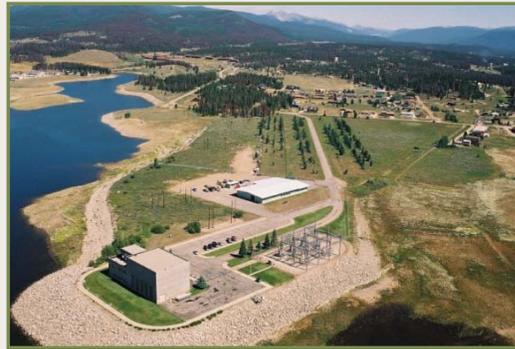
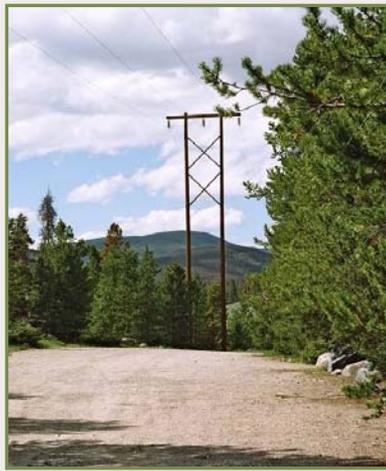


# GRANBY PUMPING PLANT SWITCHYARD – WINDY GAP SUBSTATION TRANSMISSION LINE REBUILD, GRAND COUNTY, COLORADO

DOE/EIS-0400

Draft Environmental Impact Statement



Grand County, Colorado  
March 2012

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# GRANBY PUMPING PLANT SWITCHYARD – WINDY GAP SUBSTATION TRANSMISSION LINE REBUILD, GRAND COUNTY, COLORADO

DOE/EIS-0400

Draft Environmental Impact Statement

## Responsible Agencies

Lead Federal Agency:

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

Cooperating Federal Agencies:

U.S. Bureau of Land Management

U.S. Forest Service

Local Cooperating Agencies:

Grand County, Colorado

## Abstract

The Western Area Power Administration (Western) owns and operates a 13.6-mile, 69-kilovolt (kV) electric transmission line in Grand County, Colorado, that originates at Windy Gap Substation, located immediately northwest of the intersection of U.S. Highway 40 and State Highway 125. The proposed project involves rebuilding this single-circuit line as a double-circuit transmission line and adding a second power transformer. One circuit would replace the existing 69-kV line; the other circuit would be a new 138-kV line. The Granby Pumping Plant Switchyard would be expanded to accommodate the second line and power transformer. Windy Gap Substation would be modified to accommodate the second line. The purpose of this project is to enhance system reliability by providing a second source of power (or looped service) to the area between Grand Lake and Granby before failure of the 69-kV cable located in the Alva B. Adams water tunnel (also known as the Adams Tunnel Cable).

## Deadline for Draft EIS Comments

Comments on the Draft EIS must be received at the address provided below no later than: May 29, 2012.

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Draft EIS, contact:

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Web site at [www.energy.gov/nepa/office-nepa-policy-and-compliance](http://www.energy.gov/nepa/office-nepa-policy-and-compliance).

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## ACRONYMS AND ABBREVIATIONS

°C	degree Celsius
°F	degree Fahrenheit
µg/m <sup>3</sup>	Micrograms per Cubic Meter
µT	micro Tesla
µV/m	microvolts per meter
AC	Alternating Current
AECOM	AECOM Technical Services, Inc.
amp or amps	Amperes
ANRA	Arapaho National Recreation Area
APE	Area of Potential Effect
APLIC	Avian Power Line Interaction Committee
ARNF	Arapaho and Roosevelt National Forests and Pawnee National Grassland
ATV	All Terrain Vehicle
AWG	American Wire Gauge
BBS	Breeding Bird Survey
BGEPA	Bald and Golden Eagle Protection Act
BLM	U.S. Bureau of Land Management
BPA	Bonneville Power Administration
BR	Biological Report
CAA	Clean Air Act
CAAQS	Colorado Ambient Air Quality Standards
C-BT	Colorado-Big Thompson project
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNHP	Colorado Natural Heritage Program
CO	Carbon monoxide
CO <sub>2</sub>	Carbon dioxide
CR	County Road
CWA	Clean Water Act
CWD	Chronic Wasting Disease
dB	Decibel
dBA	Decibel (A-weighted)
DC	Direct Current
DEIS	Draft Environmental Impact Statement
DOE	U.S. Department of Energy
DTV	Digital Television
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMF	Electric and magnetic fields
E.O.	Executive Order
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FLPMA	Federal Land Policy and Management Act
Forest Plan	Arapaho-Roosevelt National Forest <i>1997 Revision of the Land Resource Management Plan</i>
Forest Service	U.S. Forest Service
FPD	Fire Protection District

DEIS

FSM	Forest Service Manual
FSS	Forest Service Sensitive
ft <sup>2</sup>	square foot
G	Gauss
GIS	Geographic Information System
GMU	Game Management Unit
GPS	Global Positioning Systems
Grand County	Grand County, Colorado
GSGCP	Greater Sage Grouse Conservation Plan
HAP	Hazardous Air Pollutant
Hz	Hertz
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEEE	Institute of Electrical and Electronics Engineers
IITRI	Illinois Institute of Technology Research
kCM	Kilo Circular Mil
km	Kilometers
km <sup>2</sup>	Square Kilometers
KOP	Key Observation Point
kV	Kilovolt
kV/m	Thousands of volts per meter
LAU	Lynx Analysis Unit
Ld	daytime Leq
Ldn	Equivalent Day-Night Sound Level
Leq	Equivalent Sound Level
Ln	nighttime Leq
mA	Milliampere
MBTA	Migratory Bird Treaty Act
mG	Milligauss
mg/m <sup>3</sup>	Milligrams Per Cubic Meter
MHz	megahertz
MIC	Forest Service Management Indicator Community
MIS	Forest Service Management Indicator Species
MLS	Multiple Listing Service
MPEI	Mountain Parks Electric, Inc.
MS-NCWCD	Municipal Subdistrict-Northern Colorado Water Conservancy District
MVA	Megavolt-ampere
NAAQS	National Ambient Air Quality Standards
NCWCD	Northern Colorado Water Conservancy District
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NFMA	National Forest Management Act
NFS	National Forest System
NHPA	National Historic Preservation Act
NO <sub>2</sub>	Nitrogen Dioxide
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
O <sub>3</sub>	Ozone
P.L.	Public Law
Pb	Lead
PFYC	Potential Fossil Yield Classification
PM <sub>10</sub>	10 micrometers or less
PM <sub>2.5</sub>	2.5 micrometers or less
ppb	part per billion
ppm	Parts Per Million

PFYC	Potential Fossil Yield Classification
Reclamation	U.S. Bureau of Reclamation
RMNP	Rocky Mountain National Park
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
ROW	Right-of-Way
RV	Recreational Vehicle
Scenic byway	Colorado River Headwaters National Scenic and Historic Byway
SCORP	Colorado State Comprehensive Outdoor Recreation Plan
SCP	Standard Construction and Mitigation Practices
SHPO	State Historic Preservation Officer
SIO	Scenic Integrity Objective
SIP	State Implementation Plan (Clean Air Act)
SLB	Colorado State Land Board
SNR	Signal-to-Noise Ratio
SO <sub>2</sub>	Sulfur Dioxide
SSURGO	Soil Survey Geographic
SWA	State Wildlife Area
T	Tesla
TCP	Traditional Cultural Property
Tri-State	Tri-State Generation and Transmission, Inc.
TV	Television
U.S.	United States
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
UCM	University of Colorado Museum
UGA	Urban Growth Area
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
V/m	Volts per meter
VAC	Visual Absorption Capacity
VOC	Volatile Organic Compounds
VRM	Visual Resource Management
WCRM	Western Cultural Resource Management, Inc.
Western	Western Area Power Administration
WRCC	Western Regional Climate Center

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## EXECUTIVE SUMMARY

### Introduction

Western Area Power Administration (Western), a power marketing administration within the U.S. Department of Energy (DOE), is proposing to rebuild and upgrade the Granby Pumping Plant Switchyard-Windy Gap Substation transmission line in Grand County, Colorado (Grand County). This Environmental Impact Statement (EIS) analyzes the impacts associated with the proposal to remove approximately 13.6 miles of 69-kilovolt (kV) transmission line, construct approximately 12 miles of new 138-kV double-circuit transmission line (operated at 69-kV and 138-kV), and add a second power transformer.

This EIS has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] Section 4321 et seq.), the Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (40 Code of Federal Regulations (CFR) Parts 1500-1508), and the DOE's NEPA Implementing Procedures (10 CFR Part 1021).

The project Cooperating Agencies and partners include the following:

- Western (Lead Federal Agency)
- U.S. Forest Service (Forest Service), Arapaho and Roosevelt National Forests and Pawnee National Grassland (ARNF) (Federal Cooperating Agency)
- Bureau of Land Management (BLM), Kremmling Field Office (Federal Cooperating Agency)
- Grand County, Colorado (Local Cooperating Agency)
- Tri-State Generation and Transmission Association (Tri-State)
- Mountain Parks Electric, Inc. (MPEI)
- Northern Colorado Water Conservancy District (NCWCD)
- Municipal Subdistrict-Northern Colorado Water Conservancy District (MS-NCWCD)

### Project Background

Western owns and operates a 13.6-mile, 69-kV electric transmission line in Grand County, Colorado. The line originates at Windy Gap Substation, located immediately northwest of the intersection of U.S. Highway 40 and Colorado State Highway 125. The single circuit, wood pole, H-frame transmission line was authorized in 1938 and constructed in 1939 by the U.S. Bureau of Reclamation (Reclamation) as part of the Colorado-Big Thompson (C-BT) project. The existing transmission line runs northeast along U.S. Highway 34 and terminates at the Granby Pumping Plant Switchyard at the end of Grand County Road (CR) 64 on the north shore of Lake Granby. Portions of the existing transmission line are adjacent to the western shoreline of Lake Granby and are within the Arapaho National Recreation Area (ANRA), managed by the Forest Service. The Project Area includes tracts of land managed by the Bureau of Land Management (BLM) Kremmling Field Office and the ARNF, including portions of the ANRA, as well as Colorado State Land Board (SLB), NCWCD, MS-NCWCD, and private lands (Map ES-1).

