

United States
Department of Energy

Western Area Power
Administration

September 2011



Final

Biological Report

**Granby Pumping Plant Switchyard – Windy Gap
Substation Transmission Line Rebuild**

**Biological Assessment, Biological Evaluation, Management Indicator
Species Report, and Review of Local and State Species of Concern**

Grand County, Colorado

For more information, contact:

Jim Hartman, A7400
Natural Resources Office
Western Area Power Administration
P.O. Box 281213
Lakewood, CO 80228-8213
email: hartman@wapa.gov
phone: 720.962.7255

BIOLOGICAL REPORT

Biological Assessment, Biological Evaluation, Management Indicator Species Report, and
Review of Local and State Species of Concern
Granby Pumping Plant Switchyard – Windy Gap Substation Transmission Line Rebuild

Western Area Power Administration

Grand County, Colorado

September 2011

Prepared by:

AECOM

September 2011

Terrestrial Wildlife Reviewed by:

Brock McCormick



09/13/11

U.S. Forest Service Wildlife Biologist

Date

Terrestrial Wildlife Approved by:

Doreen Sumerlin



9/13/2011

U.S. Forest Service Wildlife Biologist

Date

Fisheries Reviewed and Approved by:

Kelly Larkin-McKim



9.14.2011

U.S. Forest Service Fisheries Biologist

Date

Botany Reviewed and Approved by:

Steve Popovich



9/29/2011

U.S. Forest Service Botanist

Date

Project contact:

Jim Hartman, A7400
Natural Resources Office
Western Area Power Administration
P.O. Box 281213
Lakewood, CO 80228-8213
email: hartman@wapa.gov
phone: 720.962.7255

ACRONYMS AND ABBREVIATIONS

ANRA	Arapaho National Recreation Area
APLIC	Avian Power Line Interaction Committee
ARNF	Arapaho-Roosevelt National Forest
BA	Biological Assessment
BE	Biological Evaluation
BLM	Bureau of Land Management, United States Department of Interior
C-BT	Colorado-Big Thompson
CDOW	Colorado Division of Wildlife
CFR	Code of Federal Regulations
CNHP	Colorado Natural Heritage Program
CR	County Road
DC	Design Criteria
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
Forest Plan	Arapaho-Roosevelt National Forest <i>1997 Revision of the Land Resource Management Plan</i>
Forest Service	U.S. Forest Service
FSM	Forest Service Manual
FSS	Forest Service Sensitive
GIS	Geographic Information System
GPS	Global Positioning Systems
GSGCP	Greater Sage -grouse Conservation Plan
ID Team	Interdisciplinary Team
kCM	Kilo Circular Mil
kV	Kilovolt
LAU	Lynx Analysis Unit
MBTA	Migratory Bird Treaty Act
MIC	Management Indicator Community
MIS	Management Indicator Species
MPEI	Mountain Parks Electric, Inc.
MS-NCWCD	Municipal Subdistrict-Northern Colorado Water Conservancy District
NCWCD	Northern Colorado Water Conservancy District
NDIS	National Diversity Information Source

NE	No Effect
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NFS	National Forest System
Reclamation	U.S. Bureau of Reclamation
RMBO	Rocky Mountain Bird Observatory
ROW	Right-of-Way
SCP	Standard Construction Practices
SLB	Colorado State Land Board
Tri-State	Tri-State Generation and Transmission, Inc.
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
Western	Western Area Power Administration

Table of Contents

ACRONYMS AND ABBREVIATIONS	i
1.0 Project Introduction	1-1
1.1 Introduction	1-1
1.2 Project Purpose and Need	1-1
1.3 Project Location and Setting Overview	1-7
2.0 Alternatives Considered in Detail	2-1
2.1 Alternative A – Keep the Existing Transmission Line (No Action)	2-2
2.2 Alternative B1 – Rebuild and Upgrade Existing Transmission Line	2-11
2.3 Alternative C1 – Reroute and Upgrade the Transmission Line	2-15
2.4 Alternative C2 – Reroute and Upgrade the Transmission Line, with Option to Use Existing Rights-of-Way	2-19
2.5 Alternative D – Proposed Action – Rebuild and Upgrade the Existing Transmission Line, with Options to Use Existing Rights-of-Way	2-20
2.6 Comparison of Alternative Elements	2-28
2.7 Activities Common to All Action Alternatives	2-29
2.7.1 Construction Methods and Requirements	2-30
2.7.2 Acquisition of Land Rights	2-31
2.7.3 Access	2-32
2.7.4 Construction Staging Area	2-33
2.7.5 Clearing and Grading	2-33
2.7.6 Structure and Conductor Installation	2-34
2.7.7 Site Cleanup and Restoration	2-34
2.7.8 Workforce	2-34
2.7.9 Construction Sequencing	2-34
2.7.10 Construction Monitoring	2-35
2.7.11 Operation and Maintenance	2-35
2.7.12 Other Permits and Approvals	2-35
3.0 Standard Construction Practices and Environmental Protection / Mitigation Measures	3-1
3.1 Western’s Standard Construction and Mitigation Practices	3-1
3.2 Project-Specific Environmental Protection / Mitigation Measures	3-4
5.0 Federally Listed Species	5-1
5.1 Consultation and Coordination	5-1
5.2 Species Considered	5-1
5.3 Species Evaluation	5-2

5.3.1	Canada lynx, <i>Lynx canadensis</i>	5-2
5.3.2	Osterhout milk-vetch, <i>Astragalus osterhoutii</i>	5-4
5.3.3	Penland’s beardtongue, <i>Penstemon penlandii</i>	5-5
5.4	Effects from Interrelated and Interdependent Actions	5-6
5.5	Determinations Summary	5-6
6.0	Forest Service Sensitive Species.....	6-1
6.1	Forest Service Guidance.....	6-1
6.2	Species Considered	6-1
6.3	Species Evaluation - Wildlife	6-9
6.3.1	Mammals	6-9
6.3.2	Birds	6-16
6.3.3	Amphibians	6-43
6.4	Species Evaluation - Plants.....	6-49
6.4.1	Pre-Field Review.....	6-49
6.4.2	Previous Investigations and Known Resources in the Area	6-50
6.4.3	Survey Methods	6-50
6.4.4	Survey Results	6-51
6.4.5	Ferns and Allies	6-51
6.5	Determination of Impacts for All Forest Service Sensitive Species	6-80
7.0	Forest Service Management Indicator Species.....	7-1
7.1	Forest Service Guidance.....	7-1
7.2	Species Considered	7-1
7.3	Species Evaluation.....	7-3
7.3.1	Mammals	7-3
7.3.2	Birds	7-13
7.3.3	Amphibians	7-26
7.4	Relationship of MIC/MIS Effects to the Forest Plan	7-26
7.4.1	Young and Mature Forest Structural Stages	7-26
7.4.2	Openings	7-27
7.4.3	Interior Forest	7-27
7.4.4	Old Growth.....	7-27
7.4.5	Aspen Forest	7-27
7.4.6	Montane Riparian and Wetland.....	7-28
7.4.7	Montane Aquatic Environments	7-28
7.5	Viability of MIS Species	7-28

8.0	Discussion and Consistency with Forest Plan	8-1
8.1	Species Considered	8-1
9.0	State or Other Species of Concern	9-1
9.1	Species Evaluation.....	9-1
9.1.1	American White Pelican, <i>Pelecanus erythrorhynchos</i>	9-1
9.1.2	Environmental Baseline	9-2
9.1.3	Bald eagle, <i>Haliaeetus leucocephalus</i>	9-3
9.1.4	Golden eagle, <i>Aquila chrysaetos</i>	9-3
9.1.5	Greater sage-grouse, <i>Centrocercus urophasianus</i>	9-5
9.1.6	Osprey, <i>Pandion haliaetus</i>	9-5
9.1.7	Migratory Birds	9-6
10.0	Cumulative Impacts of the Proposed Action (All species)	10-1
11.0	Responsibility for Revisions to this Biological Report.....	11-1
12.0	References	12-1
13.0	Appendices.....	13-1

Figures

Figure 2-1.	Existing H-Frame Wood Structure Profile.	2-2
Figure 2-2.	Typical Profile of Alternative A ROW through Residential Developments.....	2-2
Figure 2-3.	Existing 69-kV Granby Pumping Plant Switchyard - Windy Gap Substation Transmission Line, Grand County, Colorado.	2-10
Figure 2-4.	Typical Single-Post Steel Structure Profile.	2-11
Figure 2-5.	Example of Double-Circuit Single-Pole Steel Structures with COR-TEN Finish.	2-11
Figure 2-6.	Typical Profile of New Single-Pole Steel Structures on Existing but Expanded ROW.	2-12
Figure 2-7.	Typical Profile of New ROW on East Side of Table Mountain.	2-12
Figure 2-8.	Typical Profile of Existing Parallel ROW Versus New Single ROW Leaving Stillwater Tap towards Granby Pumping Plant Switchyard.....	2-15
Figure 2-9.	Typical Profile of New Single-Pole Steel Structure on Shared Windy Gap Pipeline ROW....	2-16

Tables

Table 2-1.	Comparison of Alternative Elements.	2-28
Table 2-2.	Comparison of Alternative Engineering Specifications.	2-29
Table 2-3.	Estimated Access Road Availability and Type by Alternative.....	2-33
Table 2-4.	Construction Activities and Equipment.....	2-35
Table 3-1.	Western’s Standard Construction and Mitigation Practices.	3-1
Table 3-2.	Project-Specific Design Criteria and Protection Measures by Resource.....	3-4
Table 5-1.	Federally Listed Species with the Potential to Occur in Grand County.....	5-2
Table 5-2.	Summary of Effects Determinations for Federally Listed Species.	5-6

Table 6-1.	R2 Forest Service Sensitive Species – Wildlife.....	6-1
Table 6-2.	Region 2 Forest Service Sensitive Species – Plants.	6-3
Table 6-3.	Forest Service Sensitive Species Retained for Further Analysis.....	6-6
Table 6-4.	Transmission Line ROW Impact Calculations	6-9
Table 6-5.	Sulphur District Goshawk Nest Characteristics.....	6-37
Table 6-6.	Boreal Toad Breeding Occurrence in Proximity to the Project Area.....	6-45
Table 6-7.	Determination for Forest Service Sensitive Wildlife Species by Project Alternative.	6-80
Table 6-8.	Determination for Forest Service Sensitive Plant Species by Project Alternative.	6-81
Table 7-1.	Management Indicator Species (MIS) Considered for Analysis.	7-2
Table 7-2.	MIS Carried Forward for Analysis.....	7-3
Table 7-3.	Elk Post-hunt Population Estimates	7-4
Table 7-4.	Mule Deer Post-hunt Population Estimates	7-10
Table 7-5.	Golden-crowned Kinglet In and near ARNF.....	7-14
Table 7-6.	Hairy Woodpecker in and near ARNF.....	7-16
Table 7-7.	Mountain Bluebird in and near ARNF	7-18
Table 7-8.	Pygmy Nuthatch In and near ARNF	7-20
Table 7-9.	Warbling Vireo In and Near ARNF	7-23
Table 7-10.	Wilson's warbler in and near ARNF*	7-25
Table 7-11.	Summary of Determinations for Management Indicator Species.	7-28
Table 8-1.	Forest Service Plant Species of Local Concern/Arapaho National Forest.....	8-1
Table 8-2.	State Listed Noxious Weeds Observed in the Project Area ROW.....	8-5
Table 9-1.	State or Other Species of Concern Retained for Further Analysis.....	9-1

Maps

Map 1-1.	Locator Map	1-3
Map 1-2.	Project Area	1-5
Map 2-1.	All Alternatives	2-3
Map 2-2.	Alternative A – No Action	2-5
Map 2-3.	North End Alternative Alignments	2-7
Map 2-4.	Alternative B1.....	2-13
Map 2-5.	Alternative C1	2-17
Map 2-6.	Alternative C2.....	2-21
Map 2-7.	Southwest End Alternative Alignments.....	2-23
Map 2-8.	Alternative D – Proposed Action	2-25
Map 6-1.	Vegetation Types.....	6-7
Map 7-1.	Elk Summer Habitats	7-5
Map 7-2.	Elk Winter Habitats.....	7-7
Map 7-3.	Mule Deer Winter Habitats	7-11
Map 8-1.	Noxious Weeds, Southwest End.....	8-6

Map 8-2. Noxious Weeds, North End8-7

Appendices

Appendix A Western’s Tranmission Vegetation Management Program
Appendix B Colorado Division of Wildlife Raptor Buffer Guidelines, 2008
Appendix C U.S. Fish and Wildlife Service Species Lists
Appendix D Bald Eagle Data Tables
Appendix E Colorado Natural Heritage Program Boreal Toad Technical Report
Appendix F Boreal Toad Recovery Team Data Tables
Appendix G Colorado Division of Wildlife Consultation Letter

1.0 Project Introduction

1.1 Introduction

Western Area Power Administration (Western) is the lead agency and will supervise the preparation of the Environmental Impact Statement (EIS) and this Biological Report, including the Biological Assessment (BA), Biological Evaluation (BE), and Management Indicator Species (MIS) review. The United States Forest Service (Forest Service) is a federal land management agency that regulates and manages the Arapaho National Recreation Area (ANRA) and surrounding Arapaho National Forest lands, which would be affected by this proposed project. Because the Forest Service must ensure that actions proposed to occur within the ANRA or surrounding National Forest lands are consistent with its 1997 Revised Forest Plan and the requirements of NEPA before granting a Special Use Authorization across lands under its management, the Forest Service has accepted Cooperating Agency status with Western in preparing the required documents, and will be responsible for assessing the final determination of the project's impacts on Forest Service Sensitive (FSS) species. The purpose of this Biological Report is to document the likely impacts of the project alternatives, including the no action alternative, on federally listed species, FSS species, state species of concern, and any other sensitive species or habitats that may be affected by the project.

Western is the lead federal agency for preparing the EIS, as defined in 40 Code of Federal Regulations [CFR] 1501.5. The Forest Service, United States Bureau of Land Management (BLM), and Grand County are cooperating agencies. Other project participants include Tri-State Generation and Transmission, Inc. (Tri-State), Mountain Parks Electric, Inc. (MPEI), Northern Colorado Water Conservancy District (NCWCD), and Municipal Subdistrict NCWCD (MS-NCWCD).

1.2 Project Purpose and Need

Western, a power marketing administration within the United States Department of Energy, is proposing to rebuild and upgrade the Granby Pumping Plant Switchyard-Windy Gap Substation transmission line in Grand County, Colorado.

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 US Highway 40 and Colorado State Highway 125 (Map 1-1). The single circuit, wood pole, H-frame transmission line was authorized in 1938 and constructed in 1939 by the United States Bureau of Reclamation (Reclamation) as part of the Colorado-Big Thompson (C-BT) project. The existing transmission line runs northeast along US 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 ANRA, managed by the Forest Service. The project area includes tracts of land managed by the BLM Kremmling Field Office and Arapaho-Roosevelt National Forest (ARNF), including portions of the ANRA, as well as Colorado State Land Board (SLB), NCWCD, MS-NCWCD, and private lands (Map 1-2).

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 and a potentially jeopardized power supply

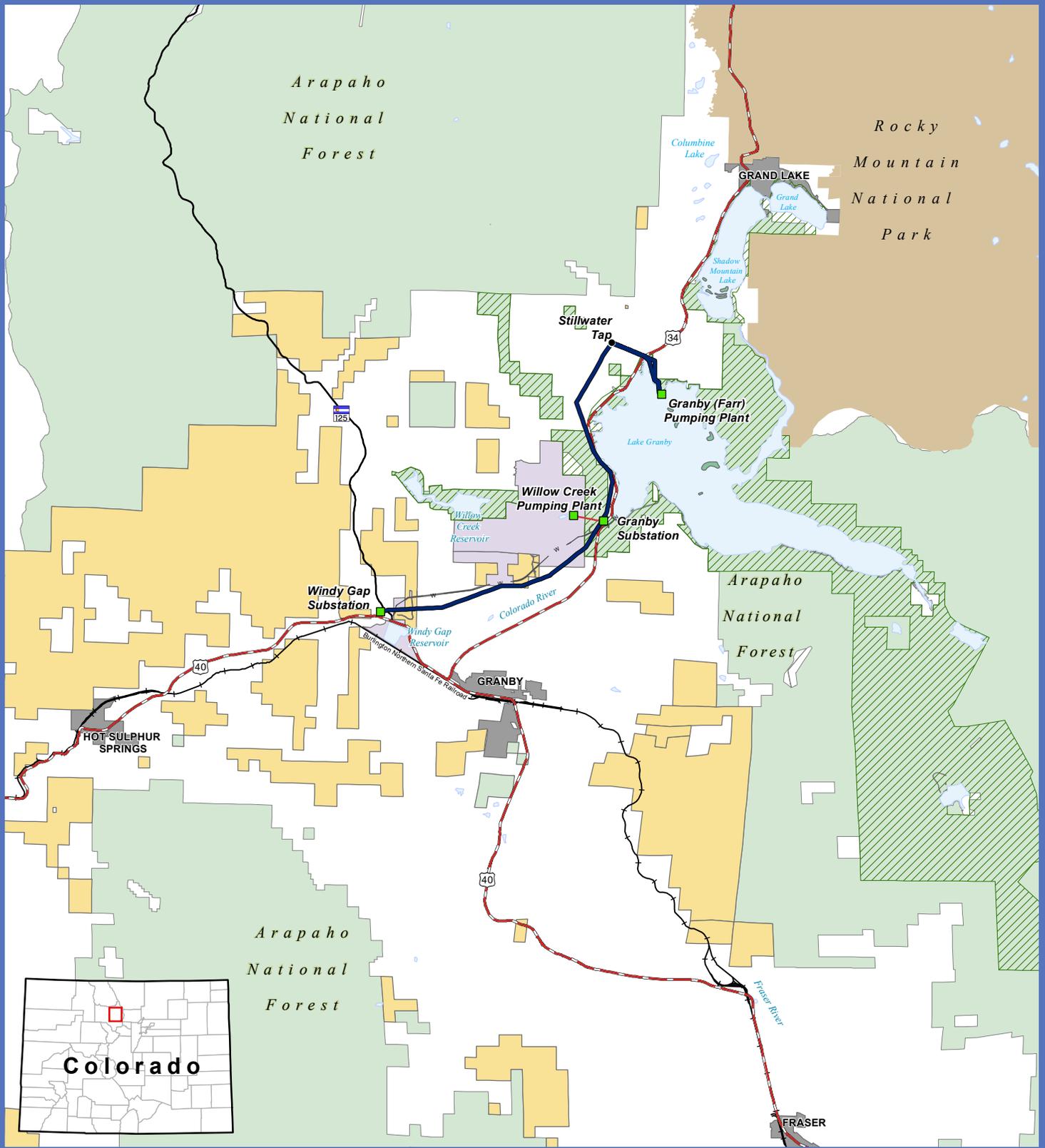
for all electric customers in the service area.

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 by the year 2010 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 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.

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 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 be consolidating existing facilities to meet growing service area needs, while minimizing impacts.



Map 1-1

Locator Map

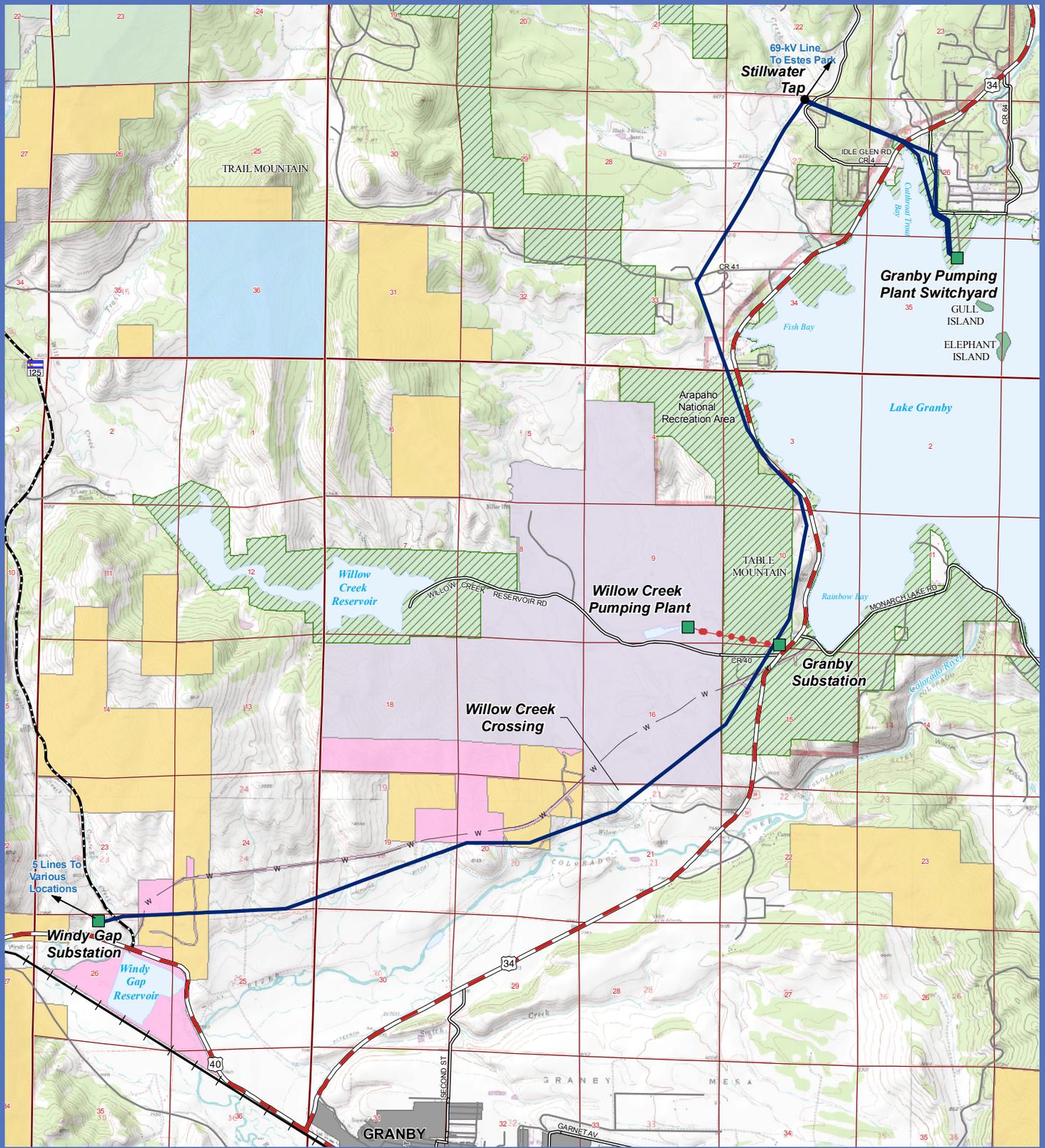
July 23, 2010

Legend

- | | |
|--|--|
| <ul style="list-style-type: none"> Existing Willow Creek Tap (69-KV) Windy Gap Water Pipeline (NCWCD) Existing 69-kV Transmission Line | <p>Land Status</p> <ul style="list-style-type: none"> Arapaho National Recreation Area (ANRA) Bureau of Land Management (BLM) Colorado State Land Board National Park Service (NPS) U.S. Forest Service (USFS) Northern Colorado Water Conservancy District (NCWCD) |
|--|--|



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



Map 1-2

Legend

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

Land Status

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

Project Area

November 4, 2010



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

The eventual failure of the Adams Tunnel cable will leave large parts of Western 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 US Highway 34 corridor, are included in the service area. Without a rebuild and upgrade of 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.

1.3 Project Location and Setting Overview

The transmission line is located in Grand County. It originates at Windy Gap Substation, located immediately northwest of the intersection of US Highway 40 and State Highway 125, and runs northeast along US Highway 34 and terminates at the Granby Pumping Plant Switchyard at the end of CR 64 on the north shore of Lake Granby (Map 1-1). The project area includes tracts of land managed by the BLM Kremmling Field Office and ARNF, including portions of the ANRA, as well as Colorado SLB, NCWCD, MS-NCWCD, and private lands (Map 1-2).

The project area, for the purpose of this Biological Report, includes all five alternative transmission corridors, including the no action alternative (or existing) corridor. The planning area used to assess population viability and habitat impacts for FSS species includes the ANRA and, on a larger scale, the ARNF.

Elevation in the project area ranges from 7,800 feet near the Windy Gap Substation to 8,400 feet near the Town of Grand Lake. The Colorado River flows south to southwest, immediately east of the project area, and joins with the Fraser River one mile south of the project area. Willow Creek runs through the project area as well as several intermittent and ephemeral creeks, and the Bunte Highline and Red Top irrigation ditches. Average annual precipitation is approximately 14 inches (WRCC 2010).

The southern segments of the alternatives pass through sagebrush dominated shrubland areas and irrigated hay meadows. The central segments of the alternatives pass through sagebrush communities interspersed with evergreen conifer forests. The northern segments of the alternatives pass through predominantly evergreen conifer forest, interspersed with areas of wet meadow wetlands. A fen wetland is located at the northern end of the project area, west of US Highway 34.

2.0 Alternatives Considered in Detail

The development of a reasonable range of alternatives is the foundation of the National Environmental Policy Act (NEPA) process.

Each alternative has a different range of impacts and addresses the project purpose and need with varying degrees of success. The NEPA process requires that a no action alternative be evaluated in addition to the action alternatives to establish a baseline for analysis and to analyze the consequences of not implementing the project.

An Interdisciplinary Team (ID Team) representing various resources potentially affected by the project developed a range of reasonable alternatives for the proposed project. The project ID Team was comprised of Western, Tri-State, MPEI, NCWCD, Forest Service, BLM, Grand County, and contractor staff. The alternatives were identified by evaluating opportunities, constraints, and engineering design standards. 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.

The ID Team refined alternatives in response to relevant issues and concerns identified during both the EA and EIS scoping process. 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.

In developing the project and project alternatives, Western considered a range of transmission design and routing alternatives. Western relied on existing studies, new studies, and public comments to narrow the range of alternatives to those presented in this EIS. Development of the Granby Pumping Plant-Windy Gap Substation Transmission Line Rebuild project occurred in several phases, beginning with identification of the system capacity and voltage needs. Western and Tri-State conducted several rounds of stability and power-flow studies to develop a system configuration that would accommodate the required system capacity. In developing the alternative transmission routes, Western and Tri-State relied on additional studies and public comments to assess and refine preliminary transmission line corridors and to identify the proposed and alternative transmission line routes to carry forward into the EIS.

Ultimately, the ID Team developed five alternatives in response to the issues, concerns, and constraints. These five alternatives are carried forward for further analysis in the EIS (Map 2-1):

- (1) Alternative A – Keep the Existing Transmission Line (no action)
- (2) Alternative B1 – Rebuild and Upgrade the Transmission Line on the Existing ROW
- (3) Alternative C1 – Reroute and Upgrade the Transmission Line
- (4) Alternative C2 – Reroute and Upgrade the Transmission Line, with Options to Use Existing ROW
- (5) Alternative D – Rebuild and Upgrade the Transmission Line on the Existing ROW, with Options to Use New ROWs (Proposed Action)

The alternatives are discussed in the following sections. Western evaluated approximately 10 alternatives, line configurations, or alternative components during the process. Alternatives and components that were considered but eliminated during the EIS process are discussed in the Draft EIS Chapter 2.0, Section 2.5.

All alternative maps are located at the end of this section.

2.1 Alternative A - Keep the Existing Transmission Line (No Action)

Alternative A would not upgrade or rebuild any of the existing transmission line system between the Granby Pumping Plant Switchyard and the Windy Gap Substation. Alternative A would continue use of the existing 69-kV transmission line for approximately 13.6 miles between the Windy Gap Substation and the Granby Pumping Plant Switchyard (Map 2-2). The existing line consists of wooden H-frame pole structures (Figure 2-1, Figure 2-2, and Figure 2-3).

From the Windy Gap Substation, the current alignment crosses State Highway 125 and travels northeast, generally parallel to US Highway 34, to the Granby Substation (Map 2-2). On the east side of Table Mountain, private development in the Scanloch Subdivision has encroached on the existing transmission line. Private buildings, including residences and unoccupied outbuildings, are located immediately adjacent to or directly under the existing transmission line (Figure 2-2).

Both of the existing circuits from Stillwater Tap to the Granby Pumping Plant Switchyard would remain in operation.

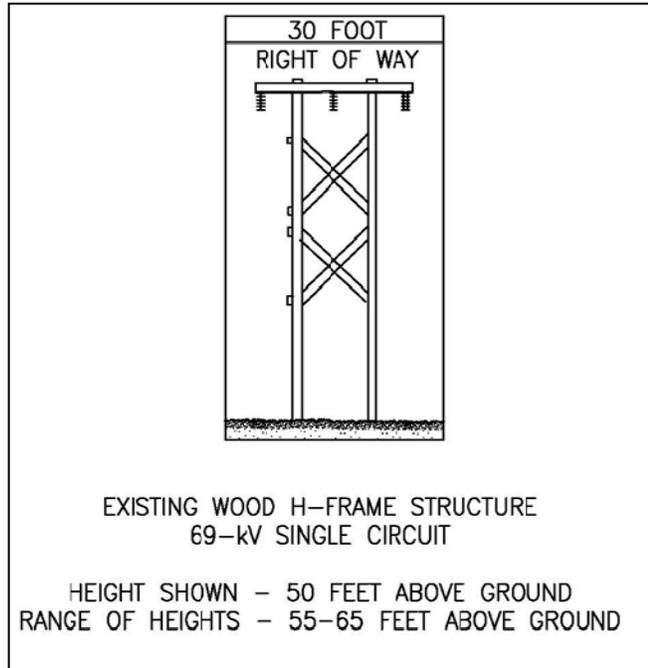


Figure 2-1. Existing H-Frame Wood Structure Profile.

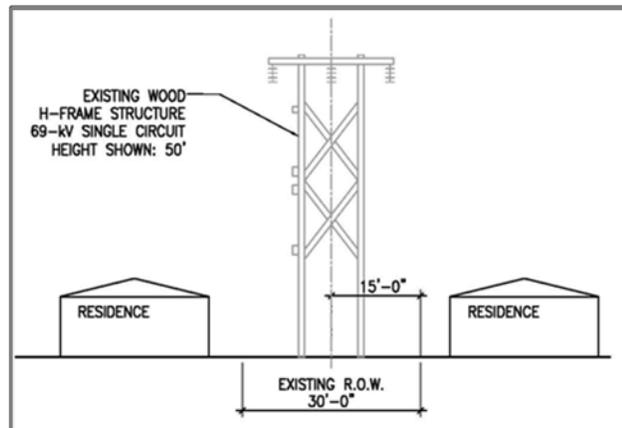
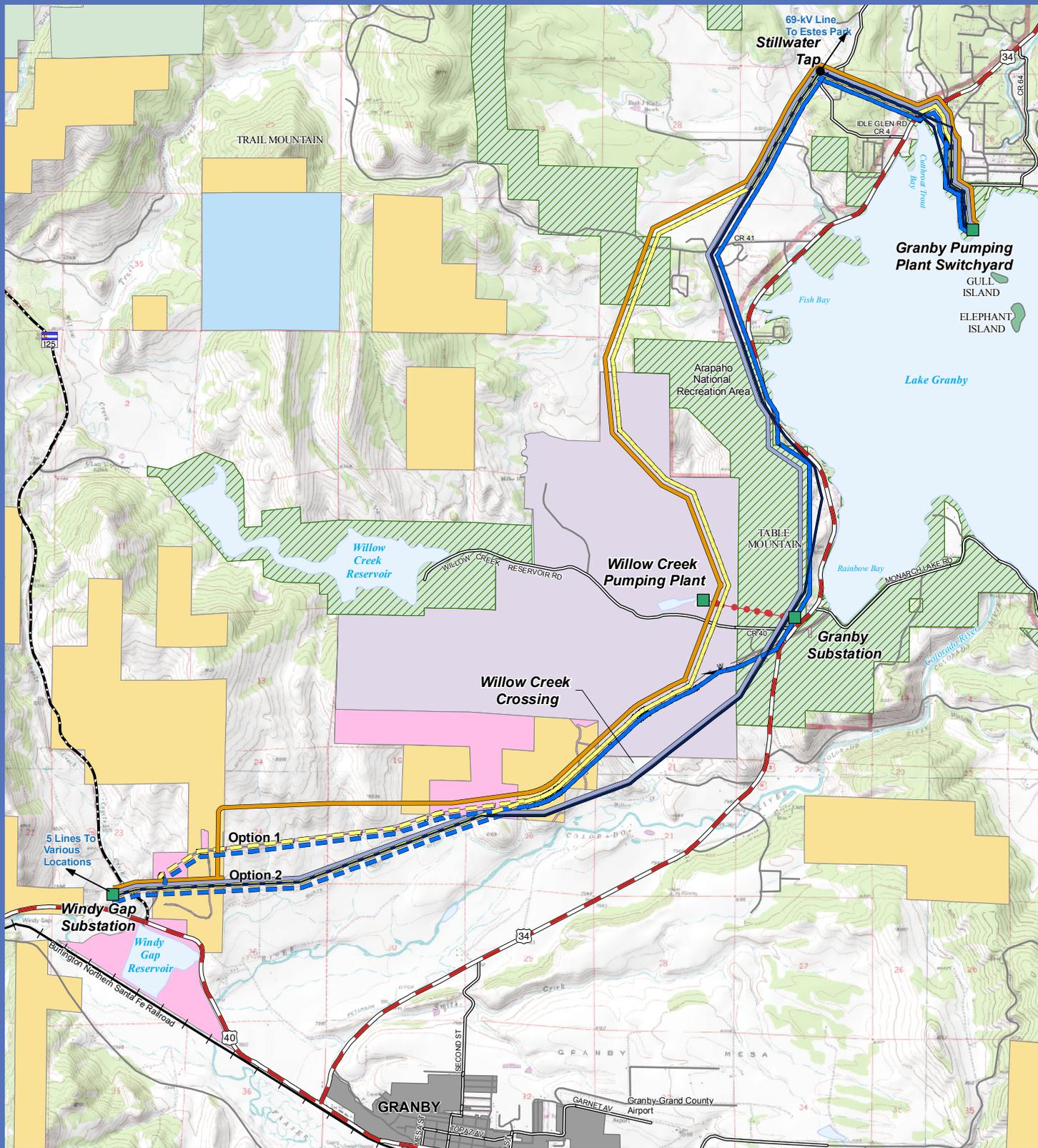


Figure 2-2. Typical Profile of Alternative A ROW through Residential Developments.



Map 2-1

Legend

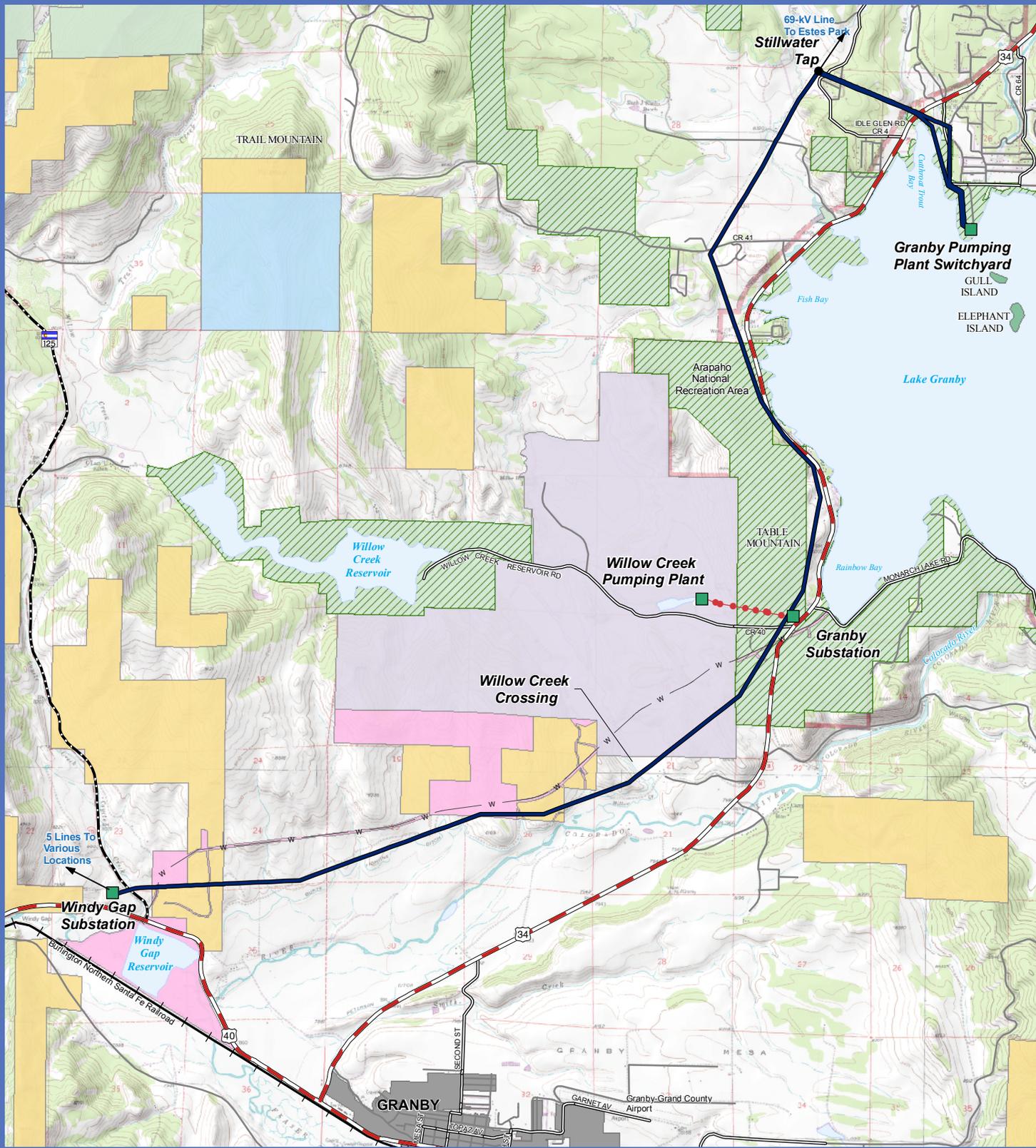
- | | | |
|-------------------------------------|---------------------------------------|---|
| Base Data | Transmission Line Alternatives | Land Status |
| ● Existing Willow Creek Tap (69-KV) | — Alternative A - Existing | ▨ Arapaho National Recreation Area (ANRA) |
| —W Windy Gap Water Pipeline (NCWCD) | — Alternative B1 | ■ Bureau of Land Management (BLM) |
| | — Alternative C1 | ■ Colorado State Land Board |
| | — Alternative C2 | ■ U.S. Forest Service (USFS) |
| | — Alternative C2 - Options 1 and 2 | ■ Northern Colorado Water Conservancy District (NCWCD) |
| | — Alternative D | ■ Municipal Subdistrict-Northern Colorado Water Conservancy District (MS-NCWCD) |
| | — Alternative D - Option 1 and 2 | |

All Alternatives

November 4, 2010



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



Map 2-2

Legend

- | | | |
|---|--|--|
| <p>Base Data</p> <ul style="list-style-type: none"> ● Existing Willow Creek Tap (69-KV) -W- Windy Gap Water Pipeline (NCWCD) | <p>Transmission Line Alternatives</p> <ul style="list-style-type: none"> — Alternative A - Existing — No Action Alternative | <p>Land Status</p> <ul style="list-style-type: none"> ▨ Arapaho National Recreation Area (ANRA) ▨ Bureau of Land Management (BLM) ▨ Colorado State Land Board ▨ U.S. Forest Service (USFS) ▨ Northern Colorado Water Conservancy District (NCWCD) ▨ Municipal Subdistrict-Northern Colorado Water Conservancy District (MS-NCWCD) |
|---|--|--|

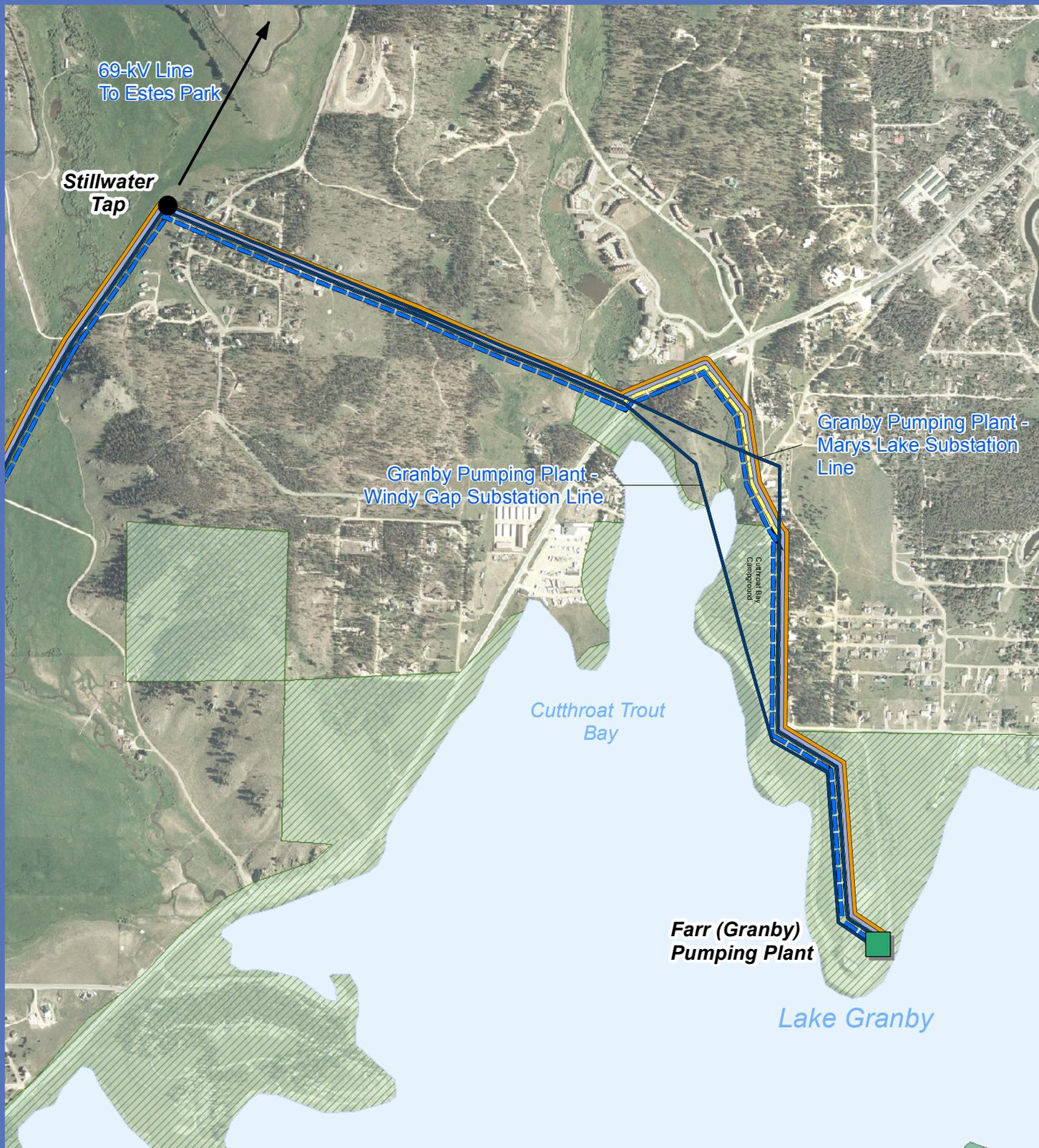
Alternative A
November 4, 2010



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

GRANBY PUMPING PLANT - WINDY GAP TRANSMISSION LINE REBUILD PROJECT

Filepath: P:\2005\05\30029_02\GIS\Project\Layouts\A1TA_8.5x11_090827.mxd



Map 2-3

Legend

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

- Transmission Line Alternatives**
- Existing
 - Alternative B1
 - Alternative C1
 - Alternative C2
 - Alternative C2 - Options 1 and 2
 - Alternative D
 - Alternative D - Options 1 and 2

- Land Status**
- ▨ Arapaho National Recreation Area (ANRA)
 - ▨ U.S. Forest Service (USFS)

North End Routes

November 4, 2010



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

Structures and hardware components would be maintained, repaired, or replaced (as required) during routine maintenance activities or in the event of emergency outages. Repairs and other maintenance activities would be necessary, likely with increasing frequency as the transmission line ages. When the Adams Tunnel cable fails, the existing transmission line would be the only source of power for the Grand Lake-Granby area and the Farr (Granby) and Willow Creek pumping plants.

