) ▪ Loss of or negative impacts on small portions of unoccupied suitable habitat for local species
Low	▪ Impacts that would have only minor adverse effects on species and would not limit the long-term sustainability of populations (e.g., indirect effects or impacts in areas of pre-existing disturbance) ▪ Indirect effects or disturbance in areas of pre-existing disturbance

Initial Impacts

The level of a potential effect on special status plants (i.e., a particular species or habitat type) that could result from implementation of the Project is used as the basis for assessing initial impacts. All suitable habitat is considered occupied for the purpose of assessing the level of impacts on species. Design features of the Proposed Action would reduce impacts on special status plants and were considered when assessing potential impacts on specific resources. Based on the level of a potential effect on a special status plant, initial impacts were assigned (Table 3-68) using the criteria presented in Table 3-67.

Residual Impacts

Selective mitigation measures would be applied to reduce the level of impacts associated with Project construction and maintenance. Residual impacts are impacts on resources anticipated to occur from Project activities after the application of selective mitigation measures described in the Mitigation Planning and Effectiveness section. The level of anticipated residual impacts on special status plant resources associated with implementation of the Project was assessed using the criteria presented in Table 3-67. Application of selective mitigation measures is expected to reduce the level of potential impacts on all federally listed plant species (e.g., those with an initial impact rating of moderate would have a residual impact rating of low after application of selective mitigation measures). A summary of anticipated initial and residual impacts on special status plant resources, as well as the selective mitigation measures applied, are presented in Table 3-68.

The level of residual impacts are quantified and reported as a function of miles crossed of known or potential habitat for each federally listed or candidate plant species.

TABLE 3-68
SUMMARY OF INITIAL AND RESIDUAL IMPACTS ON SPECIAL STATUS PLANTS

Common Name	Design Features	Initial Impacts	Selective Mitigation Measure Applied	Residual Impact
Endangered				
Barneby ridge-cress	1, 2, 3, 5, 9, 26, 27, 28, 30	High	2, 7	Moderate
Clay phacelia	1, 2, 3, 5, 9, 26, 27, 28, 30	High	2, 3, 7	Moderate
San Rafael cactus	1, 2, 3, 5, 9, 26, 27, 28, 30	Moderate	2, 5, 7	Low
Shrubby reed-mustard	1, 2, 3, 5, 9, 26, 27, 28, 30	Moderate	2, 7	Low
Threatened				
Deseret milkvetch	1, 2, 3, 5, 9, 26, 27, 28, 30	High	2, 7	Moderate
Jones' cycladenia	1, 2, 3, 5, 9, 26, 27, 28, 30	High	2, 5, 7	Moderate
Pariette cactus	1, 2, 3, 5, 9, 26, 27, 28, 30	High	2, 5, 7	Moderate
Uinta Basin hookless cactus	1, 2, 3, 5, 9, 26, 27, 28, 30	Moderate	2, 5, 7	Low
Clay reed-mustard	1, 2, 3, 5, 9, 26, 27, 28, 30	High	2, 7	Moderate
Ute ladies'-tresses	1, 2, 3, 5, 9, 26, 27, 28, 30	Moderate	2, 7	Low

TABLE 3-68 SUMMARY OF INITIAL AND RESIDUAL IMPACTS ON SPECIAL STATUS PLANTS				
Common Name	**Design Features**	**Initial Impacts**	**Selective Mitigation Measure Applied**	**Residual Impact**
Petitioned				
Cisco milkvetch	1, 2, 3, 5, 9, 26, 27, 28, 30	High	2, 7	Moderate
BLM Sensitive				
Graham's beardtongue	1, 2, 3, 5, 9, 26, 27, 28, 30	Moderate	2, 7	Low
White River beardtongue	1, 2, 3, 5, 9, 26, 27, 28, 30	Moderate	2, 7	Low
Core Habitat Areas				
Level 1 *Sclerocactus* core habitat (high density occupied habitat)	1, 2, 3, 5, 9, 26, 27, 28, 30	High	2, 5, 7, 12	Moderate
Level 2 *Sclerocactus* core habitat (low density occupied habitat)	1, 2, 3, 5, 9, 26, 27, 28, 30	Moderate	2, 5, 7,	Low

Federally Listed Endangered Species

Barneby Ridge-cress

The Barneby ridge-cress is found on poorly developed soils derived from Marly Shale outcrops in a zone of interbedding geologic strata from the Uinta and Green River formations. As this type of soil is rare in the Uinta Basin, only small islands of suitable habitat are available. Only one population of approximately 5,000 individuals of Barneby ridge-cress is currently known. The primary threat to the survival of Barneby ridge-cress is damage due to oil and gas exploration, but trampling from unrestricted off-road vehicle use and livestock also threaten the survival of the species (FWS 1993). Impacts on Barneby ridge-cress habitat or populations could limit this species' long-term viability due to its small population size and available range of habitat. Therefore, the level of initial impacts on this species was determined to be high where the transmission line would cross habitat for this species. Selective Mitigation Measures 2 and 7 would be applied to minimize surface disturbance in habitat for this species if crossed. As occurrences of this species are limited in the Project area, it is likely direct impacts on Barneby ridge-cress plants could be avoided. However, if populations were crossed by the transmission line, indirect impacts on populations or habitat could still occur as a result of Project activities after application of Mitigation Measures 2 and 7. Therefore, the level of residual impacts on this species was determined to be moderate. Moderate-level impacts are those that would have adverse effects on a species but would not severely limit the long-term sustainability of populations or those that would result in loss of or negative impacts on small portions of unoccupied suitable habitat for local species (Table 3-67).

Clay Phacelia

Approximately 200 clay phacelia individuals are known from small populations in Spanish Fork Canyon in Utah (FWS 1982). Clay phacelia grows on very steep slopes (up to 70 percent grade) in sparsely populated pinyon-juniper and mountain brush communities (Welsh et al. 1975). Modeled potential habitat for this species occurs on slopes of up to 86 percent (USFS 2013b). The substrate of clay phacelia habitat is shaley clay colluviums of the Green River Formation, which continually slough down slope faces (Atwood 1975). The primary threat to the survival of clay phacelia is the vulnerability resulting from such a small population size, a high degree of habitat specificity, and from the high erodibility of the substrate of its habitat. Impacts on clay phacelia habitat or populations could limit this species' long-term viability

due to its small population size and fragile habitat. Therefore, the level of initial impacts on this species was determined to be high where the transmission line would cross occupied or potential habitat. Selective Mitigation Measures 2, 3, and 7 would be applied to minimize disturbance in clay phacelia habitat. Additional clay phacelia specific mitigation measures specifying avoidance distances, erosion and sedimentation controls, seasonal restrictions, and herbicide application restrictions would be developed in coordination with the FWS throughout the Section 7 consultation process. As Project alternative route centerlines avoid known occurrences and reintroduction sites of this species by at least 0.5 mile, it is likely direct impacts on individuals would be avoided. Indirect impacts on populations and reintroduction sites such as increased noxious weed invasion or dust deposition would be avoided and minimized to the extent feasible using design features and selective mitigation measures but may still occur after application of selective mitigation measures. In addition, Project centerlines do cross USFS-mapped uitable habitat for clay phacelia and direct and indirect impacts on this habitat are likely. Indirect effects are expected to be greatest adjacent to any Project-related activities and decrease at distances further away from the Project. No studies exist that would allow for quantification of indirect effects on clay phacelia and USFS-modeled suitable habitat.

Potential impacts on USFS-modeled suitable clay phacelia habitat that could occur from implementation of the various alternative routes range from 0 to 19 acres, or approximately 0.0 to 1.5 percent of total USFS-mapped habitat. FWS has indicated that ground-truthing of the clay phacelia habitat model used in the analysis will likely reduce the amount of suitable habitat available. If the amount of suitable habitat is reduced, BLM anticipates that the amount of Project-related disturbance to suitable clay phacelia habitat would be reduced in a similar manner. Due to the small amounts of disturbance to suitable clay phacelia habitat anticipated to result from implementation of the various Alternative Routes relative to the amount of habitat available, the BLM does not anticipate that the Project will result in the loss of large portions of suitable habitat for this species.Therefore, the level of residual impacts on this species was determined to be moderate. Moderate -level impacts are those that would have adverse effects on species but would not severely limit the long-term sustainability of populations, or those that would result in loss or negative impacts on small portions of unoccupied suitable habitat for local species (Table 3-67).

In discussions with the BLM, the FWS has expressed concerns regarding the potential for the Project to affect suitable habitat for this species, decreasing the FWS's ability to recover the species. Per the FWS, recovery depends on expanding the range for the species through reintroduction to suitable but unoccupied habitat. Much of the suitable habitat is located on privately owned lands, which limits reintroduction efforts.

San Rafael Cactus

Three known populations of the San Rafael cactus with an estimated total population of 20,000 individuals were known in 1995. San Rafael cactus individuals lose turgidity and withdraw to below the soil surface during portions of the year where soil moisture is low, which provides some natural protection from trampling. However, the species forms flower buds at ground level that remain vulnerable to surface disturbance (FWS 1995a). Due to this species' relatively large population size, impacts on San Rafael cactus habitat or individuals are not likely to limit the species' long-term viability. Therefore, the level of initial impacts on this species was determined to be moderate in the event the transmission line crosses habitat for this species. Selective Mitigation Measures 2, 5, and 7 would be applied to minimize surface disturbance and accessibility in habitat for this species, if crossed. Due to the localized nature of the occupied habitat in the Project area, it is likely direct impacts on San Rafael cactus occupied habitat could be avoided through application of Selective Mitigation Measures 2 and 7. Therefore, the level of residual impacts on this species was determined to be low. Low-level impacts are those that would have only minor adverse effects on the species and would not limit the long-term sustainability of populations (Table 3-67).

Shrubby Reed-mustard

The shrubby reed-mustard is confined to localized geological formations of buff-colored calcareous shale of the Green River Formation in the Uinta Basin of eastern Utah (FWS 1994a). Approximately 2,900 individuals are currently known from seven populations (FWS 2010). Primary threats to survival of the shrubby reed-mustard are the vulnerability resulting from a small population size and exposure to various forms of disturbance, such as those associated with the oil and gas industry and off-road vehicle use (FWS 1994a). Due to this species' small population size but relatively widespread habitat range, impacts on shrubby reed-mustard habitat or populations are not likely to limit the species' long-term viability. Therefore, the level of initial impacts on this species was determined to be moderate. Selective Mitigation Measures 2 and 7 would be applied to minimize surface disturbance in habitat for this species, if crossed. As occurrences of this species are sparse in the Project area, it is likely direct impacts on shrubby reed-mustard plants could be avoided. However, if populations were crossed by the transmission line, indirect impacts on populations or habitat could still occur as a result of Project activities after application of Mitigation Measures 2 and 7. Therefore, the level of residual impacts on this species was determined to be low. Low-level impacts are those that would have only minor adverse effects on species and would not limit the long-term sustainability of populations (Table 3-67).

Federally Listed Threatened Species

Clay Reed-mustard

The clay reed-mustard occurs in six distinct populations in western Uintah County, Utah. Most sites of clay reed-mustard contain fewer than 200 individuals. Small population sizes and decreased genetic diversity increase the sensitivity of this species to disturbance (FWS 2011a). Due to this species' small population size, impacts on clay reed-mustard habitat or populations could limit this species' long-term viability. Therefore, the level of initial impacts on clay reed-mustard was determined to be high. Selective Mitigation Measures 2 and 7 would be applied to minimize surface disturbance in occupied and potential habitat, if crossed. Additionally, steep slopes favored by this species are generally not suitable for construction of a permanent feature. As such, it is likely direct impacts on occurrences and known populations of this species could be avoided. However, indirect impacts on populations or habitat could still occur as a result of Project activities after application of Mitigation Measures 2 and 7. Therefore, the level of residual impacts on this species was determined to be moderate. Moderate-level impacts are those that would have adverse effects on species but would not severely limit the long-term sustainability of populations or those that would result in loss of or negative impacts on small portions of unoccupied suitable habitat for local species (Table 3-67).

Deseret Milkvetch

The Deseret milkvetch is endemic to central Utah and known from only one location on the east side of the Thistle Creek Valley near the town of Birdseye in Utah County (UDWR 2005). The population consists of an estimated 86,775 to 98,818 individuals growing on 146 acres on both state and privately owned land (FWS 2011b). The single known population is in an open to sparse juniper-sagebrush community on steep, naturally disturbed south and west (rarely north) facing slopes with sandy-gravelly soils adjacent to a dirt road (FWS 2011b; UDWR 2005). No threats to the survival of the Deseret milkvetch were believed to exist at the time of the Deseret milkvetch 5-year status review (FWS 2011b); however, widening of a dirt access road on UDWR property adjacent to known habitat, if required for Project construction or maintenance, could negatively impact this species. However, the limited population size makes the species more susceptible to extirpation and the consequences of limited genetic diversity; specifically, decreased ability to adapt to changing conditions (Ellstrand and Elam 1993). Due to its restricted habitat, impacts on Deseret milkvetch habitat or populations could limit this species' long-term viability. Therefore, the level of initial impacts on Deseret milkvetch was determined to be high

where the transmission line crosses occupied or potential habitat for the species. As Selective Mitigation Measures 2 and 7 would be applied to minimize surface disturbance in habitat for this species, and as no direct disturbance of habitat and plants would be required for Project construction, it is likely no direct impacts on known populations of this species would occur. However, indirect disturbance from increased vehicle use and dust deposition from traffic associated with Project construction and operation could occur. Conservation measures developed by the FWS for actions near Deseret milkvetch habitat and populations, including surveys in potential habitat identified through aerial photo interpretation, would be followed as practicable to minimize impacts on suitable habitat and populations. Therefore, the level of residual impacts on this species was determined to be moderate. Moderate-level impacts are those that would have adverse effects on species but would not severely limit the long-term sustainability of populations or those that would result in loss of or negative impacts on small portions of unoccupied suitable habitat for local species (Table 3-67.