The local transmission system has been reliably served by Reclamation's Adams Tunnel 69-kV cable for the past 65 years. The tunnel carries a 69-kV transmission line in the form of an electric cable owned by Reclamation and operated by Western. This cable currently provides the only secondary source of electrical power to the Grand Lake-Granby area by allowing looped transmission service (explanation provided below) between the Marys Lake and Windy Gap substations. The Adams Tunnel cable has exceeded its predicted useful life (40 years) and, upon failure, will not be replaced (USBR 1994).

The Adams Tunnel cable currently provides Tri-State with the only second source of power for MPEI loads (e.g., local residential and commercial electrical needs).

To ensure electrical service reliability, Tri-State must maintain a second source of power to serve MPEI loads. The result of systems studies by both Western and Tri-State demonstrated electrical system reliability improvements when a new 138-kV transmission line was added between the Windy Gap and Granby Tap substations (Western 2003).

The failure of the Adams Tunnel cable will leave large parts of Western's and Tri-State's Granby-Grand Lake service area with only a one-way or radial transmission supply. The portion of the system affected by this transmission system includes approximately 7,000 customers in the area extending from the west side of Rocky Mountain National Park on the north, to the YMCA Snow Mountain Ranch on the south, and from Byers Canyon on the west, to the ANRA and Continental Divide on the east. The towns of Hot Sulphur Springs, Granby, and Grand Lake, as well as hundreds of customers in rural areas, particularly along the U.S. Highway 34 corridor, are included in the service area. Without a rebuild and upgrade of the existing facilities, Tri-State/MPEI and Western customers risk extended power outages, especially during adverse winter weather and prolonged line maintenance due to the lack of an alternate transmission circuit to supply the area.

## **Purpose and Need**

The Granby Pumping Plant Switchyard-Windy Gap Substation Transmission Line Rebuild Project is intended to address the electrical deficiencies anticipated due to the eventual failure of the Adams Tunnel cable and the antiquated line configuration in the Project Area. The combination of the eventual failure of the Adams Tunnel cable, increasing residential and commercial load demands in the study area, and antiquated structures, creates a high-risk scenario, potentially jeopardizing power supply for all electric customers in the service area.

The proposed project is needed to:

- Upgrade voltage to ensure that the electrical system in the area will continue to operate within acceptable voltage criteria while accommodating future load growth in the area.
- Ensure that the electrical system in the area would continue to operate within established electrical criteria during motor starting operations at Farr (Granby) and Willow Creek pumping plants after the eventual failure of the Adams Tunnel power line cable. Engineering studies indicate that once the Adams Tunnel cable is out of service, the voltage drop upon starting the motors at the Willow Creek Pumping Plant would exceed acceptable system limits if load growth in the area continues at the current rate (Western 2003).
- Ensure that Western, Tri-State, and Tri-State's cooperative member (MPEI) are able to serve their customers with reliable service by providing a redundant transmission feed

(“looped” transmission service) in the Grand Lake and Granby service areas, in advance of the loss of the Adams Tunnel cable.

- Maintain reliable power supply for existing operations at the Colorado-Big Thompson Project (C-BT) facilities, regardless of future load growth demand in the valley.
- Improve transmission safety by updating antiquated facilities and rebuilding a 70-year-old transmission line to be compliant with current National Electric Safety Code (NESC) standards.
- Minimize long-term transmission line maintenance costs for Western and NCWCD.

## **Proposed Project**

The proposed project involves rebuilding and upgrading the existing single-circuit line, currently on a 30-foot right-of-way (ROW), as a double-circuit transmission line, and adding a second power transformer. The existing 69-kV, H-frame wood pole line would be removed. One circuit would replace the existing 69-kV line; the other circuit would be a new 138-kV line on a 100-foot ROW. The 138-kV double-circuit line would be operated at 69/138-kV. The Granby Pumping Plant Switchyard would be expanded to accommodate the second circuit and power transformer. Windy Gap Substation would also be modified to accommodate the second circuit. This would be a joint participation project between Western, Tri-State, MPEI, and NCWCD.

The Granby Pumping Plant Switchyard-Windy Gap Substation Transmission Line Rebuild Project would minimize impacts by rebuilding and upgrading the existing 69-kV transmission line as a 138-kV double-circuit, looped transmission system on one set of structures in a single ROW. Western acknowledges that looped transmission service on a single set of structures presents an increased risk of system failure compared to two circuits on separate structures and ROWs. However, given existing land use and environmental constraints throughout the Project Area, two sets of structures on separate ROWs are not reasonable or practical. As discussed in Chapter 2.0, the use of single-pole steel structures with concrete bases would help alleviate some of the single-structure and single-ROW vulnerabilities. Additionally, Tri-State’s need to provide a second source of power exists regardless of Western’s agreement to participate in the project. By combining the new second circuit (138-kV) with Western’s existing 69-kV circuit, electric transmission providers in the valley would consolidate existing facilities to meet growing service area needs, while minimizing impacts.

## **Decisions to be Made**

Decisions to be made by the lead and federal cooperating agencies are described below:

- Western Area Power Administration (Lead Federal Agency)

Western is the lead agency for this project, and has the primary responsibility for conducting the environmental review and preparing the NEPA document. The decision to be made by Western is whether to rebuild and upgrade the Granby Pumping Plant Switchyard-Windy Gap Substation transmission line in Grand County, Colorado as a double-circuit transmission line on a 100-foot ROW.

- U.S. Forest Service, Arapaho and Roosevelt National Forests (Federal Cooperating Agency)

The Forest Service is a federal land management agency that manages the ANRA and surrounding ARNF lands, through which transmission line ROW is proposed. The Forest Service must decide whether to approve a Special Use Authorization for construction and maintenance of the proposed transmission line on Forest Service lands.

- Bureau of Land Management, Kremmling Field Office (Federal Cooperating Agency)

The BLM Kremmling Field Office is a cooperating agency on this project because of its legal jurisdiction and expertise with respect to permitting and environmental impacts on BLM lands. The existing transmission line and each of the alternatives proposed would use ROW on BLM land. The BLM Kremmling Field Office must decide whether to approve the new or expanded ROWs proposed by the action alternatives on BLM lands.

## **Public Participation**

### ***Notice of Intent***

A Notice of Intent (NOI) to prepare an EIS was published in the *Federal Register* on August 10, 2007 (Appendix A).

### ***Public Scoping***

Public scoping for the EIS was initiated August 10, 2007, and ended September 17, 2007. Scoping activities included the publication of the NOI in the *Federal Register*; notification of stakeholders by U.S. mail and phone; a public scoping meeting held August 30, 2007, at the MPEI office in Granby, Colorado; and correspondence with potentially affected federal, state and local agencies and Tribes (Appendix A). Public meeting notices and requests for public input were published in a local newspaper, *Ski-Hi News*, prior to the August 30, 2007, public meeting. Scoping materials were also posted on the project website maintained by Western.

Approximately 200 comment forms, letters, e-mails, and faxes were received during the public scoping period. All letters were reviewed by the project team to help define the scope of analysis for the EIS and to inform the refinement of project alternatives.

## **Key Issues Identified During Scoping**

The following issues were identified during public scoping. This list is not intended to be a comprehensive listing of issues, but instead represents key public concerns:

- Potential effects to visual resources and rural aesthetics.
- Potential effects to sage grouse populations and habitats.
- Project costs.
- Potential effects to land uses, including agricultural practices and conservation easements.
- Restoration efforts proposed for the abandoned ROW.
- Human health effects.
- Interference with radio and cellular communications.
- Electromagnetic field effects.
- Effects on riparian, wetlands, or other aquatic habitats as a result of construction.

- Construction effects on winter range habitat for mule deer and elk.
- Avian collisions with conductors and structures, including migratory species and raptor species.
- Effects on special status or sensitive species and habitat as a result of construction activities and presence of above-ground structures.
- Alternatives to above-ground structures, including undergrounding, reusing the Adams Tunnel cable, and/or laying the transmission line on the bed of Lake Granby.
- Socioeconomic impacts in Grand County.
- Cumulative effects of mountain pine beetle epidemic.
- Cumulative impacts to wildlife habitats from various types of development in the Project Area.
- Effects to cultural and historic resources, including Traditional Cultural Properties.
- Effects to special designation areas, such as the ANRA or Colorado Headwaters Scenic Byway.
- Consistency with local and Grand County Zoning Regulations and management overlays.