Under the no action alternative, Western would attempt to maintain the current level of service within the project area. However, Tri-State would still need to expand their transmission system in the valley to serve increasing load demands. Due to topographic and environmental constraints, their expansion would likely occur in the same general vicinity of Western's line and would require new ROW.

The existing structures would be replaced when they fail to meet set criteria during wood pole testing, which is normally conducted in 10-year cycles. Rejected poles would be identified and marked for replacement. The frequency of pole replacements is dependent on local climatic and soil conditions and type of wood pole used for construction (i.e., cedar, pine, etc.).

The existing line is 70 years old. Maintenance activity to repair and replace components of the line would continue to increase in frequency and scope. Also, once the system is operated radially without the Adams Tunnel cable providing looped transmission service, interruptions to electric service in the Granby-Grand Lake area caused by forced outages from weather, failed line components, or scheduled outages for Western to perform certain maintenance activities would be more frequent and longer in duration.



Figure 2-3. Existing 69-kV Granby Pumping Plant Switchyard - Windy Gap Substation Transmission Line, Grand County, Colorado.

2.2 Alternative B1 – Rebuild and Upgrade Existing Transmission Line

Alternative B1 was derived from the original Alternative B presented during the scoping process and is identical to the original Alternative B, with one exception: Alternative B1 uses a new 1.3-mile alignment on the east side of Table Mountain, routing the line just inside the ANRA boundary thereby avoiding home relocations in Scanloch Subdivision. (See Draft EIS Section 2.5, Alternatives Considered but Eliminated from Further Analysis, for more information.)

Alternative B1 would rebuild and upgrade the existing transmission line from the Windy Gap Substation to the Granby Pumping Plant Switchyard (Map 2-4). Alternative B1 would remove the existing single-circuit 69-kV line and construct approximately 11.8 miles of 138-kV double-circuit line using single-pole steel structures on the existing alignment (Figure 2-4 and Figure 2-5). However, the existing 30-foot ROW is 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 per NESC and Western’s design criteria.

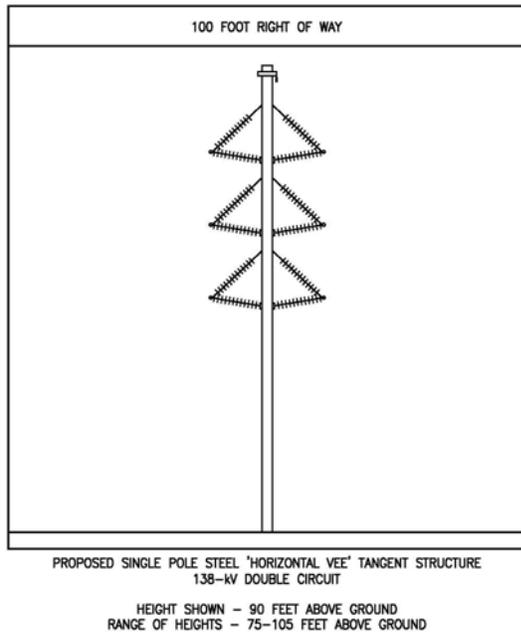


Figure 2-4. Typical Single-Post Steel Structure Profile.

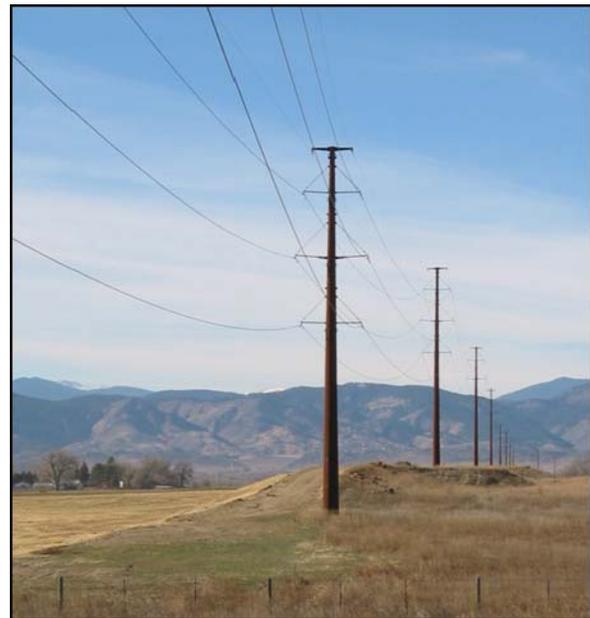


Figure 2-5. Example of Double-Circuit Single-Pole Steel Structures with COR-TEN Finish.

As shown in Map 2-4, from the Windy Gap Substation, Alternative B1 would follow the existing transmission line alignment to the Granby Substation (Figure 2-6). At the Granby Substation, Alternative B1 would deviate from the existing alignment onto a new ROW located just inside the ANRA boundary (Figure 2-7). The eastern boundary of the ROW would be the same as the ANRA boundary (the ROW centerline would be located approximately 50 feet inside the ANRA boundary).

Alternative B1 rejoins the existing transmission line alignment south of the Norton Marina and follows the existing alignment into Stillwater Tap, with one minor exception. Immediately west of the marina, Alternative B1 would deviate from the existing alignment for approximately 0.5 mile and would be located approximately 500 to 750 feet west of the existing alignment and US Highway 34. The ROW would be located on private and ANRA lands.

At Stillwater Tap, the existing Mary's 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 3-way switch. The new 138-kV circuit would bypass the 3-way switch. The existing segment of the Mary's 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 (Figure 2-8).

Between Stillwater Tap and the Granby Pumping Plant Switchyard, Alternative B1 would generally follow the existing transmission line, with a minor alignment deviation to avoid impacting several homes that are located close to the existing transmission line.

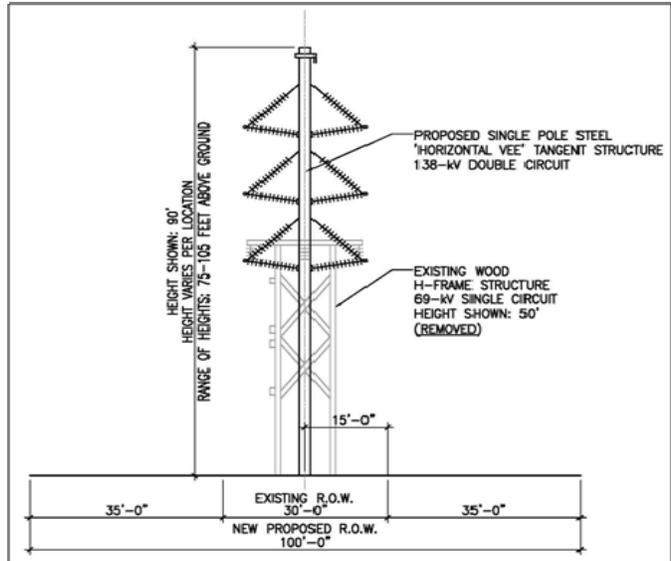


Figure 2-6. Typical Profile of New Single-Pole Steel Structures on Existing but Expanded ROW.

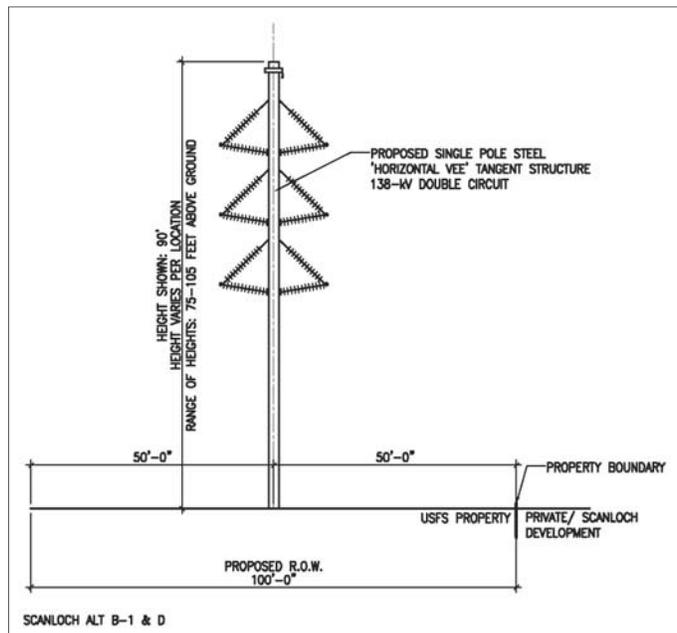
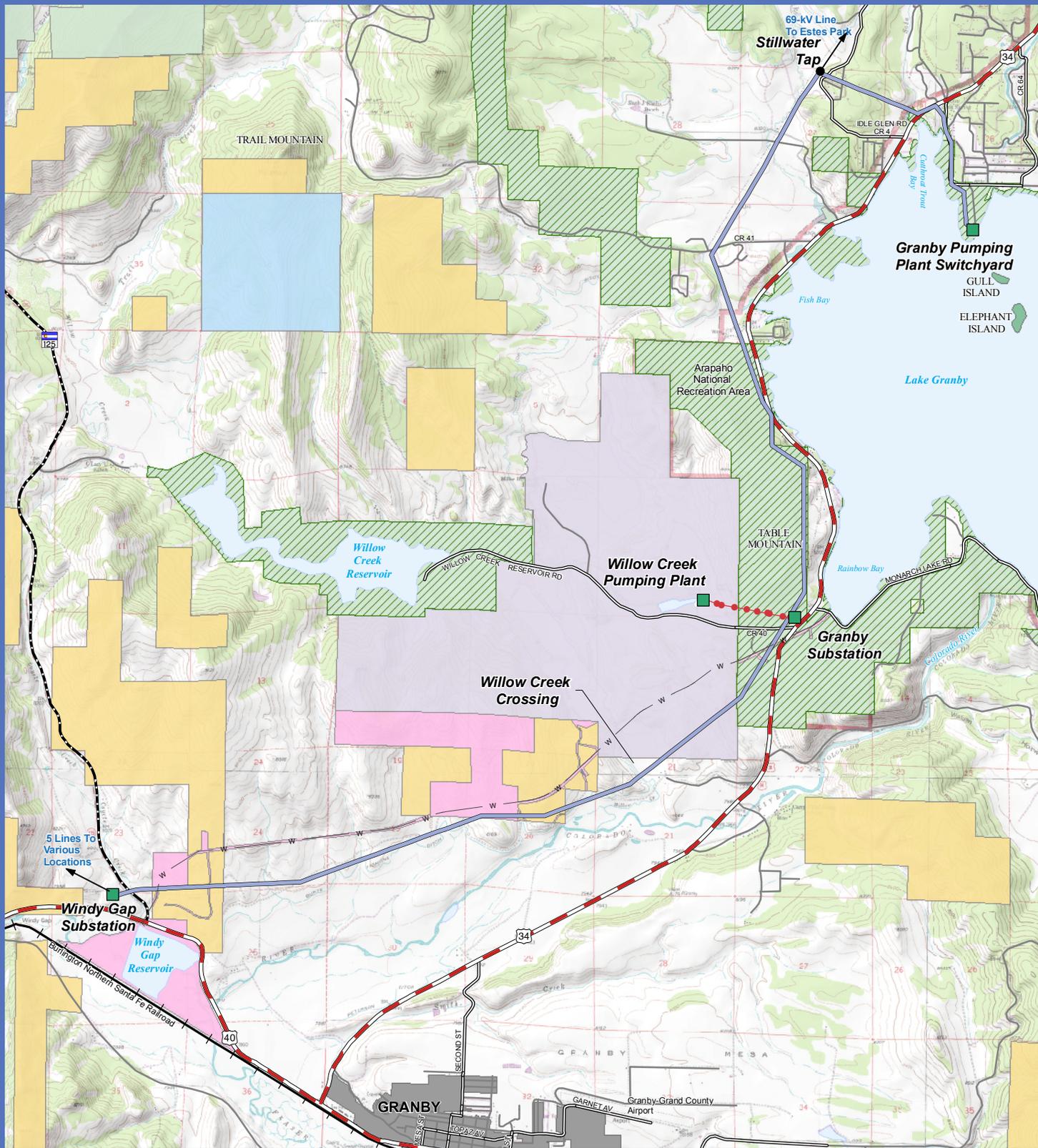


Figure 2-7. Typical Profile of New ROW on East Side of Table Mountain.



Map 2-4

Legend

Base Data

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

Transmission Line Alternatives

- Alternative B1

Land Status

- [Green Hatched] Arapaho National Recreation Area (ANRA)
- [Yellow] Bureau of Land Management (BLM)
- [Light Blue] Colorado State Land Board
- [Light Green] U.S. Forest Service (USFS)
- [Purple] Northern Colorado Water Conservancy District (NCWCD)
- [Pink] Municipal Subdistrict-Northern Colorado Water Conservancy District (MS-NCWCD)

Alternative B1

November 4, 2010



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

In addition to the rebuild and upgrade of the transmission line, Alternative B1 would upgrade the existing tap and substation facilities to include:

- One new 69-kV 3-way line disconnect switch at the Stillwater Tap.
- Additions at Granby Pumping Plant Switchyard consisting of one or two 138-kV circuit breakers, one 69-kV breaker, and a 50 megavolt-ampere 138/69-kV power transformer.
- Additions at Windy Gap Substation consisting of one 138-kV breaker.

Activities common to all action alternatives, including but not limited to, access roads, line removal and restoration activities, lands acquisitions, construction limitations, and ongoing maintenance requirements are discussed in Section 2.3.

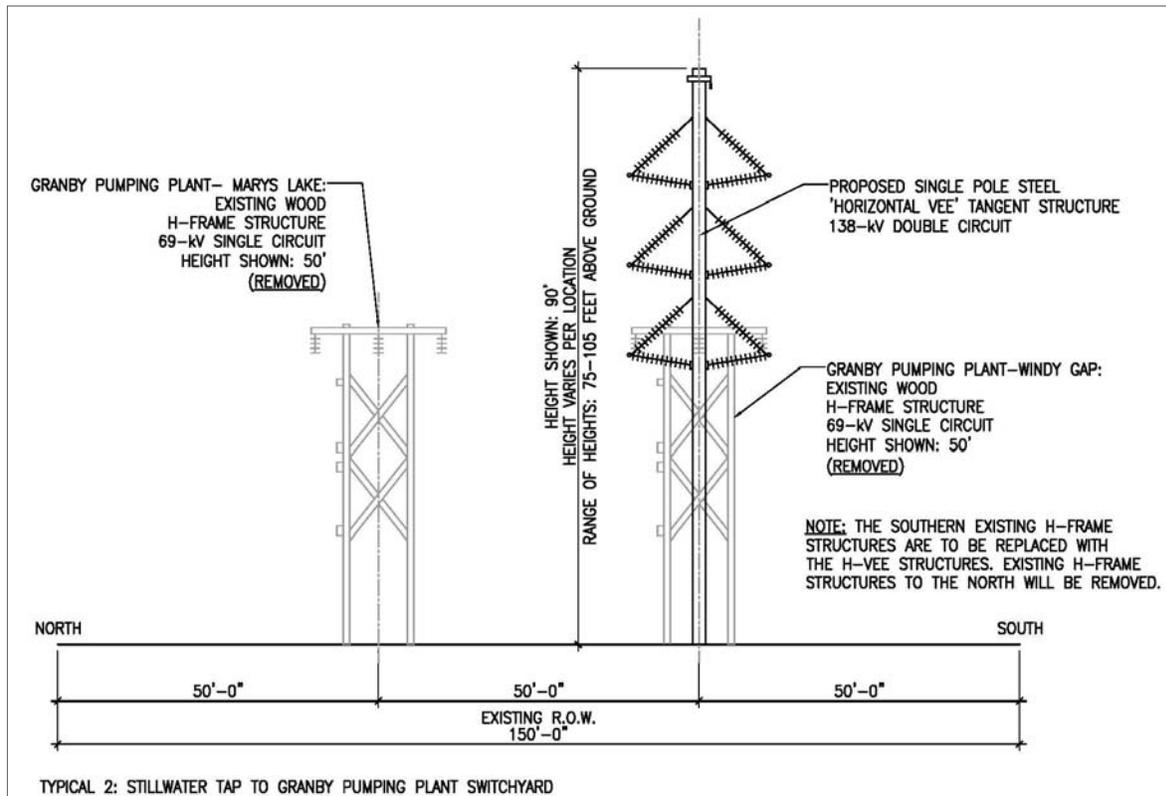


Figure 2-8. Typical Profile of Existing Parallel ROW Versus New Single ROW Leaving Stillwater Tap towards Granby Pumping Plant Switchyard.

2.3 Alternative C1 – Reroute and Upgrade the Transmission Line

Alternative C1 is identical to the original Alternative C presented during the scoping process, with one exception. The primary difference between Alternative C and Alternative C1 occurs 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. (See also Alternatives Considered but Eliminated from Further Analysis, Section 2.5 for more information.)

Alternative C1 would reroute and upgrade the transmission line between the Windy Gap Substation and the Granby Pumping Plant Switchyard (Map 2-5). Alternative C1 would remove the existing single-circuit 69-kV line and construct approximately 12.2 miles of 138-kV double-circuit line using single-pole steel structures on a primarily new ROW. Approximately 3.0 miles would be rebuilt along the existing transmission line ROW. The existing 30-foot ROW is inadequate for the new transmission line, and would be increased to a width of 100 feet to accommodate safety requirements for construction, operation, and maintenance per NESC and Western’s design criteria. Where the transmission line would be co-located with the Windy Gap Pipeline, structures would be located on the edge of the pipeline ROW. As such, Western would need to acquire approximately 50 feet of additional transmission line ROW for lands that fall outside of the existing pipeline easement (Figure 2-9).

As shown in Map 2-5, from the Windy Gap Substation, Alternative C1 would travel east for approximately 0.75 mile following the existing transmission line alignment. Just east of the boundary between BLM and private land, Alternative C1 would depart from the alignment of the existing line and turn north, paralleling the private parcel boundary. The transmission line would cross the Windy Gap Pipeline and then turn east, just inside the private property boundary until it joins with the Windy Gap Pipeline. Alternative C1 would overlap the Windy Gap Pipeline ROW for approximately 2.0 miles. The pipeline has a ROW width that varies from 100 to 400 feet. MS-NCWCD would need to agree to share ROW with Western if Alternative C1 is selected for implementation. The structures and conductors would not be located directly over the pipeline; however, the ROWs would overlap. The transmission line structures would be offset from the pipeline centerline by approximately 25 to 75 feet.

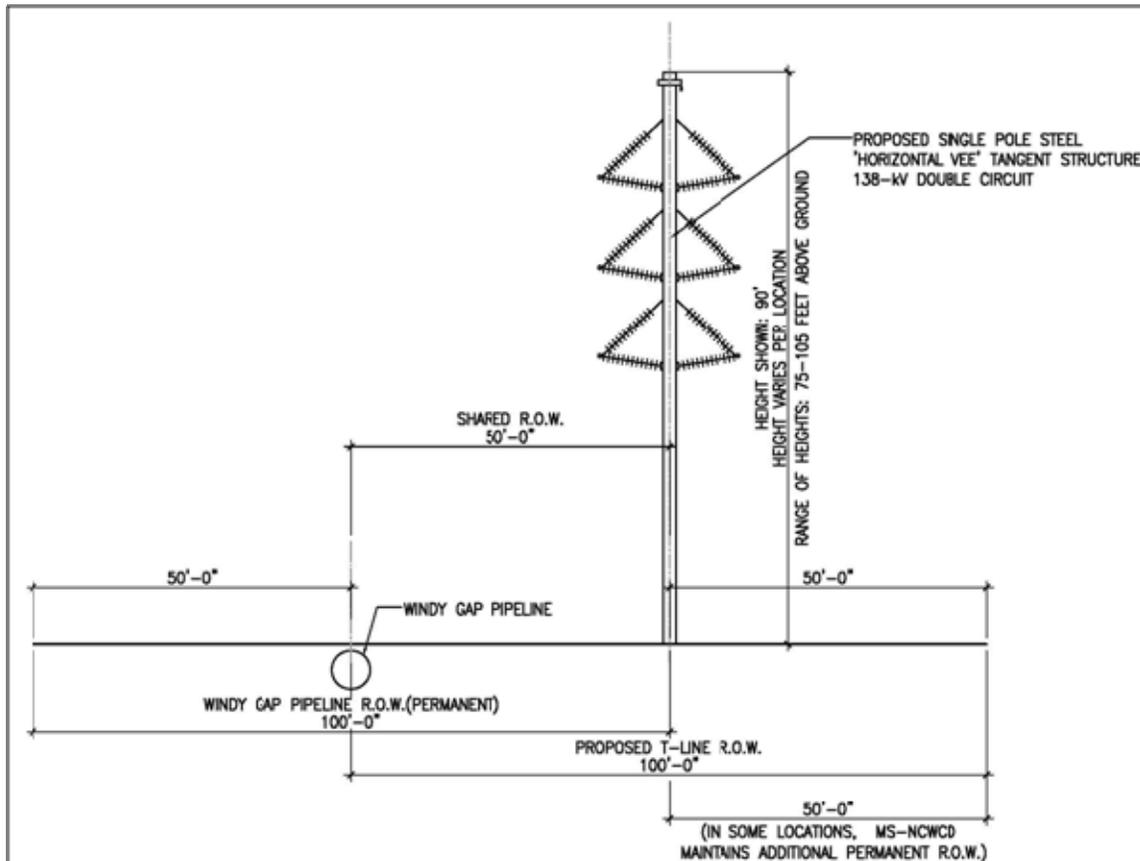
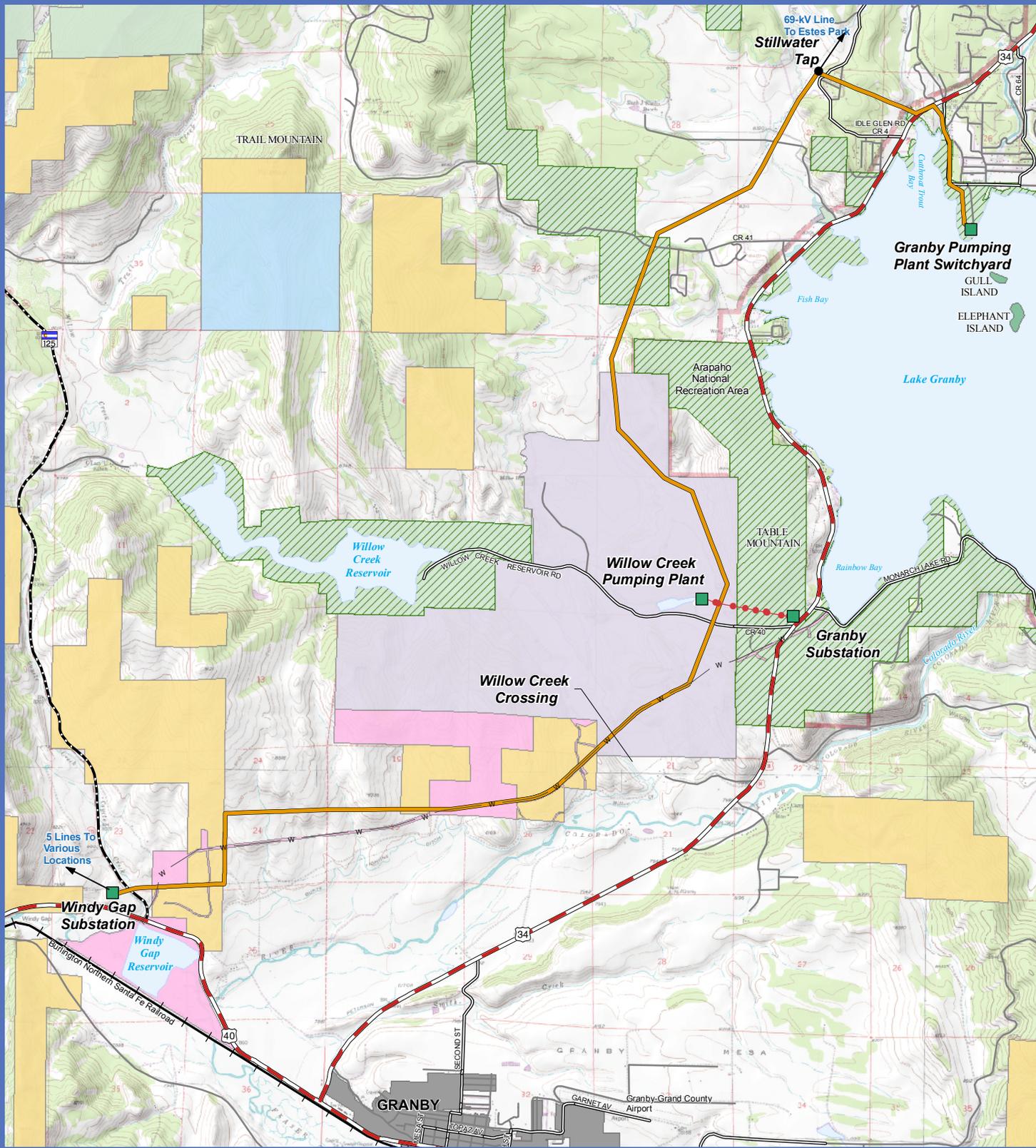


Figure 2-9. Typical Profile of New Single-Pole Steel Structure on Shared Windy Gap Pipeline ROW.



Map 2-5

Legend

- | | | |
|---|---|--|
| <p>Base Data</p> <ul style="list-style-type: none"> ● Existing Willow Creek Tap (69-KV) —W— Windy Gap Water Pipeline (NCWCD) | <p>Transmission Line Alternatives</p> <ul style="list-style-type: none"> — Alternative C1 | <p>Land Status</p> <ul style="list-style-type: none"> ▨ Arapaho National Recreation Area (ANRA) ▨ Bureau of Land Management (BLM) ▨ Colorado State Land Board ▨ U.S. Forest Service (USFS) ▨ Northern Colorado Water Conservancy District (NCWCD) ▨ Municipal Subdistrict-Northern Colorado Water Conservancy District (MS-NCWCD) |
|---|---|--|

Alternative C1
November 4, 2010



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

South of CR 40, Alternative C1 would deviate from the Windy Gap Pipeline and generally follow the contours of the western toe of Table Mountain. At the north end of Table Mountain, Alternative C1 would cross private land for approximately 0.5 mile prior to entering ANRA lands due west of Fish Bay. After crossing CR 41, the alignment would cross private land on a new alignment until joining the existing transmission line alignment at the section boundary (Sections 27 and 28). From this point to the Stillwater Tap, Alternative C1 would be located on the existing, but expanded, ROW. At Stillwater Tap, Alternative C1 would follow the same alignment described for Alternative B1 (Map 2-1).

In addition to the rebuild and upgrade of the transmission line, Alternative C1 would upgrade existing tap and substation facilities in the same manner as was described for Alternative B1.

Activities common to all action alternatives, including but not limited to, access roads, line removal and restoration activities, lands acquisitions, construction limitations, and ongoing maintenance requirements are discussed in Section 2.7.

2.4 Alternative C2 – Reroute and Upgrade the Transmission Line, with Option to Use Existing Rights-of-Way

Alternative C2 is identical to Alternative C1, except for an approximately 2.0-mile segment east of the Windy Gap Substation. From the Windy Gap Substation, Alternative C2 would use either the Windy Gap Pipeline ROW or the existing transmission line ROW to the vicinity of the Willow Creek crossing. At the Willow Creek crossing, Alternative C2 would follow the same alignment as described for Alternative C1.

Alternative C2 would reroute and upgrade the transmission line between the Windy Gap Substation and the Granby Pumping Plant Switchyard (Map 2-6). Alternative C2 would remove the existing single-circuit 69-kV line and construct approximately 12.0 miles of 138-kV double-circuit line using single-pole steel structures on a combination of new and existing ROW. Where Alternative C2 would be located on the existing alignment, the 30-foot ROW would be increased to a width of 100 feet to accommodate safety requirements for construction, operation, and maintenance per NESC and Western's design criteria and Western's vegetation management criteria.

From Windy Gap Substation, Alternative C2 has two route options (Map 2-6 and Map 2-7):

- Alternative C2, **Option 1** – Follow the Windy Gap Pipeline for 4.5 miles and then divide onto a new ROW on the west side of Table Mountain, or
- Alternative C2, **Option 2** – Follow the existing transmission line alignment for 2.7 miles, join the Windy Gap Pipeline for 1.5 miles, and then divide onto a new ROW on the west of Table Mountain.

Under Option 1, Alternative C2 would share a portion of the Windy Gap Pipeline ROW. The pipeline has a ROW width that varies from 100 to 400 feet. MS-NCWCD would need to agree to share ROW with Western if Alternative C2 is selected for implementation. The structures and conductors would not be located directly over the pipeline; however, the ROWs would overlap. The transmission line structures would be offset from the pipeline centerline by approximately 25 to 75 feet.

Under Option 2, Alternative C2 would use the existing but expanded transmission line ROW for 2.7 miles, and then join the Windy Gap Pipeline for 1.5 miles before following the same alignment on the west side of Table Mountain, as described for Alternative C1.

Under both options, Alternative C2 would generally follow the contours of the western toe of Table Mountain after leaving the Windy Gap Pipeline ROW. At the north end of Table Mountain, Alternative C2 would cross private land for approximately 0.5 mile prior to entering ANRA lands due west of Fish Bay. After crossing CR 41, the alignment would cross private land on a new alignment until joining the existing transmission line alignment at the section boundary (Sections 27 and 28). From this point to the Stillwater Tap, Alternative C2 would be located on the existing, but expanded, ROW. At Stillwater Tap, Alternative C2 would follow the same alignment described for Alternative B1 (Map 2-1).

In addition to the rebuild and upgrade of the transmission line, Alternative C2 would upgrade the existing tap and substation facilities in the same manner as was described for Alternative B1.

Activities common to all action alternatives, including but not limited to, access roads, line removal and restoration activities, lands acquisitions, construction limitations, and ongoing maintenance requirements are discussed in Section 2.7.

2.5 Alternative D – Proposed Action – Rebuild and Upgrade the Existing Transmission Line, with Options to Use Existing Rights-of-Way

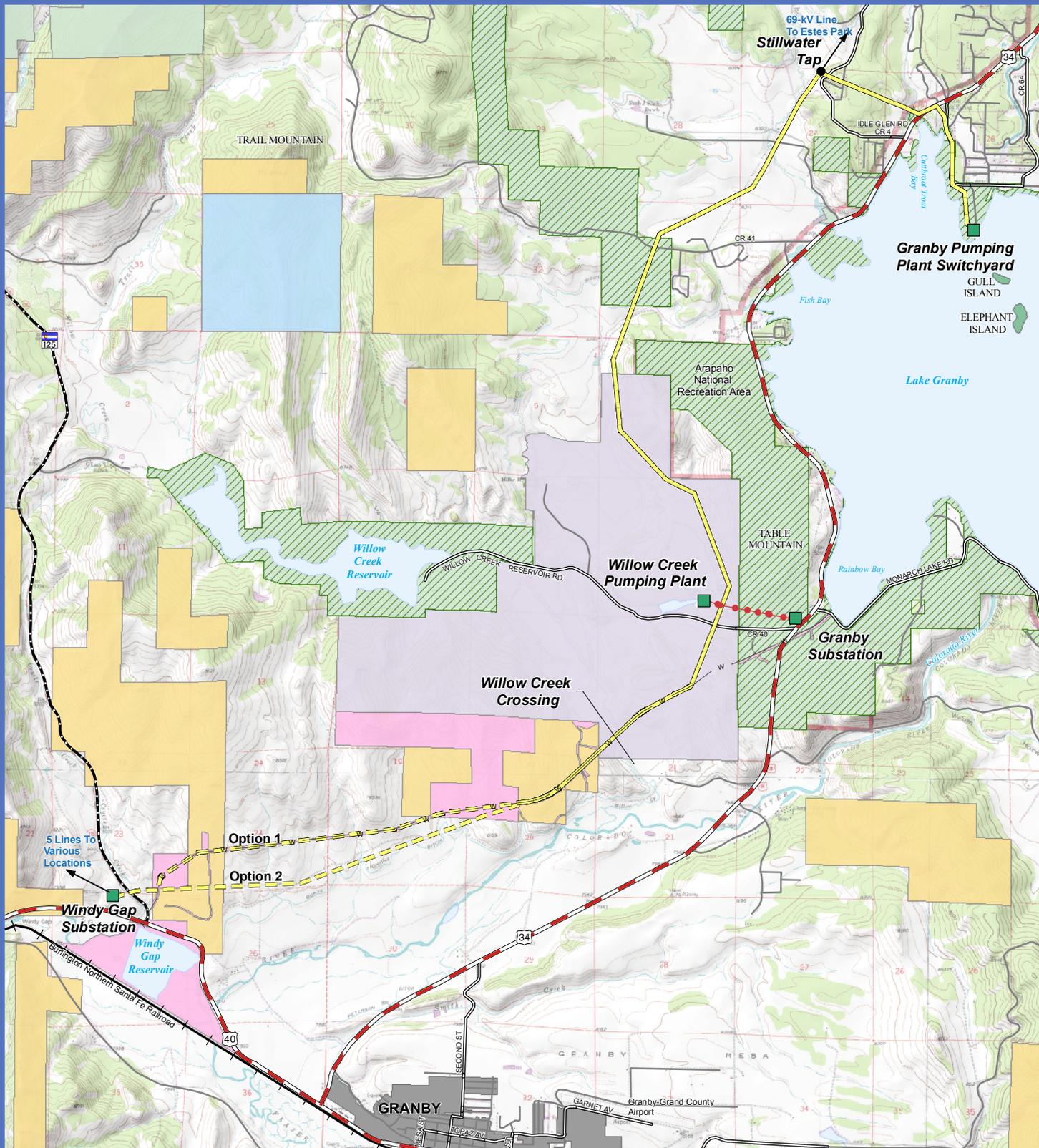
Alternative D was derived from the original Alternative B presented during the scoping process. From Windy Gap Substation to the Granby Substation, Alternative D would follow either the existing transmission line ROW or the Windy Gap Pipeline. From Granby Substation to Granby Pumping Plant Switchyard, Alternative D is identical to Alternative B1.

Alternative D would rebuild and upgrade the existing transmission line from the Windy Gap Substation to the Granby Pumping Plant Switchyard (Map 2-8). Alternative D would remove the existing single-circuit 69-kV line and construct approximately 11.7 miles of 138-kV double-circuit line using single-pole steel structures on the existing alignment or the Windy Gap Pipeline ROW. Where Alternative D would be located on the existing alignment, the 30-foot ROW would be expanded to a width of 100 feet to accommodate safety requirements for construction, operation, and maintenance per NESC and Western’s design criteria. At Stillwater Tap, Alternative D would follow the same alignment described for Alternative B1.

From Windy Gap Substation, Alternative D has two route options, similar to those described for Alternative C2 (Map 2-7 and Map 2-8):

- Alternative D, **Option 1** – Follow the Windy Gap Pipeline ROW for 5.0 miles to just south of the Granby Substation, or
- Alternative D, **Option 2** – Follow the existing transmission line alignment for 3.0 miles, join the Windy Gap Pipeline ROW for 2.0 miles to just south of the Granby Substation.

Under Option 1, Alternative D would share a portion of the Windy Gap Pipeline ROW in the same manner as was described for Alternative C2, Option 1.