Jones' Cycladenia

Jones' cycladenia is found only on gypsiferous, saline soils of Cutler, Summerville, and Chinle formations (FWS 2008a). This species exhibits low fruit production and seed set, likely due to a complicated pollination system and inadequate pollinator abundance; in addition, no seedling germination events have been documented (FWS 2008a). At the time of listing, populations of Jones' cycladenia individuals were only known from three sites. Ongoing and potential anthropogenic impacts on habitat include off-highway vehicle (OHV) use, oil, gas, and mineral exploration, including uranium mining and tar sands and livestock grazing (51 *Federal Register* [FR] 16526-16530). In combination with this species' small population size, these factors make the long-term viability of Jones cycladenia vulnerable to impacts on populations or habitat. Therefore, the level of initial impacts on this species was determined to be high where the Project would cross habitat for this species. Selective Mitigation Measures 2 and 7 would be applied to minimize surface disturbance in habitat for this species if crossed. However, no known habitat or populations of Jones cycladenia are crossed by the study corridors and impacts are not expected. If populations were crossed by the transmission line, indirect impacts on populations or habitat could still occur as a result of Project activities after application of Mitigation Measures 2 and 7. Therefore, the level of residual impacts on this species was determined to be moderate in the event that habitat or populations are crossed. Moderate-level impacts are those that would have adverse effects on species but would not severely limit the long-term sustainability of populations or those that would result in loss of or negative impacts on small portions of unoccupied suitable habitat for local species (Table 3-67).

Pariette Cactus

The Pariette cactus grows on fine soils in clay bad lands derived from the Uinta formation and inhabits a low hilly terrain overlain with gravel and stone (UDWR 2005). The entire population of Pariette cactus, which consists of about 8,000 individuals, is known from a 30-square-mile area around the Pariette Draw. The primary threats to the survival of the *Sclerocactus* complex are posed by loss of plants and habitat as a result of mineral and energy development, water development, and collection. Another threat to Pariette cactus is hybridization with the more widespread Uinta Basin hookless cactus, which results in a dilution of this species' genetic material (Flora of North America Editorial Committee 1993). Impacts on Pariette cactus habitat or populations could severely limit this species' long-term viability due to its small population size and restricted habitat. Therefore, the level of initial impacts of the Project on this species was determined to be high. Selective Mitigation Measures 2, 5, and 7 would be applied to minimize surface disturbance and accessibility in habitat for this species if crossed. However, no known habitat or populations of Pariette cactus are crossed by the study corridors and impacts are not expected. If populations were crossed by the transmission line, indirect impacts on populations or habitat could still occur as a result of Project activities after application of Mitigation Measures 2 and 7. Therefore, the level

of residual impacts on this species was determined to be moderate in the event that habitat or populations are crossed. Moderate-level impacts are those that would have adverse effects on species but would not severely limit the long-term sustainability of populations, or those that would result in loss of or negative impacts on small portions of unoccupied suitable habitat for local species Table 3-67.

Uinta Basin Hookless Cactus

Current population estimates of the Uinta Basin hookless cactus are at about 30,000 individuals over a range approximately 60 miles long and 25 miles wide. The Uinta Basin hookless cactus population in the vicinity of the proposed project is geographically separated from the remainder of the species range (current separation between this population and the nearest individual from the main part of the species range is 5.4 miles). Additionally, the individuals of this population have been found to have distinctive morphological characteristics including a greater width-to-height ratio than found in other members of *S. wetlandicus*, a flattened apex (D. Woodruff, unpublished data in Tepedino et al. 2010), and were found to differ in their reproductive biology from other members of the species in being self-compatible (Tepedino et al. 2010). The primary threats to the survival of the Uinta Basin hookless cactus are posed by loss of plants and habitat as a result of mineral and energy development, water development, and illegal collection (BLM 2008b; FWS 1990). Due to its relatively large population size and habitat range, impacts on Uinta Basin hookless cactus habitat or populations could have an adverse effect on this species but would not severely limit its long-term viability. Therefore, the level of initial impacts on Uinta Basin hookless cactus was determined to be moderate where the transmission line would cross habitat for the species. Selective Mitigation Measures 2, 5, and 7 would be applied to minimize surface disturbance and accessibility in habitat for this species, and it is likely that the vast majority of occupied and suitable habitat and individuals would be unaffected by construction of the Project. As such, the level of residual impacts on this species was determined to be low. Low-level impacts are those that would have only minor adverse effects on species and would not limit the long-term sustainability of populations (Table 3-67).

Ute Ladies'-tresses

The range of Ute ladies'-tresses extends over a large geographic area that includes the Uinta Basin, the base of the eastern slope of the Rocky Mountains, and the base of the western slope of the Wasatch Mountains. Populations are generally small and occur in scattered groups in riparian areas (FWS 1995b). Primary threats to Ute ladies'-tresses are overgrazing and noxious weed invasion of stream bank and riparian areas (57 FR 2048; FWS 1995b). Due to this species' relatively large range, impacts on Ute ladies'-tresses habitat or populations could have an adverse effect on this species but not severely limit its long-term viability. Therefore, the level of initial impacts on Ute ladies'-tresses was determined to be moderate where the transmission line crosses habitat for this species. Selective Mitigation Measures 2 and 7 would be applied to minimize surface disturbance in habitat for this species, if crossed. Project design features also would ensure impacts on riparian areas and wetlands would be avoided to the extent practicable. As such, it is likely direct impacts on individuals and habitat for this species could be avoided; however, indirect impacts may still occur on a small proportion of habitat and populations of Ute ladies'-tresses. Therefore, the level of residual impacts on this species was determined to be low. Low-level impacts are those that would have only minor adverse effects on species and would not limit the long-term sustainability of populations (Table 3-67).

Western Prairie Fringed Orchid

The species is historically known to occur throughout the Great Plains of North America. In 1996, populations of Western prairie fringed orchid were known to occur in 41 counties across six states (Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota) and Manitoba, Canada (FWS 1996). Populations in Nebraska are located within the Platte River watershed. Alternative routes of the Project do not cross

habitat for Western prairie fringed orchid; however, this species is included in analysis due to the consideration of potential water depletions in the Platte River watershed during construction and maintenance of the Project.

As the Project does not cross habitat for this species, selective mitigation measures cannot be assigned to minimize initial impacts on this species. Additionally, no design features of the Proposed Action or selective mitigation measures specifically address water depletion effects on downstream systems. Therefore this species is not included in Table 3-68. Impacts on this species due to water withdrawals will be determined through the Section 7 consultation process.

Species Petitioned for Federal Listing

Cisco Milkvetch

The Cisco milkvetch only occurs on the Mancos Shale Formation in salt desert shrub communities from 4,250 to 5,250 feet in the 20 miles between Cisco Mesa and Whipsaw Flat (Franklin 2005; Utah Native Plant Society 2013). Impacts on Cisco milkvetch habitat or populations could limit this species' long-term viability due to its restricted habitat; therefore, the level of initial impacts of the Project on this species was determined to be high where habitat for this species is crossed by the transmission line. As Selective Mitigation Measures 2 and 7 would be applied to minimize surface disturbance in habitat for this species; and as occurrences of this species are limited, it is likely the Project would avoid direct impacts on Cisco milkvetch populations. However, indirect impacts on individuals still could occur, as could direct and indirect impacts on unoccupied suitable habitat, after application of Mitigation Measures 2 and 7. Therefore, the level of residual impacts on this species was determined to be moderate. Moderate-level impacts are those that would have adverse effects on species but would not severely limit the long-term sustainability of populations, or those that would result in loss of or negative impacts on small portions of unoccupied suitable habitat for local species (Table 3-67).

BLM Sensitive Species

Graham's Beardtongue

Graham's beardtongue is limited to the Uinta Basin in known occurrences in Carbon, Duchesne, and Uintah counties in Utah and Rio Blanco County in Colorado (Utah Native Plant Society 2013). The current population estimates for this species is 31,702 individuals across five populations (78 FR 47592). Threats include increased energy development, livestock grazing, and climate change (78 FR 47590). Impacts on Graham's beardtongue could have adverse effects on the species due to its small population size but would not be likely to severely limit its long-term persistence. Therefore, the level of initial impacts of the Project on Graham's beardtongue was determined to be moderate where the transmission line crosses habitat for this species. Selective Mitigation Measures 2 and 7 would be applied to minimize surface disturbance in potential habitat for this species if crossed. As known occurrences of this species are limited in the Project area, it is likely direct impacts on Graham's beardtongue plants could be avoided. However, indirect impacts on populations could still occur as a result of Project activities after application of Mitigation Measures 2 and 7. Therefore, the level of residual impacts on this species was determined to be low. Though potential habitat for this species is crossed, penstemon conservation areas identified in the *Conservation Agreement and Strategy for Graham's Beartongue and White River Beardtongue* (Penstemon Conservation Team 2014) would not be crossed by the alternative routes and it is likely that any populations encountered during preconstruction surveying could be avoided. All Project-related activities would adhere to the conservation measures specified in the *Conservation Agreement and Strategy for Graham's Beardtongue and White River Beardtongue* and subsequent Mitigation Plan (Penstemon Conservation Team 2014, 2015). Low-level impacts are those that would have only minor adverse effects on species and would not limit the long-term sustainability of populations (Table 3-67).

White River Beardtongue

Known populations of the White River beardtongue are limited to a 20-mile arc that extends from Raven Ridge west of Rangely in Rio Blanco County, Colorado, to the vicinity of Willow Creek in Uintah County (78 FR 47595). The best total population estimate is approximately 11,423 individuals (78 FR 47596). White River beardtongue is vulnerable to habitat destruction as a consequence of energy development, livestock grazing, and climate change (78 FR 47597–47606). Due to this species' relatively large population size, impacts on White River beardtongue habitat or populations could have an adverse effect on this species but not severely limit its long-term viability. Therefore, the level of initial impacts of the Project on White River beardtongue was determined to be moderate where the transmission line crosses habitat for this species. Selective Mitigation Measures 2 and 7 would be applied to minimize direct impacts on potential habitat for this species, if crossed, though indirect impacts on potential habitat could still occur. There are no known occurrences of this species within 1 mile of Project alternative route centerlines; therefore it is likely direct impacts on White River beardtongue plants could be avoided. As such, the level of residual impacts on this species was determined to be low. Though potential habitat for this species is crossed, penstemon conservation areas identified in the *Conservation Agreement and Strategy for Graham's Beartongue and White River Beardtongue* (Penstemon Conservation Team 2014) would not be crossed by the alternative routes and it is likely that any populations encountered during preconstruction surveying could be avoided. All Project-related activities would adhere to the conservation measures specified in the *Conservation Agreement and Strategy for Graham's Beardtongue and White River Beardtongue* and subsequent Mitigation Plan (Penstemon Conservation Team 2014, 2015). Low-level impacts are those that would have only minor adverse effects on species and would not limit the long-term sustainability of populations (Table 3-67).

Other Considerations

Sclerocactus Core Habitat

Core conservation areas have been established by the FWS to provide management guidance for habitat for both Uinta Basin hookless cactus and Pariette cactus (heretofore referred to as *Sclerocactus* core habitat), as no clear geographic delineation between the ranges and habitat requirements of these species exists (FWS 2012b). Level 1 core habitat includes high-density occupied *Sclerocactus* habitat and a 400-meter buffer around plants. Level 2 core habitat includes less-densely occupied *Sclerocactus* habitat and a 1,000-meter buffer around plants. Both buffer distances allow for pollinator travel between cactus locations (FWS 2012b). Polygons for these core habitat areas will be regarded as occupied *Sclerocactus* habitat for the purposes of this analysis and impacts on these areas are reported separately. Analysis of impacts on Uinta Basin hookless cactus and Pariette cactus potential habitat reported in this chapter is based on mapped areas in which the FWS requires surveys for these species to be conducted in advance of any project construction.

The level of initial impacts on Level 2 *Sclerocactus* core habitat was determined to be moderate for the same reasons as for Uinta Basin hookless cactus, namely that *Sclerocactus* species in this area have relatively large population sizes and habitat ranges and that impacts could have an adverse effect on this species but not severely limit its long-term viability. The level of initial impacts on Level 1 *Sclerocactus* core habitat was determined to be high as these occupied habitat areas have a higher density of cactus individuals than in Level 2 *Sclerocactus* core areas, and as the FWS has recommended that no new development occur in these areas (FWS 2012b). Selective Mitigation Measures 2, 5, and 7 would be applied to minimize surface disturbance and accessibility in both these core habitat areas, and Selective Mitigation Measure 12 also would be applied in Level 1 core habitat areas to restrict construction activities in these areas to outside the flowering period for *Sclerocactus* species. As a result, the level of residual impacts would be moderate for Level 1 *Sclerocactus* core habitat and low for Level 2 *Sclerocactus* core habitat. Moderate-level impacts are those that would have adverse effects on species

but would not severely limit the long-term sustainability of populations, or those that would result in loss of or negative impacts on small portions of unoccupied suitable habitat for local species (Table 3-67). Low-level impacts are those that would have only minor adverse effects on species and would not limit the long-term sustainability of populations (Table 3-67).