## **Unresolved Issues**

The specific locations of structures and the need for additional access roads cannot be determined until final design and engineering of the preferred alternative. Access is not required along the entire length of the transmission line for construction and maintenance. However, for purposes of the EIS, it has been assumed that disturbances from access roads may occur anywhere within the proposed and alternative ROWs. This provides for a worst-case analysis of impacts in the EIS, in terms of calculated areas of disturbance. Site-specific access requirements would be addressed as the design phase proceeds. Western's standard construction practices and project-specific environmental protection measures would be incorporated into the design of any new access roads required for the project. If the proposed alignments for new access roads are outside the ROWs considered in this EIS, additional surveys and/or consultation for natural and cultural resources would be conducted prior to project implementation. All access roads on National Forest System (NFS) lands must be authorized by the Forest Service and will be designed by qualified engineers to the appropriate Forest Service standards. Road siting, designs, construction practices, operations and maintenance protocols, and closures of temporary roads on NFS lands will meet Forest Service standards and be approved by the Forest Service Authorized Officer prior to commencement of any surface-disturbing activity.

## **Areas of Controversy**

Correspondence between Western and the Grand County Department of Planning and Zoning has identified several areas of non-concurrence regarding permit requirements, consistency with land use plans and policies, and the scope of the EIS impact analysis. Specific areas of non-concurrence between Western and Grand County include:

- The degree to which the project has achieved substantive compliance with Grand County permit requirements and land use policies

- Viability of alternatives that would rebuild and upgrade the Adams Tunnel cable, or construct the transmission line as an underwater power cable below Lake Granby
- Whether to include within the scope of the EIS an analysis of effects of the proposed project on the operations and pumping capacity of the CB-T project, and other West Slope water diversion projects (i.e., the Windy Gap Firming Project)
- Whether to include within the scope of the EIS an analysis of cumulative effects to aquatic and scenic resources resulting from reservoir water level fluctuations and water development projects
- Whether to include within the scope of the EIS an analysis of effects of the proposed project on continued hydroelectric power generation for pumping plant power

Correspondence between Western and Grand County is provided in Appendix B.

### **Alternatives Carried Forward for Analysis**

A range of reasonable alternatives for the proposed project was identified by evaluating routing opportunities and constraints, engineering design standards, public comments, and environmental resources. The overall objective was to identify alternatives that address public, environmental, and social concerns, and meet the project purpose and need and engineering criteria for the transmission line rebuild.

Relevant issues identified during both the EA and EIS public scoping processes were used to refine the alternatives. The Arapaho-Roosevelt National Forest *1997 Revision of the Land Resource Management Plan* (Forest Plan) goals and objectives, and Grand County zoning and land use policies applicable to the Project Area, were also considered in the development of alternatives.

The five alternatives carried forward for analysis in this EIS are described below and presented on Map ES-2:

- **Alternative A** – Keep the existing transmission line (no action)
- **Alternative B1** – Rebuild and upgrade the transmission line primarily on the existing transmission line ROW
- **Alternative C1** – Reroute and upgrade the transmission line
- **Alternative C2** – Reroute and upgrade the transmission line, with options to use existing utility ROWs
- **Alternative D-Options 1 and 2** – Rebuild and upgrade the transmission line primarily on existing utility ROWs (preferred alternative)

#### ***Alternative A (No Action)***

Under Alternative A, Western would continue to operate and maintain the existing transmission line. This would include replacing hardware, replacing deteriorated structures, managing vegetation, maintaining access, and other maintenance activities to ensure the safety and reliability of the transmission line. Alternative A would keep the existing 69-kV transmission line for approximately 13.6 miles between the Windy Gap Substation and the Granby Pumping Plant. From the Windy Gap Substation to the Stillwater Tap, the existing transmission line is located on a 30-foot right-of-way (ROW). At Stillwater Tap, the Granby Pumping Plant-Windy Gap 69-kV

line and the Marys Lake-Granby Pumping Plant 69-kV line (which goes through the Adams Tunnel) meet and begin paralleling each other, with some minor deviations, from Stillwater Tap into the Granby Pumping Plant Switchyard. Each 69-kV transmission line has a 100-foot ROW. Both lines are constructed on wood pole H-frame structures.

### ***Alternative B1***

Alternative B1 was derived from the original Alternative B presented during the EA scoping and alternative development processes. Alternative B1 is identical to the original Alternative B, with one exception: the transmission line alignment on the east side of Table Mountain.

Alternative B would have expanded the existing 30-foot ROW to 100 feet and would have potentially impacted several homes. Alternative B1 uses a new 1.3-mile alignment on the east side of Table Mountain by routing the line just inside the ANRA boundary, therefore avoiding possible home relocations.

Alternative B1 would rebuild and upgrade the existing transmission line from the Windy Gap Substation to the Granby Pumping Plant. The rebuild would include constructing approximately 11.8 miles of 138-kV double-circuit line on the existing alignment. However, the existing 30-foot ROW is considered inadequate for the new transmission line and would be expanded to a width of 100 feet to accommodate requirements for construction, operation, and maintenance per the National Electric Safety Code (NESC). The existing single circuit 69-kV H-frame wood pole transmission line would be removed. At Stillwater Tap, the existing Marys Lake-Granby Pumping Plant 69-kV line would join the new Granby Pumping Plant-Windy Gap 69-kV line to form a three terminal line with a new three-way switch. The new 138-kV circuit would bypass the three-way switch. The existing segment of the Marys Lake-Windy Gap 69-kV line between Stillwater Tap and Granby Pumping Plant Switchyard would be removed. The existing segment of the Granby Pumping Plant-Windy Gap 69-kV line would be removed between Stillwater Tap and Granby Pumping Plant Switchyard and a new 138-kV/138-kV double-circuit line (operated at 69-kV/138-kV) would be constructed.

### ***Alternative C1***

Alternative C1 was derived from the original Alternative C presented during the EA scoping and alternative development processes. Alternative C was originally Western's Proposed Action for the project. Alternative C1 is identical to the original Alternative C, with one exception. The primary difference between Alternative C and Alternative C1 is the transmission line routing in the vicinity of the Willow Creek crossing. Alternative C was originally routed north of the Windy Gap Pipeline and behind a topographic rise in this area to avoid visual impacts to Scenic Byway users. Due to wildlife disturbance concerns as a result of creating a new ROW in this area, the Alternative C1 transmission line would be routed back onto the Windy Gap Pipeline at the Willow Creek crossing.

Alternative C1 would reroute and upgrade the transmission line between the Windy Gap Substation and the Granby Pumping Plant. The reroute would include constructing approximately 12.2 miles of 138-kV double-circuit transmission line using single-column steel poles designed for 138-kV operation on a primarily new length of ROW. The existing single circuit 69-kV H-frame wood pole transmission line would be removed. At Stillwater Tap, the existing Marys Lake-Granby Pumping Plant 69-kV line would join the new Granby Pumping Plant-Windy Gap 69-kV line to form a three terminal line with a new three-way switch. The new 138-kV circuit would bypass the three-way switch. The existing segment of the Marys Lake-Windy Gap 69-kV line between Stillwater Tap and Granby Pumping Plant Switchyard would

be removed. The existing segment of the Granby Pumping Plant-Windy Gap 69-kV line would be removed between Stillwater Tap and Granby Pumping Plant Switchyard and a new 138-kV/138-kV double-circuit line (operated at 69-kV/138-kV) would be constructed.

### ***Alternative C2***

Alternative C2 was derived from the original Alternative C presented during the EA scoping and alternative development processes. Alternative C was originally Western's Proposed Action for the project. Alternative C2 is identical to the original Alternative C, with two exceptions. The primary differences between Alternative C and Alternative C2 are the transmission line routing in the vicinity of the Willow Creek crossing and the use of either the existing transmission line alignment or the Windy Gap Pipeline ROW between Windy Gap substation and Willow Creek.

At the Willow Creek crossing, Alternative C was originally routed north of the Windy Gap Pipeline and behind a topographic rise in this area to avoid visual impacts to Scenic Byway users. Due to wildlife disturbance concerns as a result of creating a new ROW in this area, the Alternative C2 transmission line would be routed back onto the Windy Gap Pipeline at the Willow Creek crossing. At the west end of the Project Area, Alternative C (and Alternative C1) was routed, at the request of a private property owner, to follow the boundary of the private parcel. However, due to wildlife disturbance concerns as a result of creating a new ROW in this area, primarily sage-grouse habitat disturbances and the potential for avian-line collisions, Western developed Alternative C2, which would use either the Windy Gap pipeline ROW or the existing transmission line ROW on the west end.

Alternative C2 would reroute and upgrade the transmission line between the Windy Gap Substation and the Granby Pumping Plant. The reroute would include constructing approximately 12 miles of 138-kV double-circuit transmission line using single-pole steel structures designed for 138-kV operation. The existing single circuit 69-kV H-frame wood pole transmission line would be removed. At Stillwater Tap, the existing Marys Lake-Granby Pumping Plant 69-kV line would join the new Granby Pumping Plant-Windy Gap 69-kV line to form a three terminal line with a new three-way switch. The new 138-kV circuit would bypass the three-way switch. The existing segment of the Marys Lake-Windy Gap 69-kV line between Stillwater Tap and Granby Pumping Plant Switchyard would be removed. The existing segment of the Granby Pumping Plant-Windy Gap 69-kV line would be removed between Stillwater Tap and Granby Pumping Plant Switchyard and a new 138-kV/138-kV double-circuit line (operated at 69-kV/138-kV) would be constructed.