Map 2-6

Legend

Base Data

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

Transmission Line Alternatives

- Alternative C2
- Alternative C2 - Route Options

Land Status

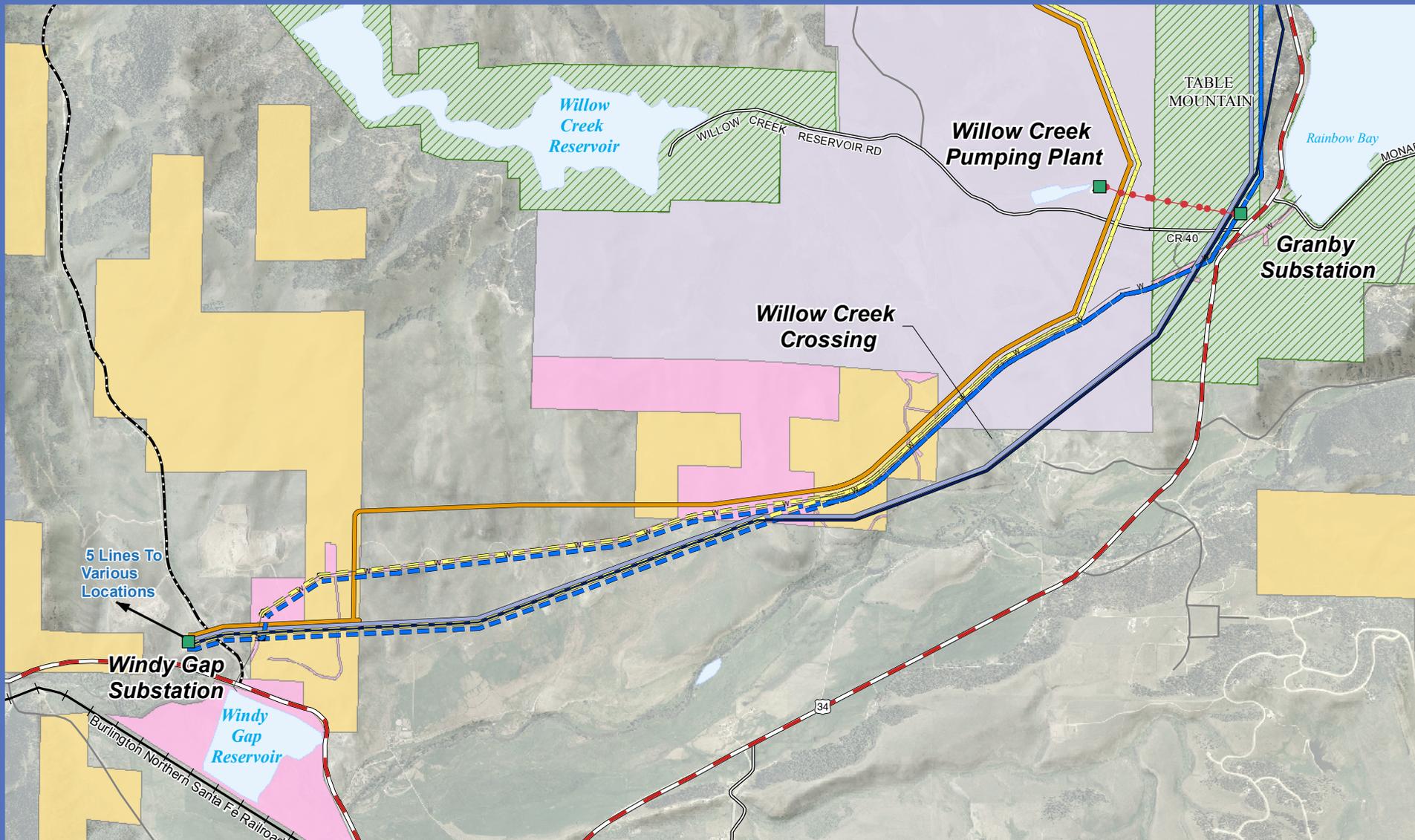
- ▨ Arapaho National Recreation Area (ANRA)
- ▨ Bureau of Land Management (BLM)
- ▨ Colorado State Land Board
- ▨ U.S. Forest Service (USFS)
- ▨ Northern Colorado Water Conservancy District (NCWCD)
- ▨ Municipal Subdistrict-Northern Colorado Water Conservancy District (MS-NCWCD)

Alternative C2

November 4, 2010



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



Map 2-7

Legend

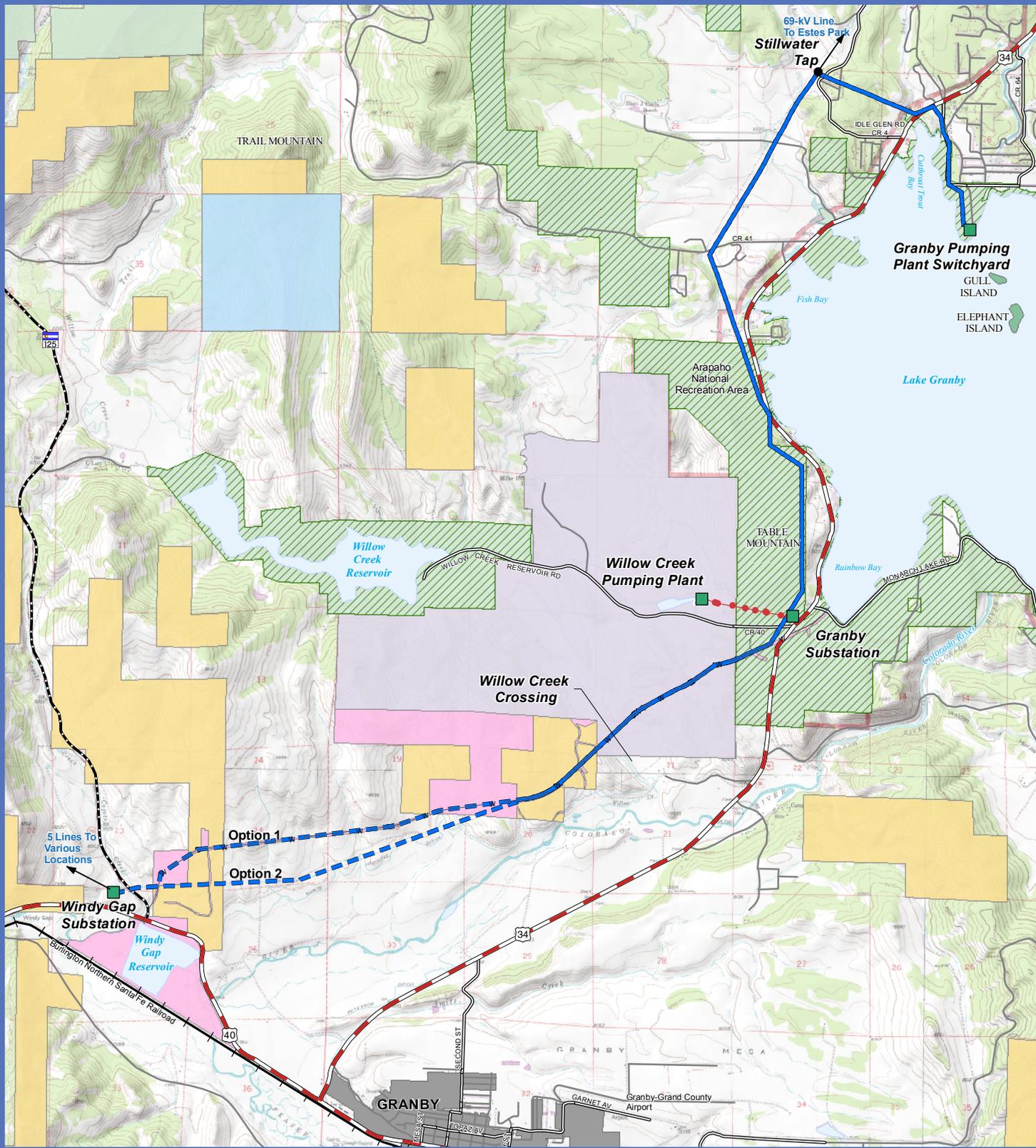
- | | | |
|---|---|--|
| <p>Base Data</p> <ul style="list-style-type: none"> ● Existing Willow Creek Tap (69-KV) —W— Windy Gap Water Pipeline (NCWCD) | <p>Transmission Line Alternatives</p> <ul style="list-style-type: none"> — Alternative A - Existing — Alternative B1 — Alternative C1 — Alternative C2 — Alternative C2 - Options 1 and 2 — Alternative D — Alternative D - Options 1 and 2 | <p>Land Status</p> <ul style="list-style-type: none"> ▨ Arapaho National Recreation Area (ANRA) ▨ Bureau of Land Management (BLM) ▨ Colorado State Land Board ▨ U.S. Forest Service (USFS) ▨ Northern Colorado Water Conservancy District (NCWCD) ▨ Municipal Subdistrict-Northern Colorado Water Conservancy District (MS-NCWCD) |
|---|---|--|

Southwest Route Options

November 4, 2010



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



Map 2-8

Legend

- | | | |
|---|---|--|
| <p>Base Data</p> <ul style="list-style-type: none"> ● Existing Willow Creek Tap (69-KV) — Windy Gap Water Pipeline (NCWCD) | <p>Transmission Line Alternatives</p> <ul style="list-style-type: none"> — Alternative D — Alternative D - Route Options | <p>Land Status</p> <ul style="list-style-type: none"> ▨ Arapaho National Recreation Area (ANRA) ▨ Bureau of Land Management (BLM) ▨ Colorado State Land Board ▨ U.S. Forest Service (USFS) ▨ Northern Colorado Water Conservancy District (NCWCD) ▨ Municipal Subdistrict-Northern Colorado Water Conservancy District (MS-NCWCD) |
|---|---|--|

Alternative D
November 4, 2010



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

Under Option 2, Alternative D would use the existing but expanded transmission line ROW for 3.0 miles, and would then join the Windy Gap Pipeline ROW for 2.0 miles to the area just south of the Granby Substation.

From the point of departure from the Windy Gap Pipeline ROW south of Granby Substation, Alternative D would follow the existing, but expanded ROW north for 0.25 mile. At the Granby Substation, Alternative D would deviate from the existing alignment onto a new ROW located just inside the ANRA boundary, as described for Alternative B1. The eastern boundary of the ROW would be the same as the ANRA boundary (structures/centerline would be located approximately 50 feet inside ANRA boundary).

Alternative D rejoins the existing transmission line alignment south of the Norton Marina and follows the existing alignment into Stillwater Tap, with one minor exception (same as described for Alternative B1). Immediately west of the marina, Alternative D would deviate from the existing alignment for approximately 0.5 mile, and would be located approximately 500 to 750 feet west of the existing alignment and US Highway 34. The ROW would be located on private and ANRA lands.

At Stillwater Tap, Alternative D would consolidate the two existing single-circuit 69-kV lines onto one double-circuit line, and would remove the existing southwestern circuit currently routed through the Forest Service campground (Map 2-1).

Between Stillwater Tap and the Granby Pumping Plant Switchyard, Alternative D would generally follow the existing transmission line, with a minor alignment deviation to avoid impacting several homes that are located close to the existing transmission line.

In addition to the rebuild and upgrade of the transmission line, Alternative D would upgrade the existing tap and substation facilities in the same manner as was described for Alternative B1.

Activities common to all action alternatives, including but not limited to, access roads, line removal and restoration activities, lands acquisitions, construction limitations, and ongoing maintenance requirements are discussed in Section 2.7 below.

2.6 Comparison of Alternative Elements

Table 2-1. Comparison of Alternative Elements.

Alternative	Total Length (miles)	Miles of Transmission Line within the Existing ROW	Miles of Transmission Line within a New ROW	Land Ownership Crossed (miles)	
Alternative A	13.6	13.6	0	BLM	0.8
				MS-NCWCD	0.4
				NCWCD	0.7
				PRIVATE	8.5
				Forest Service	3.3
Alternative B1	11.9	10.1	1.8	BLM	0.8
				MS-NCWCD	0.4
				NCWCD	0.7
				PRIVATE	6.2
				Forest Service	3.8
Alternative C1	12.3	3.3	9.0	BLM	0.7
				MS-NCWCD	1.4
				NCWCD	3.4
				PRIVATE	5.3
				Forest Service	1.5
Alternative C2 – Option 1	11.9	2.8	9.1	BLM	<0.1
				MS-NCWCD	3.5
				NCWCD	3.4
				PRIVATE	3.5
				Forest Service	1.5
Alternative C2 – Option 2	11.9	5.3	6.6	BLM	0.5
				MS-NCWCD	1.0
				NCWCD	3.4
				PRIVATE	5.5
				Forest Service	1.5
Alternative D – Option 1	11.8	5.1	6.7	BLM	0.0
				MS-NCWCD	3.8
				NCWCD	1.2
				PRIVATE	3.5
				Forest Service	3.3
Alternative D – Option 2	11.7	7.5	4.2	BLM	0.5
				MS-NCWCD	1.3
				NCWCD	1.2
				PRIVATE	5.4
				Forest Service	3.3

Table 2-2. Comparison of Alternative Engineering Specifications.

Engineering Specification	Alternative A No Action	Alternatives B1, C1, C2, D
Pole structure type	Wood H-frame	Single-pole steel
Voltage	69-kV single-circuit	138-kV double-circuit (operated at 69-kV and 138- kV)
New construction & yard preparation necessary	No	Yes
Surveying	No	Yes
Structure demolition	No	Yes
Materials hauling	No	Yes
Foundation excavation	No	Yes
Structure assembly	No	Yes
Structure erection	No	Yes
Ground wire and conductor stringing	No	Yes
Cleanup	No	Yes
Seeding and reclamation	No	Yes
ROW width	~10 miles of 30 ft ROW ~2 miles of 100 ft ROW	100 ft max.
Average span	500 ft	600 ft
Maximum span	800 ft	800 ft
Average height range of poles	55 – 65 ft	75 – 105 ft
Pole diameter	2 poles set 8 ft apart, pole diameter: 1.5 ft	5 ft
Approximate area needed for construction staging	0 acres	2 staging areas, each 62,500 ft ²
Temporary land disturbed at each structure base (area)	None	900 sq. ft. at each structure base; <2.25 acres of temporary disturbance for all action alternatives
Permanent land disturbed at each structure base (area)	n/a	<0.05 acres total for all action alternatives
Minimum ground clearance beneath conductor	21 ft	22 ft
Maximum height of any machine that can be operated safely under the line	14 ft	14 ft
Conductor size	4/0 AWG	397kCM

AWG = American wire gauge

kCM = kilo circular mil (1,000)

2.7 Activities Common to All Action Alternatives

This section describes the construction methods, permits, and approvals that would be necessary or used to implement any of the action alternatives. Conventional, above-ground construction methods would be used for the new structures built between the Windy Gap Substation and the Granby Pumping Plant Switchyard. Construction of Alternatives B1, C1, C2, or D would begin in spring 2012 and continue through winter 2013.

2.7.1 Construction Methods and Requirements

Western would take only one line segment at a time out of service to maintain electrical service to all loads during construction. The line segments are Windy Gap to Granby substations; Granby Substation to Stillwater Tap; and Stillwater Tap to Granby Pumping Plant Switchyard.

The transmission line ROW would be surveyed along its centerline. The survey data would be used during design to determine structure locations and heights needed to meet the transmission line design criteria for conductor clearances.

All segments of the existing 69-kV Granby Pumping Plant Switchyard-Windy Gap Substation transmission line constructed on H-frame wood poles would be removed, except a couple poles that may be left near Lake Granby for osprey nesting. Removed poles may be cut off at or below ground level or pulled completely out of the ground. The remaining holes would be backfilled and revegetated.

Direct embedded single-pole steel structures are proposed for the majority of the project. A truck-mounted auger would be used to excavate holes for the structures. The steel poles would be assembled at the pole sites, or portions of the poles may be assembled at the staging areas and then hauled to the sites. The structures would be lifted into place with cranes and held in place while concrete trucks backfill the excavation, filling the hole around the structure.

If site conditions or design requirements indicate a need, single-pole structures that bolt to a foundation would be used. The foundations are constructed by installing anchor bolt structures, rebar cages, and anchor bolt cages in the excavated holes. Concrete would then be poured into the formed foundation to secure these cages in place. Once the concrete has sufficiently hardened, the excavated holes would be backfilled. The steel poles would then be bolted to the foundation anchor bolts. Excess soil would be spread evenly around the base of the poles and revegetated or removed from the site.

The conductor pulling, sagging, and clipping operations would take place relatively quickly once the structures are in place. The conductor would not touch the ground during stringing or tensioning. Steel-pulling cables would be pulled through pulleys hanging from the insulator attached to each structure. Conductor pulling is limited by reel size; typically, a conductor of this diameter can be loaded onto reels in 10,000 to 15,000-foot segments.

Old wood poles and construction waste materials would be collected, hauled away, and recycled or disposed of at approved sites. All disturbed areas not returned to agricultural cultivation would be reseeded to minimize erosion and the invasion of noxious weeds. All disturbance areas would be restored to their original condition as feasible. Damaged gates, fences, or landscaping would be repaired.

The contractor would be required to prepare and implement a safety program in compliance with appropriate federal, state, and local safety standards and requirements, and as approved by Western.

Standard construction practices would be employed to minimize potential adverse effects during construction activities (see Section 3.0, Standard Construction Practices and Environmental Protection / Mitigation Measures).

2.7.2 Acquisition of Land Rights

To access, construct, and maintain the Granby Pumping Plant Switchyard-Windy Gap Substation transmission line, Western would need to obtain easements for some segments of the transmission line or access roads. Western would acquire ROW with a width of 100 feet for the upgraded 138-kV transmission line.

Prior to construction on private property and as part of the preliminary design and EIS analyses, Western requested permission from landowners for worker and contractor access to property for the purpose of conducting necessary environmental and engineering surveys and studies of local conditions affecting construction, such as slope and soil stability. To select specific structure locations, a combination of aerial and land surveys, environmental and engineering field studies, and geologic investigations would be necessary, and Western would request landowner permission prior to entering private property. Western would select final sites to minimize effects to the properties crossed, and to satisfy design criteria such as maintaining adequate conductor-to-ground clearance. Western would compensate for or repair damage to crops, fences, or other property caused by the surveys and studies.

Western would negotiate and purchase necessary easements from landowners under federal property acquisition guidelines (the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and its regulations, located at 42 U.S.C. § 4601 et seq. and 49 CFR Part 24). A qualified real estate appraiser would appraise the easement at fair market value. The appraiser would determine the value of the easement using customary appraisal methods, including analysis of available market data and comparable sales, and by taking into consideration the rights being acquired from the landowner. The appraiser would invite the landowner(s) to accompany him/her during the property inspection. Landowners could then identify any property features and uses believed to be of importance in determining the value of the easement. Western would present landowners with a written offer and a contract to purchase the required easements. Western's land services agent would explain the contract and discuss the basis for payment. Once the conditions of the agreement are met, the transaction would be processed as efficiently as possible. Western would make full payment for easements to landowners, and would pay for any title insurance and all recording fees.

If Western and a landowner are unable to agree on purchase of an easement, federal and state laws enable public agencies to acquire property rights for facilities to be built in the public interest through eminent domain proceedings. During the proceedings, a court would determine the compensation that Western would pay to the landowner.

When construction on a particular ROW is ready to begin, Western would advise the landowner(s) of the construction schedule. Western would make reasonable attempts to take into account the use and condition of the land, such as planting, irrigation, and harvest schedules, to minimize any inconvenience. Western would compensate landowners for crop and property damage that occurs as a result of construction or maintenance of the transmission line. If a landowner believes that damage has occurred and has not been recognized, he or she could contact the Western land services agent.

The landowner would retain title to the land over which Western's easement crosses, and would be able to continue using that land for activities that do not interfere with Western's use of the ROW. These uses may include parking, cultivation, and livestock grazing, among others. Activities typically not permitted in transmission line ROWs are those that reduce ground-to-line clearance, interfere with access to the line for maintenance, or jeopardize the integrity of the support structures. Buildings and

structures may not be erected in the ROW because they could impede the safe operation of the transmission line or interfere with access for maintenance. For safety reasons, equipment that can extend higher than 14 feet, such as dump trucks, cranes, derricks, bale wagons, and stack movers, should not be used around transmission towers and lines (per NESC guidelines). Likewise, pumps, wells, and flammables must not be placed in a ROW. Properly grounded and permitted fences are acceptable.

2.7.3 Access

Project crews would use existing access roads for construction and routine maintenance, to the extent possible, to minimize new disturbances. Where existing roads are not available, Western would acquire a 30-foot access easement. Construction of new roads would be limited to locations requiring ongoing access to repair and maintain the transmission lines or structures. The roads would be surfaced with road base where necessary.

To minimize road building, Western would consider overland access where topography, soil, and vegetation conditions support overland travel with minimum disturbance and compaction. Such conditions generally consist of hay meadows or grass and shrub land habitats on relatively flat terrain. Western would expect vegetation to recover quickly because it would not be graded or cleared.

For much of the proposed transmission line rebuild project, Western has adequate existing access for construction. New, short spur roads to structure sites may be required in some locations to accommodate heavy equipment or unusual soil conditions. Whenever possible, overland travel (without grading) would occur, and existing trails and roads would be used wherever available.

The location and need for additional minor ROW access cannot be determined until final design and engineering, and, in some cases, not until the construction contractor has reviewed the access situation. For purposes of impact analysis for this Biological Report and the EIS, it has been assumed that disturbances from access roads may occur anywhere within the proposed and alternative ROWs. Site-specific access requirements would be addressed as the construction phase proceeds, and Western's standard construction practices and project-specific environmental protection measures would be implemented. If new roads are required, wetland, wildlife, botanical, and cultural surveys would be conducted if the proposed alignments have not already been surveyed.

Sites for pulling and tensioning conductors are assumed to occur approximately every 2.0 to 3.0 miles of the transmission line. This assumption allows reasonable estimates of impacts to be presented in the EIS.

Table 2-3 provides access type mileage estimates by alternative. For analysis purposes, it is assumed that a corridor width of 14 feet for all types of access roads shown in Table 2-3 would be temporarily disturbed by the movement of construction equipment.

Even though existing roads or two-tracks are located near the alternative alignments, it was assumed that disturbance during construction would occur along the entire length of each alternative. A width of 14 feet was used to calculate temporary disturbance acreages for each of the action alternatives; each alternative results in approximately 12 acres of temporary access road disturbance.

Table 2-3. Estimated Access Road Availability and Type by Alternative.

Alternative	Existing Road or Track Available	Cross-Country Travel Feasible	New Temporary Road(s) Required	Grand Total
Alternative A - Existing	13.6			13.6
Alternative B1	10.5		1.4	11.9
Alternative C1	6.5	1.6	4.2	12.3
Alternative C2 - Option 1	8.1	1.6	2.2	11.9
Alternative C2 - Option 2	7.7	2.0	2.2	11.9
Alternative D - Option 1	10.4		1.4	11.8
Alternative D - Option 2	10.0	0.4	1.4	11.8

(Miles shown indicate miles of transmission line where this type of access would be necessary/feasible.)

2.7.4 Construction Staging Area

Existing substations and their immediate surroundings would be used to the extent possible for equipment staging, material laydown, and storage facilities. Additionally, Western anticipates that two 62,500 ft² temporary staging areas (approximately 3 acres, combined) would be necessary to support implementation of any action alternative. The location of staging areas would be determined by the construction contractor during the construction phase; staging areas would be sited in accordance with Western’s standard construction practices and project-specific environmental protection measures. Existing or portable concrete batch plants would be used to supply poured concrete for foundations for transmission line structures and substation equipment.

2.7.5 Clearing and Grading

Western would actively implement the 2008 Transmission Vegetation Management Program and associated orders (Appendix A). The program consists of removing trees tall enough to either grow into contact with electrical conductors or fall into the conductors or structures, as well as removing danger trees. The vegetation management program is intended to actively manage the plant communities beneath transmission lines and within ROWs, as well as address fire-related impacts that affect the overall ability of transmission facilities to withstand a fire (Western 2009).

Crews would remove trees and shrubs from the structure location and along the ROW, as necessary, using brush hogs, mowers, chain saws, skidders, and bulldozers to provide access for construction equipment and activities. Vegetation clearing activities would be conducted consistent with Western’s 2008 Transmission Vegetation Management Program guidelines. Western would dispose of slash piles and woody debris in a manner acceptable to the county and landowner, but may dispose of the debris by hauling, burning, or windrowing at the edge of the ROW for storm water control. In some instances, Western may need to remove trees outside the ROW if their growth could bring them within 10 feet of a transmission line or conductor during icing or wind events. Removal of trees outside of the ROW on Forest Service land would be addressed in Western’s Operation and Maintenance Plan, to be attached to the Forest Service ROW authorization. Crews would preserve native vegetation to the extent possible, particularly outside structure sites and near riparian areas.

2.7.6 Structure and Conductor Installation

Assembly of transmission line structures would occur on site where insulators, braces, and other equipment would be attached to the structures while they are still on the ground. Boom trucks and cranes would be used to raise the structures into foundation bore holes for structures. Helicopters maybe used at the discretion of the contractor to erect equipment on steep slopes or in rugged terrain.

The project would require level sites approximately every 2 to 3 miles along the transmission line to house reels of transmission cable and to serve as staging areas for wire-pulling. Western would try to avoid locations that require grading or removal of vegetation. Pulleys would be attached to the insulators to string the conductors, which then would be pulled to the appropriate tension. Contractors would use either a ground vehicle or helicopter to pull the pilot line. Where necessary, traffic would be stopped while activities are occurring that could affect public safety.

2.7.7 Site Cleanup and Restoration

Crews would remove debris and other materials from construction sites following construction and dispose of it in a certified private, public, or construction and demolition landfill, as appropriate. Crews would loosen and level disturbed soil areas with harrowing or disking to approximate preconstruction contours. Ruts and scars that would interfere with overland travel would be filled or recontoured. Disturbed areas would be reseeded and mulched, as needed, using a Natural Resource Conservation Service approved weed-free mix as soon as practical after construction activities are completed in any given area. On National Forest System (NFS) lands, a Forest Service approved weed-free seed mix would be used for restoration. In some areas, mulching, netting, or turf reinforcement mats may be necessary to protect seeded areas from erosion. If used, mulching would consist of weed-free hay or other approved material. Periodically, crews would monitor revegetated areas to determine that coverage is adequate. Areas may be reseeded, as necessary, to establish cover.

Drainage structures and other improvements not needed for permanent maintenance of the transmission lines would be removed. Similarly, access roads or trails that are not needed for ongoing maintenance access would be blocked or reclaimed to prevent future access by the public.

2.7.8 Workforce

The workforce would be a combination of local labor acquired by contractors, and a mobile labor workforce that specializes in transmission line construction and temporarily relocates to the area where the work necessitates. Construction would be accomplished by two crews of 5-6 persons each.

2.7.9 Construction Sequencing

The transmission line rebuild is expected to take 1-2 years to construct, beginning in late 2011 or early 2012. The line will be rebuilt in three line segments. Total construction time at each transmission structure location would be approximately 1-2 weeks spread over a period of 18 months.

Table 2-4 lists the typical sequence of construction activities for each transmission line segment and the equipment needed for each task.

Table 2-4. Construction Activities and Equipment.

Task	Equipment
Surveying	Utility vehicles, pickups, All Terrain Vehicles (ATV)
Access	Graders, caterpillars, dump trucks, water trucks
ROW Clearing	Brush hogs, mowers, chain saws, skidders, bulldozers
Staging	Flatbeds with cranes, delivery trucks, pickups
Excavation	Backhoes, rotary drilling rigs, augers, cement mixers, pickups, ATV's, portable compressors
Structure Assembly	Cranes, material trucks, carryalls, pickups
Structure Placement	Cranes, boom trucks, pickups, helicopters
Cable Pulling	Boom trucks/manlifts, reel trailers, hydraulic tensioning equipment, pickups, helicopters
Cleanup	Flatbeds, dump trucks, pickups
Restoration	Seeding equipment, hand-seeding equipment, caterpillars, backhoes, flatbeds, pickups

2.7.10 Construction Monitoring

During construction, a construction inspector (Western employee or hired independent contractor) would be present in the field to ensure implementation of Standard Construction Practices (SCP) and project-specific environmental protection measures (Section 3.0).

2.7.11 Operation and Maintenance

Operation and maintenance of the line would be the responsibility of Western. Throughout the life of the project, Western would conduct the following operation and maintenance activities:

- Routine aerial inspections of the integrity and condition of the transmission lines, and after wind, ice, and lightning events that cause forced outages. Ground inspections once per year, and as needed after weather events, to identify any repair or routine maintenance needs. Maintenance activities would include repairing damaged conductors, insulators, or structure components.
- Maintenance of permanent access roads for Western's use, including surfacing and adequate drainage.
- Remove trees and brush that create access, safety, or clearance problems for the operation of the transmission lines and associated equipment. Vegetation clearing and maintenance activities would be conducted consistent with Western's 2008 Transmission Vegetation Management Program guidelines (Appendix A).
- Identification and eradication of noxious weeds around transmission structures and in ROWs using methods approved by the landowner and any applicable land management agency.

2.7.12 Other Permits and Approvals

Where the proposed transmission line and the Windy Gap Pipeline would share ROW and cross NFS or BLM managed lands, Western would need to acquire a separate authorization from the Forest Service or BLM.

3.0 Standard Construction Practices and Environmental Protection / Mitigation Measures

Western has SCPs, including standard operation and maintenance practices that 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 Switchyard-Windy Gap Transmission Line Rebuild, Western’s SCPs would be implemented for the construction of any action alternative. These measures are part of Western’s proposed project and are considered in this Biological Report as well as the EIS analysis.

3.1 Western’s Standard Construction and Mitigation Practices

Table 3-1. Western’s Standard Construction and Mitigation Practices.

Ref. #	Standard Practices
SCP 1	The contractor shall limit the movement of its crews and equipment to the ROW, including access routes. The contractor shall limit movement on the ROW to minimize damage to grazing land, crops, or property, and shall avoid unnecessary land disturbance.
SCP 2	When weather and ground conditions permit, the contractor shall obliterate contractor-caused deep ruts that are hazardous to farming operations and to movement of equipment. Such ruts shall be leveled, filled, and graded, or otherwise eliminated in an approved manner. In hay meadows, alfalfa fields, pastures, and cultivated productive lands, ruts, scars, and compacted soils shall have the soil loosened and leveled by scarifying, harrowing, discing, or other approved methods. Damage to ditches, tile drains, terraces, roads, and other features of the land shall be corrected. Before final acceptance of the work in these agricultural areas, ruts shall be obliterated, and trails and areas that are hard-packed as a result of contractor operations shall be loosened, leveled, and reseeded. The land and facilities shall be restored as nearly as practicable to their original conditions.
SCP 3	Water bars or small terraces shall be constructed across ROW and access roads when needed to prevent water erosion and to facilitate natural revegetation.
SCP 4	The contractor shall comply with applicable federal, state, and local environmental laws, orders, and regulations. Prior to construction, supervisory construction personnel and heavy equipment operators will be instructed on the protection of cultural and ecological resources.
SCP 5	The contractor shall exercise care to preserve the natural landscape, and shall conduct its construction operations to prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work. Except where clearing is required for permanent works, construction roads, or excavation operations, trees, native shrubbery, and vegetation shall be preserved and shall be protected from damage by the contractor’s construction operations and equipment. To the extent practicable considering the need to protect transmission lines from encroaching vegetation and vegetation hazards (especially trees) edges of clearings and cuts through tree, shrubbery, or other vegetation would be irregularly shaped to soften the visual impact of straight lines within the ROW.
SCP 6	On completion of the work, work areas shall be scarified or left in a condition that would facilitate natural revegetation, provide for proper drainage, and prevent erosion. The contractor would repair damages resulting from the contractor’s operations. Newly created access roads will be left to revegetate to height that still allows vehicle passage.
SCP 7	Construction staging areas shall be located and arranged in a manner to preserve trees and vegetation to the maximum practicable extent. Staging areas will not be placed within wetlands, including fen wetlands, riparian communities, or in proximity to surface waters. On abandonment, storage and construction buildings, including concrete footings and slabs, and construction materials and debris shall be removed from the site. The area shall be regraded as required so that surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion.

Ref. #	Standard Practices
SCP 8	Borrow pits shall be excavated so that water will not collect and stand. Before being abandoned, the sides of borrow pits shall be brought to stable slopes, with slope intersections shaped to carry the natural contour of adjacent undisturbed terrain into the pit or borrow area, giving a natural appearance. Waste piles shall be shaped to provide a natural appearance. No waste piles will occur on Forest Service Lands.
SCP 9	Construction activities shall be performed by methods that will prevent entrance, or accidental spillage, of solid matter contaminants, debris, other objectionable pollutants and wastes into streams, flowing or dry watercourses, lakes, and underground water sources. Pollutants and waste include, but are not restricted to refuse, garbage, cement, concrete, sanitary waste, industrial waste, oil and other petroleum products, aggregate processing tailing, mineral salts, and thermal pollution.
SCP 10	Dewatering work for structure foundations or earthwork operations adjacent to, or encroaching on, streams or watercourses, shall be conducted in a manner to prevent muddy water and eroded materials from entering the streams or watercourses by construction of intercepting ditches, bypass channels, barriers, settling ponds, or by other approved means. Dewatering shall comply with applicable state requirements.
SCP 11	Excavated material or other construction materials shall not be stockpiled or deposited near or on stream banks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff, or can encroach upon the actual watercourse itself.
SCP 12	Waste waters from construction operations shall not enter streams, watercourses, or other surface waters without the appropriate permits and proper implementation of applicable permit conditions, including but not limited to use of turbidity control methods as settling ponds, gravel-filter entrapment dikes, approved flocculating processes, or other approved methods. Waste waters discharged into surface waters shall be essentially free of settleable material. For the purpose of these practices, settleable material is defined as material that will settle from the water by gravity during a 1-hour quiescent detention period.
SCP 13	The contractor shall use practicable methods and devices that are reasonably available to control, prevent, and otherwise minimize discharges of air contaminants.
SCP 14	The emission of dust into the air will not be permitted during the handling and storage of concrete aggregate, and the contractor shall use methods and equipment as necessary for the collection and disposal, or prevention, of dust. The contractor's methods of storing and handling cement and pozzolans shall include means of controlling air discharges of dust.
SCP 15	Equipment and vehicles that show excessive emissions of exhaust gases due to poor engine adjustments, or inefficient operating conditions, shall not be operated until repairs or adjustments are made.
SCP 16	The contractor shall prevent nuisance to persons or damage to crops, cultivated fields, and dwellings from dust originating from his operations. Oil and other petroleum derivatives shall not be used for dust control. Speed limits shall be enforced, based on road conditions, to reduce dust problems.
SCP 17	To avoid nuisance conditions due to construction noise, internal combustion engines shall be fitted with an approved muffler and spark arrester.
SCP 18	Burning or burying waste materials on the ROW or at the construction site will be permitted if allowed by local regulations. The contractor shall remove all other waste materials from the construction area. All materials resulting from the contractor's clearing operations shall be removed from the ROW. No waste materials can be buried on NFS lands.
SCP 19	The contractor shall make necessary provisions in conformance with safety requirements for maintaining the flow of public traffic, and shall conduct its construction operations to offer the least possible obstruction and inconvenience to public traffic.
SCP 20	Western will apply necessary mitigation to eliminate problems of induced currents and voltages onto conductive objects sharing a ROW, to the mutual satisfaction of the parties involved.
SCP 21	Structures will be carefully located to avoid sensitive vegetative conditions, including wetlands, where practical. Wetlands will be crossed at a feasible location for the construction contractor and in an area where the least amount of damage would occur to the wetland community. If necessary, Western would obtain the appropriate permits from the USACE.
SCP 22	No disturbance of vegetation will occur within 100 feet of a stream, except for hazard trees. No fueling, staging or storage areas would be placed within 100 feet of wetlands, streams or riparian areas. Where possible, vehicles should avoid crossing hydric soils.
SCP 24*	Topsoil will be removed, stockpiled, and respread at heavily disturbed areas not needed for maintenance access.

Ref. #	Standard Practices
SCP 25	Disturbed areas not needed for maintenance access will be reseeded using mixes approved by the landowner or land management agency.
SCP 26	Erosion control measures will be implemented on disturbed areas, including areas that must be used for maintenance operations (access ways and areas around structures).
SCP 27	The minimum area will be used for access ways (generally 12-16 feet wide, except where roadless construction is used).
SCP 28	Leveling and benching of structure sites will be the minimum necessary to allow structure assembly, erection, and maintenance.
SCP 29	ROW will be located to use the least steep terrain.
SCP 30	Careful structure location will ensure spanning of narrow flood prone areas.
SCP 31	Structures will not be sited on potentially active faults.
SCP 32	Structure sites and other disturbed areas will be located at least 100 feet, where practical, from rivers, streams (including ephemeral streams), ponds, lakes, and reservoirs.
SCP 33	New access ways will be located at least 100 feet, where practical, from rivers, ponds, lakes, and reservoirs.
SCP 34	At crossings of perennial streams by new access ways, culverts of adequate size to accommodate the estimated peak flow of the stream will be installed. Construction areas will minimize disturbance of the stream banks and beds during construction. The mitigation measures listed for soil/vegetation resources will be performed on areas disturbed during culvert construction.
SCP 35	If the banks of ephemeral stream crossings are sufficiently high and steep that breaking them down for a crossing would cause excessive disturbance, culverts will be installed using the same measures as for culverts on perennial streams, and the applicable USACE permits would be obtained.
SCP 36	Blasting will not be allowed.
SCP 37	Power line structures will be located, where practical, to span small occurrences of sensitive land uses, such as cultivated areas. Where practicable, construction access ways will be located to avoid sensitive conditions.
SCP 38	ROW will be purchased at fair market value and payment will be made of full value for crop damages or other property damage during construction or maintenance.
SCP 39	The power line will be designed to minimize noise and other effects from energized conductors.
SCP 41*	Crossing of operating railroads by construction vehicles or equipment in a manner that would cause delays to railroad operations will be avoided. Construction will be coordinated with railroad operators. Conductors and overhead wire string operations would use guard structures to eliminate delays.
SCP 42	Before construction, Western will perform a Class III (pedestrian) cultural survey on areas to be disturbed, including structure sites and new access ways. These surveys will be coordinated with the appropriate landowner or land management agency, the State Historic Preservation Officer and Indian Tribe if on tribal lands. The survey reports and recommendations will be reviewed with the State Historic Preservation Offices and other appropriate agencies, and specific mitigation measures necessary for each site or resource will be determined. Mitigation may include careful relocation of access ways, structure sites, and other disturbed areas to avoid cultural sites that should not be disturbed, or data recovery.
SCP 43	The contractor will be informed of the need to cease work in the location if cultural resource items are discovered.
SCP 44	Construction activities will be monitored or sites flagged to prevent inadvertent destruction of cultural resource for which the agreed mitigation was avoidance.
SCP 45	Construction crews will be monitored to the extent possible to prevent vandalism or unauthorized removal or disturbance of cultural artifacts or materials from sites where the agreed mitigation was avoidance.
SCP 46	If cultural resources that were not discovered during the Class III survey are encountered during construction, ground disturbance activities at that location will be suspended until the provisions of the National Historic Preservation Act have been carried out.
SCP 47	Construction activities will be monitored or significant locations flagged to prevent inadvertent destruction of paleontological resource for which the agreed mitigation was avoidance.
SCP 48	Clearing for the access road will be limited to that necessary to permit the passage of equipment, and the safe construction, operation and maintenance of the line.
SCP 49	The access road will follow the lay of the land rather than a straight line along the ROW where steep topography would result in a higher disturbance.

*Western's SCPs 23 and 40 are not applicable to this project.

3.2 Project-Specific Environmental Protection / Mitigation Measures

The following design criteria (DC) and environmental protection measures were developed specifically for this project to minimize or avoid resource impacts. The following project-specific design criteria apply to all action alternatives (unless otherwise noted).

Table 3-2. Project-Specific Design Criteria and Protection Measures by Resource.

Wildlife Resources	
DC 1	Construction will not occur within pronghorn, mule deer, or elk severe winter range between November 15 and April 30 on all public and private lands, unless an exception is granted by the BLM or Colorado Division of Wildlife (CDOW).
DC 2	Western will design and construct the transmission line in conformance with Suggested Practices for Protection of Raptors on Power Lines (Avian Power Line Interaction Committee [APLIC], 2006) to minimize the potential for raptor electrocution.
DC 3	The siting of structure locations and/or timing of construction related activities will CDOW's 2008 <i>Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors</i> (Appendix B). When distance buffers are not possible because of project proximity, then seasonal restrictions will be implemented.
DC 4	Avian nesting surveys will be conducted prior to construction to ensure ground disturbing activities do not result in the "take" of an active nest or migratory bird protected under the Migratory Bird Treaty Act (MBTA).
DC 5	Perch deterrents will be placed on structures that span sagebrush habitats to mitigate raptor predation on avian and other wildlife species in the project area.
DC 6	Flight diverters will be placed in areas that are determined to be "high risk" for avian collision. These locations may differ depending on species, and this will be assessed prior to construction of the transmission line and through coordination with United States Fish and Wildlife Service (USFWS) and Forest Service.
DC 7	During removal of the existing 69-kV transmission line, some structures will be left in place to provide osprey nesting opportunities. Locations of remaining structures will be identified by Western and the Forest Service and be in the vicinity of Lake Granby and Table Mountain.
Special Status Wildlife	
DC 7	Western will consult with CDOW and the BLM to prepare a seed mix that will restore sagebrush habitats in the ROW. Guidance and further detail is provided in the Colorado's Greater Sage-grouse Conservation Plan (CDOW 2008).
DC 8	If it is not feasible to construct outside of the 4.0 mile sage grouse lek buffer during the March through mid July breeding season, Western will consult with CDOW and USFWS to develop methods that would minimize impacts to breeding sage grouse activities. In addition, Western will place perch deterrents within proximity to lek areas and those areas that cross greater sage-grouse wintering, summer, spring, nesting, and brooding habitats.
DC 9	If construction occurs during the avian breeding season (roughly between March 15 and September 1), surveys will be conducted no earlier than 72 hours prior to any ground disturbing activities to ensure the project complies with the MBTA.
Vegetation, including Noxious Weeds	
DC 10	Low growing trees, shrubs, forbs, and grasses will not be intentionally removed but could be crushed by equipment moving up and down the ROW.
DC 11	It is expected that bare ground will be exposed by some construction activities. If erosion becomes a concern for either the Forest Service or for Western, construction of water bars, spreading mulch, brush piles, or seeding with a native or sterile cover crop will be undertaken. In areas with slopes greater than 20% that are identified to have erosion or ATV traffic concerns, 300 linear feet per acre of large logs (preferably 10 inches dbh) will be spread to deter erosion.

DC 12	All revegetation will be accomplished using native species or a sterile cover crop. All seed will be certified weed-free via the All-States exam. Species lists for revegetation will be developed in consultation with the Forest Service botanist or the botanist's representative.
DC 13	All seed used will be tested for noxious weed seed using an All States Exam by a federally approved facility. Results will be provided to the Forest Service prior to seeding. Presence of any seed that is either prohibited or restricted under the Colorado Weed Seed Act will result in the seed lot being rejected and replaced by the project proponent at proponent's cost. Replacement seed will be retested. If weed seeds are present based on exam results that are not prohibited or restricted in Colorado, seed will be rejected unless otherwise agreed upon by the Forest Service.
DC 14	All mulch will be certified weed-free.
DC 15	Western's contractor will follow a "clean vehicle policy". Equipment will be clean and clear of mud or vegetative debris when brought on site in an effort to minimize the spread of noxious weeds.
DC 16	Western will minimize the introduction or spread of weeds by washing all equipment at a commercial facility prior to the start of construction each year, by avoiding vehicle traffic in known weedy areas, and by rewashing equipment if weeds are encountered. Western will reclaim all disturbed areas as soon as practical after construction each year, and will implement a weed control program (in consultation with the BLM, Forest Service, and private landowners) if the project causes the spread of weeds.
DC 17	Western will implement a noxious weed management plan to minimize the spread of noxious weeds within the project area to mitigate potential impacts to wildlife forage and habitats. A weed free native seed mix will be used in areas that are temporarily disturbed during project construction. Nonnative species and/or sterile crop seed may also be used to revegetate disturbed areas on Forest Service land, if approved by the Forest Service botanist.
Special Status Plants	
DC 18	Known rare plant sites will be avoided where possible. If hazard trees must be felled, they will be hand-cut and directionally felled away from rare plant individuals. Dropped trees may be skidded out of the site if an unoccupied corridor is available; otherwise, they will be left on site. No chips will be piled within an occurrence, and no machinery will be operated within an occurrence unless agreed upon in writing by the Forest Service and Western on a case-by-case basis.
DC 19	A biological site monitor, familiar with the sensitive species detected on site, will be present when work is initiated at documented sites for these species. Individual populations of special status plants will be marked and avoided if at all practicable during the construction process.
DC 20	If new site information regarding threatened, endangered, proposed, sensitive, or rare species is located, the Forest Botanist or botanical representative will be notified immediately.
Wetlands	
DC 21	Construction and access in floodplains and wetlands would be avoided to the greatest extent feasible. However, if construction in floodplains and wetlands cannot be avoided and would cause soil compaction or ruts, long-term impacts to wetland vegetation could occur. To avoid this impact, Western will limit construction in floodplains and wetlands to periods when soils are dry or frozen, or use measures to support construction equipment (e.g., oversized treads on equipment, tracked equipment, matting) to avoid compacting soils and creating ruts.
DC 22	Fording streams will not be permitted unless permission is granted by Western and the Forest Service.
DC 23	Fen wetlands will be avoided altogether, with no vehicular access or pole placement in these systems. Removal of an existing pole in the fen would be accomplished by cutting the pole at the base using hand-held chainsaws. The pole would be supported by a crane, and lifted out of the fen wetland once the base is cut.
Soil Resources	
DC 24	Crews will decompact roads and other heavily disturbed areas (i.e., staging areas) by ripping or subsoiling to the depth of compaction to promote natural infiltration, reduce runoff and erosion, and to facilitate natural revegetation. Crews will then recontour to approximate pre-construction contours and will reseed with certified weed-free seed mix and mulch.
DC 25	Topsoil resources will be salvaged from the component footprints and any construction sites that are heavily disturbed (i.e., staging areas). The topsoil pile will be protected from wind and water erosion at all times. Berms, hay bales, or sediment fence will be placed around topsoil piles to prevent water erosion. Topsoil will be replaced, after decompaction is complete, on disturbed areas that are returned to their pre-existing state following construction.