Methods for Additional Analysis of Potential Impacts

In addition to the analysis conducted to allow interdisciplinary comparison of alternative routes, additional analyses were required to adequately address some issues raised by the public and the agencies during scoping regarding potential impacts on special status plant resources or to meet the requirements of relevant law, regulation, or policy.

The total loss of special status plant habitat (in acres) due to Project features was estimated to provide an overview of potential impacts on special status plant resources. The analysis was completed by estimating the disturbance due to construction of features such as roads, transmission line tower, and other Project facilities and divided by the total length (in miles) of the alternative route to calculate the average rate of disturbance per mile. This rate was then used to estimate the extent of loss of special status plant habitat (in acres) that would occur with each specific length of habitat crossed by an alternative route.

As the rate of special status plant disturbance per mile varies by alternative route, the same length of special status plant habitat crossed by different alternative routes could have fluctuations in disturbance to a habitat.

Element occurrence data from state natural heritage programs, population points and occupied habitat polygons from the BLM, and modeled habitat from the Wyoming Natural Diversity Database (WYNDD) were used to determine the presence of or potential for federally listed and BLM- and USFS-listed sensitive species in the 2-mile corridor (1 mile on each side) of the Project alternative route centerlines. Numbers of element occurrences, population points, or occupied habitat polygons (hereafter occurrences) in these areas are reported by alternative route. Multiple population points reported in the same immediate area (from a single or multiple sources) were considered a single occurrence for the purpose of this analysis; therefore, numbers of occurrences in these results may not exactly match agency-supplied population data. Number of occurrences for each species will be reported for each Project alternative route in each state. Occurrences of all BLM- or USFS-listed sensitive plants will be reported regardless of land jurisdiction on which they occur (i.e., Colorado BLM-listed sensitive species may be reported in Utah). Total populations or numbers of individuals are not reported, as these data often are not recorded consistently between observers, states, or agencies.

3.2.6.5 Results

Disturbance to special status plant species habitat and populations would occur with all action alternative routes. Surveys for special status plants would be conducted along the selected alternative route following BLM, USFS, and/or FWS guidance and protocols. Selective Mitigation Measures 1, 2, 3, 5, 7, 12, and 15 would be applied to reduce impacts where special status plants and habitat are detected. These measures and others also may be applicable to habitat and occurrences of other special status plants including BLM and USFS sensitive species as identified during preconstruction surveys, though the specific areas to which these measures would be applied have not been identified. It is anticipated not all special status plant populations, individuals, and habitat would be able to be avoided. Areas of highest resource value, as determined by and approved by the agencies, would be given the highest priority for avoidance. All actions that could affect federally listed plants would be subject to the conditions established during Section 7 consultation. Sufficient data are not available at this time to determine if all habitat and plants could be avoided. Where avoidance is not possible, impacts could include permanent loss of habitat or populations of special status plant species. In some cases, permanent loss of habitat or populations of

special status plants could result in loss of federally listed plants and negative impacts on habitat for these species.

3.2.6.5.1 No Action Alternative

Under this alternative, the environment would remain as it presently exists.

3.2.6.5.2 Impacts Common to All Action Alternatives

There are no impacts common to all action alternative routes for special status plant resources.

3.2.6.5.3 345-kilovolt Ancillary Transmission Components

The 345kV ancillary transmission line components would be located in an area between the Mona and Clover substations west of the town of Mona, Utah. Most of the 345kV ancillary transmission line components would be in an existing right-of-way. No habitat for special status species would be crossed by 345kV transmission line components. No occurrences of special status species are within 1 mile of these components.

3.2.6.5.4 500-kilovolt Transmission Line Components

Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO)

The WYCO alternative routes are from Aeolus, Wyoming, to U.S. Highway 40 in Colorado (Map 2-3a). The majority of the alternative routes are in the Wyoming Basin Ecoregion. The Colorado Plateaus Ecoregion is crossed as the alternative routes proceed southwest of the area around Maybell, Colorado (refer to Section 3.2.5.3 for ecoregion descriptions).

Habitat for Barneby ridge-cress, Cisco milkvetch, clay phacelia, clay reed-mustard, Deseret milkvetch, Graham's beardtongue, Jones' cycladenia, Pariette cactus, San Rafael cactus, shrubby reed-mustard, Uinta Basin hookless cactus, and White River beardtongue is not known to occur in the areas crossed by the WYCO alternative routes would not be affected by any of the WYCO alternative routes. Additionally, no occurrences of these species are located within 1 mile of any WYCO alternative routes.

Alternative WYCO-B (Agency and Applicant Preferred Alternative)

Affected Environment (Wyoming)

Alternative WYCO-B in Wyoming predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities (Table 3-53).

Alternative WYCO-B in Wyoming crosses Ute ladies'-tresses potential habitat (Table 3-69) in four different areas, all in Carbon County:

- the floodplain of Medicine Bow River
- wetlands in Hanna Draw
- the floodplain of North Platte River
- wetlands in Hay Gulch.

No documented occurrences of federally listed plant species are within 1 mile of the centerline of Alternative WYCO-B in Wyoming.

TABLE 3-69 ALTERNATIVE ROUTE COMPARISON FOR SPECIAL STATUS PLANT RESOURCES INVENTORY DATA FOR THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES		
Alternative Routes	**Total Miles**	**Ute Ladies'-tresses Potential Habitat (miles crossed)**
WYCO-B (Agency and Applicant Preferred Alternative)	206.3	0.4
Wyoming	*141.0*	*0.2*
Colorado	*65.3*	*0.2*
WYCO-C	210.0	0.4
Wyoming	*144.7*	*0.2*
Colorado	*65.3*	*0.2*
WYCO-D	249.4	1.4
Wyoming	*134.9*	*0.4*
Colorado	*114.5*	*1.0*
WYCO-F	218.8	0.7
Wyoming	*153.5*	*0.5*
Colorado	*65.3*	*0.2*

Potential habitat for the BLM-listed sensitive species Gibbens' beardtongue and persistent-sepal yellowcress occur within 1 mile of the centerline of Alternative WYCO-B in Wyoming. This alternative route also crosses WYNDD-modeled habitat for meadow pussytoes and Beaver Rim phlox. WYNDD-modeled habitat for Cedar Rim thistle also occurs within 1 mile of this alternative route. Two occurrences of Gibbens' beardtounge and a single occurrence of persistent-sepal yellowcress are within 1 mile of the centerline of this alternative route in Wyoming.

Environmental Consequences (Wyoming)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative WYCO-B would have low residual impacts on Ute ladies'-tresses (Table 3-70) as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

TABLE 3-70 ALTERNATIVE ROUTE COMPARISON FOR SPECIAL STATUS PLANT RESOURCES RESIDUAL IMPACTS FOR THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES			
	Residual Impacts (miles crossed)		
Alternative Route	**Low**	**Moderate**	**High**
WYCO-B (Agency and Applicant Preferred Alternative)	0.4	0.0	0.0
Wyoming	*0.2*	*0.0*	*0.0*
Colorado	*0.2*	*0.0*	*0.0*
WYCO-C	0.4	0.0	0.0
Wyoming	*0.2*	*0.0*	*0.0*
Colorado	*0.2*	*0.0*	*0.0*
WYCO-D	1.4	0.0	0.0
Wyoming	*0.4*	*0.0*	*0.0*
Colorado	*1.0*	*0.0*	*0.0*
WYCO-F	0.7	0.0	0.0
Wyoming	*0.5*	0.0	*0.0*
Colorado	*0.2*	*0.0*	*0.0*

Results of Additional Analysis of Potential Impacts

The estimated area of Ute ladies'-tresses potential habitat that may be affected by Alternative WYCO-B in Wyoming is presented in Table 3-71.

TABLE 3-71
ESTIMATED EXTENT (IN ACRES) OF SPECIAL STATUS PLANT SPECIES POTENTIAL HABITAT AFFECTED FOR THE WYOMING TO COLORADO – AEOLUS TO U.S. HIGHWAY 40 (WYCO) ALTERNATIVE ROUTES

Alternative Route	Ute Ladies'-tresses
WYCO-B (Agency and Applicant Preferred Alternative)	6
Wyoming	*3*
Colorado	*3*
WYCO-C	6
Wyoming	*3*
Colorado	*3*
WYCO-D	22
Wyoming	*6*
Colorado	*16*
WYCO-F	11
Wyoming	*8*
Colorado	*3*

Information is not comprehensive regarding the locations of Project activities in relation to potential habitat for Gibbens' beardtongue and persistent-sepal yellowcress and the specific occurrence of persistent sepal-yellowcress; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or the extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to determine application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

Affected Environment (Colorado)

Alternative WYCO-B in Colorado predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities (Table 3-53).

No known or potential habitat for federally listed plant species is crossed by this alternative route and in Colorado (Table 3-69). No documented occurrences of federally listed plant species are within 1 mile of the centerline of this alternative route in Colorado.

Two occurrences of caespitose cat's-eye, three occurrences of debris milkvetch, and one occurrence of Ownbey's thistle (all BLM-listed sensitive species) are within 1 mile of the centerline of Alternative WYCO-B in Colorado. The debris milkvetch occurrences belong to a single larger area of habitat crossed by Alternative WYCO-B.

Environmental Consequences (Colorado)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative WYCO-B in Colorado would have no identifiable residual impacts on special status plant species (Table 3-70).

Results of Additional Analysis of Potential Impacts

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences of BLM-listed sensitive species within 1 mile of this alternative route; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

Alternative WYCO-C

Affected Environment (Wyoming)

Alternative WYCO-C in Wyoming predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities (Table 3-53).

Alternative WYCO-C in Wyoming crosses Ute ladies'-tresses potential habitat (Table 3-69) in four different areas, all in Carbon County:

- the floodplain of Medicine Bow River
- wetlands in Hanna Draw
- the floodplain of North Platte River
- wetlands in Hay Gulch.

No documented occurrences of federally listed plant species are within 1 mile of the centerline of this alternative route in Wyoming.

Potential habitat for the BLM-listed sensitive species Gibbens' beardtongue and persistent-sepal yellowcress occurs within 1 mile of the centerline of Alternative WYCO-C in Wyoming. Seventeen occurrences of Gibbens' beardtongue and one occurrence of persistent-sepal yellowcress are within 1 mile of the centerline of Alternative WYCO-C in Wyoming. Alternative WYCO-C also crosses WYNDD-modeled habitat for meadow pussytoes, Beaver Rim phlox, racemose milkvetch, stemless beardtongue, dense twinpod, and Cedar Rim thistle. WYNDD-modeled habitat for Cedar Rim thistle and large-footed bladderpod also occurs within 1 mile of this alternative route.

Environmental Consequences (Wyoming)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative WYCO-C in Wyoming would have low residual impacts on Ute ladies'-tresses (Table 3-70) as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

Results of Additional Analysis of Potential Impacts

The extent of Ute ladies'-tresses potential habitat that may be affected by Alternative WYCO-C in Wyoming is presented in Table 3-71.

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences of BLM-listed sensitive species within 1 mile of this alternative route; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by

the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

Affected Environment (Colorado)

Alternative WYCO-C in Colorado predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities (Table 3-53).

No known or potential habitat for federally listed plant species is crossed by Alternative WYCO-C in Colorado (Table 3-69). No documented occurrences of federally listed plant species are within 1 mile of the centerline of Alternative WYCO-C in Colorado.

Two occurrences of caespitose cat's-eye, three occurrences of debris milkvetch, and one occurrence of Ownbey's thistle (all BLM-listed sensitive species) are within 1 mile of the centerline of Alternative WYCO-C in Colorado. The debris milkvetch occurrences belong to a single larger area of habitat crossed by Alternative WYCO-C.

Environmental Consequences (Colorado)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative WYCO-C in Colorado would have no identifiable residual impacts on special status plant species (Table 3-70).

Results of Additional Analysis of Potential Impacts

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences of BLM-listed sensitive species within 1 mile of Alternative WYCO-C in Colorado; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

Alternative WYCO-D

Affected Environment (Wyoming)

Alternative WYCO-D in Wyoming predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities (Table 3-53).

Alternative WYCO-D in Wyoming crosses Ute ladies'-tresses potential habitat (Table 3-69) in five areas, all in Carbon County:

- the floodplain of Medicine Bow River
- near a series of springs to the north of Hi Allen Ridge
- the floodplain of the North Platte River
- Hay Gulch
- the floodplain of Muddy Creek

No documented occurrences of federally listed plant species are within 1 mile of the centerline of this alternative route in Wyoming.

Potential habitats for the BLM-listed sensitive species Gibbens' beardtongue and a single occurrence of persistent-sepal yellowcress occur within 1 mile of the centerline of Alternative WYCO-D in Wyoming. Alternative WYCO-D also crosses WYNDD-modeled habitat for meadow pussytoes and Beaver Rim phlox. WYNDD-modeled habitat for Cedar Rim thistle also occurs within 1 mile of this alternative route.

Environmental Consequences (Wyoming)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative WYCO-D in Wyoming would have low residual impacts on Ute ladies'-tresses (Table 3-70) as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

Results of Additional Analysis of Potential Impacts

The extent of Ute ladies'-tresses potential habitat that may be affected by construction of roads and transmission line towers with Alternative WYCO-D in Wyoming is presented in Table 3-71.

Information is not comprehensive regarding the locations of Project activities in relation to potential habitat for Biggens' beardtongue and the occurrence of persistent-sepal yellowcress; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

Affected Environment (Colorado)

Alternative WYCO-D in Colorado predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities (Table 3-53).