### ***Alternative D-Options 1 and 2 – Preferred Alternative***

This alternative was derived from the original Alternative B presented during the EA scoping and alternative development processes. From Windy Gap Substation to the Granby Substation, Alternative D-Option 1 would follow the Windy Gap Pipeline for the initial 2+ mile segment. Option 2 would remain on the existing transmission line ROW. Of the two options, Option 1 is the preferred alternative. From Granby Substation to Granby Pumping Plant, Alternative D, both options, is identical to Alternative B1. Alternative D, both options, would rebuild and upgrade the existing transmission line from the Windy Gap Substation to the Granby Pumping Plant. The rebuild would include constructing approximately 11.7 miles of 138-kV double-circuit line on the existing alignment or the Windy Gap Pipeline ROW. However, the existing 30-foot transmission line ROW is considered inadequate for the new transmission line and would be expanded to a width of 100 feet to accommodate safety requirements for construction, operation, and maintenance. The existing single circuit 69-kV H-frame wood pole transmission line would be removed. At Stillwater Tap, the existing Marys Lake-Granby Pumping Plant 69-kV line would

join the new Granby Pumping Plant-Windy Gap 69-kV line to form a three terminal line with a new three-way switch. The new 138-kV circuit would bypass the three-way switch. The existing segment of the Marys Lake-Windy Gap 69-kV line between Stillwater Tap and Granby Pumping Plant Switchyard would be removed. The existing segment of the Granby Pumping Plant-Windy Gap 69-kV line would be removed between Stillwater Tap and Granby Pumping Plant Switchyard and a new 138-kV/138-kV double-circuit line (operated at 69-kV/138-kV) would be constructed.

Western has adopted standard construction, operation, and maintenance practices (SCP) that would avoid or minimize impacts to the environment to the greatest extent practicable. Design criteria are actions or measures integrated into the project design to avoid, minimize, reduce, or eliminate adverse effects as a result of implementing the “action” alternatives. For the Granby Pumping Plant-Windy Gap transmission line rebuild, Western’s Standard Construction and Mitigation Practices and Special Measures would be implemented for the construction of any action alternative. These measures are part of Western’s proposed project and are considered in this EIS.

Additionally, resource-specific environmental protection measures were developed to minimize or avoid resource impacts.

### ***Key Differences between Alternatives***

The key differences between the alternatives are route location (east or west of Table Mountain), ROW type (existing or new), and voltage (69-kV single circuit or 138-kV double-circuit [operated at 69-kV and 138-kV]).

The existing alignment (Alternative A) is routed to the east of Table Mountain on an existing 30-foot ROW. Alternatives B1 and D, both options, would generally follow this same alignment to the east of Table Mountain, but on an expanded 100-foot ROW. These alternatives also include slight alignment variations from the existing ROW due to site-specific concerns. Alternatives C1 and C2 would follow a primarily new alignment on the west side of Table Mountain on a new 100-foot ROW. Alternatives C1, C2, and D, both options, parallel the Windy Gap Pipeline ROW to some extent.

Alternative A consists of a single-circuit 69-kV line whereas Alternatives B1, C1, C2, and D, both options, would use a 138-kV double-circuit line (operated at 69-kV and 138-kV).

### **Alternatives Considered but Eliminated**

Western considered 11 alternatives that were ultimately eliminated from further analysis. In summary, Western investigated, but ultimately eliminated full or partial underground line construction, a rebuild of the Adams Tunnel Cable, construction of an underwater transmission line, and partial above-ground rebuilds. Brief descriptions of all alternatives considered but eliminated are provided below:

#### ***Eliminated Alternative #1***

This alternative would rebuild 6 miles of existing line with double-circuit 138-kV line; enlarge Western’s existing Granby Substation to accommodate a second power transformer and expanded switchyard; and leave the existing transmission line between Granby Substation and Granby Pumping Plant Switchyard intact. This alternative was eliminated because of environmental concerns related to seepage at the Granby Substation enlargement site, visual intrusiveness, and not meeting Western’s purpose and need to ensure looped transmission

service to its customers, since the Granby Pumping Plant Switchyard would become a radially fed load after loss of the Adams Tunnel 69-kV cable. This alternative would only defer the rebuild of the remaining 6 miles from Granby Substation to Granby Pumping Plant Switchyard. At 70 years old, Western would still need to rebuild this line at some future time to ensure system reliability and safety criteria are met.

### ***Eliminated Alternative #2***

This alternative would rebuild 10 miles of the existing 69-kV line with double-circuit 138-kV line, construct a new substation at Stillwater Tap to house a power transformer and switchyard, and would leave the existing line between Stillwater Tap and Granby Pumping Plant Switchyard intact. This alternative was eliminated because of seepage concerns and unstable soils identified during a preliminary site investigation that would preclude constructing a substation and installing a second power transformer at Stillwater Tap. This alternative would also leave 2 miles of the existing line in service in an antiquated line configuration.

### ***Eliminated Alternative #3***

This alternative would rebuild 12 miles of the existing 69-kV line with double-circuit 138-kV line, enlarge Western's existing Granby Substation to accommodate a second power transformer and expanded switchyard, and expand the Granby Pumping Plant Switchyard to accommodate a third power transformer and additional switchyard equipment. This alternative was eliminated because of general ineffectiveness. Although this alternative would expand two existing substation facilities, doing so would not provide any additional system benefits over the proposed alternative, which expands only the Granby Pumping Plant Switchyard. As such, this alternative does not offer any unique advantages over the action alternatives carried forward for further analysis.

### ***Eliminated Alternative #4***

This alternative would underground all of the approximately 12.2 miles of 69-kV and 138-kV double-circuit transmission line on a combination of new and existing ROW along the alternative alignments. By eliminating the need for above-ground transmission structures and conductors, underground construction would reduce the project's visibility and impacts on visual resources. The primary disadvantages of underground transmission line construction include cost, the time and expense required to locate and repair problems if outages occur, and the recurring environmental impacts associated with maintenance activities, such as searching for and repairing problems.

The large volume of earthwork required to underground the proposed transmission line would result in increased impacts to soil, surface geology, water quality, and biological resources (including sensitive habitats that support threatened and endangered species), which could be avoided by spanning with overhead construction. Removal of vegetation to native soil could create an avenue for the spread of invasive species and weeds, and may have a long-term visual impact if ground disturbance causes a change in the vegetation assemblage occurring in the ROW.

This alternative was ultimately eliminated because of long-term operational and maintenance difficulties and unreasonable construction and replacement cost issues. Western does not currently own or operate any underground high-voltage-cable circuits. If this underground cable were installed, Western does not have the expertise or equipment to maintain and service the installed cable. It is not practical or feasible for Western to acquire the specialized personnel or equipment necessary to install, maintain, and operate 12.2 miles out of Western's more than

17,000 miles of transmission lines. This would substantially increase maintenance and operation costs, which ultimately conflicts with the project need to reduce maintenance and operation costs for Western, Tri-State, and NCWCD.

#### ***Eliminated Alternative #5***

This alternative would underground approximately 1.7 miles between Granby Pumping Plant Switchyard and Stillwater Tap of the 12.2-mile 138-kV double-circuit transmission line. The remainder of this alignment would be modeled on the original Alternative C (see Eliminated Alternative #10). This alternative would have removed the existing 11.8 miles of single-circuit 69-kV H-frame wood pole transmission line, installed one new 69-kV three-way switch at the Stillwater Tap, and constructed additions at Granby Pumping Plant Switchyard and Windy Gap Substation.

This alternative was ultimately eliminated because of long-term operational and maintenance difficulties and cost issues. This alternative would rebuild 100 percent of the length of line identified in the action alternatives carried forward for further analysis, but for 155 percent of the cost. Operational, maintenance, and environmental issues, as described for Eliminated Alternative #4, would also apply to underground sections of the transmission line in Eliminated Alternative #5.

#### ***Eliminated Alternative #6***

This alternative would rebuild and upgrade the 13.2-mile Adams Tunnel cable from 69-kV to 138-kV. This alternative was eliminated because of cost, construction constraints, maintenance access constraints, health and safety concerns for construction and maintenance workers (due to air quality, confined spaces, and access for emergency rescue), and the fact that the alternative did not fulfill Western's stated purpose and need to update the antiquated line configuration on the ground from the Granby Pumping Plant Switchyard to the Windy Gap Substation.

The primary use of the Adams Tunnel is for transporting drinking and irrigation water to communities along the Colorado Front Range. The tunnel transports water 11 months out of the year. Tunnel inspections and repairs, as well as physical inspections and tests on the existing 69-kV circuit, are all completed within a 4-week window each year when the tunnel is drained. Water delivery could be interrupted for up to 8 weeks with prior coordination with the Bureau of Reclamation, allowing a maximum construction duration of 5 weeks per year with mobilization and demobilization to/from the construction site (Black & Veatch 2006). Scheduling construction and maintenance activities within the tunnel are, therefore, extraordinarily constrained. It would take numerous years to replace the existing cable or a failed cable installed in the Adams Tunnel. This scenario could leave the transmission system serving the Project Area in a radial configuration for an unacceptable period of time while a cable is repaired or replaced. The possibility that the transmission system may be in a radial configuration for extended periods of time does not meet the purpose and need for looped transmission service. This alternative is also cost-prohibitive, costing 1,150 percent more than the action alternatives carried forward for further analysis.

#### ***Eliminated Alternative #7***

This alternative would install approximately 6 miles of the 12.2 miles of 138-kV double-circuit transmission line as cable inside the Windy Gap Water Pipeline, from near the Windy Gap Substation to Lake Granby. The remaining 6.2 miles of 138-kV double-circuit transmission line would be similar to the original Alternative C (see Eliminated Alternative #10). This alternative was ultimately eliminated because it was determined to be technically infeasible. Unlike the

Adams Tunnel, the Windy Gap Water Pipeline was not designed to accommodate electrical power cables. The primary use of the Windy Gap Pipeline is for transporting drinking and irrigation water. It is technically infeasible to construct and maintain a transmission line within the pipeline.