DC 26	To the extent feasible, equipment will only be operated when soils are dry (below the plastic limit to a depth of 6-8 inches or more) or frozen. If rutting over 3 inches in depth occurs, soil is too wet to operate and detrimental soil mixing and a reduction in soil productivity may occur.
DC 27	Soil will be returned to any excavated area in the order it was removed. This will ensure the nutrient and biologically rich topsoil will stay at the surface. Excess subsoil/soft bedrock excavated for foundations beyond 14 inches in depth should be disposed of with construction debris.
Cultural & Historic Resources	
DC 28	Removal of the existing wooden transmission line structures on eligible cultural sites will be accomplished by cutting the structures at ground surface, thus requiring no additional excavation of the surrounding area. The structures will be accessed using rubber-tire vehicles to minimize other associated impacts to the site. All structure removals will be monitored by a permitted archaeologist.
DC 29	Impacts to eligible cultural sites caused by construction of new towers will be minimized by planning. Whenever possible, transmission structures will be planned outside of site boundaries. In cases where avoidance is not possible, a mitigation plan will be formulated. If new structures are planned within 150 feet of a site, an on-site archaeological monitor will be present to ensure that the site is not impacted during structure construction.
DC 30	Heavy trucks and other equipment will not cross eligible sites when unimproved access roads are wet. Upgrading or maintenance of access roads within the boundaries of eligible sites will be avoided wherever possible. Where avoidance is not possible, a mitigation plan will be prepared and implemented prior to any construction or roadwork. The plan will include mitigation of adverse effects. These guidelines apply not only to roads surveyed as project access roads, but also to roads beneath the transmission lines that were subsumed in the transmission line survey.
Paleontological Resources	
DC 31	Prior to construction, a qualified and permitted paleontologist should examine the construction design plans, and develop an appropriate mitigation monitoring program.
DC 32	The contractor will receive instructions from Western regarding the potential presence of fossils in pole excavations and in areas excavated or disturbed for roadwork. The contractor will be notified of his obligation to report any suspected paleontological finds to Western. Western will retain a paleontologist to assess the significance of the paleontological finds and make recommendations. The BLM maintains staff paleontologists to perform assessments of discoveries on lands managed by them.
Visual Resources	
DC 33	All steel structures will be a rust-colored COR-TEN® steel.
DC 34	Structures will be placed at the maximum feasible distance from highway and trail crossings, within the limits of the design of the structure, to reduce potential visual impacts at crossings.
DC 35	Access roads will follow the lay of the land rather than a straight line along the ROW where steep features will result in a higher disturbance.
DC 36	Western will coordinate closely with the Forest Service on the placement and design of both access roads and gates/closures.

4.0 Biological Report Organization

To facilitate USFWS, Forest Service, and Colorado Division of Wildlife (CDOW) review, this remainder of this Biological Report has been divided into the following key sections. Each section provides habitat and population trend information for each species; potential direct, indirect, and cumulative effects for each species; and a determination of effects (federally listed species) and impacts (FSS species).

The remainder of this report is organized as follows:

- 5.0 Federally Listed Species
- 6.0 Forest Service Sensitive Species
- 7.0 Forest Service Management Indicator Species
- 8.0 Forest Service Plant Species of Local Concern
- 9.0 State Species of Concern
- 10.0 Cumulative Impact Considerations
- 11.0 Responsibility for Revisions to this Biological Report
- 12.0 References
- 13.0 Appendices

5.0 Federally Listed Species

5.1 Consultation and Coordination

Section 7 of the Endangered Species Act (ESA) of 1973, as amended, requires federal agencies to ensure that their actions (authorized, funded, or carried out) are not likely to jeopardize the continued existence of, listed, proposed or candidate species, or result in the destruction or adverse modification of their critical habitats. In order to document project effects on federally listed species, a BA is required if listed species or critical habitat may be present in the project area. The BA determinations included in this document apply only to federally listed and proposed species and their designated and/or proposed critical habitat.

As required by Section 7 of the ESA, interagency consultation has occurred between Western, the Forest Service, and the United States Fish and Wildlife Service (USFWS) regarding listed and proposed, species in the project area. Informal consultation with the USFWS was initiated on June 30, 2005 when Western submitted a letter to the USFWS requesting information on threatened and endangered species in the project area. Western received a response letter on July 13, 2005. The USFWS was not able to provide species specific information for the project area, but did include a list of endangered, threatened and candidate species for Grand County. The response letter from the USFWS and the July 2010 list of federally listed species in Grand County can be found in Appendix C. Western met informally with the USFWS on November 2, 2005 and again on December 11, 2007 to provide project updates to the USFWS and to request any new information on federally listed species that may occur in the project area. The USFWS in Lakewood, Colorado determined in December 2010 that the primary species of federal concern in the project area were the Penland's beardtongue (*Penstemon penlandii*) and Osterhout milkvetch (*Astragalus osterhoutii*). Canada lynx (*Lynx canadensis*) has also been identified for further analysis.

Because the USFWS botanist for the region is located in the USFWS's Grand Junction office, this office was designated as the USFWS lead on the Project. Western's consultant, AECOM/EDAW, met with the USFWS in their Grand Junction office on April 20, 2009 to discuss project updates, the species of federal concern in the project area, and to discuss survey protocols for threatened and endangered plant species.

5.2 Species Considered

To comply with Section 7 of the ESA, the BA included in this report addresses effects to federally threatened, endangered, proposed and candidate species that would result from the Proposed Action (Alternative D). Table 5-1 identifies the list of threatened and endangered species for Grand County (USFWS 2010). The species noted as "excluded" will not be carried forward for analysis in the BA.

Additional information regarding the rationale for exclusion is provided by species, as necessary, immediately following the table.

Table 5-1. Federally Listed Species with the Potential to Occur in Grand County

Common Name	Scientific Name	Federal Status*	Species Retained for Analysis?	Reason for Exclusion
MAMMALS				
Canada lynx	<i>Lynx canadensis</i>	T	Yes	Retained, although no suitable habitat in project area
FISH				
Bonytail chub	<i>Gila elegans</i>	E	No	Aquatic habitats will be avoided and buffered
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	E	No	Aquatic habitats will be avoided and buffered
Greenback cutthroat trout	<i>Oncorhynchus clarkii stomias</i>	T	No	Aquatic habitats will be avoided and buffered
Humpback chub	<i>Gila cypha</i>	E	No	Aquatic habitats will be avoided and buffered
Razorback sucker	<i>Xyrauchen texanus</i>	E	No	Aquatic habitats will be avoided and buffered
BIRDS				
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C	No	No suitable habitat in project area
Greater sage-grouse	<i>Centrocercus urophasianus</i>	C	Yes	Discussed in section 6.3
PLANTS				
Colorado butterfly plant	<i>Gaura neomexicana ssp. coloradensis</i>	T	No	No plants or suitable habitat in project area; no water depletions
North Park phacelia	<i>Phacelia formosula</i>	E	No	No plants or suitable habitat in project area
Osterhout milkvetch	<i>Astragalus osterhoutii</i>	E	Yes	
Penland alpine fen mustard	<i>Eutrema penlandii</i>	T	No	No plants or suitable habitat in project area; project area is not alpine
Penland's beardtongue	<i>Penstemon penlandii</i>	E	Yes	
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>	T	No	Outside the elevational range of this species; no water depletions
Western prairie fringed orchid	<i>Platanthera praeclara</i>	T	No	No plants or suitable habitat in project area; no water depletions

Source: USFWS 2010; *T= Threatened, E=Endangered, C=Candidate

5.3 Species Evaluation

The following federally listed species evaluations document the effects of the Proposed Action Alternative (Alternative D) only.

5.3.1 Canada lynx, *Lynx canadensis*

Distribution: The Canada lynx historically occupied most high elevation mountains in Colorado. For a comprehensive discussion of lynx distribution, more information can be found in Ecology and Conservation of Lynx in the United States (Ruggiero et al. 2000) and the Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000). In summary, lynx are considered historically resident in Colorado and extant, but are no longer sustaining self-supporting populations (Ruggiero et al. 2000,

Ruediger 2000); and are currently critically imperiled in Colorado with a state ranking of S1 (NatureServe 2010a). Lynx populations have declined in the United States due to human alteration of forests, past exploitation, expansion of the range of competitors (particularly bobcats and coyotes), and increasing levels of human access to lynx habitat. According to the 2000 Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000), the final ruling by the USFWS found that the single greatest threat facing the distinct population segment in the United States is the inadequacy of existing regulatory mechanisms to protect and manage for lynx and lynx habitat (Ruediger et al. 2000). As a result of the decline and near extinction across portions of its historic range, lynx were reintroduced in Colorado in 1999.

A Colorado reintroduction program initiated in 1999 in the San Juan Mountains, coupled with an estimated home range of 8 to 738 square kilometers (Ruggiero et al. 2000), has resulted in dispersing lynx passing through the Sulphur Ranger District including the Upper Colorado (closest to the project area), Fraser and Williams Fork Lynx Analysis Units (LAUs). Contemporary lynx occurrence maps indicate lynx home ranges within Grand County (Forest Service n.d).

There is currently no designated critical habitat for lynx in Colorado.

Natural History: Lynx habitat includes dense coniferous forests in the subalpine zone and at timberline where they use rock crevices, overhanging banks, deadfall, or hollow logs for denning. Lynx are dependent on the snowshoe hare as their primary prey and red squirrel when hare populations are low. Snowshoe hares prefer areas with dense protective understories composed of edible shrubs and trees (Wolfe et al. 1982). Preferred lynx hunting habitat consists of 20 to 30 year old pole-size stands of timber. Foraging habitat is considered a limiting factor for lynx in Colorado (Fitzgerald 1994). Providing and/or maintaining suitable hare habitat can benefit lynx (Ruediger et al. 2000). In addition, natural disturbance processes such as fire, insect/disease outbreaks, and blowdown events may benefit the snowshoe hare by creating an early successional forest structure (Ruediger et al. 2000).

A vital component of lynx denning sites is large woody debris, such as downed logs and root wads typical of late-successional forests. Woody debris provides thermal cover and escape habitat requirements for kittens. Dens typically occur in hollow trees, under stumps or root wads, within jack-strawed windthrow, or in thick brush. Den sites tend to be in mature or old-growth stands with a high density of logs (Ruediger 2000, Ruggiero et al. 2000)

Lynx rarely venture into open areas and generally do not cross openings wider than 300 feet. The primary limiting factor for lynx populations is the abundance of snowshoe hare and alternative prey species, which is limited by availability of winter habitat (Ruggiero et al. 2000, Ruediger 2000, NatureServe 2010a).

Lynx habitat has been lost due to suppression of forest fires and ecological succession in habitats that no longer support snowshoe hare and lynx. Fragmentation due to forestry, agriculture, and roads, and the subsequent isolation of suitable habitat is a concern (USFWS 2000). Road construction allows increased human access into lynx habitat; this may increase lynx mortality by facilitating access to hunters and trappers; incidental harvest of lynx in the course of legal trapping/hunting for other species may be a problem in some areas. Increased winter recreation (snowmobiles, ski area development) may be causing the displacement and/or incidental mortality of lynx. Habitat changes and increased recreational access resulting in expansion of areas of snow compaction has resulted in increased

competition and displacement of lynx by bobcat and coyote in some areas (Ruggiero 2000, Ruediger 2000, and NatureServe 2010a).

Environmental Baseline: The vegetation community types within the project area are sagebrush shrubland, lodgepole pine heavily impacted by the mountain pine beetle, aspen forest, wet meadows, wetlands and riparian communities. Suitable denning habitat does not exist within the project area. As a result of the pine beetle epidemic, the density of forested stands within the project area has been reduced and they are not expected to support snowshoe hare populations. Sagebrush communities adjacent to or integrated with coniferous or conifer/aspen stands may provide an important alternate prey resource for lynx (e.g., jack-rabbits) (Ruediger 2000); however, the project area is not located adjacent to suitable lynx denning or foraging habitat.

LAUs were created as part of the Lynx Conservation Assessment and Strategy and are areas approximately the size of an annual home range of a female Canada lynx. LAUs were created as a means of tracking and evaluating project and cumulative effects on the lynx. The project area is not located within a designated LAU. The project area is below 9,000 feet in elevation and is outside of the closest LAU. The closest LAU is the Upper Colorado LAU which is located approximately 2.5 miles northwest of the project area.

Direct, Indirect, and Cumulative Effects: Alternative D, the Proposed Action, would have no direct or indirect effect on the lynx or its habitat. The Proposed Action alignment and ROW does not occur in lynx habitat. The project area is below 9,000 feet in elevation and is outside of the closest LAU.

Determination: Because the project is outside Lynx habitat and the closest LAU is over two miles from the project, this analysis results in the **no effect** determination because the project occurs outside of a designated LAU and outside of lynx habitat.

5.3.2 Osterhout milk-vetch, *Astragalus osterhoutii*

Distribution: Osterhout milk-vetch is a perennial herbaceous species in the Fabaceae (pea) family. Plants are restricted to badlands of shale and siltstone sediments in soils derived from shales of the Niobrara, Pierre and Troublesome formations. These badlands are characterized by open, grassy vegetation with scattered shrubs of big sagebrush (*Artemisia tridentate*), rabbitbrushes (*Chrysothamnus* spp.), bitterbrush (*Pursia tridentate*), winterfat (*Ceratoides lanata*), snowberry (*Symphoricarpos* spp.), and/or mountain mahogany (*Cercocarpus montanus*). This species can be found on moderate slopes, sometimes growing up through sagebrush. Osterhout milk-vetch is endemic to Middle Park in Grand County at elevations around 7,500 feet.

No known occurrences of this species have been reported in the project area. However, small areas of shale and siltstone badland habitat required by this species occur along short reaches of the proposed alignment.

Natural History and Environmental Baseline: Threatened by habitat fragmentation and the construction of nearby Wolford Mountain Dam, this species was federally listed as endangered on July 13, 1989 (Federal Register 1989). A recovery plan has been developed for this species (USFWS 1992). Critical habitat has not been designated for this species. Osterhout milkvetch occurs in scattered colonies over a 15-mile range in Middle Park near Kremmling, Colorado (USFWS 1992). A majority of the plants occur

on land administered by the BLM, although other important colonies also occur on privately owned land.

This species can be found on old road cuts and fills, indicating some tolerance for disturbance. Threats to the Osterhout milk-vetch include grazing, oil and gas exploration, ATVs/off-road vehicle use, and residential development. In addition, the density of Osterhout milk-vetch has been observed to be lower in big sagebrush stands than in the adjacent open benchlands where it normally grows. Competition for limited soil moisture with sagebrush and crested wheatgrass (*Agropyron cristatum*) may impose limitations on growth and development of the milkvetch.

Direct, Indirect, and Cumulative Effects: Alternative D, the Proposed Action, is not anticipated to have any direct or indirect effects on this species or its habitat. There would be no adverse effects to Osterhout milk-vetch from the Proposed Action for the following reasons:

- A review of existing information shows no known occurrences of this species in the project area.
- Field surveys were conducted within the ROW in 2008 and again in July 2009 by qualified specialists using the USFWS standard protocol for federally listed plant species. No individuals were observed during field surveys.

Determination: The Proposed Action alternative is expected to have **no effect** on Osterhout milk-vetch and its habitat within the project area for the reasons described under the **Direct, Indirect, and Cumulative Effects** discussion.

5.3.3 Penland's beardtongue, *Penstemon penlandii*

Distribution: Penland's beardtongue is found in habitat similar to that described for the Osterhout milk-vetch. Little is known about the reproductive biology of the Penland's beardtongue, except that it must be visited by animals (including several native bee species) to reproduce sexually.

No known occurrences of this species have been reported in the project area. Small areas of shale and siltstone badland habitat needed by this species occur along short reaches of the proposed alignment.

Natural History and Environmental Baseline: The Penland's beardtongue was federally listed as endangered on July 13, 1989 (Federal Register 1989) and a recovery plan has been developed (USFWS 1992). The Penland's beardtongue is rarer than the Osterhout milk-vetch, and is also only known to occur along Troublesome Creek. Threats to the species include water projects along Muddy Creek, grazing, and oil and gas exploration, and residential development.

Direct, Indirect, and Cumulative Effects: Alternative D, the Proposed Action, is not anticipated to have any direct or indirect effects on this species or its habitat. There will be no adverse effects to Penland's beardtongue from the Proposed Action for the following reasons:

- A review of existing information shows no known occurrences of this species in the project area.
- Field surveys for this species were conducted within the ROW in 2008 and again in 2009 by qualified specialists using the USFWS standard protocol for federally listed plant species. No individuals were observed during field surveys.

Determination: The Proposed Action alternative is expected to have **no effect** on Penland’s beardtongue and its habitat within the project area for the reasons described under the **Direct, Indirect, and Cumulative Effects** discussion.

5.4 Effects from Interrelated and Interdependent Actions

Interdependent actions are actions that have no purpose or utility apart from the activities or actions of the proposed project. Interrelated actions are actions that are dependent on the proposed project activities or actions to justify their pursuit.

No interrelated or interdependent actions, separate from the various support activities described as part of the project alternatives such as line routine maintenance, temporary access roads, or equipment staging, have been identified for this project.

5.5 Determinations Summary

Table 5-2 summarizes the Proposed Action effects determination for each of the federally listed species.

Table 5-2. Summary of Effects Determinations for Federally Listed Species.

Common Name	Scientific Name	Federal Status	Determination
Canada lynx	<i>Lynx canadensis</i>	T	NE
Osterhout milk-vetch	<i>Astragalus osterhoutii</i>	E	NE
Penland's beardtongue	<i>Penstemon penlandii</i>	E	NE

NE = No Effect

6.0 Forest Service Sensitive Species

6.1 Forest Service Guidance

Forest Service Manual (FSM) 2600, Chapter 2670 *Threatened, Endangered and Sensitive Plant and Animals* provides additional guidance on habitat management for all sensitive species. The direction establishes the process, objectives, and standards for conducting a BE and ensures that all FSS species receive full consideration in the decision-making process. Region 2 Manual Supplement 2600-94-2 provides additional direction for conducting the analysis required of the BE. The BE portion of this report provides impact determinations for FSS species not addressed in the BA section; these include FSS, FSS of local concern, and state species of concern.

6.2 Species Considered

It is Forest Service policy to analyze impacts to sensitive species in a BE (FSM 2670.31-32; Forest Service 1995). Sensitive species are identified by the Forest Service Regional Forester as “those...for which population viability is a concern, as evidenced by...significant current or predicted downward trends in habitat capability that would reduce a species’ existing distribution.” (FSM 2670.5; Forest Service 1995). Western reviewed the Region 2 FSS species list received from the Regional Forester in May 2011. The following list includes current FSS species potentially found within the ARNF and Pawnee National Grassland (or ARP). A complete list for Region 2 and for the forest/grassland can be obtained by contacting the Arapaho National Forest, Sulphur Ranger District. Table 6-1 and Table 6-2 list all FSS wildlife and plant species (respectively) considered in this analysis. Species noted as “excluded” will not be carried forward for evaluation.

Table 6-1. R2 Forest Service Sensitive Species – Wildlife.

Common Name	Scientific Name	MIS / Indicator Community	Species Excluded	Reason for Exclusion
MAMMALS				
American marten	<i>Martes americana</i>	No	No	Not excluded
Fringed myotis	<i>Myotis thysanodes</i>	No	Yes	No occurrences or suitable habitat within the project area
Hoary bat	<i>Lasiurus cinereus</i>	No	Yes	No occurrences or suitable habitat within the project area
North American river otter	<i>Lontra canadensis</i>	No	No	Not excluded
Pygmy shrew	<i>Sorex hoyi</i>	No	No	Not excluded
Rocky Mountain bighorn sheep	<i>Ovis canadensis Canadensis</i>	Yes	Yes	No occurrences or suitable habitat within the project area
Townsend’s big-eared bat	<i>Plecotus townsendii</i>	No	Yes	No occurrences or suitable habitat within the project area
White-tailed prairie dog	<i>Cynomys leucurus</i>	No	Yes	No occurrences or suitable habitat within the project area
American wolverine	<i>Gulo gulo</i>	No	No	Not excluded
BIRDS				
American bittern	<i>Botaurus lentiginosus</i>	No	No	Not excluded

Common Name	Scientific Name	MIS / Indicator Community	Species Excluded	Reason for Exclusion
American peregrine falcon	<i>Falco peregrinus anatum</i>	No	No	Not excluded
Bald eagle	<i>Haliaeetus leucocephalus</i>	No	No	Not excluded
Black swift	<i>Cypseloides niger</i>	No	Yes	No occurrences or suitable habitat within the project area
Black tern	<i>Chlidonias niger</i>	No	No	Not excluded
Boreal owl	<i>Aegolius funereus</i>	No	No	Not excluded
Brewer's sparrow	<i>Spizella breweri</i>	No	No	Not excluded
Burrowing owl	<i>Athene cunicularia</i>	Yes/Prairie Dog Towns	Yes	No occurrences or suitable habitat within the project area
Ferruginous hawk	<i>Buteo regalis</i>	Yes/Shortgrasses & Midgrass Prairie	Yes	No occurrences or suitable habitat within the project area
Flammulated owl	<i>Otus flammeolus</i>	No	Yes	No occurrences or suitable habitat within the project area
Greater sage-grouse	<i>Centrocercus urophasianus</i>	No	No	Not excluded
Lewis's woodpecker	<i>Melanerpes lewis</i>	No	Yes	No occurrences or suitable habitat within the project area
Loggerhead shrike	<i>Lanius ludovicianus</i>	No	No	Not excluded
Long-billed curlew	<i>Numenius americanus</i>	No	Yes	No occurrences or suitable habitat within the project area
Northern goshawk	<i>Accipiter gentilis</i>	No	No	Not excluded
Northern harrier	<i>Circus cyaneus</i>	No	No	Not excluded
Olive-sided flycatcher	<i>Contopus cooperi</i>	No	No	Not excluded
Purple martin	<i>Progne subis</i>	No	Yes	No occurrences or suitable habitat within the project area
White-tailed ptarmigan	<i>Lagopus leucurus</i>	No	Yes	No occurrences or suitable habitat within the project area
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	No	Yes	No occurrences or suitable habitat within the project area
AMPHIBIANS				
Boreal toad	<i>Anaxyrus boreas boreas</i>	Yes/Montane Riparian and Wetlands	No	Not excluded
Northern leopard frog	<i>Lithobates pipiens</i>	No	No	Not excluded
Wood frog	<i>Lithobates sylvatica</i>	No	No	Not excluded
FISH				
Bluehead sucker	<i>Catostomus discobolus</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Colorado River cutthroat trout	<i>Oncorhynchus clarkii pleuriticus</i>	Yes/Montane Aquatic	Yes	Surface waters will be avoided, no impacts to suitable habitat
Finescale dace	<i>Phoxinus neogaeus</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Flannelmouth sucker	<i>Catostomus latipinnis</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Flathead chub	<i>Platygobio gracilis</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Greenback Cutthroat trout	<i>Oncorhynchus clarki stomias</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Hornyhead chub	<i>Nocomis biguttatus</i>	No	Yes	Surface waters will be avoided, no impacts to

Common Name	Scientific Name	MIS / Indicator Community	Species Excluded	Reason for Exclusion
				suitable habitat
Lake chub	<i>Couesius plumbeus</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Mountain sucker	<i>Catostomus platyrhynchus</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Northern redbelly dace	<i>Phoxinus eos</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Pearl dace	<i>Margariscus margarita</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Plains minnow	<i>Hybognathus placitus</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Rio Grande chub	<i>Gila Pandora</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Rio Grande cutthroat trout	<i>Oncorhynchus clarki virginalis</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Rio Grande sucker	<i>Catostomus plebeius</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Roundtail chub	<i>Gila robusta</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Southern redbelly dace	<i>Phoxinus erythrogaster</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Sturgeon chub	<i>Macrhybopsis gelida</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
Yellowstone cutthroat trout	<i>Oncorhynchus clarki bouvieri</i>	No	Yes	Surface waters will be avoided, no impacts to suitable habitat
INSECTS				
Hudsonian emerald	<i>Somatochlora hudsonica</i>	No	Yes	No occurrences or suitable habitat within the project area
Regal fritillary	<i>Speyeria idalia</i>	No	Yes	No occurrences or suitable habitat within the project area
MOLLUSCS				
Cooper's Rocky Mountain capshell	<i>Oreohelix strigosa cooperi</i>	No	Yes	No occurrences or suitable habitat within the project area
Rocky Mountain capshell	<i>Acroloxus coloradensis</i>	No	Yes	No occurrences or suitable habitat within the project area

Source: Forest Service 2009.

Table 6-2. Region 2 Forest Service Sensitive Species – Plants.

Scientific Name	Common Name	MIS/Indicator Community	Species Excluded?	Reason for Exclusion	*Potential Occurrence
FERNS AND ALLIES					
<i>Botrychium ascendens</i>	Upswept moonwort	No	No	Not excluded	L
<i>Botrychium campestre</i>	Prairie moonwort	No	Yes	Distribution restricted to the Great Plains	L
<i>Botrychium lineare</i>	Narrow-leaved moonwort	No	No	Not excluded	M-H
<i>Botrychium</i> tax. nov. "furcatum"	Forked-leaf moonwort	No	Yes	This species is not described in the taxonomic literature. Its habitat requirements are not well understood. It has not been	NA

Scientific Name	Common Name	MIS/Indicator Community	Species Excluded?	Reason for Exclusion	*Potential Occurrence
				previously detected in the project vicinity.	
MONOCOTS					
<i>Carex diandra</i>	Lesser paniced sedge	No	No	Not excluded	M
<i>Carex livida</i>	Livid sedge	No	No	Not excluded	M-H
<i>Cypripedium parviflorum</i> (=C. calceolus spp. parviflorum)	Yellow lady's slipper	No	No	Not excluded	M
<i>Eriophorum altaicum</i> var. <i>neogaeum</i>	Altai cottongrass	No	Yes	This species is typically found in fen wetlands at elevations of 9,500 – 14,000 feet, well above the average elevation for this project area.	NA
<i>Eriophorum gracile</i>	Slender cottongrass	No	Yes	Project area lacks fen wetlands of sufficient elevation.	L
<i>Festuca hallii</i>	Hall's fescue	No	Yes	Grass of subalpine/alpine habitats which is well above elevations found on this project	NA
<i>Kobresia simpliciuscula</i>	Simple Kobresia	No	Yes	No suitable habitat in the analysis area	NA
<i>Malaxis brachypoda</i> (=M. monophyllus spp. <i>Brachypoda</i>)	Adder's mouth	No	Yes	Geographically distant from analysis area. Species is known only from El Paso and Jefferson counties in Colorado. Limited or no suitable habitat in analysis area.	NA
DICOTS					
<i>Armeria maritima</i> ssp. <i>sibirica</i>	Sea pink	No	Yes	Geographically distant from analysis area. No suitable habitat in analysis area.	NA
<i>Asclepias uncialis</i>	Dwarf milkweed	No	Yes	No suitable habitat in analysis area and	NA
<i>Astragalus leptaleus</i>	Park milkvetch	No	No	Not excluded	M
<i>Chenopodium cycloides</i>	Sandhill goosefoot	No	Yes	Geographically distant from analysis area and no suitable habitat in analysis area	NA
<i>Draba exunguiculata</i>	Clawless draba	No	Yes	No suitable habitat and area is below species known range	NA
<i>Draba grayana</i>	Gray's peak whitlowgrass	No	Yes	No suitable habitat and area is below species' known elevational range	NA
<i>Drosera rotundifolia</i>	Roundleaf sundew	No	No	Not excluded	L
<i>Eriogonum exilifolium</i>	Dropleaf buckwheat	No	No	Not excluded	M
<i>Ipomopsis aggregata</i> ssp. <i>weberi</i>	Weber's scarlet gilia	No	No	Not excluded	L
<i>Machaeranthera coloradoensis</i>	Colorado tansy-aster	No	No	Not excluded	L
<i>Mimulus gemmiparus</i>	Weber's monkeyflower	No	Yes	No suitable habitat in the analysis area. Granitic seeps, slopes and alluvium in open sites within spruce-fir forest and	NA

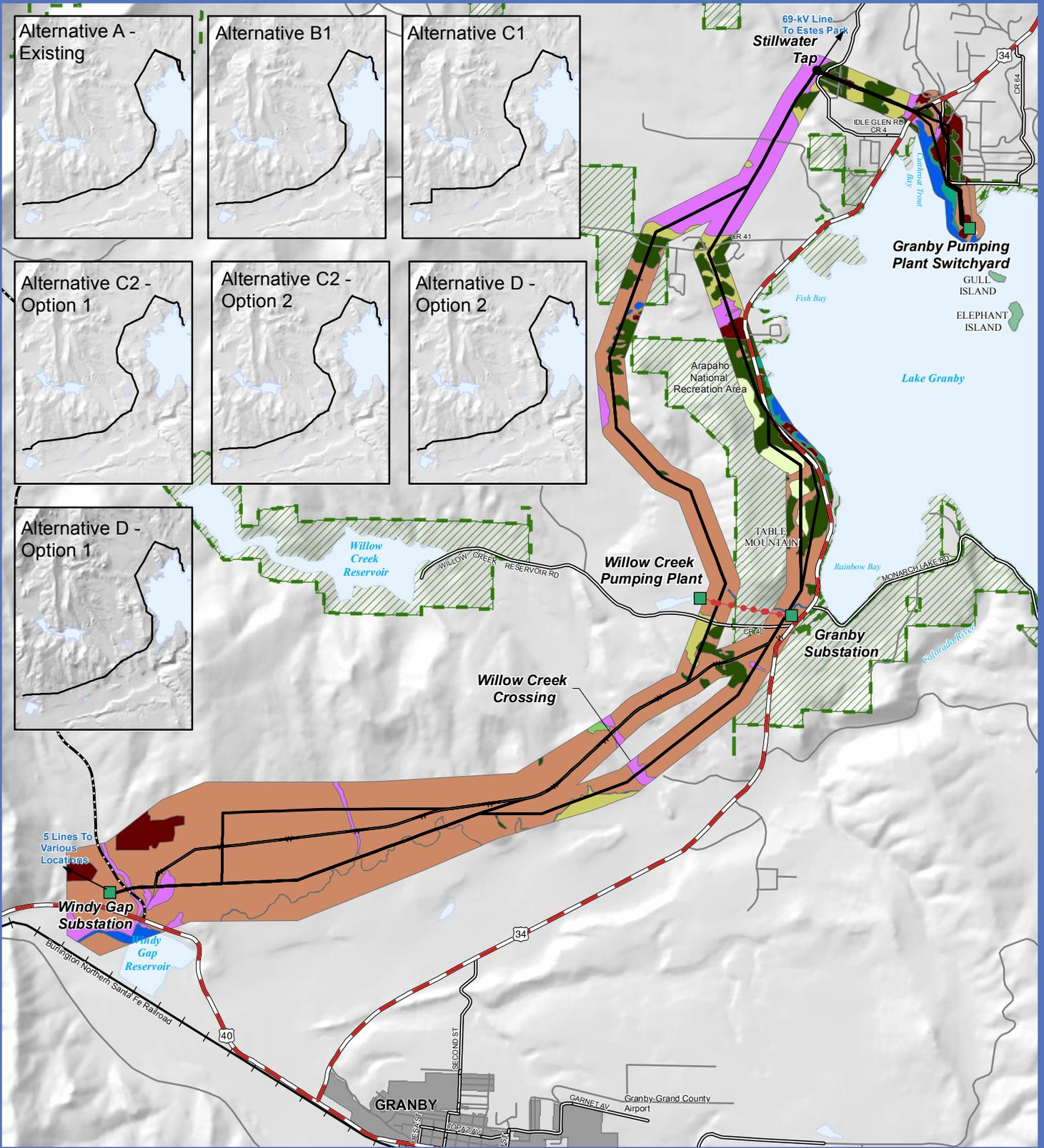
Scientific Name	Common Name	MIS/Indicator Community	Species Excluded?	Reason for Exclusion	*Potential Occurrence
				aspen; 8,500-10,500	
<i>Parnassia kotzebuei</i>	Kotzebue's grass of Parnassus	No	Yes	No suitable habitat in the analysis area. Occurs in subalpine and alpine wet, rocky ledges, in streamlets, and moss mats: 10,000 – 12,000 ft	NA
<i>Penstemon harringtonii</i>	Harrington beardtongue	No	No	Not excluded	M
<i>Potentilla rupincola</i> (<i>P. effuse</i> var. <i>rupincola</i>)	Front Range cinquefoil	No	Yes	Global distribution limited to the Front Range. No suitable habitat in analysis area.	NA
<i>Ranunculus karelinii</i> (= <i>R. gelidus</i> ssp. <i>Grayi</i>)	Ice cold buttercup	No	Yes	No suitable habitat in the analysis area. Found among rocks and scree on exposed summits: 12,000 to 14,000 ft in elevation.	NA
<i>Rubus arcticus</i> var. <i>acaulis</i> (<i>Cylactis arctica</i> ssp. <i>Acaulis</i>)	Dwarf raspberry	No	No	Not excluded	M
<i>Salix candida</i>	Hoary willow	No	No	Not excluded	M
<i>Salix serisissima</i>	Autumn willow	No	No	Not excluded	M
<i>Utricularia minor</i>	Lesser bladderpod	No	No	Not excluded	M
<i>Viola selkirkii</i>	Selkirk violet	No	No	Not excluded	L

*Potential for occurrence is ranked L=Low, M=Medium, and H =High; NA = no potential for occurrence

The following FSS species have been retained for further analysis (Table 6-3). Map 6-1 shows general vegetation cover types and all project alternatives.

Table 6-3. Forest Service Sensitive Species Retained for Further Analysis.

Forest Service Sensitive Species	
WILDLIFE	
American marten North American river otter American wolverine Pygmy shrew	Mammals
American bittern American peregrine falcon Bald eagle Black tern Boreal owl Brewer's sparrow Greater sage-grouse Loggerhead shrike Northern goshawk Northern harrier Olive-sided flycatcher	Birds
Boreal toad Northern leopard frog Wood frog	Amphibians
PLANTS	
<i>Botrychium ascendens</i> <i>Botrychium lineare</i>	Ferns and Allies
<i>Carex diandra</i> <i>Carex livida</i> <i>Cypripedium parviflorum</i> (= <i>C. calceolus</i> spp. <i>parviflorum</i>)	Monocots
<i>Astragalus leptaleus</i> <i>Drosera rotundifolia</i> <i>Eriogonum exilifolium</i> <i>Ipomopsis aggregata</i> ssp. <i>weberi</i> <i>Machaeranthera coloradoensis</i> <i>Penstemon harringtonii</i> <i>Rubus arcticus</i> var. <i>acaulis</i> (<i>Cylactis arctica</i> ssp. <i>Acaulis</i>) <i>Salix candida</i> <i>Salix serisissima</i> <i>Utricularia minor</i> <i>Viola selkirkii</i>	Dicots



Map 6-1

Legend

- | | |
|---|---------------------------------------|
| Base Data | Transmission Line Alternatives |
| ● Existing Willow Creek Tap (69-KV) | — Transmission Line Alternatives |
| — Windy Gap Water Pipeline (NCWCD) | |
| ▨ Arapaho National Recreation Area (ANRA) | |
| ▨ U.S. Forest Service (USFS) | |

- Vegetation Communities**
- | | |
|-----------|-----------------|
| Aspen | Man Made Pond |
| Developed | Mixed Conifer |
| Disturbed | Sagebrush |
| Grassland | Weedy Shoreline |
| Highway | Wetland |
| Lodgepole | |

Vegetation
July 23, 2010



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

GRANBY PUMPING PLANT - WINDY GAP TRANSMISSION LINE REBUILD PROJECT

File path: P:\2010\0600\0229_02\GIS\Project\Layouts\ALTB1_8_6\X11_060227.mxd

Table 6-4. Transmission Line ROW Acreage Calculations*

Community Type	Alternative A-Existing	Alternative B1	Alternative C1	Alternative C2-01	Alternative C2-02	Alternative D-01	Alternative D-02
Aspen	0	4.79	0	0	0	4.79	4.79
Disturbed	10.08	9.58	6.34	6.34	6.34	9.58	9.58
Grassland	8.63	11.44	8.92	8.92	8.92	9.40	9.40
Highway	0.27	0.81	0.80	0.80	0.80	0.81	0.81
Lodgepole	12.05	17.72	14.40	14.40	14.40	17.31	17.31
Man Made Pond	0.87	0.83	0.11	0.11	0.44	0.18	0.52
Sagebrush	31.86	74.96	95.38	92.42	87.17	80.05	78.05
Weedy Shoreline	1.95	0	0	0	0	0	0
Wetland	8.37	23.20	22.84	21.60	21.77	20.74	21.70

O1 = Option 1; O2 = Option 2

*Acreage calculations are based on National Land Cover Dataset (NLCD) and do not account for mortality including mountain pine beetle logged areas

6.3 Species Evaluation - Wildlife

6.3.1 Mammals

American marten, Martes americana

Distribution: Marten occur throughout Alaska, Canada, and the lower 48 states except for the Midwest and the South. Natural reestablishment and reintroduction programs have contributed to a moderate comeback in some areas of the northern United States including northern New England and the Great Lakes region (NatureServe 2010b). In Colorado, they occur in most areas of coniferous forest habitat in the high mountains (Fitzgerald et al. 1994). According to NatureServe (2010b), marten populations are apparently secure.

Natural History: Marten inhabit subalpine spruce-fir and lodgepole pine forests, alpine tundra, and occasionally montane forests. They prefer late-successional or mixed age stands with over 30%, and preferably 40 to 60% canopy cover. Marten den in tree cavities, logs, rocks, rock piles, and burrows in late-successional forests, and frequently rest on tree limbs during the day. Voles and mice may constitute over 60 to 88% of the marten diet. Martens will also consume other small mammals. The species prefers interior forests and will avoid open areas more than 100 to 250 meters wide. Marten are crepuscular to nocturnal though they may exhibit diurnal behavior in the summer where diurnal ground squirrels are an important prey source. Marten remain active year-round and rely upon downed logs, woody debris, brush piles, and rootwads to access the subniveous environment in search of food. Marten are generally tolerant of human disturbance but are vulnerable to habitat loss or modification (NatureServe 2010b, Ruggiero et al. 1994).

According to NatureServe (2010b) threats to marten include timber harvest that reduces canopy cover and removes structure from the forest floor, and trapping for pelts. Marten are susceptible to over-harvest.

Environmental Baseline: According to Hoover and Wills (1984), marten are considered common in subalpine forest, Douglas-fir, lodgepole pine and high elevation riparian habitats. Specifically, marten cover habitat occurs within mature and late-successional subalpine (spruce-fir) forest; Douglas-fir; lodgepole pine and high elevation riparian forests. Marten foraging habitat occurs within all structural stages of spruce-fir forest, lodgepole pine and high elevation riparian forest, and mature and late-successional Douglas-fir habitat.

Winter tracking surveys for large vegetation management projects covered extensive areas of mature forest (lodgepole and spruce-fir) habitats. Data indicates that marten appear to be well-distributed within mature, forested habitats. As the mature lodgepole pine forests die as a result of mountain pine beetles, impacts to the current abundance and distribution of marten and red squirrels are uncertain, although red/pine squirrels are expected to decline (Hayward 2008).

Surveys were conducted for martens in 2005 on Table Mountain and there were no signs or tracks of martens found.

Direct, Indirect, and Cumulative Impacts: The mountain pine beetle epidemic has substantially reduced habitat for the marten within all of the project alternative corridors. The marten prefers interior forests, and many of these areas are now open because of the abundance of dead lodgepole in the area. Much of Alternatives B1 and D1 are located in existing ROW and parallel or span existing residential or other open developments making it unlikely that a marten occurs in proximity to the ROW, the exception to this would be approximately one mile of new ROW east of Table Mountain. Alternatives C1 and C2 would span fewer forested habitats, as shown on Table 6-4, and contain less suitable habitat for this species.