Alternative WYCO-D in Colorado crosses Ute ladies'-tresses potential habitat (Table 3-69) in four areas, all in Moffat County:

- the floodplain of the Little Snake River
- the area around Fortification Creek
- the floodplain of Cottonwood Creek, a smaller tributary of Fortification Creek
- the floodplain of the Yampa River

No documented occurrences of federally listed plant species are located within 1 mile of the centerline of Alternative WYCO-D in Colorado.

One occurrence of caespitose cat's-eye, three occurrences of debris milkvetch, and one occurrence of Ownbey's thistle (all BLM-listed sensitive species) are within 1 mile of the centerline of Alternative WYCO-D in Colorado. The debris milkvetch occurrences belong to a single larger area of habitat crossed by Alternative WYCO-D.

Environmental Consequences (Colorado)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative WYCO-D in Colorado would have low residual impacts on Ute ladies'-tresses (Table 3-70) as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

Results of Additional Analysis of Potential Impacts

The extent of Ute ladies'-tresses potential habitat that may be affected by construction of roads and transmission line towers with Alternative WYCO-D in Colorado is presented in Table 3-71.

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences of BLM-listed sensitive species within 1 mile of this alternative route; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

Alternative WYCO-F

Affected Environment (Wyoming)

Alternative WYCO-F in Wyoming predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities (Table 3-53).

Alternative WYCO-F in Wyoming crosses Ute ladies'-tresses potential habitat (Table 3-69) in seven areas:

- floodplain of Medicine Bow River
- wetlands in the Mexican Flats area
- a series of wetlands in the Robber's Gulch area
- floodplain of Cottonwood Creek, a tributary of Muddy Creek
- wetlands in Hanna Draw
- floodplain of North Platte River
- wetlands in Hay Gulch

No documented occurrences of federally listed plant species are within 1 mile of the centerline of Alternative WYCO-F in Wyoming.

Potential habitat for Gibbens' beardtongue and persistent-sepal yellowcress, both BLM-listed sensitive species, occurs within 1 mile of the centerline of Alternative WYCO-F in Wyoming. Three occurrences of Gibbens' beardtongue are crossed by or within 1 mile of the centerline of Alternative WYCO-F in Wyoming. One occurrence of persistent-sepal yellowcress is within 1 mile of the centerline of Alternative WYCO-F in Wyoming. This alternative route also crosses WYNDD-modeled habitat for meadow pussytoes and Beaver Rim phlox. WYNDD-modeled habitat for Ownbey's thistle also occurs within 1 mile of this alternative route.

Environmental Consequences (Wyoming)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative WYCO-F in Wyoming would have low residual impacts on Ute ladies'-tresses (Table 3-70) as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

Results of Additional Analysis of Potential Impacts

The extent of Ute ladies'-tresses potential habitat that may be affected by construction of roads and transmission line towers with Alternative WYCO-F in Wyoming is presented in Table 3-71.

Information is not comprehensive regarding the locations of Project activities in relation to occurrences and potential habitat of BLM-listed sensitive species within 1 mile of this alternative route; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

Affected Environment (Colorado)

Alternative WYCO-F in Colorado predominantly crosses big sagebrush and shrub/shrub steppe vegetation communities (Table 3-53).

No known or potential habitat for federally listed plant species is crossed by Alternative WYCO-F in Colorado (Table 3-69). No documented occurrences of federally listed plant species are within 1 mile of the centerline of Alternative WYCO-F in Colorado.

Two occurrences of caespitose cat's-eye, three occurrences of debris milkvetch, and one occurrence of Ownbey's thistle, all BLM-listed sensitive species, are within 1 mile of the centerline of Alternative WYCO-F in Colorado. The debris milkvetch occurrences belong to a single, larger area of habitat crossed by Alternative WYCO-F. The debris milkvetch occurrences belong to a single, larger area of habitat crossed by Alternative WYCO-F.

Environmental Consequences (Colorado)

Alternative WYCO-F would have no identifiable residual impacts on special status plant species (Table 3-70).

Results of Additional Analysis of Potential Impacts

Information is not comprehensive regarding the locations of Project activities in relation to occurrences of BLM-listed sensitive species within 1 mile of this alternative route; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the

results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

Colorado to Utah – U.S. Highway 40 to Baxter Pass to Clover (COUT BAX)

The COUT BAX alternative routes are from U.S. Highway 40 in Colorado to Clover, Utah, by way of Baxter Pass. The alternative routes travel south of the Uintah and Ouray Indian Reservation and pass through Green River, Utah (Map 2-3b). The COUT BAX alternative routes are predominantly in the Colorado Plateaus Ecoregion but cross into the Wasatch and Uinta Mountains and Central Basin and Range ecoregions as it approaches Mona, Utah (refer to Section 3.2.5.3 for ecoregion descriptions).

Habitat for Barneby ridge-cress, clay phacelia, clay reed-mustard, Deseret milkvetch, Graham's beardtongue, Jones' cycladenia, Pariette cactus, shrubby reed-mustard, Uinta Basin hookless cactus, or White River beardtongue habitat is not known to occur in the areas crossed by the COUT BAX alternative routes and would not be affected by any of the COUT BAX alternative routes. Additionally, no occurrences of these species are located within 1 mile of any COUT BAX alternative routes.

Alternative COUT BAX-B

Affected Environment (Colorado)

Alternative COUT BAX-B in Colorado predominantly crosses big sagebrush, pinyon-juniper, and shrub/shrub steppe vegetation communities (Table 3-57).

Alternative COUT BAX-B in Colorado crosses Ute ladies'-tresses potential habitat (Table 3-72) on the floodplain of the White River in Rio Blanco County.

TABLE 3-72
ALTERNATIVE ROUTE COMPARISON FOR SPECIAL STATUS PLANT RESOURCES INVENTORY DATA FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO BAXTER PASS TO CLOVER (COUT BAX) ALTERNATIVE ROUTES

Alternative Route	Total Miles	Special Status Plant Species Habitat (miles crossed)		
		Cisco Milkvetch	San Rafael Cactus	Ute Ladies'-tresses
COUT BAX-B	279.9	30.7	0.0	1.5
Colorado	*87.0*	*0.0*	*0.0*	*0.2*
Utah	*192.9*	*30.7*	*0.0*	*1.3*
COUT BAX-C	290.4	30.7	0.7	1.5
Colorado	*87.0*	*0.0*	*0.0*	*0.2*
Utah	*203.4*	*30.7*	*0.7*	*1.3*
COUT BAX-E	292.2	30.7	0.0	1.3
Colorado	*87.0*	*0.0*	*0.0*	*0.2*
Utah	*205.2*	*30.7*	*0.0*	*1.1*

No known occurrences of federally listed plant species are within 1 mile of the centerline of Alternative COUT BAX-B in Colorado.

Several occurrences of BLM- and USFS-listed sensitive plant species are within 1 mile of the centerline of Alternative COUT BAX-B in Colorado:

- 7 occurrences of debris milkvetch
- 1 occurrence of Duchesne milkvetch
- 5 occurrences of Ferron's milkvetch
- 1 occurrence of Grand Junction suncup

- 1 occurrence of Jones' bluestar
- 2 occurrences of narrow-stem gilia
- 1 occurrence of Ownbey's thistle
- 5 occurrences of Rollins' cat's-eye
- 1 occurrence of twisted buckwheat
- 1 occurrence of Uinta Basin spring-parsley.

Environmental Consequences (Colorado)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Potential residual impacts on special status plant resources crossed by Alternative COUT BAX-B in Colorado after application of selective mitigation measures are shown in Table 3-73.

Alternative COUT BAX-B in Colorado would have low residual impacts on Ute ladies'-tresses (Table 3-73) as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

TABLE 3-73
ALTERNATIVE ROUTE COMPARISON FOR SPECIAL STATUS PLANT RESOURCES RESIDUAL IMPACTS FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO BAXTER PASS TO CLOVER (COUT BAX) ALTERNATIVE ROUTES

Alternative Route	Residual Impacts (miles crossed)		
	Low	Moderate	High
COUT BAX-B	1.5	30.7	0.0
Colorado	*0.2*	*0.0*	*0.0*
Utah	*1.3*	*30.7*	*0.0*
COUT BAX-C	2.2	30.7	0.0
Colorado	*0.2*	*0.0*	*0.0*
Utah	*2.0*	*30.7*	*0.0*
COUT BAX-E	1.3	30.7	0.0
Colorado	*0.2*	*0.0*	*0.0*
Utah	*1.1*	*30.7*	*0.0*

Results of Additional Analysis of Potential Impacts

The extent of Ute ladies'-tresses potential habitat that may be affected by Alternative COUT BAX-B in Colorado is presented in Table 3-74.

TABLE 3-74
ESTIMATED EXTENT (IN ACRES) OF SPECIAL STATUS PLANT SPECIES HABITAT AFFECTED FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO BAXTER PASS TO CLOVER (COUT BAX) ALTERNATIVE ROUTES

Alternative Route	Special Status Plant Species Habitat (acres)		
	Cisco Milkvetch	San Rafael Cactus	Ute Ladies'-tresses
COUT BAX-B	515	0	26
Colorado	*0*	*0*	*3*
Utah	*515*	*0*	*22*
COUT BAX-C	511	12	25
Colorado	*0*	*0*	*3*
Utah	*511*	*12*	*22*
COUT BAX-E	507	0	22
Colorado	*0*	*0*	*3*
Utah	*507*	*0*	*18*

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences and occupied habit for Cisco milkvetch, San Rafael cactus, and the several BLM- and USFS-listed sensitive species within 1 mile of this alternative route; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

Affected Environment (Utah)

Alternative COUT BAX-B in Utah predominantly crosses big sagebrush, pinyon-juniper, and shrub/shrub steppe vegetation communities (Table 3-57).

Alternative COUT BAX-B in Utah crosses Cisco milkvetch habitat (Table 3-72) in the areas of Whipshaw Flat, Sagers Flat, and Danish Flat to the southeast of the Book Cliffs in Grand County.

Alternative COUT BAX-B in Utah also crosses Ute ladies'-tresses potential habitat (Table 3-72) in six areas:

- floodplain of the Green River in Grand County
- floodplain of Huntington Creek in Emery County
- wetlands in the area of Wilberg Flat in Emery County
- floodplain of the San Pitch River in Sanpete County
- wetlands and riparian areas in the canyon between Nephi and Fountain Green in Juab County
- wetlands in the Juab Valley in Juab County

Two occurrences of Cisco milkvetch and one occurrence of San Rafael cactus are within 1 mile of the centerline of Alternative COUT BAX-B in Utah.

Several occurrences of BLM- and USFS-listed sensitive plant species are located within 1 mile of the centerline of Alternative COUT BAX-B in Utah:

- 1 occurrence of Bolander's camissonia
- 1 occurrence of canyon sweet-vetch
- 1 occurrence of Carrington daisy
- 7 occurrences of Creutzfeldt's cat's-eye
- 1 occurrence of Ferron's milkvetch
- 1 occurrence of Psoralea globemallow
- 1 occurrence of Thompson's talinum
- 3 occurrences of twisted buckwheat

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative COUT BAX-B in Utah would have moderate residual impacts on Cisco milkvetch (Table 3-73) as Project activities would result in loss or adverse modification of small portions of unoccupied suitable habitat for this species (Table 3-67).

Alternative COUT BAX-B in Utah would have low residual impacts on Ute ladies'-tresses (Table 3-73) as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

Results of Additional Analysis of Potential Impacts

The extent of Cisco milkvetch and Ute ladies'-tresses potential habitat that may be affected by Alternative COUT BAX-B in Utah is presented in Table 3-74.

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences of BLM-listed sensitive species within 1 mile of this alternative route; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT BAX-B would be in conformance with USFS policy objectives pertaining to USFS sensitive plant species. The results of these analyses are presented in the Vegetation and Special Status Plants Report available for review and download from the Project website. The analysis found that Alternative COUT BAX-B could be approved in compliance with USFS policy objectives pertaining to USFS sensitive plant species (USFS 2015a).

Alternative COUT BAX-C

Affected Environment and Environmental Consequences Colorado

The affected environment and environmental consequences of Alternative COUT BAX-C in Colorado would be the same as those for Alternative COUT BAX-B in Colorado.

Affected Environment (Utah)

Alternative COUT BAX-C in Utah predominantly crosses big sagebrush, pinyon-juniper, and shrub/shrub steppe vegetation communities (Table 3-57).

Alternative COUT BAX-C in Utah crosses potential Cisco milkvetch habitat (Table 3-72) in the areas of Whipshaw Flat, Sagers Flat, and Danish Flat to the southeast of the Book Cliffs in Grand County.

Alternative COUT BAX-C in Utah also crosses known San Rafael cactus habitat (Table 3-72) in Emery County in the Furniture Draw area south of the Cedar Mountains.

Alternative COUT BAX-C in Utah also crosses Ute ladies'-tresses potential habitat (Table 3-72) in six areas:

- floodplain of the Green River in Grand County
- floodplain of Huntington Creek in Emery County
- wetlands in the area of Wilberg Flat in Emery County
- floodplain of the San Pitch River in Sanpete County
- wetlands and riparian areas the canyon between Nephi and Fountain Green in Juab County
- wetlands in the Juab Valley in Juab County

Two occurrences of Cisco milkvetch and one occurrence of San Rafael cactus are within 1 mile of the centerline of Alternative COUT BAX-C in Utah.