### ***Eliminated Alternative #8***

This alternative would install 3 miles of the 9 miles of double-circuit transmission line as an underwater power cable below Lake Granby. The remaining 6 miles of 138-kV double-circuit transmission line, from where the line would enter Lake Granby to the Windy Gap Substation, would be constructed similar to Alternative C.

Western engineers conducted a preliminary review of the concept. Some of the construction and engineering issues were related to getting underwater cable-laying equipment (which is usually seagoing) to an inland lake; trenching in very shallow water; cable weight and the logistics of cable delivery and transfer to the cable-laying equipment; long-term maintenance, including keeping a barge on the lake that could raise and lower the replacement cables for repairs, and repairing/replacing cable lengths during the winter while the lake is iced over; and the potential for extended outages if the cable failed. Public safety concerns include the potential for the cable to be exposed when water levels are low.

Western does not currently own or operate any underwater high-voltage-cable circuits. It is not practical or feasible for Western to acquire the specialized personnel or equipment necessary to install, maintain, and operate 3 miles of underwater cable out of Western's more than 17,000 miles of transmission lines. This would increase maintenance and operation costs, which ultimately conflicts with the project need to reduce maintenance and operation costs for Western, Tri-State, and NCWCD.

Preliminary estimates of the cost of materials indicate that underwater cable is prohibitively expensive for small projects like the proposed action. Since power system reliability is a key component of Western's purpose and need and the costs of this alternative were not economically feasible, this alternative was determined to be not viable and was eliminated from further consideration.

### ***Eliminated Alternative #9 – Original Alternative B***

The original Alternative B, as presented during the EA process and during the EIS scoping period, has been eliminated. Alternative B would have rebuilt and upgraded the line through the Scanloch Subdivision (east side of Table Mountain). This alternative was eliminated due to the high potential for unacceptable impacts to homes and homeowners (e.g., relocations or condemnations). Additionally, this alternative is similar to Alternative B1 and would not have substantially contributed to the range of reasonable alternatives.

### ***Eliminated Alternative #10 – Original Alternative C***

The original Alternative C, as presented during the EA process and during the EIS scoping period, has been eliminated. Variations of this alternative are being carried forward for analysis; however, the Alternative C segment at the Willow Creek Crossing (formerly called the "knoll" reroute) has been eliminated due to high potential for unacceptable impacts to sage grouse habitat that could be easily avoided by relocating a minor line segment. Additionally, this alternative is similar to Alternatives C1 and C2 and would not have substantially contributed to the range of reasonable alternatives.

### ***Eliminated Alternative #11 – Outside the Project Area***

Early in the planning process, prior to preparation of the initial EA, Western and Tri-State investigated whether other routing options existed outside of the Project Area. No other feeds from outside the service area were identified as sources to provide the secondary transmission feed needed to establish a looped transmission system. As such, this alternative could not satisfy the reliability aspects of the project purpose and need. Additionally, the large distances and topographic constraints requisite with a regional-scale construction project would have resulted in unacceptable resource impacts that could be avoided.

### **Impact Comparison**

Table ES-1 provides a general summary comparison of effects by alternative. Impacts are similar between the action alternatives for accidents and intentional acts of destruction, air quality, aquatic resources, cultural resources, electric and magnetic fields (EMF), paleontological resources, recreation and wilderness, soils, and terrestrial and avian wildlife.

All the action alternatives have lower EMF at the ROW edge, and a reduced risk of damage from accidents and intentional acts of destruction, compared to the no-action alternative (Alternative A).

Construction and/or maintenance activities proposed for all alternatives would result in negligible to moderate impacts to air quality, aquatic resources, paleontological resources, and soils due to ground disturbance and the use of heavy equipment in the ROW.

Acreage of impacts to vegetation is similar for each alternative, but the type of vegetative cover impacted varies slightly between the action alternatives. Alternatives B1 and D would have a slightly greater impact on vegetative communities, because more forested cover would be impacted by construction and vegetation management activities. Both these alternatives would cross more acres of aspen and lodgepole pine communities. Alternatives C1 and C2 would cross fewer acres of forested communities and more sagebrush communities. Sagebrush would be allowed to return to the project ROW following construction, and therefore these alternatives would have short-term impacts.

Construction and/or maintenance activities proposed for all alternatives could also adversely affect cultural resources, if historic properties cannot be avoided. Impacts to cultural resources could range in severity from negligible to significant, depending on the final treatment of sites identified in the alternative ROWs. The treatment of historic properties in the alternative ROWs, and mitigation for adverse effects, will be determined in consultation with the State Historic Preservation Officer (SHPO) under Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. Results of this consultation will be included in the Final EIS.

Key differences between alternatives with regard to land use, socioeconomic, special status plant and wildlife species, terrestrial and avian wildlife resources, visual resources, and wetlands are described below:

### **Land Use**

Alternative A would maintain the existing transmission line and ROW that passes through the Scanloch Subdivision for 1 mile, as well as the Stillwater Estates Subdivision, the Lakeridge Mountain Valley Subdivision, and other smaller neighborhoods along the north end of the Project

Area. Sixty improved residential lots, two residential lots with mobile homes, and 55 vacant residential lots are located within 100 feet of the current alignment. An additional 60 improved residential lots, six condominiums, and 48 vacant residential lots are located at a distance between 100 and 300 feet.

Alternative B1 follows the existing transmission line, except at two locations. Alternative B1 does not cross through the Scanloch Subdivision; instead, it borders the subdivision's western boundary for approximately 1 mile. The alignment also diverges from the existing corridor on the north end of the Project Area. Forty-three improved residential lots, two residential lots with mobile homes, and 18 vacant residential lots are located within 100 feet of the alignment of Alternative B1. An additional 51 improved residential lots, six condominiums, and 55 vacant residential lots are located at a distance between 100 and 300 feet.

The alignment for Alternative C1 is located on NCWCD land west of Table Mountain, and does not directly pass through either the Stillwater Estates or the Scanloch subdivisions. It also does not require new ROW easement on the ANRA, east of Table Mountain. This alternative crosses the C Lazy U Preserves for 0.5 mile along its northeastern edge, including approximately 0.1 mile of the property that has a conservation easement on it. Thirty-five improved residential lots and 10 vacant residential lots are located within 100 feet of the current alignment. An additional 30 improved residential lots, two residential lots with mobile homes, six condominiums, and nine vacant residential lots are located at a distance between 100 and 300 feet.

Alternative C2, which has two options, differs from Alternative C1 only in the approximately 2-mile segment immediately east of the Windy Gap Substation. Therefore, the description of land use along Alternative C2 is similar to that provided for Alternative C1.

Alternative D-Option 1 follows the ROW of the Windy Gap pipeline for several miles between the Windy Gap Substation and the Granby Substation, and then follows the alignment of Alternative B1 to the project terminus on the north end of the Project Area. The alignment for Alternative D-Option 2, is located south of Alternative D-Option 1 east of the Windy Gap Substation. Alternative D-Options 1 and 2 each have two fewer residences located within 100 feet of the centerline, compared to Alternative B1.

## **Socioeconomic and Environmental Justice**

All action alternatives would be expected to have beneficial effects on the local economy from construction phase employment and expenditures, and increased reliability of the transmission system, whereas the no-action alternative (Alternative A) could have indirect adverse effects on the local economy if the reliability of the transmission system is diminished over time. None of the alternatives would have adverse impacts with regard to environmental justice.

## **Special Status Plant Species**

Field surveys documented the presence of five Forest Service species of local concern within or at the edge of the ROW of Alternatives A, B1, and D, both options: *Botrychium hesperium* (western moonwort), *Botrychium minganense* (mingan moonwort), *Pediocactus simpsonii* (Simpson's hedgehog cactus), *Dermatocarpon reticulatum* "vagrant form" (reticulate earth lichen), and *Penstemon cyathophorus* (cupped penstemon). Suitable habitat for other special status species was also confirmed. Cupped penstemon and suitable habitat for other Forest Service Sensitive species was documented in the ROW for Alternatives C1 and C2.

Construction and/or maintenance activities proposed under all alternatives would result in minor

to moderate adverse effects on special status plant species and habitat occurring within the alternative ROWs. None of the alternatives would result in a species being listed or proposed for listing as threatened or endangered.

### **Special Status Terrestrial, Avian, and Aquatic Wildlife Species**

Federally listed species are not affected by any of the project alternatives.

The greater sage grouse is a Forest Service Sensitive (FSS) species that inhabits sagebrush. Colorado Department of Wildlife (CDOW) currently monitors two sage-grouse leks, or breeding grounds, near the project alternatives: the Horn West lek and the Horn lek (inactive). The Horn West lek is located on private property on the western end of the project area and is approximately 0.8 mile north of Alternatives A, B1, and D-Option 2. The Horn lek is 0.3 mile north of Alternative C1, 0.5 mile north of Alternative C2-Option 1, and 0.8 mile north of Alternative C2-Option 2.

Operation of the proposed transmission line could result in increased mortality as a result of an increase in raptor perches in the ROW. Increased perching opportunities for raptors leads to increased predation rates on breeding sage grouse. Sage grouse are also at risk for collision with transmission lines. Alternatives C1, C2-Options 1 and 2, and D-Option 1 would result in moderate to significant long-term impacts to the greater sage grouse and associated sagebrush habitats. However, Alternative C2-Option 2 would result in fewer impacts than Option 1 because it would rebuild the line in the existing transmission ROW, which is located further south of the Horn lek site. Alternatives A, B, and D-Option 2 are located slightly further from the active lek and within existing ROW; therefore, these alternatives would be expected to result in fewer impacts to the greater sage grouse.