Tracking data did not detect marten in the project area. However, if martens occur in the project area, construction would result in direct, long term habitat loss within the ROW, and individuals would likely be displaced until construction is complete. Direct impacts to martens could occur from vegetation management activities such as long term removal of forested cover. The long term removal of a mature forested canopy within the ROW would decrease denning habitat directly within the ROW. It would not impact foraging habitat because this species does not require the forested cover for foraging. Martens avoid openings greater than 300 feet wide; however the project ROW and tree removal will not be greater than 100 feet wide and therefore marten would not be expected to avoid the area once construction is complete.

Cumulative impacts are associated with the mountain pine beetle epidemic which is reducing habitat for the marten on the ANRA. Other cumulative impact projects include past and future salvage logging and thinning operations on the Forest, which reduce overall canopy cover and remove cavities used for breeding. Proposed and existing residential developments adjacent to the Forest further reduce marten habitat. Recreational use of BLM and Forest Service lands also may impact the marten though they appear tolerant of human presence.

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor, Alternative A contains the least amount of forested land than the other alternatives, however, much of this has been logged because of the beetle-kill. The existing condition of the beetle-killed landscape significantly limits habitat for this species, therefore Alternative A would have **no impact** on the American marten.

Determination for Alternative B1: Suitable habitat including denning habitat exists on the east side of Table Mountain; this habitat will be decreased by tree removal within the new ROW. Marten may also temporarily avoid construction areas because of vehicle and human presence. Therefore, Alternative B1 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C1: Most of these beetle-killed forests on private lands crossed by Alternative C1 have been logged. The existing condition of the beetle-killed landscape significantly limits habitat for American Martens. Given the limited amount of suitable habitat within the project area, Alternative C1 will have **No Impact** on this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C2: Suitable habitats for the American marten are found in the same segments of the ROW of Alternatives C1 and C2. Most of these beetle-killed forests on private lands crossed by Alternative C2 have been logged. The existing condition of the beetle-killed landscape significantly limits habitat for American Martens. Alternative C2 will have **No Impact** on this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative D (Proposed Action): Suitable habitat including denning habitat will be decreased by tree removal within the new ROW east of Table Mountain. Marten may also temporarily avoid construction areas because of vehicle and human presence. Therefore, Alternative D **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Pygmy shrew, *Sorex hoyi*

Distribution: Considered imperiled in Colorado, pygmy shrews have relatively unknown status, trend and distribution, other than historically documented occurrences in Grand, Gunnison and Larimer counties (NatureServe 2010c). The species is known from the boreal habitats of Alaska through Canada and into the Northern Rockies, the upper Midwest and the Appalachians in the United States (Beauvais and McCumber 2006). Prior to 1961, this species was not known to occur south of Montana (Fitzgerald et al. 1994). The pygmy shrew in northern Colorado and south-central Wyoming is one of two distinct subspecies (*S. h. montanus*) found in Region 2.

Natural History: The pygmy shrew is relatively specialized within its range, occupying high-elevation, mesic coniferous forest with possible preference for late-seral stands and possibly the edges between wet, lowland forest and dry, upland forest (Beauvais and McCumber 2006). A specimen was collected in 1961 west of Fort Collins and another specimen was found near Rabbit Ears Pass (Fitzgerald et al. 1994). All captures of this species in Colorado have occurred above 9,600 feet (NDIS 2010d). The species has been found in subalpine forests, clear-cut and selectively logged forests, forest-meadow edges, boggy meadows, willow thickets, aspen-fir forests, and subalpine parklands. Pygmy shrews build runways under stumps, fallen logs, and litter (NatureServe 2010c, Fitzgerald et al. 1994). Pygmy shrews have short lives (12 months) and reproduce only once in their lives at about 10 months. This subspecies lives off of small insects and invertebrates, and prefers moist, late-seral coniferous forests and wet-dry forest edges. Pygmy shrews are easily out-competed by other larger shrew species. The greatest threat to this subspecies are activities or conditions that convert moist forest types to drier, more open habitats: timber harvest, livestock grazing, wildfire, drought and insect epidemics in forested habitats (Beauvais and McCumber 2006).

It is possible that this species occupies suitable habitat throughout the mountains of northern and central Colorado; however populations may be discontinuous relicts from glacial times (Fitzgerald et al. 1994).

Environmental Baseline: In Colorado, pygmy shrews appear to occur in higher elevations (9,600 feet and above), which are above the project area elevation. However, the project area does contain other suitable pygmy shrew habitat characteristics including moist forest habitats (mixed conifer and aspen), forest-moist meadow edges, and wet meadow habitats. Pygmy shrews have not been documented on the Sulphur District, but survey records are scarce.

Very few field studies have focused on pygmy shrews in Region 2. Historically, subspecies *montanus* was documented from 17 localities throughout Region 2 but cursory surveys in 2005 failed to detect the subspecies at a subset of historically occupied sites (Beauvais and McCumber 2006).

There are no records of the pygmy shrew within the project area; however, formal surveys have not been conducted.

Direct, Indirect, and Cumulative Impacts: The pygmy shrew primarily occurs at elevations well above the project area. The project area ranges from 7,800 to 8,400 feet in elevation and pygmy shrews have all been collected above 9,600 feet. However, since populations of this species are not well documented, this species is included for analysis. A majority of the lodgepole pine forests found in the project area have been logged. This causes drying of the forest floor, reducing potential habitat. Additionally, residential development, recreational use of Forest Service lands, and past and future timber management projects may cumulatively impact habitat fragmentation, habitat quality, and individual mortality.

Determination for Alternative A (No Action): It is unlikely the pygmy shrew exists in the project area. The forests are increasingly dry because of the lack of canopy and increased logging from beetle kill. Additionally, the project area is more than 1,000 feet below this species' documented range. Because this species is not believed to exist in the project area, Alternative A will have **no impact** on the pygmy shrew.

Determination for Alternative B1: It is unlikely the pygmy shrew exists in the project area. The forests are increasingly dry because of the lack of canopy and increased logging from beetle kill. Additionally, the project area is more than 1,000 feet below this species' documented range. Because this species is not believed to exist in the project area, Alternative B1 will have **no impact** on the pygmy shrew.

Determination for Alternative C1: It is unlikely the pygmy shrew exists in the project area. The forests are increasingly dry because of the lack of canopy and increased logging from beetle kill. Additionally, the project area is more than 1,000 feet below this species' documented range. Because this species is not believed to exist in the project area, Alternative C1 will have **no impact** on the pygmy shrew.

Determination for Alternative C2: It is unlikely the pygmy shrew exists in the project area. The forests are increasingly dry because of the lack of canopy and increased logging from beetle kill. Additionally, the project area is more than 1,000 feet below this species' documented range. Because this species is not believed to exist in the project area, Alternative C2 will have **no impact** on the pygmy shrew.

Determination for Alternative D (Proposed Action): It is unlikely the pygmy shrew exists in the project area. The forests are increasingly dry because of the lack of canopy and increased logging from beetle kill. Additionally, the project area is more than 1,000 feet below this species' documented range. Because this species is not believed to exist in the project area, Alternative D will have **no impact** on the pygmy shrew.

American Wolverine, *Gulo gulo*

Distribution: Considered critically imperiled in Colorado, the American wolverine (wolverine) occurs over a large range in northern Canada and Alaska, where populations are in good condition. Wolverines have been extirpated from most of its historic range in the contiguous 48 states. Recently there are signs of semi-recovery in selected western states. Outside of Alaska, Montana has the largest population in the United States. Numbers have apparently declined steadily in the United States beginning in the latter half of the 1800s (NatureServe 2010d). In Colorado, records from the 19th century indicate that populations were never very high. It is unlikely that wolverines were common in Colorado and current population levels are not self-sustaining (Ruggiero et al. 1994). Relatively recent CDOW surveys failed to find any definitive wolverine signs in the state (Fitzgerald et al. 1994). The first confirmed wolverine sighting in Colorado since 1919 was recorded in June of 2009 in northern Colorado, just south of the Wyoming state line. The wolverine was observed at 10,500 feet and is believed to be a part of the Greater Yellowstone Wolverine Program. This individual (M56) remains in northern Colorado (Inman et al. 2009). CDOW maintains a list of Class B (probable) sightings, including several on or near the Sulphur Ranger District.

Natural History: Wolverines are solitary, wide-ranging and exist in low densities in large roadless or isolated areas. Wolverines have historically had one of the lowest densities of any carnivore in North America (Fitzgerald et al. 1994). Suitable habitat includes alpine and arctic tundra and boreal and mountain forests (primarily coniferous). Wolverines use habitats with snow on the ground in the winter. Riparian areas may also be important winter habitat. Home range sizes in Alaska and Montana vary from 94 to 388 square kilometers for females to 422 to 666 square kilometers for males (Fitzgerald et al. 1994, Ruggiero et al. 1994). In Colorado, historical and current reports show nearly all wolverines are from higher elevations, in areas with heavy timber. However, they may also hunt in open areas (CDOW 2009).

When inactive, wolverines occupy dens in caves, rock crevices, under fallen trees, or in thickets. Young are born in March or April in natal dens among rocks or tree roots, in hollow logs, under fallen trees, or in dense vegetation, including sites under snow. Reproductive success is low, due in part to loss of kits, lack of mating opportunities, and age at first litter. Wolverines are omnivores, feeding on small mammals, birds, fish, carrion, and plant material. In winter, the diet is mostly mammalian prey and carrion, with more diversity at other times of the year (Fitzgerald et al. 1994, Ruggiero et al. 1994). Wolverines are nocturnal and remain active year-round. Ruggiero et al. (1994) documented cougar, eagle, and bear predation on wolverine, especially kits. Wolverine mothers go to great lengths to find secluded dens for their young, suggesting that predation may be important (Ruggiero et al. 1994).

Over much of its distribution, the primary mortality factor for the wolverine is trapping (Ruggiero et al. 1994). Habitat has been degraded through timber harvesting, ski area construction, road construction, and general human disturbance (NatureServe 2010d). Activities that increase the presence of early seral stages on the landscape may enhance ungulate populations, which provide important food for

wolverines. However, the presence of roads and clearcuts alters wolverine use of the landscape and these areas are generally avoided (Ruggiero et al. 1994).

Environmental Baseline: The CDOW database includes Class A (positive), Class B (probable) and Class C (possible) wolverine sightings in Colorado. The last Class A sightings in Grand County were in 1903: a wolverine trapped on the Williams Fork of Grand River and another on Ranch Creek. An additional Class A record from 1883 was from the Gore Pass vicinity. Class B sightings in Grand County are from 1979 to 1994 and all occur north of Highway 40 in the Rabbit Ears Range or in Rocky Mountain National Park. Class C reports in Grand County (many undated) include Gore Pass, Corona Lake (1974 and 1979), Granby vicinity, Bowen Gulch, 12 in Rocky Mountain National Park from 1954 to 1990, Willow Creek Pass, Highway 34, Gravel Mountain, and the Williams Fork drainage (1972 and 1983)(Forest Service n.d.). The M56 siting is a Class A sighting and includes numerous Grand County locations (Sulphur District files).

It is unlikely for wolverines to occur within or directly adjacent to the project area, given the wolverine's intolerance for human activity, and the lack of contiguous forested areas within the project area. Additionally, there are no records of possible wolverine occurrence from the project area.

Direct, Indirect, and Cumulative Impacts: The majority of the project area contains sagebrush shrublands and irrigated hay meadows. The forested portions of the project areas have been previously disturbed by residential developments, mountain pine beetle outbreaks, recreation including skiing and snowmobiling, and agricultural uses. Habitats within all project alternatives are poor quality for wolverines and existing disturbances would likely cause the wolverine to avoid the project area.

Determination for Alternative A (No Action): Given the wolverine's intolerance for human activity, and lack of contiguous forested areas, and lack of known occurrences, this species likely does not exist within the project area. Alternative A is expected to have **no impact** on the wolverine.

Determination for Alternative B1: Given the wolverine's intolerance for human activity, and lack of contiguous forested areas, and lack of known occurrences, this species likely does not exist within the project area. Alternative B1 is expected to have **no impact** on the wolverine.

Determination for Alternative C1: Given the wolverine's intolerance for human activity, and lack of contiguous forested areas, and lack of known occurrences, this species likely does not exist within the project area. Alternative C1 is expected to have **no impact** on the wolverine.

Determination for Alternative C2: Given the wolverine's intolerance for human activity, and lack of contiguous forested areas, and lack of known occurrences, this species likely does not exist within the project area. Alternative C2 is expected to have **no impact** on the wolverine.

Determination for Alternative D (Proposed Action): Given the wolverine's intolerance for human activity, and lack of contiguous forested areas, and lack of known occurrences, this species likely does not exist within the project area. Alternative D is expected to have **no impact** on the wolverine.

North American River Otter, *Lontra canadensis*

Distribution: The North American river otter's (river otter) status in Colorado was recently changed from endangered to threatened. This species occurs in the Colorado, Gunnison, Piedra, and Dolores rivers.

Tracks and other sign of otters have also been found in the Poudre and Laramie drainages in Larimer County (NDIS 2010c).

Natural History: River otters inhabit riparian habitats that traverse a variety of other ecosystems ranging from semi-desert shrublands to montane and subalpine forests. The species requires permanent water of relatively high quality and with an abundant food base of fish or crustaceans (NDIS 2010c). Their diet includes aquatic animals including crayfish, frogs, fish, young muskrats and beavers (CDOW 2010).

Because of their high mobility and low densities, river otters require relatively long reaches of streams and rivers. They will occupy lakes and reservoirs, as long as shoreline cover and food resources are adequate, and river otter presence has been reported in several large lakes and reservoirs in Colorado. The physical habitat attribute most important to river otters besides water is riparian vegetation, which provides security cover when they are feeding, denning, or moving on land. The importance of cover along waterways for river otter habitat is clear. If riparian vegetation is lacking, rock piles or similar physical structures may provide such cover. River otters generally avoid areas where cover is lacking, such as reservoir shorelines with little vegetation or structural cover, even if food is abundant (Boyle 2006).

Principal threats are habitat destruction and degradation, and human-caused mortality. Habitat destruction and degradation include water development resulting in stream flow and channel morphology alteration, water pollution, loss of riparian vegetation, and human settlement and recreational use along rivers and lakes. Water pollution that reduces or eliminates otter prey populations (fish and invertebrates) is a threat at local scales to some otter populations or potential habitats. Human recreational use of streams, lakes, and reservoirs is a localized and increasing threat in some watersheds (Boyle 2006).

Environmental Baseline: From 1978 to 1984, 45 river otters from Washington, Wisconsin, Michigan, Virginia, and Minnesota were released on the North Fork Colorado River in western Rocky Mountain National Park. Several recent surveys confirm that river otters now inhabit most of the North Fork Colorado River in Rocky Mountain National Park and the ARNF, including Shadow Mountain and Granby Reservoirs and Grand Lake (Boyle 2006).

Direct, Indirect, and Cumulative Impacts: According to Forest Service (Boyle 2006) North American river otters likely inhabit Granby Reservoir. However, most of the surface waters in the project area lack the riparian vegetation that this species prefers. The project would span all surface waters, and project construction including access would also avoid all surface waters. As specified in Western's construction practices, construction activities are not anticipated to occur within 100 feet of surface waters (SPC 32 and SPC 33). Additionally, construction activities shall be performed by methods that will prevent entrance, or accidental spillage, of solid matter contaminants, debris, other objectionable pollutants and wastes into streams, flowing or dry watercourses, lakes, and underground water sources (SPC 9). Cumulative impacts include water development resulting in alterations to stream flow and channel morphology, water and human encroachment from settlement, and recreational use along Lake Granby.

Determination for Alternative A (No Action): Because Alternative A spans all river otter habitat including surface waters and riparian communities, and does not affect stream flow, this alternative will have **no impact** on river otters.

Determination for Alternative B1: Because Alternative B1 spans all river otter habitat including surface waters and riparian communities, and does not affect stream flow, this alternative will have **no impact** on river otters.

Determination for Alternative C1: Because Alternative C1 spans all river otter habitat including surface waters and riparian communities, and does not affect stream flow, this alternative will have **no impact** on river otters.

Determination for Alternative C2: Because Alternative C2 spans all river otter habitat including surface waters and riparian communities, and does not affect stream flow, this alternative will have **no impact** on river otters.

Determination for Alternative D (Proposed Action): Because Alternative D spans all river otter habitat including surface waters and riparian communities, and does not affect stream flow, this alternative will have **no impact** on river otters.

6.3.2 Birds

American bittern, *Botaurus lentiginosus*

Distribution: The American bittern is an uncommon spring and fall migrant and summer resident on eastern plains and in mountain parks. In the western valleys, it occurs at Browns Park National Wildlife Refuge. It has been recorded in Meeker, Rio Blanco, and Gunnison counties, and has nested in La Plata County (NDIS 2009). According to NDIS, the bittern has been known to occur in Grand County, but there are no recorded occurrences of this species within the project area.

Natural History: In Colorado, the bittern can be found in cattail marshes and adjacent wet meadows. It is seen outside of marshes around lakes and in riparian areas, primarily during fall and spring migration (NDIS 2005). This species breeds and overwinters in freshwater wetlands with emergent vegetation and shallow water. According to NatureServe (2010e), loss and degradation of wetlands is the most serious threat to bittern viability. According to NDIS 2009, this species is known to occur in Grand County, however there are no known incidental or breeding occurrences of this species within or adjacent to the project area.

Environmental Baseline: The American bittern is encountered too infrequently on breeding bird surveys to assess population trends in most states. Long-term data is not available rangewide. However, habitat trends suggest that substantial declines have probably occurred (NatureServe 2010e). The bittern's entire life cycle is dependent on wetlands. Breeding bird survey data (1966 to 1987) indicate a decline in the north-central United States (NatureServe 2010e), due mainly to loss and degradation of wetlands. Breeding bird survey data suggest a 2.4% annual decline in United States populations between 1966 and 1989, but no significant trends were evident for populations in the eastern United States or Canada (NatureServe 2010e).

Direct, Indirect, and Cumulative Impacts: There are no known breeding occurrences of American bitterns in Grand County. Breeding habitat is limited in the project area. For all project alternatives, the largest wetland complexes are found north of CR 41. Alternative routes are similar in these areas and, all alternatives transect approximately the same length of suitable habitat for the bittern. Cutthroat Trout Bay also supports wetland communities that may provide foraging habitat for bitterns during spring and

fall migration. Wetlands and surface waters would be spanned and avoided to the greatest extent feasible, reducing the likelihood of habitat impacts.

The primary impact associated with any of the project alternatives is the potential for collision where the transmission line would cross surface waters and wetland habitats. Collision risk would be minimized through the implementation of the environmental protection measures described in Section 3.0, including the use of flight diverters in areas that are identified by the Forest Service as high risk.

Other past, present, and reasonably foreseeable future activities within the project area that could cumulatively affect this species' habitat include future development adjacent to wetlands and surface waters including Lake Granby, Grand Lake, Willow Creek Reservoir, and the Colorado River; recreational use/hunting throughout the area; and collision risk associated with existing and proposed communication towers on Table Mountain and other power lines within the project area. Although water development projects may ultimately increase habitat for the American bittern, they would likely inundate existing wetlands and riparian communities which currently provide habitat for this species and would de-water other areas.

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A currently spans wetlands, wet meadows, and surface waters that provide habitat for this species. Some individuals may be familiar with the existing transmission line placement, making collision less likely. However, juvenile and migrant species are likely not familiar with the existing line and Alternative A **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

Determination for Alternative B1: With the implementation of best management practices and the environmental protection measures described in Section 3.0 intended to reduce collision impacts (such as the use of flight diverters in high risk areas [DC-6]), Alternative B1 **may impact, not likely to adversely impact individuals**, and is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

Determination for Alternative C1: The potential for collisions is expected to be higher for Alternative C1 because it would occur primarily in a new ROW and would occur on the west side of Table Mountain, which borders a number of large wetland communities that are used by a variety of avian and other terrestrial and aquatic wildlife. With the implementation of best management practices and the environmental protection measures described in Section 3.0 intended to reduce collision impacts, Alternative C1 **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

Determination for Alternative C2: Impacts would be similar to those described for Alternative C1. Alternative C2 **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

Determination for Alternative D (Proposed Action): Alternative D is a combination of Alternatives A and B1. With the implementation of best management practices and the environmental protection measures described in Section 3.0 intended to reduce collision impacts, Alternative B1 **may impact, not likely to adversely impact individuals**, and is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing.

American peregrine Falcon, Falco peregrinus

Distribution: Considered imperiled in Colorado, peregrine falcons breed on every continent except Antarctica. They are absent from the desert regions of Africa, Asia, and Australia and from most tropical forests. Although the Eurasian subspecies is listed as endangered, the North American subspecies (*F. p. anatum* and *F. p. tundrius*) were delisted in 1999 and 1994 respectively (NatureServe 2010f). In the United States, the peregrine breeds primarily in the western half of the country.

In Colorado, peregrine eyries are scattered throughout the mountains and canyons with highest concentrations along the Dolores and Colorado River canyons and in Dinosaur National Park (Kingery 1998). Breeding pairs nest on cliffs and forage over adjacent coniferous and riparian forests. Migrants and winter residents occur mostly around reservoirs, rivers, and marshes, but may also be seen in grasslands and agricultural areas. They are a rare spring and fall migrant in western valleys, foothills, lower mountains, mountain parks, and on the eastern plains. In Grand County, peregrine falcons are rare spring and fall visitors in aspen, canyon, riparian and tundra habitats (Jasper and Collins 1987). An active eyrie was discovered near Hot Sulphur Springs in Grand County in 2009 which is also active in 2010 (Forest Service n.d.).

Natural History: The peregrine falcon is found in various open habitats from tundra, moorlands, steppe and seacoasts, especially where there are suitable nesting cliffs. They are found in mountains, open forested regions and human population centers (NatureServe 2010f). Non-breeding habitats for this species include area where prey concentrate such as farmlands, marshes, lakeshores, river mouths, tidal flats, dunes and beaches, broad river valleys, cities, and airports.

Peregrines nest on ledges on cliff faces and also on other structures/micro-habitats including river banks, tundra mounds, bogs, large stick nests of other species, tree hollows, and man-made structures (e.g., ledges of city buildings). Nests are typically situated on ledges of vertical rocky cliffs, commonly with a sheltering overhang. Ideal locations include undisturbed areas with a wide view, near water, and close to plentiful prey (Nature Serve 2010f). In Colorado, peregrine eyries are found from 4,500 to 9,000 feet elevation; with only the most remote sites having withstood increasing human disturbance (Kingery 1998). Peregrines feed primarily on birds (medium-size passerines up to small waterfowl); and, secondarily, small mammals (e.g., bats), lizards, fishes, and insects. Prey pursuit is initiated from perches or while soaring (NatureServe 2007). Predominant prey species for interior continental peregrines include columbids, swifts, and passerines (NatureServe 2010f).

Populations nesting in northern latitudes are highly migratory (Nature Serve 2010f). Most Colorado peregrines winter south of Colorado (Kingery 1998). Peregrines arrive in northern breeding areas in late April to early May and depart in late August to early September.

A clutch size averages four eggs at mid-latitudes and incubation lasts 32 to 35 days; young fledge at 39 to 49 days. Peregrines first breed at 2 to 3 years, occasionally as yearlings and pair bonds are usually life-long. Lost clutches may be replaced, usually at an alternate site, and the most common reason for loss is bad weather (NatureServe 2010f).

Peregrine populations in the Northern Hemisphere declined drastically from the 1940s to the 1970s due to DDT and its breakdown products, primarily DDE in the environment. Populations were reduced an estimated 80 to 90% in the Western United States by the mid 1970s. In the 1980s continent wide

populations were stabilizing but local increases and declines were continuing. Other threats to the peregrine falcon include loss of wetland habitat (hunting habitat), poachers robbing nests, shooting by hunters, and food chain contamination from use of persistent pesticides (NatureServe 2010f)

Environmental Baseline: In 1998, there were at least 193 breeding pairs in the eastern United States, 32 in the Midwest, 535 in the western region, and 269 in the Pacific coast region. In Alaska, there are a minimum of 301 breeding pairs. In Canada, 319 breeding pairs were located in 1995. Mexico has not been surveyed adequately, but at least 70 nest sites were occupied there in the late 1980s and early 1990s (NatureServe 2010f). As populations crashed throughout the country, the Colorado population in 1977 dropped to a low of four nesting pairs. As a result of population augmentation, peregrine numbers rebounded to 68 nesting pairs in 1995. Kingery (1998) indicates that peregrines breed near the Grand, Jackson and Routt County lines. Breeding was confirmed in Hot Sulphur Springs in 2009 and 2010 (Sulphur District files).

Review of the Forest Service and CDOW data for the project area showed there are neither anecdotal sightings nor historic occurrence records for peregrine falcons in the project area (prairie falcons are far more common cliff occupants in Grand County) (Forest Service n.d.). The cliff habitats on the west side of Table Mountain contain marginal cliff habitat, which may provide habitat for some smaller avian species, but it is highly unlikely a peregrine would nest in the area. The Colorado River, Stillwater Creek, Willow Creek and Reservoir, and the agricultural properties within the greater project area provide suitable foraging habitat for this species.

Direct, Indirect, and Cumulative Impacts: The project is not expected to have any impacts on nesting peregrine falcons. Peregrine falcons may migrate and forage through the project area. Collision and electrocution risks are the primary impacts associated with the alternatives. This species may use the transmission structures as a perch in the absence of other perching structures such as trees. Risks are greatest along Alternatives C1 and C2 which parallel the west side of Table Mountain. The valley to the west of Table Mountain contains wetland habitats that are suitable for peregrine foraging. The wetlands and wet meadows associated with Stillwater Creek also provide suitable foraging habitat for peregrines. These impacts would be minimized through the use of flight diverters and perch deterrents in areas of concern as described in the project specific design criteria. Peregrine falcons may be displaced from the project area during project construction and maintenance.

Cumulative impacts which may affect the peregrine falcon include water development projects and residential developments that would result in the loss of wetland and riparian communities. The mountain pine epidemic may result in indirect and direct impacts to prey species for the falcon and the habitats where they are found. The existing communication tower on Table Mountain may also increase collision risk in the area.

Determination for Alternative (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A exists within foraging habitat for this species including sagebrush and wetland communities, resulting in the risk of collision or electrocution. With the implementation of project-specific design criteria and best management practices, Alternative A **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative B1: Construction and operation of Alternative B1 would result in short-term and minor impacts to peregrine falcons within the ROW. Impacts to foraging habitat would be limited to the footprints of the transmission structures and not likely impact the prey base for this species. Portions of this alternative are located within foraging habitat for this species including sagebrush and wetland communities, resulting in a risk of collision or electrocution. With the implementation of project-specific design criteria and best management practices, Alternative B1 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C1: Construction and operation of Alternative C1 would result in short-term and minor impacts to peregrine falcon habitat within the ROW. Impacts to foraging habitat would be restricted to the footprints of the transmission structures. Alternative C1 also contains more sagebrush habitat where the falcon may forage. This alternative would be constructed in a new ROW and would result in greater habitat fragmentation, and fragmentation of aerial habitat through foraging areas, resulting in higher risk of collisions. Noise and human disturbance is more of a concern in this area because it is not as developed as the other action alternatives (B1 and D). Therefore, all impacts discussed above under the general impacts heading are expected to be greater with this alternative. With the implementation of best management practices Alternative C1 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C2: The habitats for the peregrine falcon that may be affected as the result of construction and operation of Alternative C1 are similar to Alternative C2. Alternative C2 also contains more sagebrush habitat where the falcon may forage. This alternative would be constructed in a new ROW and would result in greater habitat fragmentation, and fragmentation of aerial habitat through foraging areas, resulting in higher risk of collisions. Noise and human disturbance is more of a concern in this area because it is not as developed as the other action alternatives (B1 and D). Therefore, all impacts discussed above under the general impacts heading are expected to be greater with this alternative. With the implementation of best management practices, the project **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative D (Proposed Action): The habitats for the peregrine falcon that may be affected as the result of construction and operation of Alternative D are the same as those discussed under B1. The same discussion presented above for Alternative B1 also applies to Alternative D. Alternative D **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Bald eagle, *Haliaeetus leucocephalus*

Distribution: Bald eagles breed in Canada, Alaska, Baja, California, New Mexico, Arizona, the Texas Gulf Coast, Florida, and in localized pockets throughout the Great Basin, prairie, and plains regions in interior North America, including Colorado, Nebraska, and Kansas. Non-breeding habitat occurs generally throughout the breeding range except in the far north. The Chilkat Bald Eagle Preserve, Alaska, supports the largest wintering population anywhere (NatureServe 2010g). Two decades ago, bald eagles were extremely rare in Colorado and throughout the continental United States. In 2001, there were an estimated 51 breeding pairs in the state. CDOW's annual midwinter count shows a stable population of up to 800 eagles. Within Colorado, the San Luis Valley in the southern part of the state is a preferred location for bald eagles because of its supply of fish and waterfowl from open water as well as its high population of rodents and rabbits (CDOW 2005).

Natural History: On the Sulphur Ranger District, bald eagles may nest in mature cottonwood, Engelmann spruce, lodgepole pine or Douglas-fir trees near lakes and rivers (Forest Service n.d.). Breeding habitat most commonly includes areas close to (within 4 kilometers of) coastal areas, bays, rivers, lakes, or other bodies of water that reflect the general availability of primary food sources including fish, waterfowl, and seabirds (NatureServe 2010g).

Bald eagles prefer to roost in conifers or other sheltered sites in winter and typically select larger trees. Communal roost sites used by two or more eagles are common, and 100 or more eagles may use some roosts during winter. Winter roost sites vary in their proximity to food resources (up to 33 kilometers) and may be determined to some extent by a preference for a warmer microclimate at these sites. Wintering areas are commonly associated with open water though in some areas eagles use habitats with little or no open water if other food resources (e.g. carrion) are readily available. Winter roosts generally avoid areas with nearby human activity (pedestrians) and development (buildings) (NatureServe 2010g).

In addition to fish, bald eagles eat sick and injured waterfowl, muskrats, squirrels, rabbits, prairie dogs and often eat carrion and road-killed animals (CDOW 2005).

Environmental Baseline: Bald eagle numbers started to decline in the last century due to human disturbances and loss of trees for nesting habitat. Since the bald eagle was placed on the Endangered Species List and the pesticide DDT was banned, bald eagle populations have rebounded. According to NatureServe (2010g) major threats to bald eagles include habitat loss, disturbance by humans, biocide contamination, decreasing food supply, and illegal shooting. In recent years, the most common cause of bald eagle mortality has been the consumption of lead, usually acquired from carrion (Harmata 2010). In other areas of the country, urban development, mining, and commercial timber harvest have affected breeding success. Bald eagles are also susceptible to power line electrocutions (APLIC and 2005b) and collisions. Raptor collisions often occur with the overhead static wires, which may be less visible than the other wires due to their smaller diameter.

Bald eagle production in Colorado has increased dramatically from 1974 through 2000 (Craig 2001). During the same time period, bald eagle nests in Grand County have increased from 0 to 4 sites. As of 2008, there were 6 bald eagle nest territories in Grand County on public and private lands (Forest Service n.d.). There are no bald eagle nest sites within one mile of the project area, although resident and migrating bald eagles are found along the Colorado River in fall and winter.

Bald eagle roosting sites closest to the project area occur northeast of Lake Granby and south along the Colorado River (Sumerlin 2005, pers. comm.). The project area contains habitat including winter concentration and summer forage. A winter concentration area also exists north of Lake Granby and at Shadow Mountain Lake. Summer forage habitat for bald eagles exists along the northern edge of Lake Granby and north to the southern end of Shadow Mountain Lake and along the Colorado River south of the project area.

Suitable bald eagle foraging habitat in the project area is associated with all project alternatives where the alignments would span Willow Creek and Cutthroat Bay. Wintering bald eagles may be found along ice-free sections of the Colorado River (CDOW 2003, Craig 2001, and Forest Service n.d.). Winter concentrations include portions of the Colorado River below the Shadow Mountain Dam and at Windy Gap Reservoir. Spring and fall bald eagle migrants also occur along the Colorado River, Lake Granby, Shadow Mountain Reservoir, Grand Lake, and other large creeks and lakes/reservoirs (Forest Service 2003). Bald eagle winter forage and communal roost sites are known to exist along the Colorado River directly south of the western end of the proposed transmission line alignment (Sumerlin 2005, pers. comm.).

From Craig (1980 to 1999), bald eagle mid-winter counts in Colorado have varied from a low of 418 in 1980 to a high of 1,235 in 1994, indicating a strong upward trend in numbers of wintering bald eagles. The CDOW conducts bald eagle mid-winter counts along the Colorado River in the northwest region of Colorado, known as the Middlepark Survey. Results of the survey from 1995 through 2011 for the Granby Reservoir to Windy Gap section are provided in Table 3-31 of the EIS. On average, 2 bald eagles are observed every year in this area. There has not been a significant change in occurrences to indicate a change in population trends in this particular location between 1995 and 2011. Bald Eagle survey results for the region are located in Appendix D. Suitable bald eagle foraging habitat in the project area is associated with all project alternatives where the alignments would span Willow Creek and Cutthroat Trout Bay. These areas are used year-round for bald eagle foraging.

Direct, Indirect, and Cumulative Impacts: No bald eagle nesting or communal roosting sites occur within one mile of any of the project alternatives. Foraging and roosting sites occur just south and east of the project area along the Colorado River and Lake Granby.

Bald eagles are known to move through the project area. The primary impact the proposed project may have on this species is collision and electrocution associated with the transmission line. Eagles are extremely susceptible to power line electrocution because their wings can span phase-to-phase or phase-to-ground wires (Biosystems Analysis 1989). Western would design and construct the transmission line in conformance with Suggested Practices for Protection of Raptors on Power Lines (APLIC 2006) to eliminate the potential for raptor electrocution.

Bird flight diverters and perch deterrents would be included in transmission line design at sensitive locations to minimize collision and electrocution risks to bald eagles and other local and migratory raptors in the project area (see Section 3.0). The location and spacing of these diverters would be determined by Western's biologists in coordination with other interested agencies. The areas identified for flight diverters include the northern end of the project area where the line spans Cutthroat Trout Bay and areas at the southwestern end of the project area that parallel the Colorado River. The project would follow design criteria that incorporates the appropriate Avian Protection Guidelines approved by the USFWS and Avian Power Line Interaction Committee (APLIC and USFWS 2005).

Other projects or undertakings in the project area that may cumulatively impact bald eagles include future recreational and residential developments, and proposed water developments in the project area and Grand County. Sedimentation from these developments can result in direct impacts to fish populations that species like bald eagles and osprey prey upon. Future residential and recreational developments can reduce foraging habitat and potentially lead to disturbance of foraging and winter habitats that occur in the project area.

Residential developments also contribute to habitat fragmentation, which can result in impacts to foraging, breeding and cover habitats for the bald eagle and a variety of wildlife species that occur in the project area, project vicinity, and Grand County.

Water projects may inundate foraging habitats for the bald eagle. Depending on the location and extent, the creation of large reservoirs could expand bald eagle foraging, nesting and roosting opportunities. The cumulative impacts of a second communications tower on Table Mountain, coupled with a new transmission line could increase the collision risk within the project area.

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A is the only alternative that would span Cutthroat Bay which provides foraging habitat for the bald eagle. Although some mature bald eagles are likely used to the existing line, juveniles and migrant individuals have some risk of collision and electrocution. Alternative A **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative B1: Alternative B1 is located in proximity to Lake Granby and the Colorado River which provide forage for the bald eagle. The environmental protection measures discussed in Section 3.0, including bird flight diverters, would help to minimize impacts to bald eagles and foraging habitat in the project area. Alternative B1 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C1: Alternative C1 occurs almost entirely within a new transmission ROW. The collision risk is expected to be higher in the vicinity of Lake Granby and the Colorado River. The environmental protection measures discussed in Section 3.0, including bird flight diverters would help to minimize impacts to bald eagles and foraging habitat in the project area. Alternative C1 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C2: Impacts and rationale would be similar to those described for Alternative C1. Alternative C2 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative D: Impacts and rationale of Alternative D would be similar to those described for Alternative B1, with the following exceptions. Alternative D, Option 1 would construct the transmission line outside of the existing transmission corridor and closer to the NCWCD water pipeline (further from the Colorado River). Alternative D **may adversely impact individuals**, but is not likely to

result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Black tern, Chlidonias niger

Distribution: The black tern has a widespread distribution and is relatively abundant; however, habitat alteration and degradation are threats to this species (NatureServe 2010h). Although it is not federally listed, the black tern has special status in many of the states within its breeding range (e.g., Illinois, Indiana, and Ohio).

Natural History: The black tern's preferred breeding habitat includes marshes, along sloughs, rivers, lakeshores, and impoundments, or in wet meadows, typically in sites with mixture of emergent vegetation and open water. This species will nest in prairies and in the more extensive deep-water marshes or marsh complexes. The black tern can be found along lakes, ponds, marshes, and coastal areas during migration. Nests may be placed in a variety of vegetative situations, from dense stands of emergent vegetation to open water, but moderate or sparse vegetation appears to be preferred. Nests are typically located in shallow water, close to open water or openings in stands of emergent vegetation. The range of water depths reported varies from a few inches to 1 to 2 meters. On breeding grounds this species is primarily insectivorous, but will also consume small crustaceans, spiders and small fishes as regular food items (NatureServe 2010h). Threats to the black tern include loss of freshwater marsh habitat (including losses through invasion of exotic plants and due to drought), human disturbance of nesting sites, pesticide use, and problems along the migration route or in winter range. Loss of breeding habitat has been a major contributing factor in their decline (NatureServe 2010h).

Environmental Baseline: Within Colorado, there are breeding confirmations from the San Luis Lake SWA and Alamosa and Arapaho NWRs (Naugle 2004). The largest numbers during the Colorado Breeding Bird Atlas were found in the San Luis Valley (Naugle 2004).

Andrews and Righter (1992) believed this species was at one time a common breeder in Colorado but supported this only with anecdotal evidence of apparent declines in the Barr Lake area. Although rare, the black tern has been documented in Grand County on at least three occasions (Sulphur Ranger District Records 2010). Loss of wetland habitats, particularly freshwater emergent wetlands, is the greatest threat to black tern conservation. In Colorado, an estimated 50 percent of historic wetlands no longer exist (Naugle 2004).

Direct, Indirect, and Cumulative Impacts: Locally, Willow Creek Reservoir to the west of the project area, Lake Granby and Grand Lake to the east and northeast, Windy Gap Reservoir, and the Colorado River provide habitat for the black tern. Within the project area, suitable habitat for this species is found at Willow Creek, Cutthroat Bay and associated wetlands, and the wet meadows and wetland communities associated with irrigation ditches and Stillwater Creek north of CR 41. Given the species current distribution, it is unlikely this species breeds within the project area.

The primary impact associated with the project is the risk of collision with the transmission line when spanning wetland habitat types. Collision risks are similar with all project alternatives, because all traverse similar lengths of wetland habitats.

The primary past, present, and/or reasonably foreseeable future actions that may cumulatively impact this species are the proposed water development projects in Grand County which, in the long-run, could

expand habitat for this species adjacent to the project area benefiting this species. The second communications tower on Table Mountain also increases the risk of collision for avian species.

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Black terns have occurred in Grand County and Alternative A currently spans wetland habitats this species could use for forage. Some individuals may be familiar with the existing transmission line placement, making collision less likely. However, juvenile and migrant species are likely not familiar with the existing line therefore, Alternative **A may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area nor cause a trend toward federal listing, or a loss of species viability rangewide.

Determination for Alternative B1: Alternative B1 occurs almost entirely within an existing transmission ROW. The environmental protection measures discussed in Section 3.0 would help to minimize impacts to black terns in the project area. Black terns have occurred in Grand County and Alternative A currently spans wetland habitats this species could use for forage. Therefore, Alternative B1 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C1: Alternative C1 occurs almost entirely within a new transmission ROW. Therefore, collision risk is expected to be higher for black terns and other avian species that reside or migrate through the project area. The environmental protection measures discussed in Section 3.0 would help to minimize impacts to black terns and foraging habitat in the project area. Black terns have occurred in Grand County and Alternative C1 would span wetland habitats this species could use for forage, presenting a collision risk. Therefore, Alternative C1 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C2: The same discussion presented above for Alternative C1 also applies to Alternative C2. Black terns have occurred in Grand County and Alternative C2 would span wetland habitats this species could use for forage, presenting a collision risk. Therefore, Alternative C2 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative D (Proposed Action): The same discussion presented above for Alternative B1 also applies to Alternative D, with the exception of Option 1. Alternative D, Option 1 would construct the transmission line outside of the existing transmission corridor and closer to the NCWCD water pipeline (further from the Colorado River and riparian habitats). Black terns have occurred in Grand County and Alternative D would span wetland habitats this species could use for forage, presenting a collision risk. Therefore, Alternative D **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Boreal owl, Aegolius funereus

Distribution: Considered imperiled in Colorado, boreal owls occupy a circumpolar distribution in Northern hemisphere boreal forests. In North America, boreal forests in Colorado and northern New Mexico delineate the southernmost extent of their distribution. Although boreal owls are considered globally secure, their trend is unknown due to unreliable population estimates and nomadism caused by

fluctuations in prey base abundance and distribution. Boreal owls appear to be distributed in Colorado between 9,200 and 10,400 feet. In Grand County, boreal owls are rare summer breeders in coniferous habitats and are believed to remain within and around their home ranges through the winter (NatureServe 2010i).