Several occurrences of BLM- and USFS-listed sensitive plant species are within 1 mile of the centerline of Alternative COUT BAX-C in Utah:

- 1 occurrence of canyon sweet-vetch
- 1 occurrence of Carrington daisy
- 7 occurrences of Creutzfeldt's cat's-eye
- 3 occurrences of Ferron's milkvetch
- 3 occurrences of twisted buckwheat

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative COUT BAX-C in Utah would have low residual impacts on Ute ladies'-tresses (Table 3-73) as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

Alternative COUT BAX-C in Utah would have low residual impacts on San Rafael cactus (Table 3-73) as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

Alternative COUT BAX-C in Utah would have moderate residual impacts on Cisco milkvetch (Table 3-73) as Project activities would result in loss or adverse modification of small portions of unoccupied suitable habitat for this species (Table 3-67).Results of Additional Analysis of Potential Impacts

The extent of Cisco milkvetch, San Rafael cactus, and Ute ladies'-tresses habitat that may be affected by Alternative COUT BAX-C in Utah is presented in Table 3-74.

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences of BLM-listed sensitive species within 1 mile of this alternative route; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures including avoidance of special status plants to the extent practicable.

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT BAX-C would be in conformance with USFS policy objectives pertaining to USFS sensitive plant species. The results of these analyses are presented in the Vegetation and Special Status Plants Report available for review and download from the Project website. The analysis found that Alternative COUT BAX-C could be approved in compliance with USFS policy objectives pertaining to USFS sensitive plant species (USFS 2015a).

Alternative COUT BAX-E

Affected Environment and Environmental Consequences (Colorado)

The affected environment and environmental consequences of Alternative COUT BAX-E in Colorado would be the same as those for Alternative COUT BAX-B in Colorado.

Affected Environment (Utah)

Alternative COUT BAX-E in Utah predominantly crosses big sagebrush, pinyon-juniper, and shrub/shrub steppe vegetation communities (Table 3-57).

Alternative COUT BAX-E in Utah crosses Cisco milkvetch potential habitat (Table 3-72) in the areas of Whipshaw Flat, Sagers Flat, and Danish Flat to the southeast of the Book Cliffs in Grand County.

Alternative COUT BAX-E in Utah also crosses Ute ladies'-tresses potential habitat (Table 3-72) in seven areas:

- floodplain of the Green River in Grand County
- floodplain of the Price River in two locations in Emery County
- the floodplain of the Grassy Trail Creek in Emery County
- Marsing Wash in Emery County
- Bob Wright Wash in Carbon County
- wetlands and riparian areas the canyon between Nephi and Fountain Green in Juab County
- wetlands in the Juab Valley in Juab County

Two occurrences of Cisco milkvetch are found within 1 mile of the centerline of Alternative COUT BAX-E in Utah.

Three occurrences of Ferron's milkvetch and three occurrences of twisted buckwheat, both BLM-listed sensitive species, are within 1 mile of the centerline of Alternative COUT BAX-E in Utah.

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative COUT BAX-E in Utah would have moderate residual impacts on Cisco milkvetch (Table 3-73) as Project activities would result in loss or adverse modification of small portions of unoccupied suitable habitat for this species (Table 3-67).

Residual impacts on Ute ladies'-tresses for Alternative COUT BAX-E would be low (Table 3-73) as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

Results of Additional Analysis of Potential Impacts

The extent of Cisco milkvetch and Ute ladies'-tresses potential habitat that may be affected by Alternative COUT BAX-E in Utah is presented in Table 3-74.

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences and occupied habitat for Cisco milkvetch and the two BLM-listed sensitive plant species within 1 mile of this alternative route; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys

would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT BAX-E would be in conformance with USFS policy objectives pertaining to USFS sensitive plant species. The results of these analyses are presented in the Vegetation and Special Status Plants Report available for review and download from the Project website. The analysis found that Alternative COUT BAX-E could be approved in compliance with USFS policy objectives pertaining to USFS sensitive plant species (USFS 2015a).

Colorado to Utah – U.S. Highway 40 to Central Utah to Clover (COUT)

The COUT alternative routes occur from U.S. Highway 40 in Colorado to Clover, Utah, by way of the Uinta Basin (Map 2-3b). The alternative routes are predominantly in the Colorado Plateaus Ecoregion but cross into the Wasatch and Uinta Mountains and Central Basin and Range ecoregions as it approaches Mona, Utah (refer to Section 3.2.5.3 for ecoregion descriptions).

Habitat for Barneby ridge-cress, Cisco milkvetch, Deseret milkvetch, Jones' cycladenia, San Rafael cactus, or shrubby reed-mustard is not known to occur in the areas crossed by the COUT alternative routes and would not be affected by any of the COUT alternative routes. Additionally, no occurrences of Cisco milkvetch, Dudley Bluffs twinpod, Jones' cycladenia, Pariette cactus, San Rafael cactus, or shrubby reed-mustard are located within 1 mile of any COUT alternative routes.

Alternative COUT-A

Affected Environment (Colorado)

Alternative COUT-A in Colorado predominantly crosses big sagebrush, pinyon-juniper, and shrub/shrub steppe vegetation communities (Table 3-61).

No known or potential habitat for federally listed plant species is crossed by Alternative COUT-A in Colorado (Table 3-75).

No documented occurrences of federally listed plant species are located within 1 mile of the centerline of Alternative COUT-A in Colorado.

Two occurrences of debris milkvetch, one occurrence of narrow-stem gilia, and two occurrences of Ownbey's thistle (all BLM-listed sensitive species) occur within 1 mile of the centerline of Alternative COUT-A in Colorado.

TABLE 3-75
ALTERNATIVE ROUTE COMPARISON FOR SPECIAL STATUS PLANT RESOURCES INVENTORY DATA FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES

Alternative Route	Total Miles	Special Status Plant Species Habitat (miles crossed)									
		Barneby Ridge-cress	Clay Phacelia	Clay Reed-mustard	Deseret Milkvetch	Graham's Beardtongue	Level 1 *Sclerocactus* Core Habitat (high density occupied habitat)	Level 2 *Sclerocactus* Core Habitat (low density occupied habitat)	Uinta Basin Hookless Cactus (potential habitat)	Ute Ladies'-tresses	White River Beardtongue
COUT-A	207.9	3.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0
Colorado	*24.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Utah	*183.6*	*3.6*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*4.8*	*0.0*
COUT-B	218.2	0.0	1.0	0.0	0.0	13.9	0.0	0.0	0.0	6.2	13.9
Colorado	*24.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Utah	*193.9*	*0.0*	*1.0*	*0.0*	*0.0*	*13.9*	*0.0*	*0.0*	*0.0*	*6.2*	*13.9*
COUT-C (Agency and Applicant Preferred Alternative)	208.2	0.0	1.0	4.2	0.0	7.5	2.4	8.4	33.8	1.0	7.5
Colorado	*25.0*	*0.0*	*0.0*	*0.0*	*0.0*	0.2	0.0	*0.0*	*0.0*	*0.0*	*0.2*
Utah	*183.2*	*0.0*	*1.0*	*4.2*	*0.0*	7.3	2.4	*8.4*	*33.8*	*1.0*	*7.3*
COUT-H	200.6	0.0	0.0	4.2	0.0	6.2	2.4	8.4	33.8	0.8	6.2
Colorado	*25.0*	*0.0*	*0.0*	*0.0*	*0.0*	0.2	0.0	*0.0*	*0.0*	*0.0*	*0.2*
Utah	*175.6*	*0.0*	*0.0*	*4.2*	*0.0*	6.0	2.4	*8.4*	*33.8*	*0.8*	*6.0*
COUT-I	240.2	0.0	0.0	4.2	0.0	6.2	2.4	8.4	33.8	0.9	6.2
Colorado	*25.0*	*0.0*	*0.0*	*0.0*	*0.0*	0.2	0.0	*0.0*	*0.0*	*0.0*	*0.2*
Utah	*215.2*	*0.0*	*0.0*	*4.2*	*0.0*	6.0	2.4	*8.4*	*33.8*	*0.9*	*6.0*

Environmental Consequences (Colorado)

Alternative COUT-A in Colorado would have no identifiable residual impacts on special status plant species (Table 3-76).

TABLE 3-76
ALTERNATIVE ROUTE COMPARISON FOR SPECIAL STATUS PLANT RESOURCES RESIDUAL IMPACTS FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES

Alternative Route	Residual Impacts (miles crossed)		
	Low	Moderate	High
COUT-A	4.8	3.7	0.0
Colorado	0.0	*0.0*	*0.0*
Utah	4.8	*3.7*	*0.0*
COUT-B	20.1	1.0	0.0
Colorado	0.0	*0.0*	*0.0*
Utah	20.1	*1.0*	*0.0*

TABLE 3-76 ALTERNATIVE ROUTE COMPARISON FOR SPECIAL STATUS PLANT RESOURCES RESIDUAL IMPACTS FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES			
Alternative Route	**Residual Impacts (miles crossed)**		
	Low	**Moderate**	**High**
COUT-C (Agency and Applicant Preferred Alternative)	36.3	6.9	0.0
Colorado	0.2	*0.0*	*0.0*
Utah	36.1	*6.9*	*0.0*
COUT-H	34.8	5.9	0.0
Colorado	0.2	*0.0*	*0.0*
Utah	34.6	*5.9*	*0.0*
COUT-I	34.9	5.9	0.0
Colorado	*0.2*	*0.0*	*0.0*
Utah	*34.7*	*5.9*	*0.0*

Results of Additional Analysis of Potential Impacts

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences of BLM-listed sensitive species within 1 mile of this alternative route; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

<u>Affected Environment (Utah)</u>

Alternative COUT-A in Utah predominantly crosses big sagebrush, pinyon-juniper, and shrub/shrub steppe vegetation communities (Table 3-61).

Alternative COUT-A in Utah crosses Ute ladies'-tresses potential habitat (Table 3-75) in the following areas:

- floodplain of the Green River in Uintah County
- wetlands around the Ouray Valley Canal in Uintah County
- floodplain of the Uinta River in Uintah County
- floodplain of Dry Gulch Creek and its tributaries in Uintah County
- wetlands in Cobble Hollow in Duchesne County
- wetlands in Big Sand Wash in Duchesne County
- floodplain of Lake Fork River in Duchesne County
- floodplain of Duchesne River, Duchesne County
- floodplain of Red Creek in Duchesne County
- floodplain of Currant Creek in Duchesne County
- floodplain of Soldier Creek in Spanish Fork Canyon in Utah County
- floodplain of Lake Fork Creek in Utah County
- floodplain of Thistle Creek in Utah County
- wetlands and riparian areas in the canyon between Nephi and Fountain Green in Juab County
- wetlands in the Juab Valley in Juab County

Alternative COUT-A in Utah also crosses clay phacelia suitable habitat (Table 3-75) in Spanish Fork Canyon in Utah County.

One occurrence of Deseret milkvetch (comprised of several polygons and points) and five occurrences of Ute ladies'-tresses are within 1 mile of the centerline of Alternative COUT-A in Utah.

Potential habitat for Hamilton's milkvetch occurs within 1 mile of the centerline of Alternative COUT-A in Utah. Three occurrences of Horseshoe milkvetch (comprised of several points), two occurrences of debris milkvetch, five occurrences of Duchesne milkvetch, and two occurrences of Uinta Basin spring-parsley, all BLM-listed sensitive species, also occur within 1 mile the centerline of Alternative COUT-A in Utah.

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative COUT-A in Utah would have low residual impacts on Ute ladies'-tresses (Table 3-76), as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

Alternative COUT-A in Utah would have moderate residual impacts on clay phacelia (Table 3-76) as Project activities would result in loss or adverse modification of small portions of unoccupied suitable habitat for this species (Table 3-67).

Results of Additional Analysis of Potential Impacts

The extent of clay phacelia habitat and Ute ladies'-tresses potential habitat that may be affected by Alternatives COUT-A in Utah are presented in Table 3-77.

TABLE 3-77
ESTIMATED EXTENT (IN ACRES) OF SPECIAL STATUS PLANT SPECIES HABITAT AFFECTED FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES

Alternative Route	Barneby Ridge-cress	Clay Phacelia	Clay Reed-mustard	Deseret Milkvetch	Graham's Beardtongue	Level 1 *Sclerocactus* Core Habitat (high density occupied habitat)	Level 2 *Sclerocactus* Core Habitat (low density occupied habitat)	Uinta Basin Hookless Cactus (potential habitat)	Ute Ladies'-tresses	White River Beardtongue
COUT-A	64	2	0	0	0	0	0	0	85	0
Colorado	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Utah	*64*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*85*	*0*
COUT-B	0	17	0	0	241	0	0	0	107	241
Colorado	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Utah	*0*	*17*	*0*	*0*	*241*	*0*	*0*	*0*	*107*	*241*

TABLE 3-77
ESTIMATED EXTENT (IN ACRES) OF SPECIAL STATUS PLANT SPECIES HABITAT AFFECTED FOR THE COLORADO TO UTAH – U.S. HIGHWAY 40 TO CENTRAL UTAH TO CLOVER (COUT) ALTERNATIVE ROUTES

Alternative Route	Barneby Ridge-cress	Clay Phacelia	Clay Reed-mustard	Deseret Milkvetch	Graham's Beardtongue	Level 1 *Sclerocactus* Core Habitat (high density occupied habitat)	Level 2 *Sclerocactus* Core Habitat (low density occupied habitat)	Uinta Basin Hookless Cactus (potential habitat)	Ute Ladies'-tresses	White River Beardtongue
COUT-C (Agency and Applicant Preferred Alternative)	0	19	78	0	140	48	157	630	19	140
Colorado	*0*	*0*	*0*	*0*	*4*	*0*	*0*	*0*	*0*	*4*
Utah	*0*	*19*	*78*	*0*	*136*	*48*	*157*	*630*	*19*	*136*
COUT-H	0	0	76	0	113	43	152	612	15	113
Colorado	*0*	*0*	*0*	*0*	*4*	*0*	*0*	*0*	*0*	*4*
Utah	*0*	*0*	*76*	*0*	*109*	*43*	*152*	*612*	*15*	*109*
COUT-I	0	0	75	0	111	43	150	*602*	16	111
Colorado	*0*	*0*	*0*	*0*	*4*	*0*	*0*	*0*	*0*	*4*
Utah	*0*	*0*	*75*	*0*	*107*	*43*	*150*	*602*	*16*	*107*

NOTE: Acres in the table are rounded and, therefore, columns may not sum exactly.