An active golden eagle nest is located on Table Mountain. Alternatives C1 and C2 would result in adverse impacts to golden eagles because they would construct new ROWs and alter habitat on the west side of Table Mountain, in the vicinity of an active nest.

### **Visual Resources**

Under Alternative A, the existing adverse effects from the existing 69-kV transmission line would continue. Since its construction approximately 70 years ago, viewers have become accustomed to the adverse effects of the existing transmission line, lessening its visual impact. However, views from existing commercial and residential buildings and Cutthroat Trout Bay Campground facilities, located directly under the existing transmission line or immediately adjacent to the ROW, would continue to be significantly affected. Foreground views from existing commercial and residential buildings, the scenic byway, Lake Granby, and use areas within the ANRA would continue to be adversely affected, though to a lesser degree than what would occur under the action alternatives. All action alternatives would achieve BLM Visual Resource Management (VRM) Class II and III objectives. Views of multiple power lines (both Western and MPEI) from Key Observation Points (KOPs) 1, 2, 3, and 5 (from the Stillwater Tap to the Granby Pumping Plant Substation), and KOP 12 (Granby Substation near the intersection of the scenic byway and Willow Creek Road) do not currently achieve the Forest Service Predominant Scenic Integrity Objectives (SIO) of High for the scenic byway and Moderate for the remaining lands within the ANRA. The Secondary SIO of Low would be met. Therefore, the no action alternative currently complies with Forest Plan Standards and Guidelines.

Under Alternative A, Tri-State would still need to expand their transmission system in the valley with a new transmission line in order to serve increasing load demands without the participation of Western. Due to topographic and environmental constraints, their expansion would likely occur in the same general vicinity of Western's line and would require a new ROW. Short and long-term visual effects from the Tri-State expansion would be similar to those of the action alternatives, some of which would be significantly adverse.

All action alternatives would result in short and long-term direct impacts to visual resources from the following components: construction activities (clearing, grading, new or expanded ROWs, and construction staging areas), new facilities (access roads, upgraded existing tap and substation facilities, and steel monopoles would replace existing wood H-frames), and operations and maintenance activities. All action alternatives would be visible from the Colorado River Valley (at varying degrees) and from the intersection of the scenic byway and CR 64. Within the ANRA managed by the Forest Service, the Predominant SIOs of High for the scenic byway and Moderate for the remaining lands would not be met. Secondary SIOs are meant to be transitory and subordinate with the Predominant SIOs prevailing in the management area. While the transitory nature of the Secondary SIOs is not defined in the Plan, the useful life of all action Alternatives is many decades and would not meet the Desired Future Visual Condition as listed in the Forest Plan EIS in some areas. While not requiring an amendment to the Plan, all action Alternatives are considered to be in contrast with the intent of the Forest Plan where they cross U.S. Forest Service lands (between 1.5 and 3.8 miles). In the long term, all action alternatives would achieve BLM VRM Class II and III objectives.

Alternative B1 would remove the existing transmission line from the Scanloch Subdivision and place it higher on Table Mountain, decreasing impacts to the residential areas but potentially skyline new structures above the Table Mountain ridgeline as seen from the scenic byway.

Alternatives C1 and C2-Options 1 and 2 would cross more of the Grand County Three Lakes Design Review Area, yet would be least visible from the scenic byway overall and in the ANRA, and have the fewest conflicts with Forest Service SIOs relative to the other action alternatives.

Impacts from Alternative D-Options 1 and 2 would be similar to Alternative B1, except in the Colorado River Valley where it would be less visible than Alternative B1.

## **Wetland Resources**

All action alternatives would remove an existing H-frame structure in a fen wetland. The structure would be cut at the base using hand-held chainsaws and removed by a crane during removal of the existing transmission line. No impacts are anticipated to occur to the fen wetland. Alternatives B1 and D, both options, are not anticipated to require placement of new structures in wetland areas. Alternatives C1 and C2 would place a corner pole in a wetland area, where the alignment turns to the northeast. The span from the corner pole would need to be increased to approximately 1,500 ft to avoid a second pole placement in a wetland. Alternative A (no-action) would have no measurable long-term direct effects on wetlands as a result of maintenance.

**Table ES-1. Comparison of Alternative Effects (Resources are listed in alphabetical order.)**

Resource	Alternative A	Alternative B1	Alternative C1	Alternative C2-Options 1&2	Alternative D-Options 1&2
Accidents and Intentional Acts of Destruction	Existing transmission line presents vulnerabilities in the event of a wildfire due to wooden H-frame structures and ROW vegetation. Wooden H-frame structures and single ROW configuration present vulnerabilities in the event of intentional acts of destruction. However, there is a low risk that the existing transmission line would be targeted for destruction. Short-term minor adverse effects on risk to workers in the event of intentional acts of destruction.	Risk of outages and long-term damage to steel structures from wildfire, as well as the duration of outages, would be significantly reduced compared to Alternative A. Minor long-term vulnerabilities in the event of intentional acts of destruction. However, low risk that any of the action alternatives would be targeted for destruction. Short-term minor adverse effects on risk to workers in the event of intentional acts of destruction.	Similar to Alternative B1	Similar to Alternative B1	Similar to Alternative B1

Resource	Alternative A	Alternative B1	Alternative C1	Alternative C2-Options 1&2	Alternative D-Options 1&2
Air Quality, Climate, and Global Climate Change	Long-term negligible adverse effects on air quality due to maintenance needs. No measurable effect on global climate change. No potential for cumulative effects to air quality, climate, or global climate change.	Short-term minor adverse effects on air quality as a result of construction activities. Long-term negligible adverse air quality effects as a result of long-term maintenance and operations. No exceedances of National Ambient Air Quality Standards (NAAQS).  No measurable cumulative effects to air quality, climate, or global climate change.	Similar to Alternative B1	Similar to Alternative B1	Similar to Alternative B1
Aquatic Resources	The existing transmission line crosses three perennial streams, four intermittent streams, and ten canals or ditches. Short-term negligible impacts at surface water crossings.	Similar to Alternative A and crosses the same water bodies. Short-term negligible impacts at surface water crossings.	Crosses three perennial streams, eight unnamed intermittent streams, and two canals. Short-term negligible impacts at water crossings	Similar to Alternatives A and B1, crossing the same surface waters. Short-term negligible impacts at water crossings.	Similar to Alternatives A, B1, and C2 crossing the same surface waters. Short-term negligible impacts at water crossings.

Resource	Alternative A	Alternative B1	Alternative C1	Alternative C2-Options 1&2	Alternative D-Options 1&2
Cultural Resources	Site-specific long-term adverse effects on historic properties, varying in severity. Treatment of sites and mitigation for adverse effects to be determined in consultation with the SHPO under Section 106 of the NHPA. No potential for cumulative effects to cultural resources.	Similar to Alternative A, with one additional site potentially affected. Cumulative effects on cultural resources are expected to be negligible.	Similar to Alternative A, with two additional sites potentially affected. Cumulative effects on cultural resources are expected to be negligible.	Similar to Alternative A, with two additional sites potentially affected. Cumulative effects on cultural resources are expected to be negligible.	Similar to Alternative A. Cumulative effects on cultural resources are expected to be negligible.
Electric and Magnetic Fields (EMF)	Long-term minor adverse effects on power-frequency magnetic fields. Long-term minor adverse effects on audible noise. Cumulative effects on EMF are expected to be negligible.	Lower EMF at ROW edge than existing alternatives (higher EMF within ROW). Minor adverse effects to audible noise (increase) at ROW edge. No effect on FM radio. At ROW edge, induced current values are below the threshold of perception. No effect on Global Positioning Systems (GPS) signal. Cumulative effects on EMF are expected negligible to non-existent (less than existing conditions).	Similar to Alternative B1	Similar to Alternative B1	Similar to Alternative B1

Resource	Alternative A	Alternative B1	Alternative C1	Alternative C2-Options 1&2	Alternative D-Options 1&2
Land Use	60 improved residential lots, two residential lots with mobile homes, and 55 vacant residential lots are located within 100 feet of the current alignment. No impacts related to ROW expansion. Short-term minor adverse effects on land uses in localized areas as a result of increasing maintenance and repairs to existing line. No potential for long-term cumulative effects.	Short-term minor to moderate adverse construction effects on land uses within and adjacent to the ROW. Forty-three improved residential lots, two residential lots with mobile homes, and 18 vacant residential lots are located within 100 feet of the current alignment. Long-term minor adverse effects on 13 residences located within 100 feet of the centerline due to expanded ROW and associated land use restrictions. Minor to moderate long-term effect on future development of vacant lots within 100 feet of the centerline. Short-term moderate adverse construction effects on agricultural land; negligible long-term impact. Cumulative effects would be negligible to non-existent.	Short-term minor to moderate adverse construction effects on land uses within and adjacent to the ROW. Thirty-five improved residential lots and 10 vacant residential lots are located within 100 feet of the current alignment. Long-term minor adverse effects on 13 residences located within 100 feet of the centerline due to expanded ROW and associated land use restrictions. Minor to moderate long-term effect on future development of vacant lots within 100 feet of the centerline. Short-term moderate adverse construction effects on agricultural land; negligible long-term impact; 0.1 mile of new ROW would cross private land with a conservation easement. If development north and east of the Windy Gap substation resumes, Alternative C1 would result in minor adverse cumulative effects on future land uses in this area. Otherwise, cumulative effects would be negligible to non-existent.	Similar to Alternative C1.	Similar to Alternative B1, except that Alternative D-Options 1 and 2 each have two fewer residences located within 100 feet of the centerline.