Natural History: In Colorado, boreal owls utilize late-successional, multi-layered habitats of spruce-fir and lodgepole pine interspersed with meadows. These owls may also be found in aspen and mixed conifer stands. Boreal owls are secondary cavity nesters, usually occupying cavities excavated by woodpeckers. Nest cavities are commonly found in snags with a diameter of at least 10 inches and may be used in consecutive years. In Colorado, nesting occurs from mid-April to early June. Clutch size is usually 4 to 6. Females incubate the eggs for 25 to 36 days. The young fledge at 4 to 5 weeks, are independent at 5 to 6 weeks, and sexually mature by 1 year.

Roosting studies in Canada, Colorado, and Idaho indicate that boreal owls roost at different sites throughout their home range. In summer, thermal stress appears to drive selection of cool roost sites with high canopy cover, larger basal area, and higher tree density whereas in winter, boreal owls were not thermally stressed and therefore may use a wider set of roost conditions. Average home ranges are about 2,600 acres in the summer and 3,700 acres in the winter (NatureServe 2010i).

Boreal owl predators include marten, red squirrels (*Tamiasciurus hudsonius*), and great-horned owls (*Bubo virginianus*). Major prey species for boreal owls include various voles (*Microtus* and *Clethrionomys*), deer mice (*Peromyscus* sp.), and shrews (*Sorex* sp.) as well as a variety of forest birds and insects. Forest harvesting is a major threat to boreal owls. Timber harvest may reduce primary prey populations, remove forest structure used for foraging and roosting and eliminate nesting cavities (Heyward and Hayward 1993). The presence of nest cavities appears to be the primary limiting factor for boreal owls. Maintenance of late-successional spruce-fir forests with large snags, suitable roost trees, and adequate canopy closure are important considerations for boreal owl persistence on the landscape (NatureServe 2010i).

Environmental Baseline: Although suitable boreal owl habitat occurs within the project area, breeding bird survey data has not documented boreal owl occurrences in the project area (Kingery 1998).

Direct, Indirect, and Cumulative Impacts: The project area and the Forest have been heavily impacted by the mountain pine beetle epidemic. As a result, stand structure has been significantly altered within the project area and forest-wide. The structural stages that boreal owls prefer have been compromised by the epidemic. The proposed project would not impact old growth stands and would only impact a relatively small portion of forested stands, although most of this land continues to be logged of beetle kill. Depending on the project alternative, it is expected that individual trees would need to be removed within the selected transmission line corridor for safety purposes. Lodgepole pine forests occur within each of the alternative ROWs. Alternatives C1 and C2 have a smaller percentage of forested communities relative to Alternatives A, B1 and D. Foraging habitat for boreal owls occurs within the ROWs for all project alternatives north of CR 41 within irrigated hay meadows and other forest edge habitats.

Due to the lack of preferred breeding habitat in the forested sections of the project area, impacts to breeding species within the project alternatives are expected to be minor. Boreal owls that forage in the project area may be temporarily displaced during project construction.

The current mountain pine beetle epidemic may impact the boreal owl in the project area and vicinity. The mountain pine beetle epidemic has killed much of the lodgepole pine in Grand County. Salvage of some areas of beetle-killed lodgepole pine trees may impact available, late-successional lodgepole pine habitat for this species. Spruce-fir habitats are the only suitable habitats for this species on the Forest in areas where the pine beetle has killed mature lodgepole pine communities. The cumulative impacts from other activities or actions such as habitat fragmentation and human encroachment are applicable to the boreal owl.

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A includes ROW upkeep in the form of tree removal. Alternative A **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative B1: The re-route on the east side of Table Mountain contains suitable nesting habitat including snags for nesting for boreal owls. Removal of conifers and snags within the expanded corridor may displace some individuals and reduce suitable habitat. The majority of the forested portions along this corridor (with the exception of the re-route on the east side of Table Mountain) have been logged for beetle-kill. Raptor surveys would be conducted within 0.25 miles of the selected alternative prior to construction to ensure the project does not disturb or take an active boreal owl nesting site. Alternative B1 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C1: Alternatives C1 and C2 have the lowest percentage of forested habitats relative to Alternative A, B1, and D. Habitat for the boreal owl is limited in these alignments and is of marginal value because of the mountain pine beetle epidemic. The extent of the pine beetle epidemic on the Forest and within the project area, as well as the extensive residential development in adjacent forest lands, makes it unlikely that this species occurs within the Alternative C1 alignment or the project area. Raptor surveys would be conducted within 0.25 miles of the selected alternative prior to construction to ensure the project does not disturb or take an active boreal owl nesting site. Alternative C1 **may adversely affect individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C2: The habitats for the boreal owl that may be impacted as the result of construction and operation of Alternative C2 are the same as those discussed under C1. The impacts of Alternative C2 would be similar to those described for Alternative C1. Alternative C2 **may adversely affect individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative D (Proposed Action): The habitats for the boreal owl that may be affected as a result of construction and operation of Alternative D are the same as those discussed under B1. The impacts from Alternative D would be similar to those described for Alternative B1. Alternative D **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Brewer's sparrow, *Spizella breweri*

Distribution: Brewer's sparrows are migratory birds found in the western provinces of Canada, throughout the western United States and south into Mexico (NatureServe 2010j). Brewer's sparrows are often the most abundant bird species in appropriate sagebrush habitats. There has been significant decline, however, throughout its range in the last 10 to 20 years (Rotenbury and Wiens 1998). Brewer's sparrows are a common to fairly common spring and summer visitor in Grand County's grasslands and pinyon-juniper woodlands, with confirmed breeding in grassland habitats (Jasper and Collins 1987). Breeding bird survey records document Brewer's sparrow occurrences in the project vicinity with possible and confirmed breeding (Kingery 1998).

Natural History: Breeding is strongly associated with sagebrush habitat but can also occur in mountain mahogany, rabbitbrush, bunchgrasses, bitterbrush, ceanothus, manzanita, and openings in pinyon-juniper habitats (NatureServe 2010j). In Colorado, courtship begins late in May or early June with eggs laid in June and hatched young from late June through late July (Kingery 1998). These sparrows nest in low shrubs from just above ground level to about one-meter high. In spring and summer, Brewer's sparrows consume mostly insects (weevils, aphids, leafhoppers, caterpillars, and beetles) from shrub perches, and changes to ground foraging on seeds in the fall and winter (NatureServe 2010j).

Brewer's sparrow is a shrub obligate and is threatened by large-scale reduction and fragmentation of sagebrush activities due to land conversion, new roads, and utilities, and widespread burning or other methods of sagebrush control (NatureServe 2010j). Invasion of non-native grasses, especially cheatgrass, can escalate the fire cycle, converting shrublands into annual grasslands. Predators on Brewer's sparrow include squirrels, shrikes, ravens, magpies, weasels, chipmunks, many snake species, kestrels, prairie falcons, and accipiters (birds of prey).

Environmental Baseline: North American breeding bird survey data for 1966 to 1996 show significant and strong survey-wide declines averaging 3.7% per year (n=397 survey routes). Significant declines are evident in California, Colorado, Montana, Nevada, Oregon, and Wyoming; the steepest decline occurred in Idaho (6.0% average per year; n=39) (NatureServe 2010j). These negative trends appear to be consistent throughout the 30-year survey period. Utah is the only state that shows a stable population. No state or physiographic region shows population increases (NatureServe 2010j). This species demonstrated a decline of 2.4% in Colorado, and a 2.1% decline in Colorado from 1980 to 1999. Sagebrush habitat on National Forest lands in Region 2 is relatively stable (Forest Service 2002). The state conservation status of the Brewer's sparrow in Colorado is "apparently secure". Direct causes of widespread decline on breeding grounds are uncertain, but are possibly linked to widespread degradation of sagebrush habitats in the western United States, especially on private lands (NatureServe 2010j, Forest Service 2002).

A possible Brewer's sparrow was observed during general site reconnaissance surveys on the southwestern end of the project area near the existing transmission line. Suitable habitat occurs along portions of the project alternatives that cross sagebrush communities.

Direct, Indirect, and Cumulative Impacts: The majority of the sagebrush habitats in the project area are found on the southwestern and southern end. Direct, permanent impacts to sagebrush habitats within all project alternatives would be restricted to the footprint of the transmission structures. Temporary, direct impacts to sagebrush habitats would occur within the construction ROWs. Indirect impacts to habitat include the propagation of noxious weeds within the ROW due to ground disturbing activities.

Western's environmental protection measures for the project include a noxious weed management plan and restoration plan for native vegetation.

Direct impacts to nesting Brewer's sparrows may occur during project construction. If construction is to occur during the breeding season (March 15 to August 15), Western would have a qualified biologist survey the transmission line corridor and construction areas no more than 72 hours prior to any ground-disturbing activity to ensure that breeding birds would not be impacted. Brewer's sparrows that occur within, or in proximity to, the construction ROW would be temporarily displaced during project construction.

Cumulative impacts to this species include loss of sagebrush habitats from the construction of residential developments adjacent to the project area, and water storage developments which may also result in the long-term or permanent removal of sagebrush communities.

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would result in no impacts to special status species or habitats in the project area. Alternative A would have **no impact** on the Brewer's sparrow.

Determination for Alternative B1: Alternative B1 would occur primarily in an existing transmission ROW, which would minimize impacts to sagebrush habitats. The ROW would span approximately 75 acres of sagebrush habitat. The re-route on the east side of Table Mountain contains sagebrush and mixed shrubland habitats suitable for Brewer's sparrow nesting habitat. Alternative B1 would be located on the existing alignment (with the exception of the minor re-route noted above), and construction access for this alternative is largely existing. Use of these existing access routes would help to minimize new, temporary impacts resulting from road construction. To the greatest extent feasible, transmission structures would be placed to minimize impacts to sagebrush habitats. Impacts to breeding Brewer's sparrows that may occur in the ROW would be minimized through pre-construction surveys as discussed above. Alternative B1 **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing or a loss of species viability rangewide.

Determination for Alternative C1: Alternative C1 would span approximately 95 acres of sagebrush habitats. The majority of this alternative would occur in a new corridor and may require creation of temporary access roads, which would result in higher impacts to sagebrush habitats and the species associated with these habitats, like the Brewer's sparrow. The impacts and associated mitigation discussed above for Alternative B1, also apply to Alternative C1. Alternatives C1 and C2 are expected to result in higher impacts to sagebrush habitats and Brewer's sparrow. Through the implementation of environmental protection measures and a site restoration plan, Alternative C1 **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing or a loss of species viability rangewide.

Determination for Alternative C2: Determination for Alternative C2: The habitats for the Brewer's sparrow that may be impacted as the result of construction and operation of Alternative C2 are the same as those discussed under C1. The impacts from Alternative C2 would be similar to those described for Alternative C1. Alternative C2 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative D (Proposed Action): The habitats for the Brewer's sparrow that may be impacted as the result of construction and operation of Alternative D are the same as those discussed under B1. The impacts from Alternative D would be similar to those described for Alternative B1. Alternative D **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Greater sage-grouse, *Centrocercus urophasianus*

Distribution: Greater sage-grouse are found throughout northwestern Colorado with the majority of the birds occurring in Grand, Moffat, and Jackson counties. Additional counties with sage-grouse include Eagle, Larimer, Garfield, Rio Blanco, Routt and Summit. They typically occur between 7,000 to 9,500 feet elevation in sagebrush habitats (Kingery 1998). Range-wide, greater sage-grouse occur from southwestern North Dakota and northwestern South Dakota west to Montana, Washington, Oregon and Idaho, north into Canada, and south as far as California, Nevada, Utah, and Colorado (MPCP 2001). In Grand County, sage-grouse can be found in sagebrush habitat from Kremmling to Granby, as well as within the Muddy Creek, Troublesome, Williams Fork, and Blue River drainages (MPCP 2001). The USFWS determined that listing the greater sage-grouse is "warranted, but precluded" from listing as of March 2010.

Natural History: MPCP (2001) reports that habitat for this species is restricted to sagebrush-steppe areas and adjacent to riparian areas. Habitat preferences vary seasonally. Grouse will use sagebrush-dominated habitats in the spring and more diverse mountain shrub habitat during the summer. Greater sage-grouse will move to sagebrush habitat at lower elevations during the winter. This species feeds on leaves of sagebrush, and leaves and flowers of forbs within sagebrush habitats. Male grouse display on leks in the spring that are typically found on flat, open areas within sagebrush habitats. Females build ground nests under sagebrush and incubate their clutches for 25 to 27 days. Moist areas with forb and insect availability are used for brood-rearing and often occur near riparian areas or natural wet seeps. Threats to sage-grouse include disturbance to lek and nest sites, large-scale sagebrush habitat loss, and predation from a variety of egg, chick, and adult predators.

Environmental Baseline: Greater sage-grouse range has contracted significantly and now encompasses about 56% of the pre-settlement distribution (NatureServe 2010k). Abundance has also declined, primarily as a result of loss, fragmentation, and degradation of sagebrush habitat. The rate of decline decreased significantly after 1985, but the number of males per lek and the number of active leks continue to decline, and the species is significantly threatened by loss, fragmentation, and degradation of sagebrush habitat now and for the foreseeable future (NatureServe 2010k).

Habitat fragmentation is defined as a process which divides large expanses of habitat, resulting in a number of smaller patches (Fahrig 2003). Habitat fragmentation is commonly caused by fences, power lines, roads, sagebrush treatments, and the presence of other habitat loss factors (Holloran et al. 2005).

In Colorado, populations may have decreased more than 50% since 1990 and as much as 82% since 1980. The state conservation status for the greater sage-grouse in Colorado is "apparently secure" (NatureServe 2010k). Although populations may naturally fluctuate, each population peak in Colorado has been lower over time and there have been no sustained population increases in any portion of their range. In Middle Park, historic sage-grouse numbers are largely anecdotal: estimated at 125 birds in 1938 and 700 birds in 1943 (MPCP 2001). Better methods of calculating population size based on lek

count data indicate that Middle Park populations may cycle every 8 to 10 years with 462 birds estimated in 1996 to 1,328 birds in 1989 (MPCP 2001). Lek counts conducted in 2004 indicated approximately 1,500 sage-grouse in Middle Park. Sage-grouse habitat within Middle Park continues to be lost to development although habitat improvement projects are underway to restore remaining sagebrush rangelands to healthy conditions favorable to sage grouse.

Greater sage-grouse can be found on lek sites from mid-March through late May, depending on elevation. Sage-grouse lek attendance has been observed to be much lower in Grand County than in other Colorado counties, though studies were based on daily versus seasonal attendance rates and research has only been conducted for one breeding season (MPCP 2001).

The Middle Park sage grouse population is located primarily in Grand County, but also occurs in portions of Eagle and Summit counties. The population is bordered by the Gore Range to the west and includes the areas surround the towns of Kremmling, Hot Sulphur Springs, and Granby. According to the Colorado Greater Sage-grouse Conservation Plan (CDOW 2008), the lowest density of sage grouse within the Middle Park population is in sagebrush rangelands near Granby. Sage grouse were historically observed along the Colorado River near Granby. Loss of habitat or increased disturbance to these populations may result in the permanent loss or abandonment of this segment of the Middle Park sage grouse population. The sagebrush communities found west of Lake Granby have been identified as suitable habitat for grouse under the Colorado Greater Sage-grouse Conservation Plan and also as areas where restoration activities are recommended. Further residential developments and water developments on the west side of Table Mountain would compromise existing habitats and potential restoration of currently unsuitable habitats.

Sage-grouse historically have used the upland sagebrush habitats within the upper Colorado River drainage. The project area contains breeding (lek), foraging, and nesting habitats for the greater sage-grouse. Habitat assessment surveys conducted within the project area in July 2005 and again in 2008 found signs of heavy sage-grouse use within the Alternative C1 ROW and along the NCWCD water pipeline. Up to 18 sage-grouse have been observed near the ROW for Alternatives C1, C2-Option 1, and D-Option 1. There was no sign of sage-grouse within the ROW for Alternative A. Suitable habitat exists for the sage-grouse within the ROW of Alternative A; however, the existing transmission line and disturbance from ongoing construction in the area may deter sage-grouse from frequenting the area.

CDOW currently monitors two sage-grouse leks in proximity to the project alternatives: the Horn West lek and the Horn lek. The Horn West lek is located on private property on the western end of the project area and is approximately 0.8 miles north of Alternative A, B1 and D-Option 2. The lek is 0.3 miles north of Alternative C1 and 0.5 miles from C2 –Option 1 and 0.8 miles north of C2-Option 2. This lek was located and found to be active in 2005. The high count for the males from 2005 to 2010 is five males.

An historic (last known to be active in 1993) second sage-grouse lek, known as the Horn lek occurs on BLM property to the east of the Horn West lek. The Horn lek is 0.24 miles north of Alternative A, B1, and C2-Option 2 and D-Option 2. The lek is 0.17 miles from Alternative C1 and C2-Option 1 and D-Option 1. Individuals are also known to disperse north from the Linky lek, which lies to the south of the Colorado River, into the project area (Holland 2005, pers. comm.; Oldham 2005, pers. comm.).

Direct, Indirect, and Cumulative Impacts: Habitat fragmentation, disturbance, increased predation and collision impacts are the primary concerns for the greater sage-grouse in the project area. Planned and

existing residential developments near the existing transmission line ROW (Alternative A) and further south, as well as planned developments north of Alternative A, have fragmented sage-grouse habitat and dispersal corridors.

The construction of Alternatives B1, C1, C2, or D would result in a temporary increase in human presence in the ROW, noise disturbance, permanent removal of some sagebrush breeding, nesting and foraging habitats, temporary displacement of individuals and the temporary removal of sagebrush habitats within construction areas. Alternatives B1, C2-Option 2, or D-Option 2 would utilize the existing transmission line ROW. In the long-term, this would create fewer disturbances for the birds and the leks than erecting structures in an altogether new alignment.

The primary permanent direct impact to the greater sage-grouse habitat associated with construction of Alternatives C1, C2-Option 1, or D-Option 1 is the further fragmentation and loss of sagebrush habitats. Construction of the southwestern end of Alternative C1 would result in impacts to undisturbed sagebrush habitats. Alternatives C2-Option 1 and D-Option 1 would erect new structures in the flight paths of sage-grouse and/or introduce new predator perching locations. Collision risk may be increased if the power line is moved from the existing transmission line ROW. The grouse likely use the sagebrush hillside within the project area. Increased tower height and moving the power line out of the existing transmission ROW may increase collisions as the birds fly from higher to lower elevations.

Studies have shown that the amount and frequency of noise associated with development has negative impacts on greater sage-grouse. The majority of research on sage-grouse reaction to noise, development, and human disturbance has been conducted in Wyoming and has focused on coal bed methane development. "Sage-grouse numbers on leks within one mile of coal bed methane compressor stations in Campbell County, Wyoming were consistently lower than on leks not affected by this disturbance," (Braun et al. 2002). Holloran (2005) showed that traffic during the strutting period when males are on a lek results in declines in male attendance when road-related disturbance is within 0.8 miles (Holloran 2005). Construction of Alternative C1 would require the creation of temporary access roads through largely intact sagebrush habitats. Road construction would result in impacts to sagebrush habitat and the increased propagation of noxious weeds. Noxious weeds can reduce the quality of foraging and breeding habitats for sage grouse. However, this impact would be minimized through the implementation of a noxious weed management plan and restoration of habitat in the ROW.

The operation of the proposed transmission line (any action alternative) 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 sage-grouse.

Studies have shown that sage-grouse are also adversely impacted by accidental contact with power lines and fences while in flight and through predation by raptors that use power line poles as perches (CDOW 2008). Because Alternative C1 would occur in a predominantly new ROW, and the documented lek site sits north of the ROW of Alternative C1, collision is of concern in this area.

Increased predation on sage-grouse as discussed above may result in the permanent abandonment of the active lek sites located less than 0.30 miles from the ROW for Alternative C1. The Colorado Greater Sage-grouse Conservation Plan (CDOW 2008) recommends a 0.6 mile no-surface occupancy or avoidance area for sage-grouse leks. This distance was identified in the Colorado Greater Sage-grouse Conservation Plan as the average distance a male grouse will travel from the lek during the breeding season. Sage-grouse will often nest and brood within 1 to 4 miles of the lek site. The conservation plan

also recommends a seasonal buffer of 4 miles for greater sage-grouse breeding habitats (nesting, early brood-rearing, and summer) from mid-March through September 1.

All action alternatives would include the use of taller transmission structures and an additional conductor which could increase the risk of collision. In order to minimize impacts to greater sage-grouse, transmission structures should be placed a minimum of 0.6 miles away from active lek sites (CDOW 2008). If it is not feasible to move the line this distance, it is preferred that construction should be limited to late summer and fall months within sagebrush communities to avoid impacts to breeding grouse populations. Breeding season occurs in March and lasts through mid-July. In addition, if power lines cannot be constructed outside of the 0.6 mile avoidance area, perch deterrents would be placed within lek areas and those areas that cross greater sage-grouse wintering, summer, spring, nesting, and brooding habitats.

The past and future construction of residential developments adjacent to the project area (particularly at the southwestern end where the grouse have been observed), past water development projects, and past and present recreational use which may remove and impact sagebrush habitats have cumulatively degraded habitat quality for the greater sage-grouse in the project area. The degradation, fragmentation, or loss of habitat coupled with anticipated future disturbances to these populations may result in the permanent loss or abandonment of this segment of the Middle Park sage-grouse population. The sagebrush communities found west of Granby have been identified as suitable habitat for grouse under the Colorado Greater Sage-grouse Conservation Plan and also as areas where restoration activities are recommended. Further residential developments and water developments on the west side of Table Mountain would compromise existing habitats and restoration of currently unsuitable habitats.

Determination for Alternative A (No Action): Alternative A would have **no impact** on the greater sage-grouse or its habitat.

Determination for Alternative B1: Alternative B1 occurs in an existing transmission ROW through sage-grouse habitat that has been previously disturbed by the presence of the existing transmission line. Sage-grouse sign was not observed within the Alternative B1 corridor during surveys conducted in 2005 and 2008. Overall, Alternative B1 is anticipated to have some minor, short-term adverse impacts as a result of increased human presence and ground disturbance. In the long-term, given that the alignments would be identical, the impacts of Alternative B1 would be similar to Alternative A. Through the implementation of seasonal restrictions on construction and associated buffers, Alternative B1 **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing or a loss of species viability rangewide.

Determination for Alternative C1: Alternative C1 would result in long-term, severe impacts to the greater sage-grouse and associated sagebrush habitats. Habitat loss and fragmentation, increased predation, noise disturbance, and collision risk will be higher for Alternative C1 relative to the other project alternatives because this alternative is closest to sage-grouse lek sites and occurs in a previously undisturbed corridor that provides high quality sagebrush habitat. Without additional mitigation, adverse impacts including the permanent abandonment and loss of critical breeding grounds (leks) could result. The use of environmental protection measures such as seasonal restrictions, and perch deterrents may help to reduce impacts to grouse, but it is possible that despite these measures, the presence of a transmission line in this area may cause the permanent abandonment of lek sites and would result in fragmentation of habitats in the project area. Given the small size of the Middle Park

sage-grouse population, impacts to any individuals might be significant to this population. Alternative C1 **may adversely impact individuals**, and is likely to result in a loss of viability in the planning area, but not result in a trend toward federal listing.

Determination for Alternative C2: Within suitable habitats, Alternative C2-Option 1 and 2 would be constructed within either the NCWCD pipeline ROW or the existing transmission ROW (see Section 2.0, including Figure 2-9, for a detailed description of the transmission line ROW relative to the NCWCD pipeline ROW). Alternative C2-Option 2 would result in the least impacts to sage-grouse populations. Impacts would be similar to those discussed above for Alternative B1. C2-Option 1 would occur in an existing disturbed water pipeline ROW. Up to 17 grouse were observed in this area in 2009. Construction of the C2-Option 1 transmission line is expected to result in fewer direct impacts to sagebrush habitat because it would occur in a disturbed corridor. However, the primary concern for sage-grouse for this alternative (as well as Alternative D-Option 1) is the collision risk and fragmentation of occupied habitat. Bird flight diverters and perch deterrents would be implemented to minimize these impacts. Placing the transmission line in an existing utility corridor would minimize overall impacts to sage-grouse habitats relative to Alternative C1. However, the presence of the transmission line in this area may also result in lek abandonment. Alternative C2-Option 1 **may adversely impact individuals**, and is likely to result in a loss of viability in the planning area, or cause a trend toward federal listing.

Alternative C2-Option 2 is expected to have fewer impacts to greater sage-grouse because it would locate the transmission line in the existing ROW. Through the implementation of construction buffers and seasonal restrictions; Alternative C2-Option 2 **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing or a loss of species viability rangewide.

Determination for Alternative D (Proposed Action): Alternative D is a combination of the other action alternatives. The discussion for Alternative D-Option1 is similar to that discussed above for Alternative C2-Option 1. Option 1 **may adversely impact individuals**, and is likely to result in a loss of viability in the planning area, or cause a trend toward federal listing.

The discussion for Alternative D-Option 2 is similar to that discussed above for B1. Alternative D-Option 2 is expected to have fewer impacts to sage-grouse relative to Alternatives C1 and C2 which would not utilize existing ROWs to the extent of Alternatives B1 and D. Analysis has determined that Alternative D – Option 1 **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing or a loss of species viability rangewide.

Loggerhead Shrike, *Lanius ludovicianus*

Distribution: The Loggerhead Shrike is a species that occurs throughout North America and central and eastern Canada. The range of the species includes the majority of the United States and central Canada, as well as large portions of Central America.

Natural-History: Habitat for the Loggerhead Shrike includes open riparian areas, agricultural areas, grasslands, and shrublands, especially semi-desert shrublands, and sometimes open pinyon-juniper woodlands. Breeding birds are usually near isolated trees or large shrubs. They frequent greasewood draws in both summer and winter in Mesa County and probably elsewhere in western Colorado (NDIS 2010b).

Loggerhead Shrikes have been observed to select nest sites in multiple tree and shrub species. Nest sites have included spruce and fir trees, juniper and oak tree species, and multiple woody shrub species. In some areas, vine-covered or isolated woody plants have been selected as preferred nest locations. Nests generally are 1.5 to 3 meter above ground, in a crotch or on top of an old nest. Research has shown that shrike nests are somewhat less adversely impacted by proximity to human activity than other nesting passerines. Some shrikes have nested less than 3 m from a road, but were not flushed by passing vehicles (NatureServe 2010I).

Environmental Baseline: The Loggerhead Shrike is a common spring and fall migrant in western valleys and eastern plains and is a fairly common summer resident in western valleys and in the San Luis Valley. The species is most regular in the mountains in late summer and fall; however, there are no confirmed breeding records in the mountain parks (except the San Luis Valley) or mountains. The Shrike is not commonly seen in western valleys north to Mesa County and on southeastern plains north to southern El Paso County. This species has shown significant population declines over much of North America (NatureServe 2010I), and for that reason is listed on the National Audubon Society Blue List and is a Colorado Species of Special Concern. This species apparently has been extirpated from some areas of eastern Colorado as a breeding species, but it does not appear to have declined in western Colorado (NDIS 2010b).

Breeding Bird Atlas data for the period of 1980 to 2000 indicate ongoing, significant range wide declines. Range wide, the decline was 2.2% annually, or 53% for the 20 year period. Regional declines were 3% annually (46% from 1980 to 2000) for the eastern region, 1.9% annually (32% from 1980 to 2000) for the central region, and 1.6% annually (28% from 1980 to 2000) for the western North American population (NatureServe 2010I).

According to the 2010 Occurrence Records of Grand County birds, Loggerhead shrikes are uncommon, but have been observed in the fall through early spring in Grand County. This species can occur in all habitats of the project area including aspen and coniferous forests, grasslands, wetlands, agricultural and sage brush communities.

Direct, Indirect, and Cumulative Impacts: Direct, permanent impacts to all habitats within all project alternatives would be restricted to the footprint of the transmission structures. Temporary, direct impacts to habitats would occur within the construction ROWs.

Direct impacts to loggerhead shrikes may occur during project construction, particularly because construction will occur in the winter months. A qualified biologist will survey the transmission line corridor and construction areas no more than 72 hours prior to any ground-disturbing activity to ensure that breeding birds would not be impacted.

Cumulative impacts to this species include impacts to natural communities from the construction of residential developments adjacent to the project area, and water storage developments which may also result in the long-term or permanent removal of vegetation.

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. The existing transmission line presents a minor collision risk and therefore Alternative A **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area.

Determination for Alternative B1: Alternative B1 contains habitats for this species including aspen and coniferous forests, grasslands, wetlands, agricultural and sage brush communities. This alternative presents a minor collision risk for migrant and juvenile individuals and therefore Alternative B1 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area.

Determination for Alternative C1: Alternative C1 contains habitats for this species including and coniferous forests, grasslands, wetlands, agricultural and sage brush communities. This alternative presents a minor collision risk for migrant and juvenile individuals and therefore Alternative C1 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area.

Determination for Alternative C2: Alternative C2 contains habitats for this species including and coniferous forests, grasslands, wetlands, agricultural and sage brush communities. This alternative presents a minor collision risk for migrant and juvenile individuals and therefore Alternative C2 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area.

Determination for Alternative D (Proposed Action): Alternative D contains habitats for this species including aspen and coniferous forests, grasslands, wetlands, agricultural and sage brush communities. This alternative presents a minor collision risk for migrant and juvenile individuals and therefore Alternative D **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area.

Northern goshawk, Accipiter gentilis

Distribution: Considered vulnerable in Colorado, the northern goshawk (goshawk) occurs throughout North America in the United States, Mexico, and Canada, and circumpolar through Europe and Asia (NatureServe 2010m). According to NatureServe (2010m) and Kennedy (2003), trends are difficult to determine due to the lack of quantitative data and because of biases inherent in the various methods used to track bird populations. Christmas Bird Count data (1959 to 1988), North American breeding bird survey data (1966 to 1996), and counts of migrants in the eastern United States (1972 to 1987) do not indicate any changes in populations.

In Colorado, goshawks occur at elevations of 7,500 to 11,000 feet (NatureServe 2010m, Kennedy 2003) and 64% of Breeding Bird Atlas breeding observations occurred in coniferous forests. In Grand County, goshawks occur uncommonly year-round within aspen and coniferous forests, and also in riparian, wetland, and meadow habitats.

Natural History: Northern goshawks inhabit mature forests of various cover types including aspen, lodgepole, ponderosa pine, and spruce-fir. Individuals feed primarily on birds of small to medium size as well as grouse and small mammals such as rodents, and hares. Goshawks may use marshes, meadows, and riparian zones for foraging (NatureServe 2010m, Kennedy 2003). Regardless of the cover type, goshawks require large blocks of forest for nesting and foraging. Goshawks tend to select nest trees on shallow slopes, flat benches in steep country, and fluvial pans. Nest sites are often associated with small (<1 acre) openings (Kingery 1998). For more information about habitat associations, refer to NatureServe (2010m), Kennedy (2003), Kingery (1998), Hoover and Wills (1984), Reynolds et al. (1992), Braun et al. (1996), and Graham et al. (1999).

Threats to goshawks include timber harvest, fire suppression, grazing, and insect and disease outbreaks which can result in the deterioration or loss of nesting habitat. Known or suspected predators include martens, fishers, wolverines, and Great Horned Owl. Intentional shooting or trapping is no longer considered a significant source of mortality. The impact of falconry is generally unknown; however, in northern Wisconsin falconers removed an estimated 5% of young annually from monitored nests during a 21-year period (NatureServe 2010m).

Environmental Baseline: Breeding bird survey data does not document the presence of goshawks in or near the project area (Kingery 1998). The project area has not been surveyed for goshawks but no goshawk nests or goshawk individuals were observed within the project area during general habitat assessment surveys conducted in 2005, 2007, or 2008 within any of the project alternative corridors.

According to Hoover and Wills (1984), goshawks may utilize all structural stages of spruce-fir, lodgepole pine, Douglas-fir and aspen habitats for foraging year-round. Suitable cover habitat includes spruce-fir and lodgepole pine 4B, 4C and 5 structural stages and all structural stages of mature and late-successional aspen and Douglas-fir habitat.

Characteristics of Sulphur District goshawk nest records from 1994 through 2008 are summarized in the following table (Forest Service n.d.). Note that this data described known nests found during surveys of proposed vegetation management project areas and may not represent the full range of habitat characteristics used (e.g., elevation).

Table 6-5. Sulphur District Goshawk Nest Characteristics.

Sulphur District Goshawk Nest Characteristics (1994-2008 Summary)		
Characteristic	Range	Average
Nest Tree Elevation	8,300-9,860 ft	8,945 ft
Nest Height	24-80 ft	38.9 ft
Nest Tree Height	37-108 ft	61.2 ft
Nest Tree DBH	6.7-19.6 in	12.9 in
Slope	2-20%	9.8%
Characteristic	Description	
Nest Tree Species	19 aspen (58%); 14 lodgepole (42%)	
Overstory Species	10 lodgepole; 12 aspen 11 lodgepole/aspen	
Canopy Closure	0-39% canopy closure (A)=9% 40-70% canopy closure (B)=64% 71-100% canopy closure (C)=27%	

On the nearby Routt National Forest, goshawks nearly always construct their nests in either lodgepole pines or aspens and these two tree species are selected in almost equal proportions (unpublished data on file, Routt National Forest). In a few instances, goshawks have constructed nests in another conifer species, such as subalpine fir. On the Routt National Forest, the regular dispersion and average distance

between known nests suggests goshawks probably use fewer than 3,500 acres during the breeding season. The mean distance between occupied nests in contiguous suitable habitat is about two miles.

Direct, Indirect, and Cumulative Impacts: There were no occurrences of northern goshawks observed within any of the project alternatives during habitat assessment surveys conducted in the summer of 2005, 2008, and 2009. Review of the Sulphur Ranger District files also show there are no current or past occurrences of goshawks in the project area. The occurrence of forested communities is higher on Alternatives B1 and D. These alternatives follow the existing transmission corridor for the majority of the ROW and have been cleared of forest vegetation to maintain safety standards for transmission lines. The mountain pine beetle epidemic has had a significant impact on forested habitats that goshawks prefer for nesting. The residential and recreational use within the project area is also expected to reduce the likelihood of goshawks nesting in the project area.

Project construction noise disturbances may result in temporary avoidance of the construction areas, and would result in habitat loss and alteration within the ROW. Operational impacts include collision and electrocution, but these impacts are expected to be minor given the lack of populations known to occur in the project area and because accipiters have better visual acuity to avoid collisions with overhead wires. Western would minimize collision and electrocution risks to goshawks through implementation of the environmental protection measures described in Section 3.0 and appropriate measures from the Suggested Practices for Protection of Raptors on Power Lines (APLIC 2006). If goshawk nest sites are found within the transmission line corridor prior to construction, the nest would be buffered by 0.25 miles until the chicks have fledged as directed by CDOW guidelines.

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would result in no impacts to special status species or habitats in the project area. Because it would not require additional construction or ROW clearing, Alternative A would have **no impact** on the northern goshawk.

Determination for Alternative B1: Alternative B1 occurs in an existing transmission ROW. Habitat for the northern goshawk is limited in the project area. Although much of the area has been logged for beetle kill, remaining forested land provides habitat for this species. This presents a minor chance of collision or electrocution. Through implementation of APLIC guidelines for raptor protection and pre-construction surveys, the project **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C1: Collision risk is expected to be higher for Alternative C1 because it occurs in a new ROW. Construction noise and human disturbance is more of a concern in this area because it is not as developed as the other action alternatives (B1 and D); therefore, short-term noise and construction impacts may be more pronounced. Therefore, all impacts discussed above under the general impacts heading are expected to be greater. Through implementation of APLIC guidelines for raptor protection and pre-construction surveys, the project **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C2: Collision risk is expected to be higher for Alternative C2 because it occurs in a new ROW as discussed for Alternative C1. Through implementation of APLIC guidelines for raptor protection and pre-construction surveys, the project **may adversely impact individuals**, but is not

likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative D (Proposed Action): Alternative D follows sections of all the action alternatives discussed above. The impacts and rationale of Alternative D would be similar to those described for Alternative B1. Through implementation of APLIC guidelines for raptor protection and pre-construction surveys, the project **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Northern harrier, Circus cyaneus

Distribution: Considered vulnerable in Colorado, northern harriers occur throughout North America and Eurasia, reaching their highest densities in the prairie-pothole region of the United States and Canada (Kingery 1998). According to NatureServe (2010n), the overall global trend appears more or less stable, with a moderate decline in the long term. but southern Canada showed a significant annual decline of 4% from 1990 to 2000. Globally, northern harriers have declines where large wetlands and moist grasslands have been degraded.

In Colorado, northern harriers occur in lower elevation grasslands, agricultural lands, and marshes but may range up to the tundra in the fall. The most common breeding habitats are emergent wetlands, croplands, and tall desert shrublands; their current distribution in Colorado favors the shortgrass prairie and lower elevations of the western slope (Kingery 1998). In Grand County, Jasper and Collins (1987) reported northern harriers as fairly common to uncommon in the spring through fall in coniferous forests, wetlands, grassland, and tundra habitats with no breeding records. Breeding bird survey data (Kingery 1998) indicate northern harrier occurrences as possible to probable with breeding in far northwestern Grand County.

Natural History: Generally found from 5,000 to 9,000 feet in Colorado, with additional fall use in high elevations (Kingery 1998), northern harriers are strongly associated with natural wetlands, moist grasslands, and other irrigated agricultural habitat, and tundra in the fall (NatureServe 2010n). In Colorado, breeding chronology is affected by elevation with courtship from mid-April to late June, eggs laid from April through June and chicks fledged from May to August (Kingery 1998). Nests are built on the ground in areas of dense vegetation and are composed of grasses, forbs and twigs. The female incubates and feeds the young and rarely leaves the nest. Males deliver small mammal and bird prey items captured in open grassland, shrubland and agricultural habitats (NatureServe 2010n). In Colorado, the greatest threat to northern harriers is the continued loss of wetland habitat from urban, residential, industrial and agricultural development (Kingery 1998).

Environmental Baseline: Breeding bird survey protocol is not the best survey method for this generally sparse species and data indicates mixed trends. Analysis of migratory data shows either stable or increasing trends. Christmas Bird Count data showed a downward trend from 1952 to 1966 and an increase from 1966 to 1969. Wintering populations in the Southeast have been fairly stable since the 1960s. Although population trends are mixed, habitat trends indicate a strong decline in available nesting and foraging habitats (NatureServe 2010n).

Northern harrier use on the ARNF and Pawnee National Grasslands is greatest on the Pawnee National Grassland with limited occurrences at the lowest elevations of the Front Range Ranger Districts (Kingery

1998). Breeding bird survey data does not indicate occurrences on the Sulphur Ranger District. Anecdotal observations indicate occurrences near the town of Granby and northwest of the project area (Trail Creek) but suitable habitat is found in other lower elevations areas of the District (Forest Service n.d.). Northern harrier habitat availability on the Sulphur District is relatively stable, but habitats are affected by human disturbance (nests or nesting habitat) and noxious weed invasion (prey base and cover). There were no observations of northern harriers within the project area during site visits conducted in the summer of 2005, 2008, 2009, and 2010.

Direct, Indirect, and Cumulative Impacts: Northern harriers are not known to nest in the project area. Harriers forage in wetland and agricultural areas. These habitats are more prevalent in all of the action alternatives on the northern end of the project area, north of CR 41. Wetland and riparian communities would be avoided and spanned during project construction to avoid direct impacts. Harriers may be displaced from the project area during construction of the transmission line. Direct impacts to harrier habitat may result from clearing of vegetation within the ROW where the structures would be constructed. Indirect impacts to habitat from noxious weed invasion on disturbed ground would be minimized through the implementation of a noxious weed management plan.

Water development and existing and proposed residential developments may cumulatively impact the loss of habitat and fragmentation of habitat in the project area. The Shorefox Development has removed wetland and floodplain habitat around the Colorado River which has resulted in direct loss of habitat for the northern harrier. The propagation of noxious weeds from this development would also result in cumulative impacts to harrier habitat. Ongoing development will continue to increase noise and human disturbance in the project area. Another possible cumulative impact to harriers is collision with the communication towers on Table Mountain and transmission lines in the area and electrocutions on other transmission and distribution lines in the area. Harriers hunt closer to the ground, and therefore collision impacts are expected to be low.

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would result in no impacts to special status species or habitats in the project area. Alternative A would have **no impact** on the northern harrier.