Potential habitat for clay phacelia would be crossed by this alternative route, though all known populations and reintroduction sites of this species would be avoided. USFS has conducted surveys for clay phacelia in some areas of potential habitat, though complete, systematic surveys have not been conducted in all habitat (Leinbach 2013). Large annual fluctuations in the number of plants detectable at known sites have been observed (Leinbach 2013) and undetected populations of clay phacelia may occur in surveyed or unsurveyed potential habitats. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) and Project construction would be avoided in all occupied habitat. Additionally, conservation measures for clay phacelia were developed in 2013 as a collaborative effort between the USFS and FWS (Tables J-16 and J-17, Appendix J). These include the avoidance of modeled suitable habitat (including buffered areas) for activities such as road construction, permanent features, vegetation treatments (including weed management), and stringing of wires between towers (refer to Appendix J for a complete list). If avoidance is not possible in suitable habitat, the USFS and FWS recommend that total cumulative disturbance not exceed 10 percent. Additional mitigation may be required in the event of disturbance on suitable habitat for this species. Disturbance would not be allowed within 650 feet of known occupied habitat or reintroduction sites.

Habitat for Deseret milkvetch is not directly crossed by Project centerlines; however, the single occurrence of Deseret milkvetch within 1 mile of the centerline of Alternative COUT-A is the only known population of this species and is located adjacent to an access road on UDWR property. Though the centerline of this alternative route does not cross habitat for this species, impacts on habitat and populations of this species could occur if this access road is used and improved during Project construction and maintenance.

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences of Barneby ridge-cress, Ute ladies'-tresses, and the several BLM-listed sensitive species within 1 mile of Alternative COUT-A; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

Quantitative analysis of impacts on the habitat or populations of these species is not possible without site-specific engineering design; however, habitat and occurrences of all special status plant species would be avoided wherever practicable through incorporation of Selective Mitigation Measures 2 and 7.

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT-A would be in conformance with USFS policy objectives pertaining to USFS sensitive plant species. The results of these analyses are presented in the Vegetation and Special Status Plants Report available for review and download from the Project website. The analysis found that Alternative COUT-A could be approved in compliance with USFS policy objectives pertaining to USFS sensitive plant species (USFS 2015a).

Alternative COUT-B

Affected Environment and Environmental Consequences (Colorado)

The affected environment and environmental consequences of Alternative COUT-B in Colorado would be the same as those for Alternative COUT-A in Colorado.

Affected Environment (Utah)

Alternative COUT-B in Utah predominantly crosses big sagebrush, pinyon-juniper, and shrub/shrub steppe vegetation communities (Table 3-61).

Alternative COUT-B in Utah crosses clay phacelia suitable habitat (Table 3-75) in Spanish Fork Canyon in Utah County.

Alternative COUT-B in Utah crosses habitat for both Graham's beardtongue and White River beardtongue (Table 3-75) in Sowers Canyon, Duchesne County.

Alternative COUT-B in Utah crosses Ute ladies'-tresses potential habitat (Table 3-75) in the following areas:

- floodplain of the Green River in Uintah County
- wetlands around the Ouray Valley Canal in Uintah County
- floodplain of the Uinta River in Uintah County
- floodplain of Dry Gulch Creek and its tributaries in Uintah County
- wetlands in Cobble Hollow in Duchesne County
- wetlands in Big Sand Wash in Duchesne County
- floodplain of Lake Fork River in Duchesne County
- wetlands in Zimmerman Wash in Duchesne County
- floodplain of Duchesne River, Duchesne County

- stream banks in Sowers Canyon, Duchesne County
- floodplain of Soldier Creek in Spanish Fork Canyon, Utah County
- floodplain of Lake Fork Creek in Utah County
- floodplain of Thistle Creek in Utah County
- wetlands and riparian areas the canyon between Nephi and Fountain Green in Juab County
- wetlands in the Juab Valley in Juab County

Three occurrences of clay phacelia (all known populations of this species) and several reintroduction sites are within 1 mile of the centerline of Alternative COUT-B in Utah. One occurrence of Deseret milkvetch (comprised of several polygons and points) is within 1 mile of the centerline of this alternative route. Two occurrences of Ute ladies'-tresses are also within 1 mile of the centerline of this alternative route.

Potential habitat for horseshoe milkvetch and Hamilton's milkvetch occurs within 1 mile of the centerline of Alternative COUT-B in Utah. Several occurrences of BLM- and USFS-listed sensitive plant species are within 1 mile of the centerline of this alternative route in Utah:

- 1 occurrence of Barneby's cat's-eye
- 2 occurrences of debris milkvetch
- 4 occurrences of Duchesne milkvetch
- 1 occurrence of Goodrich's blazingstar
- 4 occurrences of Goodrich's Columbine3 occurrence of horseshoe milkvetch (comprised of several points)
- 2 occurrences of Uinta Basin spring-parsley
- 2 occurrences of Untermann's daisy (each consisting of several mapped populations).

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative COUT-B in Utah would have moderate residual impacts on clay phacelia (Table 3-76) as Project activities would result in loss or adverse modification of small portions of unoccupied suitable habitat for this species (Table 3-67).

Alternative COUT-B in Utah would have low residual impacts on Graham's beardtongue and White River beardtongue (Table 3-76) as Project activities would have only minor adverse effects on these species and would not limit the long-term sustainability of populations (Table 3-67).

Alternative COUT-B in Utah would have low residual impacts on Ute ladies'-tresses (Table 3-76) as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

Results of Additional Analysis of Potential Impacts

The extent of clay phacelia, Graham's beardtongue, White River beardtongue, and Ute ladies'-tresses habitat that may be affected by Alternative COUT-B in Utah is presented in Table 3-77.

Potential habitat for clay phacelia would be crossed by Alternative COUT-B in Utah, though all known populations and reintroduction sites of this species would be avoided. USFS has conducted surveys for clay phacelia in some areas of potential habitat, though complete, systematic surveys have not been conducted in all habitat (Leinbach 2013). Large annual fluctuations in the number of plants detectable at known sites have been observed (Leinbach 2013), and undetected populations of clay phacelia may occur in surveyed or unsurveyed potential habitats. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3), and Project

construction would be avoided in all occupied habitat. Additionally, conservation measures for clay phacelia were developed in 2013 as a collaborative effort between the USFS and FWS (Tables J-16 and J-17, Appendix J). These include the avoidance of modeled suitable habitat (including buffered areas) for activities such as road construction, permanent features, vegetation treatments (including weed management), and stringing of wires between towers (refer to Appendix J for a complete list). If avoidance is not possible in suitable habitat, the USFS and FWS recommend that total cumulative disturbance not exceed 10 percent. Additional mitigation may be required in the event of disturbance to suitable habitat for this species. Disturbance would not be allowed within 650 feet of known occupied habitat or reintroduction sites.

Habitat for Deseret milkvetch is not directly crossed by Project centerlines; however, the single occurrence of Deseret milkvetch within 1 mile of the centerline of Alternative COUT-B in Utah is the only known population of this species and is located adjacent to an access road on UDWR property. Though the centerline of this alternative route does not cross habitat for this species, impacts on habitat and populations of this species could occur if this access road is used and improved during Project construction and maintenance.

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences of Ute ladies'-tresses and the several BLM- and USFS-listed sensitive plant species within 1 mile of this alternative route; therefore it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT-B would be in conformance with USFS policy objectives pertaining to USFS sensitive plant species. The results of these analyses are presented in the Vegetation and Special Status Plants Report available for review and download from the Project website. The analysis found that Alternative COUT-B could be approved in compliance with USFS policy objectives pertaining to USFS sensitive plant species (USFS 2015a).

Alternative COUT-C (Agency and Applicant Preferred Alternative)

Affected Environment (Colorado)

Alternative COUT-C in Colorado predominantly crosses big sagebrush, pinyon-juniper, and shrub/shrub steppe vegetation communities (Table 3-61).

Alternative COUT-C in Colorado crosses habitat for both Graham's beardtongue and White River beardtongue (Table 3-75) in Rio Blanco County, Colorado.

Several BLM-listed sensitive plant species are within 1 mile of the centerline of Alternative COUT-C in Colorado:

- 1 occurrence of debris milkvetch
- 1 occurrence of ephedra buckwheat
- 1 occurrence of Graham's beardtongue

- 1 occurrence of Rollin's cat's-eye
- 1 occurrence of Ownbey's thistle

Environmental Consequences (Colorado)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative COUT-C in Colorado would have low residual impacts on Graham's beardtongue and White River beardtongue (Table 3-76) as Project activities would have only minor adverse effects on these species and would not limit the long-term sustainability of populations (Table 3-67).

Results of Additional Analysis of Potential Impacts

The extent of Graham's beardtongue and White River beardtongue known habitat that may be affected by Alternative COUT-C in Colorado is presented in Table 3-77.

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences of several BLM-listed sensitive plant species within 1 mile of this alternative route in Colorado; therefore it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable.

Affected Environment (Utah)

Alternative COUT-C in Utah predominantly cross big sagebrush, pinyon-juniper, and shrub/shrub steppe vegetation communities (Table 3-61).

Alternative COUT-C in Utah crosses clay phacelia suitable habitat (Table 3-75) in Spanish Fork Canyon.

Alternative COUT-C in Utah also crosses clay reed-mustard habitat (Table 3-75) in Uintah County near the banks of the Green River.

Alternative COUT-C in Utah crosses habitat for both Graham's beardtongue and White River beardtongue (Table 3-75) in the area from the Bad Land Cliffs to Argyle Canyon in Duchesne County. Proposed critical habitat for Graham's beardtongue also occurs within 1 mile of this alternative route in Utah near the Ray's Bottom section of the Green River.

Alternative COUT-C in Utah crosses known Uinta Basin hookless cactus habitat and Level 1 and Level 2 *Sclerocactus* core habitat in the Uinta Basin (Table 3-75). The dominant federally listed plant species in these areas is assumed to be Uinta Basin hookless cactus, though Pariette cactus also may occur.

Alternative COUT-C in Utah crosses Ute ladies'-tresses potential habitat (Table 3-75) in the following areas

- floodplain of Willow Creek in Uintah County
- floodplain of the Green River in Uintah County
- floodplain of Soldier Creek in Spanish Fork Canyon in Utah County
- Lake Fork Creek in Utah County
- floodplain of Thistle Creek in Utah County

- wetlands and riparian areas the canyon between Nephi and Fountain Green in Juab County
- wetlands in the Juab Valley in Juab County

Three occurrences and several introduction sites of clay phacelia (all known populations of this species), two occurrences (comprising 22 mapped populations) of clay reed-mustard, one occurrence of Deseret milkvetch (comprised of several polygons and points), and nine occurrences of Uinta Basin hookless cactus are within 1 mile of the centerline of this alternative route in Utah.

Several occurrences of BLM- and USFS-listed sensitive plant species are within 1 mile of the centerline of Alternative COUT-C in Utah:

- 1 occurrence of caespitose cat's-eye
- 5 occurrences of debris milkvetch
- 1 occurrence of Duchesne milkvetch
- 4 occurrences of Graham's beardtongue
- 1 occurrence (comprising two populations) of horseshoe milkvetch
- 2 occurrences of hairy Townsend daisy
- 3 occurrences of Uinta Basin spring-parsley

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative COUT-C in Utah would have moderate residual impacts on clay phacelia (Table 3-76) as Project activities would result in loss or adverse modification of small portions of unoccupied suitable habitat for this species (Table 3-67).

Alternative COUT-C in Utah would have moderate residual impacts on clay reed-mustard (Table 3-76) as Project activities would result in loss or adverse modification of small portions of unoccupied suitable habitat for this species (Table 3-67).

Alternative COUT-C in Utah would have low residual impacts on Graham's beardtongue and White River beardtongue (Table 3-76) as Project activities would have only minor adverse effects on these species and would not limit the long-term sustainability of populations (Table 3-67).

Alternative COUT-C in Utah would have low residual impacts on Uinta Basin hookless cactus habitat (Table 3-76) as Project activities in these areas would have only minor adverse effects on Uinta Basin hookless cactus and would not limit the long-term sustainability of populations (Table 3-67).

Densities of cacti in Level 2 *Sclerocactus* core habitat are low, and the transmission line would be sited to avoid plants as practicable. In areas where complete avoidance is not possible, additional mitigation would be applied in accordance with agency policy. Therefore, Alternative COUT-C in Utah would have low residual impacts in Level 2 *Sclerocactus* core habitat (Table 3-76). Densities of cacti in Level 1 *Sclerocactus* core habitat are higher than in Level 2 *Sclerocactus* core habitat; therefore, residual impacts in Level 1 *Sclerocactus* core habitat would be moderate (Table 3-76). As with Level 2 *Sclerocactus* core habitat, the transmission line in Level 1 *Sclerocactus* core habitat would be sited to avoid plants as practicable and additional mitigation would be applied in accordance with agency policy where complete avoidance is not possible.