Resource	Alternative A	Alternative B1	Alternative C1	Alternative C2-Options 1&2	Alternative D-Options 1&2
Paleontological Resources	No further direct or indirect impacts, unless new excavations are needed for more intensive maintenance activities. No potential for cumulative effects to paleontological resources.	Minor to moderate potential for adverse impacts from structure excavation; sensitive locations to be monitored during construction. Cumulative effects associated with the proposed transmission line rebuild are anticipated to be negligible.	Similar to Alternative B1	Similar to Alternative B1	Similar to Alternative B1
Recreation and Wilderness	Negligible, unless maintenance activities occur at recreation sites during the prime use seasons. No potential for cumulative effects to recreation or wilderness resources.	Short-term negligible to minor effects to ANRA from removal/construction activities, depending on timing of construction. Long-term negligible adverse effects on recreation use areas from ROW expansion and clearing. Short-term moderate adverse effect on Cutthroat Trout campground as a result of construction/removal activities. Long-term moderate beneficial effect at Cutthroat Trout campground due to removal of existing line(s). No measurable cumulative effects to recreation or wilderness resources.	Similar to Alternative B1	Similar to Alternative B1	Similar to Alternative B1

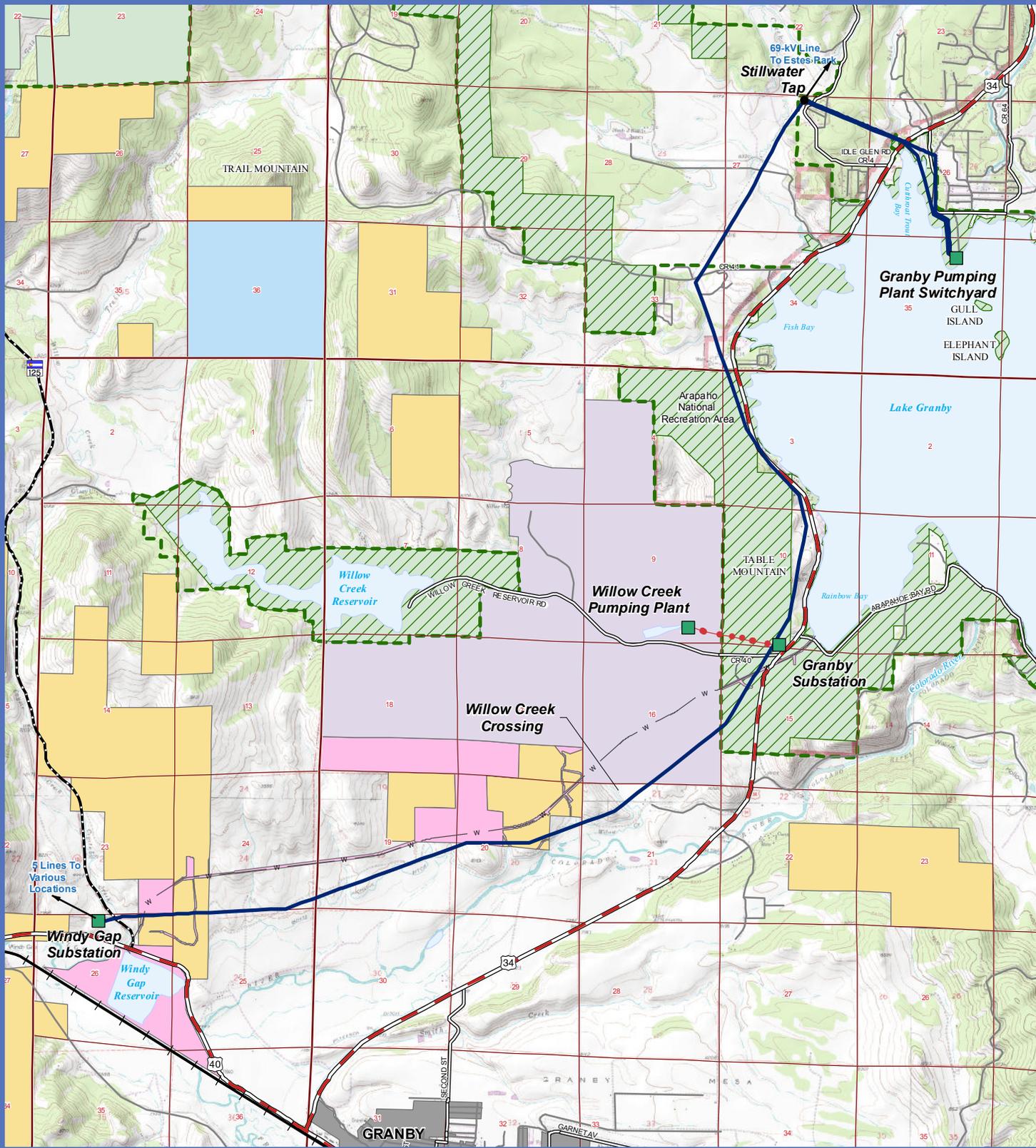
Resource	Alternative A	Alternative B1	Alternative C1	Alternative C2-Options 1&2	Alternative D-Options 1&2
Socioeconomics and Environmental Justice	Increased potential for indirect adverse effects on local economy from diminished reliability of the transmission system. No disproportionate effects to minority populations. No cumulative effects on socioeconomics or environmental justice.	Long-term beneficial effects on local economy due to increased reliability of the transmission system. Short-term negligible beneficial effects on local economy from construction phase employment and expenditures. Long-term negligible to minor adverse effects on property values adjacent to the ROW. No disproportionate effects to minority populations. No measurable cumulative effects on socioeconomics or environmental justice.	Similar to Alternative B1	Similar to Alternative B1	Similar to Alternative B1
Soils	Short-term negligible adverse effects on soils in localized areas as a result of maintenance and repairs to existing line. No potential for cumulative effects to soil resources.	Short-term, minor to moderate adverse effects from construction disturbance. Long-term minor adverse effects from soil loss and displacement. Approximately 18 acres of soil within the proposed ROW is highly erodible. Little or no cumulative effects to soil resources are expected.	Similar to Alternative B1. Approximately 8 acres of soil within the proposed ROW is highly erodible.	Similar to Alternative B1. Approximately 8 acres of soil within the proposed ROW is highly erodible.	Similar to Alternative B1. Approximately 20 acres of soil within the proposed ROW is highly erodible.

Resource	Alternative A	Alternative B1	Alternative C1	Alternative C2-Options 1&2	Alternative D-Options 1&2
Special Status Plant Species	Short-term, direct minor to moderate adverse effects on special status plant species as a result of maintenance. Short- and long-term, indirect minor to moderate adverse effects on special status plant species and habitat as a result of maintenance. Maintenance activities may impact <i>Botrychium hesperium</i> , <i>Botrychium minganense</i> , <i>Pediocactus simpsonii</i> , <i>Dermatocarpon reticulatum</i> "vagrant form," and <i>Penstemon cyathophorus</i> , which were identified within or at the edge of the ROW for Alternative A.	Similar to Alternative A: Same five species identified during field surveys. Alternative B1 transects the most suitable habitat for special status plants. Impacts to special status plants and habitat would be minor in the short-term and negligible in the long-term.	One species, <i>Penstemon cyathophorus</i> , identified during surveys. Impacts to special status plants would be minor in the short-term and negligible in the long-term.	Similar to Alternative C1: One species, <i>Penstemon cyathophorus</i> , identified during surveys. Impacts to special status plants would be minor in the short-term and negligible in the long-term.	Similar to Alternative A: Same five species identified during field surveys. Alternative D transects the second most suitable habitat for special status plants. Impacts to special status plants and habitat would be minor in the short-term and negligible in the long-term.
Special Status Terrestrial, Avian, and Aquatic Wildlife Species	Short- and long-term minor direct effects to some special status species and habitats. No change in disturbance related to ongoing maintenance activities. Replacement of aged equipment will also impact wildlife. Continued potential for collision with migratory and juvenile birds. Minor potential for cumulative effects.	Short-and long-term impacts to some special status species including risk of avian collision. Alternative B1 is located in proximity to several raptor nests. Less impacts likely to the greater sage grouse and golden eagle nest.	The two special status species of concern for Alternative C1 are greater sage grouse and the golden eagle. Long-term moderate to significant impacts to greater sage grouse and habitat. Increased risk of golden eagle collision with transmission line on west side of Table Mountain.	Similar to Alternative C1; however, Option 2 would result in fewer impacts to greater sage grouse because it would rebuild the line in the existing transmission ROW, which is located further south of the Horn lek site.	Short-and long-term impacts to some special status species including risk of avian collision. Alternative D is located in proximity to several raptor nests. Option 2 would result in fewer impacts to greater sage grouse because it would rebuild the line in the existing transmission ROW, which is located further south of the Horn lek site.