Determination for Alternative B1: Habitat for the northern harrier occurs on the northern end of the project area in the wetlands and wet meadows found north of CR 41. There are no known breeding occurrences of the northern harrier in the project area. Alternative B1 would result in minor habitat alteration because of the expansion of the ROW... Through implementation of APLIC guidelines for raptor protection and pre-construction surveys, Alternative B1 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C1: In addition to the wetlands and wet meadows north of CR 41, there are wetland and fen habitats on the west side of Table Mountain and west of Alternative C1 that also provide foraging habitat for the harrier. There are no known occurrences of northern harrier in the Alternative C1 ROW. The impacts discussed above for Alternative B1 are applicable to C1; the primary difference is the added collision risk for harriers and other foraging avian species on the west side of Table Mountain. Construction noise and human disturbance is more of a concern in this area because it is not as developed as the other action alternatives (B1 and D); therefore, short-term noise and construction impacts may be more pronounced. Overall, the general impacts discussed above are

expected to be more pronounced under Alternative C1. With incorporation of the environmental protection measures described in Section 3.0, Alternative C1 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C2: The determination and rationale for Alternative C2 would be the same as described for Alternative C1. Alternative C2 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative D: The determination and rationale for the harrier as the result of construction and operation of Alternative D are the same as those discussed under B1. The impacts of Alternative D would be the same as described for Alternative B1. Alternative D **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Olive-sided flycatcher, *Contopus cooperi*

Distribution: Considered vulnerable in Colorado and declining globally, olive-sided flycatcher breeding habitat occurs throughout the United States and Canada. Non-breeding territory occurs in central and South America as far south as Peru and Brazil, associated with the Andes Mountains and the Amazon Basin. The causes for the flycatcher's decline are not well understood, but may be due to changes in their breeding range and/or migration and wintering areas. North American breeding bird survey data indicate declines since 1966 across much of North America and overall decline of 70% (3.6% per year) from 1966 to 1999 and 53% (3.7% per year) from 1980 to 1999. Declines are relatively similar across the range (NatureServe 2010o). Overall, from 1966 to 2004, breeding bird survey data indicates a national decline of 3.5% although populations in Region 2 may be stable (Kotliar 2007). In Colorado, olive-sided flycatchers breed in coniferous forest habitat from 7,000 to 11,000 feet (Kingery 1998). In Grand County, olive-sided flycatchers are considered fairly common summer visitors, using aspen and coniferous forests, meadows and riparian areas. Breeding records exist within coniferous forest (Jasper and Collins 1983).

Natural History: Many structural stages of forest may be used if large snags are present for perching and foraging. The olive-sided flycatcher's diet consists almost entirely of flying insects and this bird prefers wild honeybees and other Hymenoptera. Breeding occurs in old growth coniferous forests over most of their range, including Colorado. They are less abundant in aspen and aspen/conifer habitat. Nests are placed most often in conifers on horizontal limbs from 5 to 30 feet above the ground. Olive-sided flycatchers will use openings, old burns, or clear-cuts for foraging habitat, as long as snags are present. Breeding Bird Atlas surveys found 84% of olive-sided flycatcher occurrences in coniferous forests (Kingery 1998).

As a neotropical migrant that may spend only three to four months of the year on its North American breeding grounds, the flycatcher is at risk from deforestation on its wintering grounds in Central and South America. Many studies in western North America conclude that this species is more abundant in some types of logged forest (especially those with suitable structural features retained) than it is in unlogged stands. A preliminary study in western Oregon documented that nest success was substantially higher in post-fire habitat than it was in several types of harvested forests. A forest dominated by dead trees would not support these flycatchers (NatureServe 2010o). The current National Forest emphasis

on reducing fuel loads and fire severity may negatively impact olive-sided flycatchers by creating even-aged and homogeneous stand conditions (Kotliar 2007).

Pesticide applications to control black flies, mosquitoes, or injurious forest insects could have a severe local impact upon the prey base of this flycatcher, both in North America and on its wintering grounds. Olive-sided flycatchers are a rare host to the brown-headed cowbird (NatureServe 2010o).

Environmental Baseline: The presence of large snags for perching and foraging appears to be the most important habitat component for olive-sided flycatchers. Breeding bird survey records document possible to probable olive-sided flycatcher breeding in the project vicinity (Kingery 1998). Sulphur District songbird and northern goshawk surveys from 2004 through 2007 documented abundant olive-sided flycatcher occurrences within spruce-fir, lodgepole pine and spruce-fir/lodgepole intermixed habitats (Forest Service n.d.). Olive-sided flycatchers are documented from nearly all District point count transects, and are commonly recorded in other coniferous habitats District-wide (Forest Service n.d.). Snag abundance in the project area and adjacent landscape is extremely high as a result of a mountain pine beetle infestation. Pending any future plans for salvage of dead and dying trees, abundance and distribution of snag trees have dramatically increased within the Forest and portions of the project area. An olive-sided flycatcher was observed near the existing ROW associated with Alternatives A, B1, and D in 2008.

Direct, Indirect, and Cumulative Impacts: The project area provides habitat for the olive-sided flycatcher. Alternatives A, B1, and D would impact more forested habitat; however, the majority of this area lies within areas previously disturbed for the existing transmission line and residential developments. Trees have already been removed in some of these areas for safety purposes. The mountain pine beetle has infected stands throughout the ANRA and the project area resulting in a higher snag density.

Expansion of the ROW for Alternatives A, B1, and D may result in the loss of some additional forested habitat including snags for the flycatcher. Trees would also be removed for Alternatives C1 and C2, but these alternatives would span a smaller percentage of forested habitats.

Olive-sided flycatchers may be temporarily displaced as a result of the action alternatives. Pre-construction surveys and other MBTA compliance activities (as discussed above for the other FSS species) would ensure that active nests are avoided during project construction.

Loss of forested habitat as a result of the mountain pine beetle epidemic is the greatest cumulative impact to flycatchers in the project area. The salvage of dead snags may adversely impact the flycatcher distribution and abundance by removing suitable nesting habitats. Recreational use, existing, planned, and proposed residential developments may also cumulatively impact this species and associated habitats.

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would result in no impacts to special status species or habitats in the project area. Alternative A would have **no impact** on the olive-sided flycatcher.

Determination for Alternative B1: Construction and operation of Alternative B1 would result in short-term and minor impacts to olive-sided flycatchers within the ROW. Impacts to habitat would include

vegetation removal for the transmission structures and the removal of hazard trees in the expanded ROW. With the implementation of best management practices and pre-construction surveys for active nest sites, Alternative B1 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C1: Construction and operation of Alternative C1 would result in short-term and minor impacts to olive-sided flycatchers within the ROW. Impacts to habitat would include vegetation removal of the transmission structures and the removal of hazard trees in the expanded ROW. Construction noise and human disturbance is more of a concern in this area because it is not as developed as the other action alternatives (B1 and D); therefore, short-term noise and construction impacts may be more pronounced. Overall, the general impacts discussed above are expected to be more pronounced under Alternative C1. With the implementation of best management practices and pre-construction surveys for active nest sites Alternative B1 **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative C2: The determination and rationale of impacts that result from Alternative C2 are similar to C1. Alternative C2 uses more existing utility ROW than C1 and would therefore better minimize impacts to sagebrush habitat where the flycatcher may forage. Through implementation of APLIC guidelines for raptor protection and pre-construction surveys, the project **may adversely impact individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

Determination for Alternative D (Proposed Action): The determination and rationale for the olive-sided flycatcher may be impacted as the result of construction and operation of Alternative D is the same as that discussed under B1. The impacts of Alternative D would be the same as described for Alternative B1. Alternative D **may adversely affect individuals**, but is not likely to result in the loss of viability of this species in the planning area, nor cause a trend towards federal listing, or a loss of species viability rangewide.

6.3.3 Amphibians

Survey results indicate that there is currently no known occupied habitat in the project area for the state endangered boreal toad (*Bufo boreas boreas*), or two species of frog that are state species of special concern: the northern leopard frog (*Rana pipiens*) and the wood frog (*Rana sylvatica*) (Appendix E). As a part of the amphibian survey, amphibian habitat was quantified and mapped. The report includes a discussion of direct and indirect impacts along with recommendations for minimizing impacts.

Boreal toad, Anaxyrus boreas boreas

Distribution: Boreal toad populations in Colorado are part of the Southern Rocky Mountain population, which were petitioned for federal listing. In 1995, the USFWS determined that federal listing was warranted but precluded due to the need for action on a higher priority species (USFWS 2005). In September of 2005, the USFWS issued a Final Ruling which withdrew the Southern Rocky Mountain population of boreal toads from the list of species being considered for listing under the ESA. The population was withdrawn from the candidate list because the population does not constitute a distinct population segment as defined by the ESA.

Although once considered fairly common in most mountainous areas of the Southern Rocky Mountains, it is much less common today and absent from many historically occupied locations. Specifically, 1986 to 1988 surveys found that toads had disappeared from 83% of historic locations in Colorado and from 94% of Wyoming historic sites (Loeffler 2001). Boreal toads occur in a handful of locations on the ARNF and also on surrounding National Forests including the Routt National Forest, Pike-San Isabel, Grand Mesa, Uncompahgre and Gunnison, Rio Grande, and White River National Forests (Loeffler 2001).

Natural History: Southern Rocky Mountain boreal toads occupy forest habitats between 7,500 and 12,050 feet. Boreal toads require breeding ponds, summer range, and overwinter refugia, within or adjacent to lodgepole pine or spruce-fir forests. Breeding habitat includes large lakes, glacial ponds, beaver ponds, man-made ponds, wetlands, and roadside ditches and puddles. Egg placement occurs in shallow, quiet water where thermal impacts of the sun on egg masses can be optimized. Young toads are restricted to moist habitats while adult toads can move several miles through upland habitats. Hibernacula include rodent burrows, and beaver dams and lodges. Summer range includes upland forests and rocky areas with spring seeps (Loeffler 2001).

The greatest threat to boreal toad persistence appears to be the pathogen *Batrachochytrium dendrobatidis* (a chytrid fungus also referred to as “Bd”). Recent theories hold that some environmental factor is causing sub-lethal stress in toads; stress is causing suppression of the immune system, and immunosuppression and cold body temperatures lead to infection and widespread mortality. Other secondary threats include alteration of habitat; aerial application of pesticides; and predation from tiger salamanders, corvids, snakes, raptors, predaceous diving beetles, and others (Loeffler 2001).

Environmental Baseline: In Colorado, evidence of boreal toad declines has been thoroughly documented (Loeffler 2001). The following excerpt is from the boreal toad technical report located in Appendix E:

The boreal toad is currently found in 67 known breeding locations comprising 32 populations in Colorado and Southern Wyoming, only two of which are considered viable (T. Jackson, CDOW, pers. comm.). This species has disappeared from 83% of its historic locations in Colorado, 94% in Wyoming, and is believed to be extirpated from New Mexico (USFWS 2005). The boreal toad was once known from 25 counties in Colorado, including Grand County, where it was considered common. Its distribution in Colorado is now restricted to 14 counties. Available information suggests that boreal toad populations continue to decline (Keinath and McGee 2005).

Boreal toads historically occurred in many locations on the Sulphur Ranger District. CDOW and Colorado Natural Heritage Program (CNHP) surveys throughout the 1990s and on-going have been unable to detect historic occurrences in many areas of the District including Berthoud Pass, Rollins Pass, Shadow Mountain Lake, Strawberry Bench, and the Never Summer Mountains (Loeffler 2001, Lambert et al. 2000). These same surveys, augmented with field observations by Forest Service personnel, have confirmed the presence of both breeding areas and non-breeding individuals on the Sulphur District. Breeding sites on the ARNF are listed in Appendix F.

Neither historic nor current survey data indicate the presence of boreal toads within the project area. The closest known breeding occurrences of boreal toads to the project area are located at Pole Creek Golf Course above the Town of Fraser and in the Big Meadows areas of Rocky Mountain National Park (Sumerlin 2005, pers. comm.).

There have been no prior records of boreal toad in the Willow Creek or Stillwater Creek drainage basins (CDOW 2007a). The maximum movements for the boreal toad are between 1 and 8 kilometers (Muths 2003). The following excerpt is from the technical report located in Appendix E:

The elevational and riparian characteristics of both the Stillwater and Willow Creek crossings of the right-of-way include suitable habitat for the boreal toad. However there has been no known boreal toad breeding documented in the project right-of-way (CDOW 2007a, CNHP 2007). Although a lack of prior information does not mean the species is absent, the closest known active boreal toad breeding sites are the Big Meadows site about 14.5 kilometers (9 miles) up the Colorado River drainage in Rocky Mountain National Park and the Pole Creek Golf Course site about 16 kilometers (10 miles) up the Fraser River drainage from the project area (CNHP 2007). Given these distances the closest known breeding for boreal toad is outside the estimated maximum dispersal distance. The Big Meadows site has had active breeding recorded from 2004 to 2007 and the site has tested positive for chytrid fungus since 2004 (Jackson 2005, E. Muths, USGS, pers comm). The Pole Creek Golf Course site has had breeding recorded over multiple years between 1995 and 2007 and has also tested positive for chytrid fungus since 2002. The presence of chytrid fungus brings the long-term viability of both sites into question (Jackson 2005, T. Jackson, CDOW, pers comm). Other active boreal toad breeding sites in Grand County include areas in the Upper Williams Fork that are well outside a practical dispersal range for the boreal toad (Jackson 2005, CNHP 2007).

As of 2006 there are 22 breeding sites in the planning area (ARNF); of all 22 sites, 9 are Bd positive, 5 are Bd negative, and 8 have not yet been tested. Despite the discovery of new sites (previously undetected sites) in the planning area and several others statewide, CNHP and other data clearly indicate a downward trend for boreal toad numbers at occupied sites in Colorado and in the planning area.

Western contracted the CNHP to conduct an inventory focused on the boreal toad within and adjacent to the proposed Granby – Windy Gap Transmission Line Rebuild project area during the summer breeding season of 2007. The objectives of the inventory were to quantify the amount and quality of habitat, find suitable breeding sites, and evaluate historic or current activity of boreal toads and other amphibians along the alternative transmission line corridors. Site visits to the project areas were made during July, 2007. Geographic information system (GIS) analysis and documentation review of all amphibian species in the area found that there are no known current or historical boreal toad sightings or breeding within the project area. However, active boreal toad breeding sites occur within about 15 kilometers (9 miles). Survey results indicated that there is currently no known occupied habitat for the State Endangered boreal toad in the project area. No boreal toads were observed during surveys conducted in 2008. The proximity of active breeding locations in relation to the project area is found in Table 6-6. More information can be found in the boreal toad survey report, which is included as Appendix E.

Table 6-6. Boreal Toad Breeding Occurrence in Proximity to the Project Area.

Species	Approximate kilometers (miles) to Project Area	Year	Breeding Confirmed
Boreal toad	14.5 (9)	2007	Yes
Boreal toad	16 (10)	2007	Yes
Boreal toad	10.5 (6.5)	1994	No

Boreal toad	13.5 (8.5)	1980	No
Boreal toad	9 (5.5)	1963	No
Boreal toad	11 (7)	1963	No
Boreal toad	3 (2)	1961	No
Boreal toad	1.5 (1)	1947	No

(Data is excerpted from Appendix E).

Calculated distances of amphibian occurrence from the project area using multiple databases (CNHP 2007, CDOW 2007a). Locations are approximate and absence of data does not necessarily mean that the species do not occur in other locations.

Direct, Indirect, and Cumulative Impacts: There are no known occurrences of boreal toads within the project area. Surveys conducted in 2008 yielded negative results for boreal toad occurrence and the habitat suitability in the project area is marginal for a naturally occurring population due to elevation. However, the Pole Creek breeding site supports a re-introduced population (9 miles away) has similar characteristics to wetlands in the project area.

Water resources and riparian/wetland communities would be spanned to the greatest extent possible. Therefore, no direct impacts to the boreal toad are anticipated. Indirect impacts to surface waters and wetlands would be minimized using Western’s standard construction practices as outlined in Section 3.0. Indirect impacts such as short-term, localized sedimentation increases are anticipated to be negligible to minor. This project is unlikely to contribute to cumulative impacts to this species as it would not result in any direct impacts and indirect impacts are anticipated to be negligible to minor. Other actions or proposed projects in the project area may add to the cumulative impacts to this species. Proposed private and commercial developments may disturb suitable habitat or increase the spread of disease.

Boreal toad is an MIS for montane riparian and wetlands (Forest Service 1997).

Threats to Species: The pathogen *Batrachochytrium dendrobatidis* (a chytrid fungus also referred to as Bd). Recent theories hold that some environmental factor is causing sub-lethal stress in toads; stress is causing suppression of the immune system, and immunosuppression and cold body temperatures leads to infection and widespread mortality. The cause of the environmental stress is unknown. Other secondary threats include alteration of habitat; aerial application of insecticides and pesticides; and predation from tiger salamanders, corvids, snakes, raptors, predaceous diving beetles, and others (Loeffler 2001).

Population Trends: A sharp decline in the 1980s has left 83% of historic locations in Colorado unoccupied (Loeffler 2001). The boreal toad currently occurs in 67 known breeding locations comprising 32 populations in Colorado and Southern Wyoming, only two of which are considered viable (Appendix E).

Determination for Alternative A (No Action): Because suitable habitat such as surface waters would be avoided, Alternative A would have **no impact** on the boreal toad.

Determination for Alternative B1: Because suitable habitat such as surface waters would be avoided, Alternative B1 would have **no impact** on the boreal toad.

Determination for Alternative C1: Because suitable habitat such as surface waters would be avoided, Alternative C1 would have **no impact** on the boreal toad.

Determination for Alternative C2: Because suitable habitat such as surface waters would be avoided, Alternative C2 would have **no impact** on the boreal toad.

Determination for Alternative D (Proposed Action): Because suitable habitat such as surface waters would be avoided, Alternative D1 would have **no impact** on the boreal toad.

Northern leopard frog, *Lithobates pipiens*

Distribution: Considered vulnerable in Colorado (NatureServe 2010p) and petitioned for listing under the ESA, the northern leopard frog range includes the southern provinces of Canada, south through the United States to Texas (Hammerson 1999). Although still widespread and common in areas, many populations have drastically declined, especially in the Rocky Mountains of Colorado, Wyoming and Montana where the species is extant in most localities where it historically occurred. Similar declines have been reported for Washington, Oregon and Alberta (NatureServe 2010p). These frogs have been lost from wide areas of Montana but they remain abundant in some parts of Forest Service Region 2, such as the Black Hills (Smith and Keinath 2007). Leopard frog records from Colorado occur from 3,500 to 11,000 feet but exclude southeastern Colorado (Hammerson 1999).

Natural History: Northern leopard frogs can be found in springs, slow-moving streams, marshes, bogs, ponds, canals, floodplains, reservoirs, and other lakes with rooted aquatic vegetation. They also can be found in wet meadow habitats in the summer. They overwinter underwater. Shallow, still, permanent, water with good exposure to sunlight is needed for egg deposition and development. Tadpoles eat algae, plant tissue, organic debris and some small invertebrates. Metamorphosed frogs eat a variety of small invertebrates. Threats to leopard frogs include habitat loss, over-harvest, and competition with and predation by introduced bullfrogs. Like many amphibians, leopard frog declines appear related to environmental changes such as temperature and crowding that alter the frog's susceptibility to disease (e.g., red leg disease) (NatureServe 2010p, Hammerson 1999).

Environmental Baseline: According to Hammerson (1999) the formerly abundant leopard frog has become scarce in many areas of Colorado. From 1973 to 1982, nine Larimer County populations were documented as extirpated from elevations of 7,760 to 8,265 feet. Six of the extirpations were attributable to drying up of breeding ponds and the other two are unexplained. A population of northern leopard frogs at Sawhill Ponds in Boulder County declined severely after bullfrogs (*Rana catesbeiana*) were established in the late 1970s. There have been no recorded occurrences of northern leopard frogs within the project area (CNHP 2007; Sumerlin 2005, pers. comm.). The closest known occurrence is 1.5 miles away (Appendix E).

Direct, Indirect, and Cumulative Impacts: There are no known occurrences of the northern leopard frog within the project area. The project area does contain suitable habitat for this species; however, the available habitat is of marginal quality. Potential habitat would be avoided and spanned to the greatest extent practicable, avoiding direct impacts to this species. Indirect impacts such as short-term, localized sedimentation increases are anticipated to be negligible to minor. This project is unlikely to measurably contribute to cumulative impacts to this species as it would not result in any direct impacts and indirect impacts are anticipated to be negligible to minor. However, other actions or proposed projects in the

project area may cumulatively impact this species. Proposed private and commercial developments may disturb suitable habitat or increase the spread of disease.

Determination for Alternative A (No Action): Because suitable habitat such as surface waters would be avoided, Alternative A would have **no impact** on the northern leopard frog.

Determination for Alternative B1: Because suitable habitat such as surface waters would be avoided, Alternative B1 would have **no impact** on the northern leopard frog.

Determination for Alternative C1: Because suitable habitat such as surface waters would be avoided, Alternative C1 would have **no impact** on the northern leopard frog.

Determination for Alternative C2: Because suitable habitat such as surface waters would be avoided, Alternative C2 would have **no impact** on the northern leopard frog.

Determination for Alternative D (Proposed Action): Because suitable habitat such as surface waters would be avoided, Alternative D1 would have **no impact** on the northern leopard frog.

Wood Frog, Lithobates sylvatica

Distribution: According to Hammerson (1999), the wood frog range extends further than any other North American amphibian. In Colorado, this species occurs in the mountains surrounding North Park, along the upper tributaries of the Colorado River in Grand County Colorado, and in the upper Laramie River drainage of Larimer County. The elevation range in Colorado for this species is approximately 7,900 to 9,800 feet. Wood frog populations typically undergo large fluctuations over periods of several years and as a result decades of monitoring are necessary to assess populations.

Natural History: Wood frogs inhabit subalpine marshes, bogs, pothole ponds, beaver ponds, lakes, stream borders, wet meadows, willow thickets, and forest bordering these mesic habitats. During the summer, wood frogs can often be seen along the edges of wetlands and marshy ponds. In winter months, wood frogs will hibernate in holes or under logs or rocks in forested areas. Wood frogs emerge from hibernation in May. Breeding habitats include small, shallow, natural ponds, which lack a permanent inlet and outlet; inactive beaver ponds; and sometimes in human created ponds. Most breeding sites are ephemeral pools which dry out in the summer. The primary vegetation types associated with breeding sites are lodgepole pine and aspen (Hammerson 1999).

Wood frogs diet includes small insects, spiders, and worms. Predators of wood frogs include brook trout (*Salvelinus fontinalis*), rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*) small-mouth bass (*Micropterus dolomieu*), western terrestrial garter snake (*Thamnophis elegans*), and various avian species.

Environmental Baseline: Activities which have reduced population numbers and led to extirpations in Grand County include: dredging of breeding ponds, clearing of shoreline vegetation, expansion of residential areas, and highway construction (Hammerson 1999). Wood frogs have not been documented south of Columbine Lake (Sumerlin 2006, pers. comm.). The closest known occurrence is 3.5 miles away (Appendix E).

Direct, Indirect, and Cumulative Impacts: There are no known occurrences of the wood frog within the project area. The project area does contain suitable habitat for this species; however, the available habitat is of marginal quality. Because suitable habitat would be avoided and spanned to the greatest extent feasible, no direct impacts to this species or habitat are anticipated. Indirect impacts such as short-term, localized sedimentation increases are anticipated to be negligible. Therefore, with limited potential for direct or indirect impacts to this species, including suitable habitat, this project is not likely to contribute to adverse cumulative impacts on this species.

Determination for Alternative A (No Action): Because suitable habitat such as surface waters would be avoided, Alternative A would have **no impact** on the wood frog.

Determination for Alternative B1: Because suitable habitat such as surface waters would be avoided, Alternative B1 would have **no impact** on the wood frog.

Determination for Alternative C1: Because suitable habitat such as surface waters would be avoided, Alternative C1 would have **no impact** on the wood frog.

Determination for Alternative C2: Because suitable habitat such as surface waters would be avoided, Alternative C2 would have **no impact** on the wood frog.

Determination for Alternative D (Proposed Action): Because suitable habitat such as surface waters would be avoided, Alternative D1 would have **no impact** on the wood frog.

6.4 Species Evaluation - Plants

6.4.1 Pre-Field Review

A pre-field review of existing data was accomplished for all FSS species listed for the ARNF and Pawnee National Grasslands. The review included a list of 22 FSS species/species groups of local concern. This effort included an evaluation of element occurrence records, research on habitat and ecological requirements for each species, and a determination of whether field surveys would be required to complete the analysis. The sources of information included records from the CNHP (Spackman et al. 1997), and discussions with Steve Popovich, ARNF Botanist, on October 16, 2008. The field botanists chosen for this project spent time in the Rocky Mountain Herbarium (University of Wyoming, Laramie) and the Herbarium COLO (University of Colorado, Boulder) studying voucher specimens for each of the rare plant species considered for analysis for this project.

Following the pre-field review process, the number of FSS species determined likely to have habitat in the project area totaled 16 species. Those 16 species are discussed in more detail in this section. Water depletion species including the Colorado butterfly plant (*Gaura neomexicana* ssp. *Coloradensis*), Ute ladies'-tresses orchid (*Spiranthes diluvialis*), and the western prairie fringed orchid (*Platanthera praeclara*) are not included in this analysis because water depletions will not occur during construction or operation of this project.

As described in section 2.7, the location and need for staging areas and minor ROW access cannot be determined until final design and engineering, and, in some cases, not until the construction contractor has reviewed the access situation. For purposes of the impact analysis to plants, it has been assumed that disturbances from access roads may occur anywhere within the proposed and alternative ROWs.

6.4.2 Previous Investigations and Known Resources in the Area

General plant surveys for this project began in 2005 and have continued through 2009. Field surveys for federally listed plant species on all alternative alignments were conducted in June 2008 and June 2009. Federally listed species surveys included *Astragalus osterhoutii*, *Penstemon penlandii*, and *Spiranthes diluvialis*.

Surveys for FSS species and Forest Service species of local concern were performed from June 15-19, 2009, and on June 23, 2009. The surveys in 2009 focused additional detail on the Proposed Action alternative ROW (Alternative D) and covered all parts of the project that were determined to lie upon Arapaho National Forest lands and ANRA lands.

The Forest Service Botanist conducted several surveys between 2007 and 2011 in the area where the current ROW crosses the intersection of County Road 41 (Willow Creek Reservoir Road) and HWY 34, including several hundred yards within the ROW on either side of the road intersection. The surveys were to detect presence of the globally rare lichen Idaho xanthoparmelia lichen (*Xanthoparmelia idahoensis*) and the rare to locally common rim lichen (*Aspicilia fruticulosa*), both known to occur NW of Kremmling in habitat similar to habitat found in the surveyed area. He also surveyed for presence of locally rare vascular plants associated with tall (*Artemisia tridentata*) and low (*Artemisia arbuscula*) sagebrush sites. Among other common non-vascular plants, the common lichens *Aspicilia hispida* and *Xanthoparmelia chlorochroa*, along with an unidentified *Cetraria*, were found. The locally uncommon vascular plants *Penstemon cyathophorus*, *Penstemon crandallii* (if recognized as distinct from *P. caespitosum*) and *Pediocactus simpsonii* were also encountered.

6.4.3 Survey Methods

Survey methods approved by the Forest Service were utilized in the project's proposed alternative ROW within the Forest Service portion of the project area. Surveys were conducted in accordance with the Forest Service Manual (FSM) 2600, Chapter 2670 *Threatened, Endangered and Sensitive Plants and Animals* (Forest Service 2007). The most common survey techniques involved meandering transects that were walked by a three-person survey team through the transmission line corridor. When habitat for a targeted species was located, (e.g. abandoned irrigation ditch at the edge of a lodgepole stand) the team surveyed using a more rigorous method, including the establishment of a survey polygon. The team walked more deliberate survey transects through the polygon and inventoried rare plants that occurred there.

When target species were located, the element occurrence was mapped using a Trimble Geo XH Global Positioning System (GPS) with an average accuracy of 1 to 5 meters. All GPS coordinates were digitized using GIS with the data stored in an ArcMap format. Plant populations that were less than 0.01 acre were mapped as points. Populations larger than 0.01 acre were mapped as polygons. A Plant Element Occurrence Field Form was completed for each element occurrence. The survey team documented the presence and mapped populations of any Colorado state listed noxious weeds that were observed during the course of the rare plant survey work. Results of weed observations are discussed in Section 8.3.

6.4.4 Survey Results

Results of the special status plant species surveys are discussed individually in the following section for each species under consideration.

6.4.5 Ferns and Allies

Trianglelobe moonwort, Botrychium ascendens

Botrychium ascendens is a diminutive perennial fern in the Adder's Tongue family (Ophioglossaceae).

Distribution: This species has been found in several provinces of Canada, Alaska, and through much of the northwestern United States, as well as California, Nevada, Wyoming and Minnesota. NatureServe does not list this species as being found in the state of Colorado (NatureServe 2010q).

Natural History: *Botrychium ascendens* has strongly ascending pinnae with lacerate margins and a yellow green color. It may be difficult to distinguish from *B. minganense*. The species has been described as occupying habitat in lower montane coniferous forests in mesic sites (NatureServe 2010q). Spores are produced from early spring through July. This plant may be found on dry, gravelly hillsides, frequently in association with little bluestem (*Schizachyrium scoparium*).

Environmental Baseline: *Botrychium ascendens* is considered to be imperiled globally (G2). This species is not currently tracked by the CNHP, thus it has no current state ranking of rarity in Colorado (CNHP 2009). This species was not identified during the rare plant surveys onsite in 2008 and July 2009. However, three other *Botrychium* species were detected along an unnamed irrigation ditch beneath the existing transmission line (Alternatives A, B1, and D1).

Direct, Indirect, and Cumulative Impacts: *Botrychium ascendens* was not detected in the project alternative ROWs, but suitable habitat was documented. *Botrychium ascendens* typically occupies mesic habitat in montane conifer forests.

- Alternative A has an estimated 12.05 acres of lodgepole pine forest in the current ROW.
- Alternative B1 has an estimated 17.72 acres of lodgepole pine forest in the current ROW.
- Alternative C1 has an estimated 14.40 acres of lodgepole pine forest in the current ROW.
- Alternative C2, Options 1 and 2 have an estimated 14.40 acres of lodgepole pine forest in the current ROW.
- Alternative D, Options 1 and 2 have an estimated 17.31 acres of lodgepole pine forest in the current ROW.

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Alternative B1, C1, C2 (Options 1 and 2), and D1 (Options 1 and 2) may result in the direct removal of *Botrychium ascendens* (assuming an undetected presence) in lodgepole pine habitat. The direct impact

of trampling during maintenance activities could also result in loss of plant vigor and mortality of *Botrychium ascendens* individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure and cover value
- Creating a thick layer of wood chips on the soil surface
- Removal or disruption of duff layer in forested habitat thereby impacting soil mycorrhizae
- Vectoring and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing localized fire regime
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
- Incidental impact to potential pollinator species
- Disturbance may benefit certain *Botrychium* species that thrive in these habitat conditions
- Noxious weed introduction can indirectly impact special status plants through alleopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

Botrychium species are often considered to be opportunistic species in disturbed areas and can occur along disturbed roadsides, trails, in maintained transmission line corridors, and in the case of this project, *Botrychium hesperium*, *B. minganense*, and *B. echo* have been found in an unnamed irrigation ditch that is no longer utilized.

Each of the five alternatives has disturbed landscapes within their respective proposed ROWs. These disturbed areas may provide indirect beneficial impacts to *Botrychium* species by clearance of the overstory. This must obviously be balanced by the initial negative impact of clearance in these disturbed areas, which can lead to the direct loss of *Botrychium* species.

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Botrychium ascendens*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing or a loss of species viability rangewide was made for each of the action alternatives (B1, C1, C2, and D). There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. However, an occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable lodgepole pine habitat in the ROW as described above. In order, the chance of incidental impacts are greatest for alternative B1 > D (Options 1 and 2)>

C1 and C2 (Options 1 and 2) > A. These impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area or a trend toward listing of this species as a threatened or endangered species.

Narrowleaf grapefern, Botrychium lineare

Botrychium lineare is a small perennial fern species in the Adder's Tongue family (Ophioglossaceae). It may be distinguished by the very narrow pinnae of the sterile frond segment.

Distribution: *Botrychium lineare* is distributed in New Brunswick, Quebec, Alberta, British Columbia and the Yukon Provinces in Canada. It is also found in Alaska, from Washington south through California, and east as far as South Dakota and Colorado. In Colorado, this species has been documented from Boulder, Clear Creek, El Paso, Grand and Lake counties (NRCS 2009, NatureServe 2010r).

Natural History: Habitat for this species is highly variable. Wagner and Wagner (1994) have identified habitat to include grassy slopes, among medium-height grasses, along the edges of streams, and shaded woods and woodlands. The USFWS (2003) has noted that the species is a possible colonizer of disturbed sites (early seral habitats). In Colorado, this species may be found at elevations ranging from 7,900 to 9,500 feet above mean sea level.

Environmental Baseline: *Botrychium lineare* was not detected in any of the project alternative ROWs, but suitable habitat was observed and documented in the project area. *Botrychium lineare* is ranked as imperiled globally (G2). Colorado ranks this species as S1, indicating that it is critically imperiled in the state. The species has a large overall range, but populations appear to be widely separated and the total number of individuals is probably low. This leaves the species vulnerable due to stochastic natural events. This species was just described in 1994, so overall trend data is not robust (NatureServe 2010rs).

Direct, Indirect, and Cumulative Impacts: *Botrychium lineare* typically occupies grassy slopes, streamsides, and forest margins.

- Alternative A has an estimated 8.63 acres of grasslands, 8.37 acres of wetlands, and 12.05 acres of lodgepole pine forest in the current ROW.
- Alternative B1 has an estimated 11.44 acres of grasslands, 23.2 acres of wetlands, and 17.72 acres of lodgepole pine forest in the current ROW.
- Alternative C1 has an estimated 8.92 acres of grasslands, 22.84 acres of wetlands, and 14.40 acres of lodgepole pine forest in the current ROW.
- Alternative C2, Option 1 has an estimated 8.92 acres of grasslands, 21.60 acres of wetlands, and 14.40 acres of lodgepole pine forest in the current ROW. Alternative C2, Option 2 has an estimated 8.92 acres of grasslands, 21.77 acres of wetlands, and 14.40 acres of lodgepole pine forest in the current ROW.
- Alternative D, Option 1 has an estimated 9.40 acres of grasslands, 20.74 acres of wetlands, and 17.31 acres of lodgepole pine forest in the current ROW.
- Alternative D, Option 2 has an estimated 9.4 acres of grasslands, 21.70 acres of wetlands, and 17.31 acres of lodgepole pine forest in the current ROW.

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Construction activities proposed Alternatives B1, C1, C2 (Options 1 and 2), and D (Options 1 and 2) may result in the direct removal of undetected *Botrychium lineare*. The direct impact of trampling during maintenance activities could also result in loss of plant vigor and mortality of *Botrychium lineare* individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure and cover value
- Creating a thick layer of wood chips on the soil surface
- Removal or disruption of duff layer in forested habitat thereby impacting soil mycorrhizae
- Vectors and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing localized fire regime
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
- Incidental impact to pollinator species
- Disturbance may benefit certain species, such as *Botrychium* that thrive in these habitat conditions
- Noxious weed introduction can indirectly impact special status plants through alleopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

As previously mentioned for *Botrychium ascendens*, *Botrychium* species are often considered to be opportunistic species in disturbed areas. *Botrychium* species may be found in disturbed roadsides, trails, in maintained transmission line corridors, and in the case of this project, *Botrychium hesperium*, *B. manganense*, and *B. echo* have been found in an unnamed irrigation ditch that is no longer utilized beneath the existing transmission lines (Alternatives A, B1, D1).

As described for *Botrychium ascendens*, each of the five alternatives has disturbed landscapes within their respective proposed ROWs.

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Botrychium lineare*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing or a

loss of species viability rangewide was made for each of the action alternatives (A, B1, C1, C2, and D). There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. However, an occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable grassland, wetland, and lodgepole pine habitat in the ROW. In order, the chance of incidental impacts are greatest for alternative B1 (52.36 acres) > D Option 2 (48.41 acres) > D Option 1 (47.45 acres) > C1 (46.16 acres) > C2 Option 2 (45.09 acres) > C2 Option 1 (44.92 acres) > A (29.05 acres). These impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area, or a trend toward listing of this species as a threatened or endangered species.

Lesser panicled sedge, Carex diandra

Carex diandra is a perennial graminoid in the sedge family (Cyperaceae).

Distribution: This sedge is widely scattered throughout Canada, and the northern two-thirds of the United States. It is relatively common in the northern portions of its range, becoming uncommon to rare in much of its distribution southward in the United States. In Colorado, the species appears limited to six counties including Boulder, Eagle, Garfield, Grand, Jackson, Larimer, Routt and Saguache counties (NatureServe 2010s, NRCS 2009).

Natural History: This plant is a tussock-forming species which may be distinguished by red dots on the inner band of its leaf sheaths. It is an obligate wetland species in the mountains of Colorado. It occurs in wet peaty meadows, calcareous fens, and the peaty or marly shores of lakes and ponds. The species flowers May to June, sets fruit in June, and the perigynia fall in July or August (Hipp 2008).

Environmental Baseline: *Carex diandra* is demonstrably secure globally (G5). The state rank for this species is critically imperiled (S1). This species was surveyed for in June 2009 and was not detected in the project area, but suitable habitat was documented.

Direct, Indirect, and Cumulative Impacts of the Alternatives: *Carex diandra* typically occupies wetland sites, including wet peaty meadows, fens, and pond and lakeshore sites.

- Alternative A has an estimated 8.37 acres of wetlands in the current ROW and 0.87 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative B1 has an estimated 23.2 acres of wetlands in the current ROW and 0.83 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C1 has an estimated 22.84 acres of wetlands in the current ROW and 0.11 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C2, Option 1 has an estimated 21.6 acres of wetlands in the current ROW and 0.11 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C2, Option 2 has an estimated 21.77 acres of wetlands in the current ROW and 0.44 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative D, Option 1 has an estimated 20.74 acres of wetlands in the current ROW and 0.18 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).

- Alternative D, Option 2 has an estimated 21.7 acres of wetlands in the current ROW and 0.52 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Construction activities proposed Alternatives B1, C1, C2 (Options 1 and 2), and D (Options 1 and 2) may result in the direct removal of undetected *Carex diandra*. The direct impact of trampling during maintenance activities could also result in loss of plant vigor and mortality of *Carex diandra* individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure, and cover value
- Vectoring and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
- Incidental impact to potential pollinator species
- Noxious weed introduction can indirectly impact special status plants through allelopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water, and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Carex diandra*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing or a loss of species viability rangewide was made for each of the action alternatives (A, B1, C1, C2, and D). There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. However, an occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable wetland and water habitat in the ROW. In order, the chance of incidental impacts are greatest for alternative B1 (24.03 acres) > C1 (22.95 acres) > D Option 2 (22.22 acres) > C2 Option 2 (22.21 acres) > C2 Option 1 (21.71 acres) > D Option 1 (20.92 acres) > A (9.24 acres). These impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area or a trend toward listing of this species as a threatened or endangered species.

Livid sedge, Carex livida

Carex livida is a perennial graminoid in the sedge family (Cyperaceae). The species can be distinguished from a distance based on the grayish (glaucous) coating of its culms.

Distribution: *Carex livida* is widely distributed throughout Canada, Europe and Asia. In the United States, the species is documented from Alaska, the Pacific Northwest, California, the Rocky Mountain states, the upper Midwest, and the New England states south through New Jersey. The Colorado distribution includes documented populations in Jackson, Larimer, and Park counties (NatureServe 2010t, NRCS 2009).

Natural History: *Carex livida* has a rhizomatous habit and it is an obligate wetland species found in rich fens in Colorado. These sites typically have a water table at, or very close to the ground surface. Examples of these sites include High Creek Fen in Park County and Boston Creek Fen in Larimer County. High Creek Fen is a calcareous ecosystem.

Environmental Baseline: *Carex livida* is secure globally (G5), but is considered to be critically imperiled (S1) in the state of Colorado. This species was surveyed for in June 2009 and was not detected in the project area, but suitable habitat was documented.

Direct, Indirect, and Cumulative Impacts: *Carex livida* typically occupies rich fen wetland sites, some of which occur north of CR 41. Fens are peat-forming wetlands fed by groundwater supply. One of the current power poles on Alternative A is located in a fen wetland.

- Alternative A has an estimated 8.37 acres of wetlands in the current ROW.
- Alternative B1 has an estimated 23.20 acres of wetlands in the proposed ROW.
- Alternative C1 has an estimated 22.84 acres of wetlands in the proposed ROW.
- Alternative C2, Option 1 has an estimated 21.60 acres of wetlands in the proposed ROW.
- Alternative C2, Option 2 has an estimated 21.77 acres of wetlands in the proposed ROW.
- Alternative D, Option 1 has an estimated 20.74 acres of wetlands in the proposed ROW.
- Alternative D, Option 2 has an estimated 21.70 acres of wetlands in the proposed ROW.

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Indirect impacts from the action alternatives may include the following:

- Changes in vegetation composition, structure, and cover value
- Vectoring and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors

- Incidental impact to potential pollinator species
- Noxious weed introduction can indirectly impact special status plants through alleopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water, and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Carex livida*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing or a loss of species viability rangewide was made for each of the action alternatives. There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. However, an occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable wetland habitat in the ROW as described above. In order, the chance of incidental impacts are greatest for alternative B1 > C1 > C2 Option 2 > D Option 2 > C2 Option 1 > D Option 1 > A. These impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area or a trend toward listing of this species as a threatened or endangered species.

Yellow lady's-slipper, Cypripedium parviflorum

Cypripedium parviflorum is a perennial herbaceous plant species in the lady's slipper family (Cypripedium).

Distribution: This species is widely distributed throughout Canada and the United States. In Colorado, the species is found in fourteen counties including Clear Creek, Custer, Douglas, El Paso, Garfield, Huerfano, Jefferson, La Plata, Larimer, Las Animas, Montrose, Park, Pueblo, and Teller (NatureServe 2010u; NRCS 2009). The species has not been documented in Grand County (Weber 2001, Spackman et al. 1997). Elevation range for the species is between 7,400 and 8,500 feet.

Natural History: This species flowers in Colorado from June through July. Yellow lady's slipper habitat in Colorado typically includes aspen groves, and ponderosa pine/Douglas-fir forests (FNA 2002).