Alternative COUT-C in Utah would have low residual impacts on Ute ladies'-tresses (Table 3-76) as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

Results of Additional Analysis of Potential Impacts

The extent of clay phacelia habitat, clay reed mustard habitat, Graham's beardtongue potential habitat, *Sclerocactus* core habitat, Uinta Basin hookless cactus habitat, Ute ladies'-tresses potential habitat, and White River beardtongue potential habitat that may be affected by Alternative COUT-C in Utah is presented in Table 3-77.

Potential habitat for clay phacelia would be crossed by this alternative route, though all known populations and reintroduction sites of this species would be avoided. USFS has conducted surveys for clay phacelia in some areas of potential habitat, though complete, systematic surveys have not been conducted in all habitat (Leinbach 2013). Large annual fluctuations in the number of plants detectable at known sites have been observed (Leinbach 2013) and undetected populations of clay phacelia may occur in surveyed or unsurveyed potential habitats. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) and Project construction would be avoided in all occupied habitat. Additionally, conservation measures for clay phacelia were developed in 2013 as a collaborative effort between the USFS and FWS (Tables J-16 and J-17, Appendix J). These include the avoidance of modeled suitable habitat (including buffered areas) for activities such as road construction, permanent features, vegetation treatments (including weed management), and stringing of wires between towers (refer to Appendix J for a complete list). If avoidance is not possible in suitable habitat, the USFS and FWS recommend that total cumulative disturbance not exceed 10 percent. Additional mitigation may be required in the event of disturbance to suitable habitat for this species. Disturbance would not be allowed within 650 feet of known occupied habitat or reintroduction sites.

Habitat for Deseret milkvetch is not directly crossed by Project centerlines; however, the single occurrence of Deseret milkvetch within 1 mile of the centerline of Alternative COUT-C is the only known population of this species and is located adjacent to an access road on UDWR property. Though the centerline of this alternative route does not cross habitat for this species, impacts on habitat and populations of this species could occur if this access road is used and improved during Project construction and maintenance.

Level 1 and Level 2 *Sclerocactus* core habitat would be crossed by Alternative COUT-C in Utah. Uinta Basin hookless cactus individuals are known to occur in Level 1 core habitat at high densities and Level 2 core habitat at somewhat lower densities. Due to the high density of plants in *Sclerocactus* core habitat areas, individual plants may need to be relocated from areas that would be affected during construction and additional mitigation may be required by BLM or as a condition established during Section 7 consultation. It is not possible to determine the number of individual plants that would need to be relocated to construct the Project at this time, as the exact locations of construction disturbance and individual plants are not known. All actions that could affect Uinta Basin hookless cactus individuals would be subject to the conditions established during Section 7 consultation. Preconstruction surveys would be conducted on the selected route in habitat areas using agency-approved protocols (Design Feature 3), and the number of individuals that would need to be moved would be minimized wherever practicable. Previous projects have monitored transplanted cacti for 3 years, though the exact monitoring schedule for transplanted individuals would be determined during Section 7 consultation. Additional mitigation to reduce impacts on *Sclerocactus* and promote *Sclerocactus* conservation also may be implemented based on the results of Section 7 consultation with FWS. Additional mitigation may include payments to the FWS *Sclerocactus* Mitigation Fund, purchase of conservation easements to protect the species, ground truthing the recently completed University of Wyoming habitat model for Uinta Basin hookless cactus, and funding of studies to meet objectives identified in the FWS recovery outlines for these species. Potentially funded studies may include response of *Sclerocactus* populations to climate change, monitoring of cactus-borer beetle (*Moneilema semipunctatum*) infestations, caterpillar predation

and rodent browsing, and the relationship of episodic infestations with drought and other environmental factors.

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences of clay reed-mustard and several BLM- and USFS-listed sensitive plant species within 1 mile of this alternative route; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable. Impacts on clay reed-mustard and Uinta Basin hookless cactus from Alternative COUT-C could be mitigated if the Project crossing of the Green River were relocated north of the Fourmile Bottom crossing area identified in the BLM Vernal RMP, but a plan amendment would be required (Table 5-21).

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT-C would be in conformance with USFS policy objectives pertaining to USFS sensitive plant species. The results of these analyses are presented in the Vegetation and Special Status Plants Report available for review and download from the Project website. The analysis found that Alternative COUT-C could be approved in compliance with USFS policy objectives pertaining to USFS sensitive plant species (USFS 2015a).

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

Affected Environment

The 345kV Bears Ears to Bonanza transmission line relocation components would cross predominantly crosses pinyon-juniper woodland, big sagebrush and shrub/shrub steppe communities (Table 3-53).

No documented occurrences of federally listed plant species are within 1 mile of the proposed relocation; however, there are 3 occurrences of debris milkvetch, 1 occurrence of Rollins' cat's-eye, 1 occurrence of ephedra buckwheat, and 1 occurrence of Graham's beardtongue. The 1 mile area around the existing transmission line within the Area of Critical Environmental Concer (ACEC) also would be within 1 mile of these occurrences. The relocated lines would cross potential Graham's beardtongue habitat twice for a total of 0.4 mile, and the existing line crosses potential habitat for 0.9 mile.

Environmental Consequences

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

The 345kV Bears Ears to Bonanza transmission line relocation alternative would have low residual impacts on Graham's beardtongue potential habitat as Project activities would only have minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

Results of Additional Analysis of Potential Impacts

While the proposed and existing 345kV lines cross potential Graham's beardtongue habitat, neither intersect with known occupied habitat. The types of impacts associated with relocating the transmission line would be similar to the effects of construction of the 500kV transmission line. The types of potential effects that may occur are described in Section 3.2.6.4.2. Preconstruction surveys would be conducted in

potential habitat areas according to agency appropriate protocols (Design Feature 3), and Project construction and associated disturbance would be avoided in all occupied habitat by a 300-foot buffer (Design Feature 9). Similar design features and mitigation measures would guide the removal of the existing line within the ACEC.

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences of several BLM- and USFS-listed sensitive plant species within 1 mile of Alternative COUT-C; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to determine application of selective mitigation measures.

Alternative COUT-H

Affected Environment and Environmental Consequences (Colorado)

The affected environment and environmental consequences of Alternative COUT-H in Colorado would be the same as those for Alternative COUT-C in Colorado.

Affected Environment (Utah)

Alternative COUT-H in Utah predominantly crosses big sagebrush, pinyon-juniper, and shrub/shrub steppe vegetation communities (Table 3-61).

Alternative COUT-H in Utah crosses clay reed-mustard habitat (Table 3-75) in Uintah County near the banks of the Green River.

Alternative COUT-H in Utah also crosses habitat for both Graham's beardtongue and White River beardtongue (Table 3-75) in the area between the Bad Land Cliffs to Argyle Canyon in Duchesne County. Proposed critical habitat for Graham's beardtongue also occurs within 1 mile of this alternative route in Utah near the Ray's Bottom section of the Green River.

Alternative COUT-H in Utah also crosses Ute ladies'-tresses potential habitat (Table 3-75) in six areas:

- floodplain of Willow Creek in Uintah County
- floodplain of the Green River in Uintah County
- floodplain of Willow Creek in Carbon County
- floodplain of Gordon Creek in Carbon County
- wetlands and riparian areas the canyon between Nephi and Fountain Green in Juab County
- wetlands in the Juab Valley in Juab County

Alternative COUT-H in Utah also crosses known Uinta Basin hookless cactus habitat and Level 1 and Level 2 *Sclerocactus* core habitat areas (Table 3-75 in the Uinta Basin. The dominant federally listed plant species in these areas is assumed to be Uinta Basin hookless cactus, though Pariette cactus also may occur.

Two occurrences (comprising 22 mapped populations) of clay reed-mustard and nine occurrences of Uinta Basin hookless cactus are within 1 mile of the centerline of Alternative COUT-H in Utah.

Several occurrences of BLM- and USFS-listed sensitive plant species are within 1 mile of the centerline of Alternative COUT-H in Utah:

- 1 occurrence of canyon sweet-vetch
- 1 occurrence of caespitose cat's-eye
- 5 occurrences of debris milkvetch
- 1 occurrence of Duchesne milkvetch
- 4 occurrences of Graham's beardtongue
- 1 occurrence of Goodrich's blazingstar
- 1 occurrence (comprising of two known populations) of horseshoe milkvetch
- 2 occurrences of Uinta Basin spring-parsley
- 3 occurrences of Green River greenthread
- 1 occurrence of hairy Townsend daisy

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative COUT-H in Utah would have moderate residual impacts on clay reed-mustard (Table 3-76) as Project activities would result in loss or adverse modification of small portions of unoccupied suitable habitat for this species (Table 3-67).

Alternative COUT-H in Utah would have low residual impacts on Graham's beardtongue and White River beardtongue (Table 3-76) as Project activities would have only minor adverse effects on these species and would not limit the long-term sustainability of populations (Table 3-67).

Alternative COUT-H in Utah would have low residual impacts on Uinta Basin hookless cactus habitat (Table 3-76) as Project activities in these areas would have only minor adverse effects on Uinta Basin hookless cactus and would not limit the long-term sustainability of populations (Table 3-67).

Densities of cacti in Level 2 *Sclerocactus* core habitat are low, and the transmission line would be sited to avoid plants as practicable. In areas where complete avoidance is not possible, additional mitigation would be applied in accordance with agency policy. Therefore, Alternative COUT-H in Utah would have low residual impacts in Level 2 *Sclerocactus* core habitat (Table 3-76). Densities of cacti in Level 1 *Sclerocactus* core habitat are higher than in Level 2 *Sclerocactus* core habitat; therefore residual impacts in Level 1 *Sclerocactus* core habitat would be moderate (Table 3-76). As with Level 2 *Sclerocactus* core habitat, the transmission line in Level 1 *Sclerocactus* core habitat would be sited to avoid plants as practicable and additional mitigation would be applied in accordance with agency policy where complete avoidance is not possible.

Alternative COUT-H in Utah would have low residual impacts on Ute ladies'-tresses (Table 3-76) as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

Results of Additional Analysis of Potential Impacts

The extent of clay reed mustard habitat, Graham's beardtongue habitat, *Sclerocactus* core habitat, Uinta Basin hookless cactus habitat, Ute ladies'-tresses potential habitat, and White River beardtongue habitat that may be affected by Alternative COUT-H in Utah is presented in Table 3-77.

Level 1 and Level 2 *Sclerocactus* core habitat would be crossed by Alternative COUT-H in Utah. Uinta Basin hookless cactus individuals are known to occur in Level 1 core habitat at high densities and Level 2 core habitat at somewhat lower densities. Due to the high density of plants in *Sclerocactus* core habitat

areas, individual plants may need to be relocated from areas that would be affected during construction and additional mitigation may be required by BLM or as a condition established during Section 7 consultation. It is not possible to determine the number of individual plants that would need to be relocated to construct the Project at this time as the exact locations of construction disturbance and individual plants are not known. All actions that could be affect Uinta Basin hookless cactus individuals would be subject to the conditions established during Section 7 consultation. Preconstruction surveys would be conducted on the selected route in habitat areas using agency-approved protocols (Design Feature 3), and the number of individuals that would need to be moved would be minimized wherever practicable. Previous projects have monitored transplanted cacti for 3 years, though the exact monitoring schedule for transplanted individuals would occur be determined during Section 7 consultation. Additional mitigation to reduce impacts on *Sclerocactus* and promote *Sclerocactus* conservation also may be implemented based on the results of Section 7 consultation with FWS. Additional mitigation may include payments to the FWS *Sclerocactus* Mitigation Fund, purchase of conservation easements to protect the species, ground truthing the recently completed University of Wyoming habitat model for Uinta Basin hookless cactus, and funding of studies to meet objectives identified in the FWS recovery outlines for these species. Potentially funded studies may include response of *Sclerocactus* populations to climate change, monitoring of cactus-borer beetle (*Moneilema semipunctatum*) infestations, caterpillar predation and rodent browsing, and the relationship of episodic infestations with drought and other environmental factors.

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences of clay reed-mustard and several BLM- and USFS-listed sensitive plant species within 1 mile of Alternative COUT-H; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable. Impacts on clay reed-mustard and Uinta Basin hookless cactus from this alternative route could be mitigated if the Project crossing of the Green River were relocated north of the Fourmile Bottom crossing area identified in the BLM Vernal RMP, but a plan amendment would be required (Table 5-21).

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT-H would be in conformance with USFS policy objectives pertaining to USFS sensitive plant species. The results of these analyses are presented in the Vegetation and Special Status Plants Report available for review and download from the Project website. The analysis found that Alternative COUT-H could be approved in compliance with USFS policy objectives pertaining to USFS sensitive plant species (USFS 2015a).

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

The affected environment and environmental consequences of the 345kV Bears Ears to Bonanza relocation would be the same as Alternative COUT-C.

Alternative COUT-I

Affected Environment and Environmental Consequences (Colorado)

The affected environment and environmental consequences of Alternative COUT-I in Colorado would be the same as those for Alternative COUT-C in Colorado.

Affected Environment (Utah)

Alternative COUT-I in Utah predominantly crosses big sagebrush, pinyon-juniper, and shrub/shrub steppe vegetation communities (Table 3-61).

Alternative COUT-I in Utah crosses clay reed-mustard habitat (Table 3-75) in Uintah County near the banks of the Green River.

Alternative COUT-I in Utah crosses habitat for both Graham's beardtongue and White River beardtongue (Table 3-75) in the area from the Bad Land Cliffs to Argyle Canyon in Duchesne County. Proposed critical habitat for Graham's beardtongue also occurs within 1 mile of this alternative route in Utah near the Ray's Bottom section of the Green River.