Resource	Alternative A	Alternative B1	Alternative C1	Alternative C2-Options 1&2	Alternative D-Options 1&2
Terrestrial and Avian Wildlife Resources	Existing impacts to birds include potential for collision and electrocution and increased perching opportunities for foraging raptors, resulting in increased predation.	Short- and long-term minor adverse effects from widened ROW clearing. Long-term minor adverse effects due to increased potential for avian collisions and habitat fragmentation and alteration. Impacts similar for all action alternatives.	Short- and long-term minor adverse effects from widened ROW clearing. Long-term minor adverse effects due to increased potential for avian collisions and habitat fragmentation and alteration. Impacts similar for all action alternatives.	Short- and long-term minor adverse effects from widened ROW clearing. Long-term minor adverse effects due to increased potential for avian collisions and habitat fragmentation and alteration. Impacts similar for all action alternatives.	Short- and long-term minor adverse effects from widened ROW clearing. Long-term minor adverse effects due to increased potential for avian collisions and habitat fragmentation and alteration. Impacts similar for all action alternatives.
Vegetation Resources	Short-term, negligible to minor direct adverse effects on vegetation, increasing with the age of the transmission line, as a result of routine maintenance operations. Long-term, negligible to minor direct adverse effects on vegetation as a result of plant removal.	Short-term direct moderate impacts on individual plants as a result of construction. Alternative B1 would have a slightly greater impact on vegetative communities, because more forested cover would be impacted.	Direct short-term minor impacts on individual plants as a result of construction. Alternative C1 would cross less acreage of forested communities and more sagebrush communities. Sagebrush would be allowed to return to the project ROW following construction, and therefore these alternatives would have short- term impacts.	Direct short-term minor impacts on individual plants as a result of construction. Alternative C2 would cross less acreage of forested communities and more sagebrush communities. Sagebrush would be allowed to return to the project ROW following construction, and therefore these alternatives would have short- term impacts.	Short-term direct moderate adverse effects on individual plants as a result of construction Alternative D would have a slightly greater impact on vegetative communities, because more forested cover would be impacted.

Resource	Alternative A	Alternative B1	Alternative C1	Alternative C2-Options 1&2	Alternative D-Options 1&2
Visual Resources	No or negligible adverse effects from ongoing maintenance activities. Crosses BLM Visual Resource Management (VRM) Class II lands and Forest Service lands with High Scenic Integrity Objectives (SIO). Ongoing adverse effects as Forest Service High SIO objectives continue to not be met. Limited or no potential for cumulative effects to visual resources.	Taller structures and associated disturbance result in moderate to significant long-term visual effects along Highway 34 and areas with Forest Service Retention objectives. Crosses BLM VRM Class II lands and Forest Service lands with High SIO. Alternative B1 would result in long-term, minor adverse cumulative effects to visual resources.	Similar to Alternative B1. However, long-term effects would range from minor to moderate with localized areas of significant effects. Less long-term adverse effects to ANRA, views from Lake Granby, and Highway 34. Crosses BLM VRM Class II lands and Forest Service lands with High SIO. Cumulative effects would be the same as described for Alternative B1.	Similar to Alternative C1. Option 2 crosses BLM VRM Class II lands. Cumulative effects would be the same as described for Alternative B1.	Similar to Alternative B1. Option 2 crosses BLM VRM Class II lands. Cumulative effects would be the same as described for Alternative B1.
Wetland Resources	No measurable long-term direct adverse effects on wetlands and riparian areas as a result of maintenance. Long-term, indirect negligible to minor adverse effects on wetlands and riparian areas. The potential for cumulative effects to wetland resources is limited.	Short-term, direct minor to moderate adverse effects on wetland vegetation, soils, and surface and groundwater flow regimes as a result of construction. An existing H-frame structure in the fen wetland would be cut at the base using hand-held chainsaws and removed by a crane during removal of the existing transmission line. Alternative B1 crosses the greatest acreage of wetland communities.	Short-term, direct minor to moderate impacts to wetlands during construction for one to two structures in wetland areas. Long-term minor impacts to wetlands include a corner pole in a wetland area, where the alignment turns to the northeast.	Similar to Alternative C1: Short-term, direct minor to moderate impacts to wetlands during construction for one to two structures in wetland areas. Long-term minor impacts to wetlands include a corner pole in a wetland area, where the alignment turns to the northeast.	Similar to Alternative B1: Short-term, direct minor to moderate adverse effects on wetland vegetation, soils, and surface and groundwater flow regimes as a result of construction. An existing H-frame structure in the fen wetland would be cut at the base using hand-held chainsaws and removed by a crane during removal of the existing transmission line. Alternative D crosses the second greatest acreage of wetland communities.

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Map ES-1

**Legend**

**Base Data**

- Existing Willow Creek Tap (69-kV)
- Windy Gap Water Pipeline (NCWCD)
- Existing 69-kV Transmission Line (Alt. A)

**Land Status**

- Northern Colorado Water Conservancy District (NCWCD)
- Municipal Subdistrict - Northern Colorado Water Conservancy District (MS-NCWCD)
- Forest Service Land within Arapaho National Recreation Area
- Bureau of Land Management (BLM)
- Colorado State Land Board (SLB)
- U.S. Forest Service (USFS)
- Private or Other Land Ownership

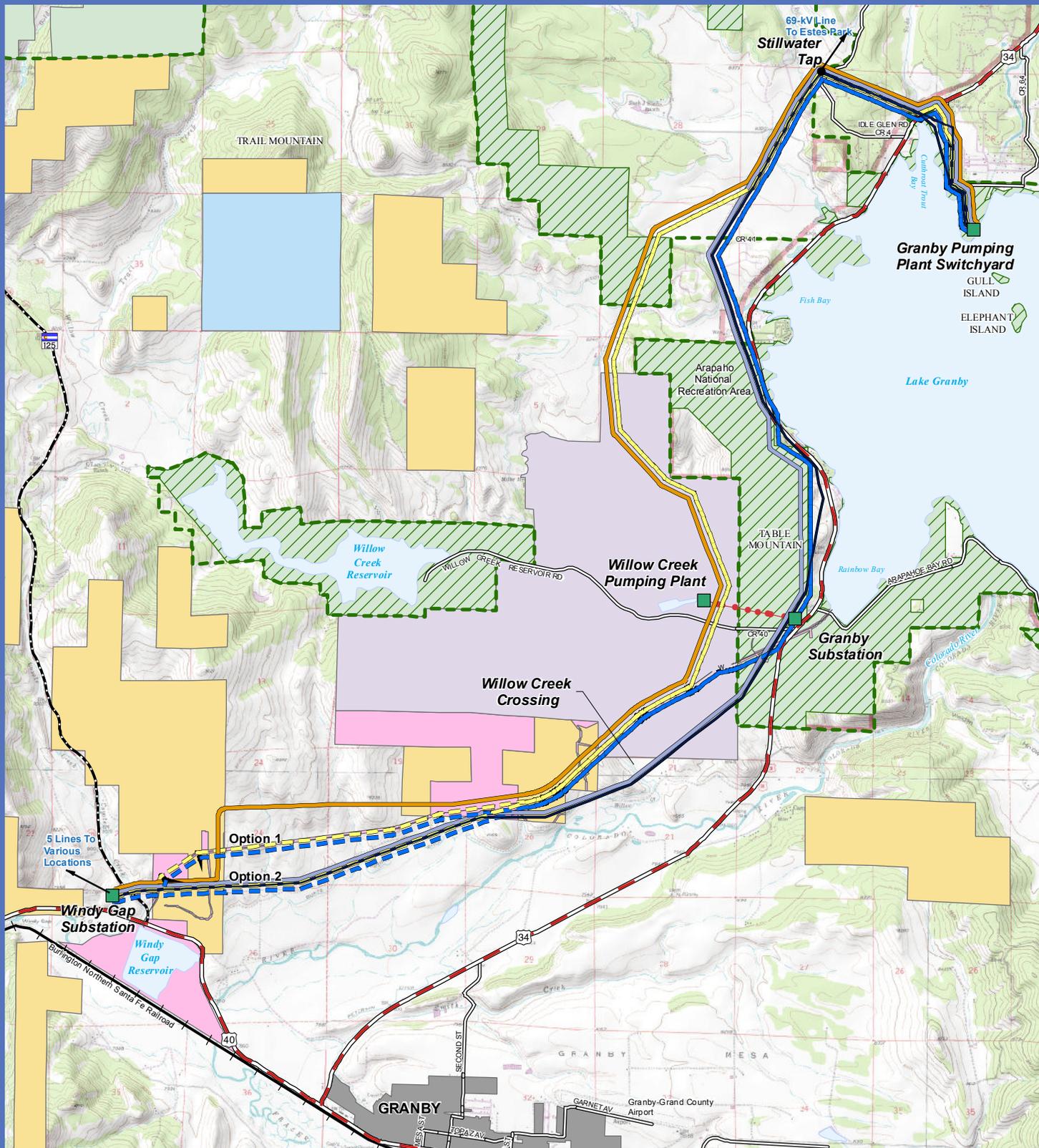
U.S. Forest Service Boundary

**Project Area**  
November 7, 2011



Source: Bureau of Land Management (BLM), Northern Colorado Water Conservancy District (NCWCD), U.S. Forest Service (USFS), Grand County, and Colorado State University





Map ES-2

### Legend

**Base Data**

- Existing Willow Creek Tap (69-kV)
- W— Windy Gap Water Pipeline (NCWCD)

**Transmission Line Alternatives**

- Alternative A - Existing
- Alternative B1
- Alternative C1
- Alternative C2
- - - Alternative C2 - Options 1 and 2
- Alternative D
- - - Alternative D - Option 1 and 2

**Land Status**

- Northern Colorado Water Conservancy District (NCWCD)
- Municipal Subdistrict - Northern Colorado Water Conservancy District (MS-NCWCD)
- Forest Service Land within Arapaho National Recreation Area
- Bureau of Land Management (BLM)
- Colorado State Land Board (SLB)
- U.S. Forest Service (USFS)
- Private or Other Land Ownership
- U.S. Forest Service Boundary

## All Alternatives

November 7, 2011



Source: Bureau of Land Management (BLM), Northern Colorado Water Conservancy District (NCWCD), U.S. Forest Service (USFS), Grand County, and Colorado State University