Alternative COUT-I in Utah also crosses known Uinta Basin hookless cactus habitat and Level 1 and Level 2 *Sclerocactus* core habitat areas (Table 3-75) in the Uinta Basin. The dominant federally listed plant species in these areas is assumed to be Uinta Basin hookless cactus, though Pariette cactus also may occur.

Alternative COUT-I in Utah crosses Ute ladies'-tresses potential habitat (Table 3-75) in eight areas:

- floodplain of Willow Creek in Uintah County
- floodplain of the Green River in Uintah County
- floodplain of Price River in Carbon County
- wetlands in Marsing Wash in Emery County
- floodplain of Huntington Creek in Emery County
- floodplain of San Pitch River in Sanpete County
- wetlands and riparian areas the canyon between Nephi and Fountain Green in Juab County
- wetlands in the Juab Valley in Juab County

Two occurrences (comprising of 22 mapped populations) of clay reed-mustard and nine occurrences of Uinta Basin hookless cactus are within 1 mile of the centerline of Alternative COUT-I in Utah.

Several occurrences of BLM- and USFS-listed sensitive plant species are within 1 mile of the centerline of Alternative COUT-I in Utah:

- 1 occurrence of caespitose cat's-eye
- 1 occurrence of canyon sweet-vetch
- 1 occurrence of Carrington daisy
- 2 occurrences of Cruetzfeldt's cat's-eye
- 5 occurrences of debris milkvetch
- 1 occurrence of Duchesne milkvetch
- 1 occurrence of Ferron's milkvetch
- 4 occurrences of Graham's beardtongue
- 1 occurrence of Goodrich's blazingstar
- 1 occurrence (comprising of two known populations) of horseshoe milkvetch
- 3 occurrences of Uinta Basin spring-parsley

- 1 occurrence of Untermann's daisy.
- 3 occurrences of Green River greenthread
- 1 occurrence of hairy Townsend daisy

Environmental Consequences (Utah)

Results of Analysis Conducted to Support Interdisciplinary Comparison of Alternative Routes

Alternative COUT-I in Utah would have moderate residual impacts on clay reed-mustard (Table 3-76) as Project activities would result in loss or adverse modification of small portions of unoccupied suitable habitat for this species (Table 3-67).

Alternative COUT-I in Utah would have low residual impacts on Graham's beardtongue and White River beardtongue (Table 3-76) as Project activities would have only minor adverse effects on these species and would not limit the long-term sustainability of populations (Table 3-67).

Alternative COUT-I in Utah would have residual impacts on Uinta Basin hookless cactus habitat (Table 3-76) as Project activities in these areas would have only minor adverse effects on Uinta Basin hookless cactus and would not limit the long-term sustainability of populations (Table 3-67).

Densities of cacti in Level 2 *Sclerocactus* core habitat are low, and the line would be sited to avoid plants as practicable. In areas where complete avoidance is not possible, additional mitigation would be applied in accordance with agency policy. Therefore, Alternative COUT-I in Utah would have low residual impacts in Level 2 *Sclerocactus* core habitat (Table 3-76). Densities of cacti in Level 2 *Sclerocactus* core habitat are higher than in Level 2 *Sclerocactus* core habitat; therefore, residual impacts in Level 1 *Sclerocactus* core habitat would be moderate (Table 3-76). As with Level 2 *Sclerocactus* core habitat, the line in Level 1 *Sclerocactus* core habitat would be sited to avoid plants as practicable and additional mitigation would be applied in accordance with agency policy where complete avoidance is not possible.

Alternative COUT-I in Utah would have low residual impacts on Ute ladies'-tresses (Table 3-76) as Project activities would have only minor adverse effects on this species and would not limit the long-term sustainability of populations (Table 3-67).

Results of Additional Analysis of Potential Impacts

The extent of clay reed mustard habitat, Graham's beardtongue habitat, Ute ladies'-tresses potential habitat, *Sclerocactus* core habitat areas, Uinta Basin hookless cactus habitat, and White River beardtongue habitat that may be affected by Alternative COUT-I in Utah is presented in Table 3-77.

Level 1 and Level 2 *Sclerocactus* core habitat would be crossed by Alternative COUT-I in Utah. Uinta Basin hookless cactus individuals are known to occur in Level 1 core habitat at high densities and Level 2 core habitat at somewhat lower densities. Due to the high density of plants in *Sclerocactus* core habitat areas, individual plants may need to be relocated from areas that would be affected during construction and additional mitigation may be required by BLM or as a condition established during Section 7 consultation. It is not possible to determine the number of individual plants that would need to be relocated to construct the project at this time, as the exact locations of construction disturbance and individual plants are not known. All actions that could be affect Uinta Basin hookless cactus individuals would be subject to the conditions of established during Section 7 consultation. Preconstruction surveys would be conducted on the selected route in habitat areas using agency-approved protocols (Design Feature 3), and the number of individuals that would need to be moved would be minimized wherever practicable. Previous projects have monitored transplanted cacti for 3 years; though the exact monitoring schedule for transplanted individuals would occur be determined during Section 7 consultation. Additional mitigation to reduce impacts on *Sclerocactus* and promote *Sclerocactus* conservation also may

be implemented based on the results of Section 7 consultation with FWS. Additional mitigation may include payments to the FWS *Sclerocactus* Mitigation Fund, purchase of conservation easements to protect the species, ground truthing the recently completed University of Wyoming habitat model for Uinta Basin hookless cactus, and funding of studies to meet objectives identified in the FWS recovery outlines for these species. Potentially funded studies may include response of *Sclerocactus* populations to climate change, monitoring of cactus-borer beetle (*Moneilema semipunctatum*) infestations, caterpillar predation and rodent browsing, and the relationship of episodic infestations with drought and other environmental factors.

Information is not comprehensive regarding the locations of Project activities in relation to specific occurrences of clay reed-mustard and several BLM- and USFS-listed sensitive plant species within 1 mile of Alternative COUT-I in Utah; therefore, it is not possible to precisely determine the number of individuals or the amount of habitat that may be affected by the Project. Detailed engineering design is needed to determine the exact number of individuals or extent of habitat affected. Preconstruction surveys would be conducted on the selected route in agency-designated habitat areas using agency-approved protocols (Design Feature 3) to locate previously unrecorded populations of all special status species considered in this analysis. Detailed engineering design and the results of preconstruction surveys would be used to inform application of selective mitigation measures, including avoidance of special status plants to the extent practicable. Impacts on clay reed-mustard and Uinta Basin hookless cactus from this alternative route could be mitigated if the Project crossing of the Green River were relocated north of the Fourmile Bottom crossing area identified in the BLM Vernal RMP, but a plan amendment would be required (Table 5-21).

Results of Additional Analysis Conducted by the U.S. Forest Service

The USFS evaluated whether implementation of Alternative COUT-I would be in conformance with USFS policy objectives pertaining to USFS sensitive plant species. The results of these analyses are presented in the Vegetation and Special Status Plants Report available for review and download from the Project website. The analysis found that Alternative COUT-I could be approved in compliance with USFS policy objectives pertaining to USFS sensitive plant species (USFS 2015a).

Bears Ears to Bonanza 345-kilovolt Transmission Line Relocation

The affected environment and environmental consequences of the 345kV Bears Ears to Bonanza relocation would be the same as Alternative COUT-C.

3.2.6.5.5 Series Compensation Stations for the 500-kilovolt Transmission Line

Alternative WYCO-B (Agency and Applicant Preferred Alternative)

Siting Area A – Powder Wash

Affected Environment

Siting Area A (MV-7a) would be located on the Wyoming/Colorado state line. In Wyoming, the Powder Wash series compensation station would be located in an area with potential habitat for Ute ladies' tresses and Gibbens' beardtongue.

Environmental Consequences

The estimated area of disturbance (in acres) to Ute ladies'-tresses habitat from the Powder Wash series compensation station is included in the disturbance analysis for Alternative WYCO-B (Table 3-71). Application of Design Feature 9 (avoidance of rare and sensitive plant species) require locating the compensation station outside of potential habitat and minimize any indirect impacts.

Siting Area B – Nine Mile Basin

Affected Environment

Siting Area B (MV-7 a) would be located where Alternative WYCO-B diverges in Nine Mile Basin in Colorado. The Nine Mile Basin series compensation station would be located in an area with small areas of habitat for Ute ladies'-tresses.

Environmental Consequences

The estimated area of disturbance (in acres) to Ute ladies'-tresses habitat from the Nine Mile Basin series compensation station is included in the disturbance analysis for Alternative WYCO-B (Table 3-71). Application of Design Feature 9 (avoidance of rare and sensitive plant species) would require locating the compensation station outside of potential habitat and minimize any indirect impacts.

Siting Area C – Maybell

Affected Environment

Siting Area C (MV-7 a) would be located where Alternative WYCO-B diverges in the near U.S. Highway 40 in Moffat County, Colorado. The Maybell Siting Area would be located in an area with small areas of potential Ute ladies'-tresses and one known occurrence of caespitose cat's-eye.

Environmental Consequences

The estimated area of disturbance (in acres) to Ute ladies'-tresses habitat from the Maybell series compensation station is included in the disturbance analysis for Alternative WYCO-B (Table 3-71). Application of Design Feature 9 (avoidance of rare and sensitive plant species) would require locating the compensation station outside of potential habitat and minimize any indirect impacts.

Alternative WYCO-C

Siting Area A – Powder Wash

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area A as Alternative WYCO-B.

Siting Area B – Nine Mile Basin

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area B as Alternative WYCO-B.

Siting Area C – Maybell

Affected Environment and Environmental Consequences

Alternative WYCO-C would have the same affected environment and environmental consequences for Siting Area C as Alternative WYCO-B.

Alternative WYCO-D

Siting Area D – Bell Rock

Affected Environment

Siting Area D (MV-7a) would be located in sagebrush, shrub/shrub steppe and pinyon-juniper vegetation communities just south of U.S. Highway 40, west of Craig. Siting Area D would be located in an area with small areas of habitat for Ute ladies'-tresses.

Environmental Consequences

The estimated area of disturbance (in acres) Ute ladies'-tresses habitat from the Siting Area D is included in the disturbance analysis for Alternative WYCO-B (Table 3-74). Application of Design Feature 9 (avoidance of rare and sensitive plant species) would require locating the compensation station outside of potential habitat and minimize any indirect impacts.

Alternative WYCO-F

Siting Area A – Powder Wash

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area A as Alternative WYCO-B.

Siting Area B – Nine Mile Basin

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area B as Alternative WYCO-B.

Siting Area C – Maybell

Affected Environment and Environmental Consequences

Alternative WYCO-F would have the same affected environment and environmental consequences for Siting Area C as Alternative WYCO-B.

Alternatives COUT BAX-B, COUT BAX-C, and COUT BAX-E

Siting Area G – Green River

Affected Environment

Siting Area G (MV-7b) would be located in an area previously disturbed by the I-70 corridor and U.S. Highway 6, approximately 5 miles west of the Green River. Siting Area G would be located in an area with small areas of habitat for Ute ladies'-tresses.

Environmental Consequences

The estimated area of disturbance (in acres) to Ute ladies'-tresses habitat from the Green River series compensation station is included in the disturbance analysis for Alternatives COUT BAX-B, COUT BAX-C, and COUT BAX-E (Table 3-74). Application of Design Feature 9 (avoidance of rare and sensitive plant species) would require locating the compensation station outside of potential habitat and minimize any indirect impacts.

Alternative COUT-A

Siting Area F – Roosevelt

Affected Environment

Siting Area F (MV-7b) would be located in an area previously disturbed by agriculture and U.S. Highway 40 in the vicinity of Roosevelt. Siting Area F would be located in an area with small areas of habitat for Ute ladies'-tresses, Uinta Basin hookless cactus, and Hamilton's milkvetch.

Environmental Consequences

Siting Area F (MV-7b) would be located in an area previously disturbed by agriculture and U.S. Highway 40 in the vicinity of Roosevelt. Siting Area F would be located in an area with small areas of habitat for Ute ladies'-tresses, Uinta Basin hookless cactus, and Hamilton's milkvetch.

Alternative COUT-B

Siting Area F – Roosevelt

Affected Environment and Environmental Consequences

Alternative COUT-B would have the same affected environment and environmental consequences for Siting Area F as Alternative COUT-A.

Alternative COUT-C (Agency and Applicant Preferred Alternative)

Siting Area E – Bonanza

Affected Environment

Siting Area E (MV-7b) would be located in an area previously disturbed by oil and gas development, and the Bonanza Power Plant. Siting Area E would be located in an area with small areas of habitat for Ute ladies'-tresses and Uinta Basin hookless cactus as well as both 1,000-m and 400-m *Sclerocactus* core areas. Additionally, 1 occurrence of debris milkvetch, 2 occurrences of Uinta Basin spring-parsley, and 6 occurrences of Duchesne milkvetch are known within the siting area.

Environmental Consequences

The estimated area of disturbance (in acres) to Ute ladies'-tresses and Uinta Basin hookless cactus habitat and Levels 1 and 2 *Sclerocactus* core areas from the Bonanza series compensation station is included in the disturbance analysis for Alternative COUT-C (Table 3-77). Application of Design Feature 9 (avoidance of rare and sensitive plant species) would require locating the compensation station outside of occupied habitat and minimize any direct or indirect impacts.

Alternatives COUT-H and COUT-I

Siting Area E – Bonanza

Affected Environment and Environmental Consequences

Alternatives COUT-H and COUT-I have the same affected environment and environmental consequences for Siting Area E as Alternative COUT-C.