Environmental Baseline: *Cypripedium parviflorum* is ranked as secure globally (G5). In Colorado, this species is ranked as imperiled (S2). According to the NatureServe conservation status, this species complex is undergoing a taxonomic revision (NatureServe 2010u). According to Weber and Wittmann (2001), this species is local and is especially vulnerable to extermination by collectors. This species was surveyed for in June 2009 and was not detected in the project area, but suitable habitat was documented.

Direct, Indirect, and Cumulative Impacts: *Cypripedium parviflorum* typically occupies aspens stands and ponderosa pine/Douglas-fir forest. Alternative A, C1, and C2 (Options 1 and 2) do not have any acreage

of aspen forest in their respective ROWs. Alternative B1 and D1 (Options 1 and 2) both have an estimated 4.79 acres of aspen forest in the proposed ROW.

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Alternative B1, C1, C2 (Options 1 and 2), and D1 (Options 1 and 2) may result in the direct removal of *Cypripedium parviflorum* (assuming an undetected presence). The direct impact of trampling during maintenance activities could also result in loss of plant vigor and mortality of *Cypripedium parviflorum* individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure, and cover value
- Creating a thick layer of wood chips on the soil surface
- Removal or disruption of duff layer in forested habitat thereby impacting soil mycorrhizae
- Vectoring and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing localized fire regime
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
- Incidental impact to potential pollinator species
- Noxious weed introduction can indirectly impact special status plants through alleopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water, and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Cypripedium parviflorum*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing or a loss of *Cypripedium parviflorum* viability rangewide was made for each of the action alternatives. There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. However, an occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable aspen, ponderosa pine, and Douglas-fir forested habitat in the ROW as described above. In order, the chance of incidental impacts are greatest for alternatives B1 and D1 (Options 1 and 2) > C1, and C2 (Options 1 and 2) > A. In this event, direct and indirect impacts may result for this species. These impacts would be

localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area or a trend toward listing of this species as a threatened or endangered species.

Park milkvetch, Astragalus leptaleus

Astragalus leptaleus is a perennial herbaceous species in the pea family (Fabaceae).

Distribution: Distribution for this plant includes occurrence in Montana, Idaho, Wyoming, and Colorado. In Colorado, *Astragalus leptaleus* has been documented in Gunnison, Jackson, Park, and Summit counties. It has not been documented in Grand County (NRCS 2009). The species occurs between 6,550 and 9,500 feet in elevation.

Natural History: This species inhabits wetlands, including sedge-dominated meadows, swales and hummocks. The plant may also be found in aspen glades and riparian willow communities. This species typically flowers and sets fruit from June through August.

Environmental Baseline: The Park milkvetch carries a global rank of G4 (apparently secure globally) and a state rank of S2 (imperiled statewide). The population trend for the species is unknown, but it may be in decline. Historically, the species was described as locally abundant. Many herbarium voucher specimens have been collected, but few plants are being collected currently, and several historic occurrences have not been rediscovered (Ladyman 2006). This milkvetch produces relatively few flowers and seeds, thus contributing to its rarity. This species was surveyed for in June 2009 and was not detected in the project area.

Direct, Indirect, and Cumulative Impacts: *Astragalus leptaleus* was not detected in the project alternative ROWs, however suitable habitat was documented. *Astragalus leptaleus* typically occupies wetland sites, including wet meadows, swales, and riparian sites.

- Alternative A has an estimated 8.37 acres of wetlands in the current ROW.
- Alternative B1 has an estimated 23.20 acres of wetlands in the existing ROW.
- Alternative C1 has an estimated 22.84 acres of wetlands in the ROW.
- Alternative C2, Option 1 has an estimated 21.6 acres of wetlands in the current ROW.
- Alternative C2, Option 2 has an estimated 21.77 acres of wetlands in the current ROW.
- Alternative D1, Option 1 has an estimated 20.74 acres of wetlands in the current ROW.
- Alternative D1, Option 2 has an estimated 21.70 acres of wetlands in the current ROW.

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. No additional impacts are projected to this species above and beyond what may have taken place in the past and what results from the current routine maintenance activity.

Alternative B1, C1, C2 (Options 1 and 2), and D1 (Options 1 and 2) may result in the direct removal of *Astragalus leptaleus* (assuming an undetected presence) if construction activities cannot fully span wetlands, wet meadows, or riparian sites. The direct impact of trampling during maintenance activities could also result in loss of plant vigor and mortality of *Astragalus leptaleus* individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure, and cover value
 - Vectoring and creating habitat for competitive invasive plant species
 - Changing local hydrologic pattern in wetland habitat
 - Changing soil characteristics of the habitat
 - Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
 - Incidental impact to potential pollinator species
 - Noxious weed introduction can indirectly impact special status plants through alleopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water, and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Astragalus leptaleus*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the Planning area, nor cause a trend toward federal listing or a loss of species viability rangewide was made for each of the action alternatives. There are no known occurrences of this species in the project area; however, suitable habitat does exist within the alternative ROWs. Rare plant surveys in 2008 and 2009 did not detect this species. However, an occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable wetland habitat in the ROW as described above. In order, the chance of incidental impacts are greatest for alternative B1 > C1 > C2 Option 2 > D Option 2 > C2 Option 1 > D Option 1 > A. Impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area or a trend toward listing of this species as a threatened or endangered species.

Roundleaf sundew, Drosera rotundifolia

Drosera rotundifolia is a perennial, insectivorous herbaceous plant in the sundew family (Droseraceae).

Distribution: *Drosera rotundifolia* is a circumboreal species that is distributed throughout Canada, as well as the northern and eastern United States, the Pacific Northwest, California and Colorado. The species has been documented in three counties in Colorado, including Grand, Gunnison, and Jackson (y 2009). The elevation range for the species is 9,100 to 9,800 feet in Colorado.

Natural History: This species inhabits wetlands, including the margins of acidic ponds and floating peat mats in fens. The plant flowers in July, but the flowers rarely open in Colorado. It tends to prefer open, sunny or partly sunny habitats. The upper leaf surfaces are round, with long glandular hairs to capture

prey. Enzymes are released by *Drosera* in order to digest insect prey and obtain the vital nitrogen and sulfur compounds which may otherwise be in short supply, or difficult to obtain in its environment.

Environmental Baseline: *Drosera rotundifolia* is ranked as globally secure (G5), but it is ranked as imperiled within the state of Colorado (S2). This species was surveyed for in June 2009 and was not detected in the project area, but suitable habitat was documented.

Direct, Indirect, and Cumulative Impacts: *Drosera rotundifolia* typically occupies fen wetland sites. Fen wetlands do occur north of CR 41.

- Alternative A has an estimated 8.37 acres of overall wetlands in the current ROW.
- Alternative B1 has an estimated 23.20 acres of wetlands in the proposed ROW.
- Alternative C1 has an estimated 22.84 acres of wetlands in the proposed ROW.
- Alternative C2, Option 1 has an estimated 21.60 acres of wetlands in the proposed ROW.
- Alternative C2, Option 2 has an estimated 21.77 acres of wetlands in the proposed ROW.
- Alternative D, Option 1 has an estimated 20.74 acres of wetlands in the proposed ROW.
- Alternative D, Option 2 has an estimated 21.70 acres of wetlands in the proposed ROW.

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Alternative B1, C1, C2 (Options 1 and 2), and D1 (Options 1 and 2) may result in the direct removal of *Drosera rotundifolia* (assuming an undetected presence) if suitable wetland habitats cannot be fully spanned. The direct impact of trampling during maintenance activities could also result in loss of plant vigor and mortality of *Drosera rotundifolia* individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure, and cover value
- Vectoring and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
- Incidental impact to pollinator species
- Noxious weed introduction can indirectly impact special status plants through alleopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water, and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Drosera rotundifolia*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing or a loss of species viability rangewide was made for *Drosera rotundifolia*. There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. An occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable wetland habitat in the ROW as described above. In order, the chance of incidental impacts are greatest for alternative B1 > C1 > C2 Option 2 > D Option 2 > C2 Option 1 > D Option 1 > A. These impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area, or a trend toward listing of this species as a threatened or endangered species.

Dropleaf buckwheat, Eriogonum exilifolium

Eriogonum exilifolium is a perennial herbaceous species in the buckwheat family (Polygonaceae).

Distribution: *Eriogonum exilifolium* is a regional endemic whose global distribution is limited Carbon and Albany counties, Wyoming and Jackson, Grand, and Larimer counties, Colorado (NatureServe 2010v). In Colorado, *Eriogonum exilifolium* is known from 14 occurrences in Middle Park (Grand County), North Park, and the upper Laramie River Valley. The plant is typically found at elevations of 7,500 to 9,000 feet.

Natural History: In Middle Park, *Eriogonum exilifolium* is reported most frequently on semi-barren clay soils of the Troublesome Formation. It is also known from a location underlain by the Coalmont Formation and other Cretaceous and Tertiary strata at Hot Sulphur Springs, Colorado (Anderson 2006). Colorado sites include sagebrush flats in the intermountain parks.

Environmental Baseline: *Eriogonum exilifolium* is restricted to scattered small areas of specific habitats within a narrow global range. The total population size of *Eriogonum exilifolium* is unknown. Individual occurrences range in size from 30 plants to more than one million. The species is ranked globally vulnerable (G3) by NatureServe (NatureServe 2010v), and is considered imperiled (S2) in both Wyoming and Colorado by the Wyoming Natural Diversity Database and the CNHP, respectively. The Forest Service Region 2 considers *Eriogonum exilifolium* to be a sensitive species (Forest Service 2003). It is not considered sensitive by the BLM in Colorado (BLM 2000) or Wyoming (BLM 2002). It is not included on the federal Endangered Species List, is not a candidate for listing, and has not been petitioned for listing.

Because the species is a long-lived perennial, changes in population size may occur gradually and be difficult to detect. There is evidence to suggest that dropleaf buckwheat numbers are trending downward as the result of human activities and habitat loss. Reservoir filling may have destroyed large areas of *Eriogonum exilifolium* in both Wyoming and Colorado including the nearby Willow Creek Reservoir (Anderson 2006). Other activities such as residential development, energy exploration and road construction can also threaten populations.

This species was surveyed for in June 2009 and was not detected in the project area, but suitable habitat was documented.

Direct, Indirect, and Cumulative Impacts: *Eriogonum exilifolium* typically occupies semi-barren sites with clay soils, as well as sagebrush flats.

- Alternative A has an estimated 31.86 acres of sagebrush shrublands in the current ROW.
- Alternative B1 has an estimated 74.96 acres of sagebrush shrublands in the proposed ROW.
- Alternative C1 has an estimated 95.38 acres of sagebrush shrublands in the proposed ROW.
- Alternative C2, Option 1 has an estimated 92.42 acres of sagebrush shrublands in the proposed ROW.
- Alternative C2, Option 2 has an estimated 87.17 acres of sagebrush shrublands in the proposed ROW.
- Alternative D, Option 1 has an estimated 80.05 acres of sagebrush shrublands in the proposed ROW.
- Alternative D, Option 2 has an estimated 78.05 acres of sagebrush shrublands in the proposed ROW.

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Alternative B1, C1, C2 (Options 1 and 2), and D1 (Options 1 and 2) may result in the direct removal of *Eriogonum exilifolium* (assuming an undetected presence) from semi-barren clay soils in sagebrush shrublands. The direct impact of trampling during maintenance activities could also result in loss of plant vigor and mortality of *Eriogonum exilifolium* individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure, and cover value
- Creating a thick layer of wood chips on the soil surface
- Vectoring and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing localized fire regime
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
- Incidental impact to pollinator species
- Noxious weed introduction can indirectly impact special status plants through alleopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water, and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Eriogonum exilifolium*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing or a loss of species viability rangewide was made for *Eriogonum exilifolium*. There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. An occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable sagebrush shrubland habitat in the ROW as described above. In order, the chance of incidental impacts are greatest for alternative C1 > and C2 Options 1 > C2 Option 2 > D Option 1 > D Option 2 > B1 > A. These impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area or a trend toward listing of this species as a threatened or endangered species.

Weber's scarlet gilia Ipomopsis aggregata ssp. Weberi

Ipomopsis aggregata ssp. Weberi is a perennial herbaceous species in the Polemoniaceae (Phlox) family.

Distribution: In the United States, *Ipomopsis aggregata ssp. Weberi* can be found in Idaho, Wyoming and Colorado. It is known from Jackson, Grand and Routt counties in Colorado (NatureServe 2010v), and its range extends several miles over the state line into Carbon County, Wyoming (NatureServe 200w).

Natural History: This species typically grows in rocky, gravelly soils of a sandy and coarse texture. Most commonly, the species is found in sagebrush shrublands. It has also been found in subalpine fir/Englemann spruce/willow habitat and subalpine fir/alder habitat. An associated species is reported to be *Aster junciformis*. In Colorado habitat, it is found in soils derived from the Coalmont Formation and from Miocene age silts and sandstone. *Ipomopsis aggregata ssp. Weberi* grows on ridge tops, in mountain meadows, and on variable slopes ranging from 0 to 35%. Plants have most often been reported from slopes with west, south, and east aspects. It has been most frequently reported from xeric slopes, but occasionally it grows in moister sites.

Environmental Baseline: NatureServe (NatureServe 2010w) ranks *Ipomopsis aggregata ssp. Weberi* as G5T2 indicating that the species is demonstrably secure but the subspecies *weberi* is imperiled. It is ranked imperiled (S2) by the CNHP and critically imperiled (S1) by the Wyoming Natural Diversity Database. It is designated a sensitive species by Forest Service Region 2 and the Wyoming BLM. The ranking is a result of limited geographic range and the impacts of the multiple uses of its habitat. Recreational activities, such as mountain bike riding, snowmobiling, hiking, horseback riding, and development activities associated with recreation and urbanization, such as campsite development and road building, threaten some occurrences on the Routt National Forest (Ladyman 2004). The available information suggests that there is a downward trend. It is reported at two sites, although only confirmed at one site, in Wyoming (Medicine Bow National Forest and adjacent state land). At the confirmed site there was a significant decline observed between 1989 and 1994. Herbicide spraying to control serviceberry and big sage in 1991 was suspected to have contributed to the decline. Grant and

Wilken (1986) report that it appears to be a relict species and suggest that it may have been more widespread in the past.

This species was surveyed for in June 2009 and was not detected in the project area, but suitable habitat was documented.

Direct, Indirect, and Cumulative Impacts: *Ipomopsis aggregata* ssp. *Weberi* typically occupies sagebrush shrublands and coniferous forests.

- Alternative A has an estimated 31.86 acres of sagebrush shrublands in the current ROW.
- Alternative B1 has an estimated 74.96 acres of sagebrush shrublands in the proposed ROW.
- Alternative C1 has an estimated 95.38 acres of sagebrush shrublands in the proposed ROW.
- Alternative C2, Option 1 has an estimated 92.42 acres of sagebrush shrublands in the proposed ROW.
- Alternative C2, Option 2 has an estimated 87.17 acres of sagebrush shrublands in the proposed ROW.
- Alternative D, Option 1 has an estimated 80.05 acres of sagebrush shrublands in the proposed ROW.
- Alternative D, Option 2 has an estimated 78.05 acres of sagebrush shrublands in the proposed ROW.

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Alternative B1, C1, C2 (Options 1 and 2), and D1 (Options 1 and 2) may result in the direct removal of *Ipomopsis aggregata* ssp. *Weberi* (assuming an undetected presence) in sagebrush shrublands. The direct impact of trampling during maintenance activities could also result in loss of plant vigor and mortality of *Ipomopsis aggregata* ssp. *Weberi* individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure and cover value
- Creating a thick layer of wood chips on the soil surface
- Vectors and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing localized fire regime
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
- Incidental impact to potential pollinator species

- Noxious weed introduction can indirectly impact special status plants through alleopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Ipomopsis aggregata* ssp. *Weberi*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the Planning area, nor cause a trend toward federal listing or a loss of species viability rangewide was made for each of the action alternatives. There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. However, an occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable sagebrush shrubland habitat in the ROW as described above. In order, the chance of incidental impacts are greatest for alternative C1 > and C2 Options 1 > C2 Option 2 > D Option 1 > D Option 2 > B1 > A. These impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area or a trend toward listing of this species as a threatened or endangered species.

Colorado tansy aster Machaeranthera coloradoensis

Machaeranthera coloradoensis has two recognized varieties in Colorado including var. *coloradoensis* and var. *brandegei*. This plant is a perennial herbaceous species in the sunflower family (Asteraceae).

Distribution: This plant is a regional endemic known only from Colorado and south-central Wyoming. In Colorado, the species may be found in Chaffee, Dolores, Gunnison, Hinsdale, La Plata, Lake, Park, Pitkin, Rio Grande, Saguache, and San Juan counties (NatureServe 2010x, Spackman et al. 1997). Elevational range for the species is approximately 8,500 to 12,500 feet.

Natural History: This species is known to inhabit sparse grassland and cushion plant communities in gravelly areas in mountain parks, slopes and rock outcrops up to dry tundra. The species flowers July through early August, and is normally in fruit in August. Elevational range for this species is typically 8,500 to 12,500 feet. This project would be constructed at or below the very low end of this plant's elevational range. The most similar habitat type available for this species in the project area would be the sparse grasslands type.

Environmental Baseline: The species is a G2/S2, meaning that is considered imperiled both globally and statewide. Threats to this species may include recreation, trail and road construction, livestock grazing, rangeland development, mining, urbanization, reservoir expansion, energy exploration, and competition from invasive species.

No quantitative monitoring of the species has been undertaken and no population trend is currently known. Recurring visits to known population sites has not documented apparent population declines. (Beatty et al. 2004).

This species was surveyed for in June 2009 and was not detected in the project area, but suitable habitat was documented.

Direct, Indirect, and Cumulative Impacts: *Machaeranthera coloradoensis* typically occupies sparse grassland and cushion plant communities in gravelly areas in mountain parks, slopes and rock outcrops up to dry tundra.

- Alternative A has an estimated 8.63 acres of grasslands in the current ROW.
- Alternative B1 has an estimated 11.44 acres of grasslands in the proposed ROW.
- Alternative C1 and C2 (Options 1 and 2) have an estimated 8.92 acres of grasslands in their proposed ROWs.
- Alternative D, Options 1 and 2 have an estimated 9.4 acres of grasslands in their proposed ROWs.

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Alternative B1, C1, C2 (Options 1 and 2), and D1 (Options 1 and 2) may result in the direct removal of *Machaeranthera coloradoensis* (assuming an undetected presence) in grasslands, gravelly slopes, or rocky outcrops. The direct impact of trampling during maintenance activities could also result in loss of plant vigor and mortality of *Machaeranthera coloradoensis* individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure, and cover value
- Vectors and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
- Incidental impact to pollinator species
- Noxious weed introduction can indirectly impact special status plants through allelopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water, and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Machaeranthera coloradoensis*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the Planning area, nor cause a trend toward federal listing or a

loss of species viability rangewide was made for *Machaeranthera coloradoensis*. There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. An occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable grassland and rock outcrop type habitats in the ROW as described above. In order, the chance of incidental impacts are greatest for alternative B1 > D (Options 1 and 2) > C1 and C2 (Options 1 and 2) > A. These impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area, or a trend toward listing of this species as a threatened or endangered species.

Harrington's beardtounge, Penstemon harringtonii

Penstemon harringtonii is a perennial herbaceous species that is in the snapdragon family (Scrophulariaceae).

Distribution: Scattered populations occur in Eagle, Garfield, Grand, Pitkin, Routt, and Summit counties (NatureServe 2010y).

Natural History: This is a large showy penstemon that occurs between 6,800 and 9,200 feet in open sagebrush habitat or sagebrush habitat with encroaching pinyon-juniper woodland trees (Dawson and Grant 2002). Associated soils are typically rocky loams and rocky clay loams derived from coarse calcareous parent materials, especially Pleistocene gravels, but also limey shales, limestones, and other parent rocks.

Environmental Baseline: *Penstemon harringtonii* is a Colorado endemic species. The global rank for this species is G3 (vulnerable), and the state rank is S3 (vulnerable). It is designated a sensitive species by the Forest Service and the BLM, and was formerly a Category 2 Candidate for ESA listing.

Threats are from housing and recreational developments including ski areas. Overgrazing has seemingly altered and limited suitable habitat. There is some concern over the use of chemicals on sagebrush within the occurrences of *Penstemon harringtonii* and the effect this may have on the species.

Penstemon harringtonii populations can vary between subsequent years and may peak every 4 to 5 years due to its short-lived perennial life cycle. Population numbers seem to have declined from the early 1980s and may be a response to drought (Panjabi and Anderson 2006).

This species was surveyed for in June 2009 and was not detected in the project area, but suitable habitat was documented.

Direct, Indirect, and Cumulative Impacts: *Penstemon harringtonii* could be found in this project area in sagebrush shrublands.

- Alternative A has an estimated 31.86 acres of sagebrush shrublands in the current ROW.
- Alternative B1 has an estimated 74.96 acres of sagebrush shrublands in the proposed ROW.
- Alternative C1 has an estimated 95.38 acres of sagebrush shrublands in the proposed ROW.

- Alternative C2, Option 1 has an estimated 92.42 acres of sagebrush shrublands in the proposed ROW.
- Alternative C2, Option 2 has an estimated 87.17 acres of sagebrush shrublands in the proposed ROW.
- Alternative D, Option 1 has an estimated 80.05 acres of sagebrush shrublands in the proposed ROW.
- Alternative D, Option 2 has an estimated 78.05 acres of sagebrush shrublands in the proposed ROW.

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Alternative B1, C1, C2 (Options 1 and 2), and D1 (Options 1 and 2) may result in the direct removal of Harrington's beardtounge (assuming an undetected presence) in sagebrush shrublands. The direct impact of trampling during maintenance activities could also result in loss of plant vigor and mortality of Harrington's beardtounge individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure and cover value
- Creating a thick layer of wood chips on the soil surface
- Vectoring and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing localized fire regime
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
- Incidental impact to pollinator species
- Noxious weed introduction can indirectly impact special status plants through alleopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Penstemon harringtonii*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the Planning area, nor cause a trend toward federal listing or a loss of species viability rangewide was made for *Penstemon harringtonii*. There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. An occurrence of this Region 2 FSS species may have been overlooked despite a systematic

and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable sagebrush shrubland habitat in the ROW as described above. In order, the chance of incidental impacts are greatest for alternative C1 > and C2 Options 1 > C2 Option 2 > D Option 1 > D Option 2 > B1 > A. These impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area, or a trend toward listing of this species as a threatened or endangered species.

Dwarf raspberry, Rubus arcticus var. acaulis

Rubus arcticus var. acaulis (*Cylactis arctica* ssp. *acaulis*) is a perennial herbaceous species in the family Rosaceae (Rose).

Distribution: The species has a circumboreal distribution. It is found throughout Canada, and in Alaska, Colorado, Maine, Michigan, Minnesota, Montana, Oregon, Washington, and Wyoming. In Colorado, the species has been documented from Grand and Park counties (NatureServe 2010z). It occupies an elevational range of 8,600 to 9,700 feet.

Natural History: The plant typically flowers from late June through early July. It will set fruit in late July through August. The species apparently seldom produces fruit in Colorado. *Rubus arcticus var. acaulis* occupies habitat such as willow carrs and mossy streamsides. The plant is typically found in association with shrubby cinquefoil, dwarf birch, diamondleaf willow, water sedge, and alpine meadowrue.

Environmental Baseline: *Rubus arcticus var. acaulis* is considered globally secure, but is ranked as critically imperiled (S1) in Colorado (NatureServe 2010z). This species was surveyed for in June 2009 and was not detected in the project area, but suitable habitat was documented.

Direct, Indirect, and Cumulative Impacts: *Rubus arcticus var. acaulis* typically occupies wetland sites, including willow carrs and mossy streamsides, pond and lakeshore sites.

- Alternative A has an estimated 8.37 acres of wetlands in the current ROW and 0.87 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative B1 has an estimated 23.20 acres of wetlands in the current ROW and 0.83 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C1 has an estimated 22.84 acres of wetlands in the current ROW and 0.11 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C2, Option 1 has an estimated 21.60 acres of wetlands in the current ROW and 0.11 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C2, Option 2 has an estimated 21.77 acres of wetlands in the current ROW and 0.44 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative D, Option 1 has an estimated 20.74 acres of wetlands in the current ROW and 0.18 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative D, Option 2 has an estimated 21.70 acres of wetlands in the current ROW and 0.52 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Alternative B1, C1, C2 (Options 1 and 2), and D1 (Options 1 and 2) may result in the direct removal of Dwarf raspberry (assuming an undetected presence) if construction activities cannot fully span suitable wetland habitat. The direct impact of trampling during maintenance activities could also result in loss of plant vigor and mortality of *Rubus arcticus* var. *acaulis* individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure, and cover value
- Vectoring and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
- Incidental impact to pollinator species
- Noxious weed introduction can indirectly impact special status plants through allelopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water, and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Rubus arcticus* var. *acaulis*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the Planning area, nor cause a trend towards federal listing or a loss of species viability rangewide was made for *Rubus arcticus* var. *acaulis*. There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. An occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable wetland and water habitat in the ROW. In order, the chance of incidental impacts are greatest for alternative B1 (24.03 acres) > C1 (22.95 acres) > D Option 2 (22.22 acres) > C2 Option 2 (22.21 acres) > C2 Option 1 (21.71 acres) > D Option 1 (20.92 acres) > A (9.24 acres). These impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area, or a trend toward listing of this species as a threatened or endangered species.

Hoary willow, Salix candida

Salix candida is a low to medium-sized shrub in the plant family Salicaceae. The species typically grows to four feet tall. It may be distinguished readily by densely white-tomentose ventral leaf surfaces and a revolute leaf margin (Hitchcock and Cronquist 1964).

Distribution: *Salix candida* is distributed from Alaska, northern Canada and the northern United States down through Colorado. In Colorado, the plant has been documented in Gunnison, Hinsdale, La Plata, Lake, Larimer, and Park counties (Spackman et al. 1997).

Natural History: Habitat for this species occurs on hummocks in nutrient-rich (alkaline) fens, and thickets at the edges of ponds and on river terraces. The species grows in association with many other *Salix* and *Carex* species and with *Betula glandulosa*. Elevational range for this species is approximately 8,800 to 10,600 feet. Hoary willow flowers from May through June.

Environmental Baseline: This species is ranked as secure globally (G5), but imperiled in Colorado (S2). This species was surveyed for in June 2009 and was not detected in the project area, but suitable habitat was documented in the fens north of CR 41.

Direct, Indirect, and Cumulative Impacts: *Salix candida* typically occupies fen and bog wetlands, and the edges of ponds and river terraces.

- Alternative A has an estimated 8.37 acres of total wetlands in the current ROW and 0.87 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative B1 has an estimated 23.20 acres of wetlands in the current ROW and 0.83 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C1 has an estimated 22.84 acres of wetlands in the current ROW and 0.11 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C2, Option 1 has an estimated 21.60 acres of wetlands in the current ROW and 0.11 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C2, Option 2 has an estimated 21.77 acres of wetlands in the current ROW and 0.44 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative D, Option 1 has an estimated 20.74 acres of wetlands in the current ROW and 0.18 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative D, Option 2 has an estimated 21.70 acres of wetlands in the current ROW and 0.52 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Alternative B1, C1, C2 (Options 1 and 2), and D1 (Options 1 and 2) may result in the direct removal of *Salix candida* (assuming an undetected presence) if construction activities cannot fully span suitable wetland, fen wetland, or riparian habitats. The direct impact of trampling during maintenance activities could also result in loss of plant vigor and mortality of *Salix candida* individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure, and cover value
- Vectoring and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
- Incidental impact to pollinator species
- Noxious weed introduction can indirectly impact special status plants through alleopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water, and soil nutrients
- Increase in dust from increased construction equipment or new access roads

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Salix candida*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the Planning area, nor cause a trend towards federal listing or a loss of species viability rangewide was made for *Salix candida*. There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. An occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable wetland and water habitat in the ROW. In order, the chance of incidental impacts are greatest for alternative B1 (24.03 acres) > C1 (22.95 acres) > D Option 2 (22.22 acres) > C2 Option 2 (22.21 acres) > C2 Option 1 (21.71 acres) > D Option 1 (20.92 acres) > A (9.24 acres). These impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area, or a trend toward listing of this species as a threatened or endangered species.

Autumn willow, Salix serissima

Salix serissima is a perennial woody shrub species in the willow family (Salicaceae).

Distribution: *Salix serissima* ranges from Canada to the northern United States. In the Rocky Mountains, it is found in Montana, Wyoming, and Colorado. In Colorado, where the species reaches its southernmost distribution, autumn willow is known from Custer, Larimer, Park, and Routt counties (NatureServe 2010aa).

Natural History: This species is found in wetland areas including marshes, fens, and bogs. Elevational range varies from 7,800 to 10,200 feet. It was reported at 9,200 feet in the High Creek Fen in Park County, Colorado.

Environmental Baseline: Globally, the species is secure (G4). In Colorado, *Salix serissima* is critically imperiled (ranked S1). Population trends are unknown (Decker 2006). Primary threats include grazing and loss of wetland habitats from water diversions.

This species was surveyed for in summer 2008 and 2009, but was not observed. Habitat for this species occurs in fen wetlands north of CR 41. These sites are located on private lands.

Direct, Indirect, and Cumulative Impacts: *Salix serissima* typically occupies fen and bog wetlands, and the edges of ponds and river terraces.

- Alternative A has an estimated 8.37 acres of wetlands in the current ROW and 0.87 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative B1 has an estimated 23.20 acres of wetlands in the current ROW and 0.83 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C1 has an estimated 22.84 acres of wetlands in the current ROW and 0.11 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C2, Option 1 has an estimated 21.60 acres of wetlands in the current ROW and 0.11 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C2, Option 2 has an estimated 21.77 acres of wetlands in the current ROW and 0.44 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative D, Option 1 has an estimated 20.74 acres of wetlands in the current ROW and 0.18 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative D, Option 2 has an estimated 21.70 acres of wetlands in the current ROW and 0.52 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Alternative B1, C1, C2 (Options 1 and 2), and D1 (Options 1 and 2) may result in the direct removal of *Salix serissima* (assuming an undetected presence) if construction activities cannot fully span suitable wetland, fen wetland, or riparian habitats. The direct impact of trampling during maintenance activities could also result in loss of plant vigor and mortality of *Salix serissima* individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure, and cover value
- Vectoring and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
- Incidental impact to pollinator species

- Noxious weed introduction can indirectly impact special status plants through alleopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water, and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Salix serissima*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the Planning area, nor cause a trend towards federal listing or a loss of species viability rangewide was made for *Salix serissima*. There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. An occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable wetland and water habitat in the ROW. In order, the chance of incidental impacts are greatest for alternative B1 (24.03 acres) > C1 (22.95 acres) > D Option 2 (22.22 acres) > C2 Option 2 (22.21 acres) > C2 Option 1 (21.71 acres) > D Option 1 (20.92 acres) > A (9.24 acres). These impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area, or a trend toward listing of this species as a threatened or endangered species.

Lesser bladderwort, Utricularia minor

Utricularia minor is a perennial, aquatic, carnivorous plant species in the family Lentibulariaceae (Bladderwort Family).

Distribution: The plant is widely distributed throughout Canada and the northern United States. The species reaches its southern limits in California, Colorado, and North Carolina. In Colorado, the plant has been documented in Boulder, Delta, Jackson, Mesa, and Montezuma counties (NatureServe 2010ab). The elevational range for the species is approximately 6,600 to 8,600 feet.

Natural History: *Utricularia minor* is typically found submerged in shallow ponds, lakes, and slow-moving streams. The plant uses some of its leaf segments as traps for small aquatic insects (Weber and Wittmann 2001). The flowering/fruitletting period for this species is July through September.

Environmental Baseline: *Utricularia minor* is globally secure (G5) and is ranked as imperiled (S2) in the state of Colorado. Known populations are all very small and restricted to specialized microsites (WNDD 2009). This species was surveyed for in June 2009 and was not detected in the project area, but suitable habitat was documented.

Direct, Indirect, and Cumulative Impacts: *Utricularia minor* typically occupies shallow ponds, lakes and slow-moving streams.

- Alternative A has an estimated 8.37 acres of wetlands in the current ROW and 0.87 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).

- Alternative B1 has an estimated 23.20 acres of wetlands in the current ROW and 0.83 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C1 has an estimated 22.84 acres of wetlands in the current ROW and 0.11 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C2, Option 1 has an estimated 21.60 acres of wetlands in the current ROW and 0.11 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative C2, Option 2 has an estimated 21.77 acres of wetlands in the current ROW and 0.44 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative D, Option 1 has an estimated 20.74 acres of wetlands in the current ROW and 0.18 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).
- Alternative D, Option 2 has an estimated 21.70 acres of wetlands in the current ROW and 0.52 acres of water features (including lakeshore, ponds, irrigation ditches, and streams).

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Alternative B1, C1, C2 (Options 1 and 2), and D1 (Options 1 and 2) may result in the direct removal of *Utricularia minor* (assuming an undetected presence) if construction activities cannot fully span wetlands or other suitable habitat sites with standing or slow-moving water. The direct impact of trampling during maintenance activities could also result in loss of plant vigor and mortality of *Utricularia minor* individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure and cover value
- Vectoring and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
- Incidental impact to pollinator species
- Noxious weed introduction can indirectly impact special status plants through alleopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Utricularia minor*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the Planning area, nor cause a trend toward federal listing or a

loss of species viability rangewide was made for *Utricularia minor*. There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. An occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable wetland and water habitat in the ROW. In order, the chance of incidental impacts are greatest for alternative B1 (24.03 acres) > C1 (22.95 acres) > D Option 2 (22.22 acres) > C2 Option 2 (22.21 acres) > C2 Option 1 (21.71 acres) > D Option 1 (20.92 acres) > A (9.24 acres). These impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area, or a trend toward listing of this species as a threatened or endangered species.

Selkirk's violet, Viola selkirkii

Viola selkirkii is a perennial herbaceous plant species in the family Violaceae. The glassy hairs on the upper leaf surfaces distinguish this violet species.

Distribution: The plant is distributed throughout Canada and Alaska, and much of the northern United States. It is disjunct in Colorado and possibly in New Mexico. In Colorado, the species has historically been documented from Douglas and Larimer counties (NatureServe 2010ac). Elliott (2008) reports that this species has been documented from Rocky Mountain National Park in 2004, from the base of Devil's Head in the Rampart Range in 2004, and in the Wet Mountains in 2006. This species is typically found in an elevational range of 8,500 to 9,100 feet.

Natural History: Habitat for *Viola selkirkii* includes cold mountain aspen forests, moist woods, and thickets.

Environmental Baseline: *Viola selkirkii* is considered secure globally (G5) and is ranked as critically imperiled in the state of Colorado (S1). Selkirk's violet was not detected in the project alternative ROWs, but potentially suitable habitat was documented.

Direct, Indirect, and Cumulative Impacts: *Viola selkirkii* typically occupies moist habitat in closed canopy forest. The project site features some rather dense stands of lodgepole pine forest and mesic stands of aspen forest.

- Alternative A has an estimated 12.05 acres of lodgepole pine forest in the current ROW.
- Alternative B1 has an estimated 17.72 acres of lodgepole pine forest in the current ROW and 4.79 acres of aspen forest.
- Alternative C1 has an estimated 14.40 acres of lodgepole pine forest in the current ROW.
- Alternative C2, Option 1 has an estimated 14.40 acres of lodgepole pine forest in the current ROW.
- Alternative C2, Option 2 has an estimated 14.40 acres of lodgepole pine forest in the current ROW.
- Alternative D, Option 1 has an estimated 17.31 acres of lodgepole pine forest in the current ROW.

- Alternative D, Option 2 has an estimated 17.31 acres of lodgepole pine forest in the current ROW and 4.79 acres of aspen forest.
- Alternative D (Options 1 and 2) has an estimated 4.79 acres of aspen forest in the proposed ROW and 4.79 acres of aspen forest.

Alternative A would utilize the existing route and existing hardware. Routine maintenance would be necessary to keep the system operational. Under Alternative A, no additional impacts to this species are anticipated beyond what may have occurred in the past and what results from the routine maintenance activity.

Alternative B1, C1, C2 (Options 1 and 2), and D1 (Options 1 and 2) may result in the direct removal of *Viola selkirkii* (assuming an undetected presence) in dense stands of lodgepole pine or aspen. The direct impact of trampling during maintenance activities could also result in loss of plant vigor and mortality of *Viola selkirkii* individuals.

Indirect impacts from proposed project alternatives may include the following:

- Changes in vegetation composition, structure, and cover value
- Creating a thick layer of wood chips on the soil surface
- Removal or disruption of duff layer in forested habitat thereby impacting soil mycorrhizae
- Vectoring and creating habitat for competitive invasive plant species
- Changing local hydrologic pattern in special status plant habitat
- Changing localized fire regime
- Changing soil characteristics of the habitat
- Changing foraging behavior of livestock or wildlife within and adjacent to transmission line corridors
- Incidental impact to pollinator species
- Noxious weed introduction can indirectly impact special status plants through allelopathy (release of compounds that inhibit the growth of other plants), changing the fire regime and through direct competition for light, water, and soil nutrients.
- Increase in dust from increased construction equipment or new access roads

Determination for Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A would have **no impact** on *Viola selkirkii*.

Determination for All Action Alternatives: A determination of **may adversely impact individuals**, but is not likely to result in a loss of viability in the Planning area, nor cause a trend toward federal listing or a loss of species viability rangewide was made for *Viola selkirkii*. There are no known occurrences of this species in the project area. The rare plant surveys of 2008 and 2009 did not detect this species. An occurrence of this Region 2 FSS species may have been overlooked despite a systematic and thorough survey. In this event, direct and indirect impacts may result for this species. The likelihood that undetected plants may be impacted by project construction or operation is directly related to the acres of suitable lodgepole pine habitat in the ROW as described above. In order, the chance of incidental

impacts are greatest for alternative B1>D (Options 1 and 2)>C1 and C2 (Options 1 and 2) >A. These impacts would be localized, and are unlikely to be of an intensity, duration, or scale that would result in a loss of viability in the planning area, or a trend toward listing of this species as a threatened or endangered species.

6.5 Determination of Impacts for All Forest Service Sensitive Species

Table 6-7. Determination for Forest Service Sensitive Wildlife Species by Project Alternative.

Common Name	Species	Determination*			Alternative C2 Opt.1/Opt. 2	Alternative D Opt.1/Opt. 2
		Alternative A (No Action)	Alternative B1	Alternative C1		
MAMMALS						
American marten	<i>Martes americana</i>	NI	MAII	NI	NI	MAII
Pygmy shrew	<i>Sorex hoyi montanus</i>	NI	NI	NI	NI	NI
Wolverine	<i>Gulo gulo luscus</i>	NI	NI	NI	NI	NI
North American River Otter	<i>Lontra canadensis</i>	NI	NI	NI	NI	NI
BIRDS						
American bittern	<i>Botaurus lentiginosus</i>	MAII	MAII	MAII	MAII	MAII
American peregrine falcon	<i>Falco peregrinus</i>	MAII	MAII	MAII	MAII	MAII
American three-toed woodpecker	<i>Picoides dorsalis</i>	NI	MAII	MAII	MAII	MAII
Bald eagle	<i>Haliaeetus leucocephalus</i>	MAII	MAII	MAII	MAII	MAII
Black tern	<i>Chlidonias niger</i>	MAII	MAII	MAII	MAII	MAII
Boreal owl	<i>Aegolius funereus</i>	MAII	MAII	MAII	MAII	MAII
Brewer's sparrow	<i>Spizella breweri</i>	NI	MAII	MAII	MAII	MAII
Greater sage-grouse	<i>Centrocercus urophasianus</i>	NI	MAII	MAII*	Opt 1: MAII* Opt 2: MAII	Opt 1: MAII* Opt 2: MAII
Loggerhead Shrike	<i>Lanius ludovicianus</i>	MAII	MAII	MAII	MAII	MAII
Northern goshawk	<i>Accipiter gentilis</i>	NI	MAII	MAII	MAII	MAII
Northern harrier	<i>Circus cyaneus</i>	NI	MAII	MAII	MAII	MAII
Olive-sided flycatcher	<i>Contopus borealis</i>	NI	MAII	MAII	MAII	MAII
AMPHIBIANS						
Boreal toad	<i>Bufo boreas boreas</i>	NI	NI	NI	NI	NI
Northern leopard frog	<i>Rana pipiens</i>	NI	NI	NI	NI	NI
Wood frog	<i>Rana sylvatica</i>	NI	NI	NI	NI	NI

Determinations for FSS Species:

MAII: May adversely impact individuals, but not likely to result in a loss of viability in the planning area, nor cause a trend towards federal listing or a loss of species viability rangewide; NI: No impact

Table 6-8. Determination for Forest Service Sensitive Plant Species by Project Alternative¹.

Scientific Name	Common Name	Alternative A (No Action)	Alternative B1	Alternative C1	Alternative C2 Opt.1/Opt. 2	Alternative D Opt.1/Opt. 2
FERNS AND ALLIES						
<i>Botrychium ascendens</i>	Upswept moonwort	NI	MAII	MAII	MAII	MAII
<i>Botrychium lineare</i>	Narrow-leaved moonwort	NI	MAII	MAII	MAII	MAII
MONOCOTS						
<i>Carex diandra</i>	Lesser panicled sedge	NI	MAII	MAII	MAII	MAII
<i>Carex livida</i>	Livid sedge	NI	MAII	MAII	MAII	MAII
<i>Cypripedium parviflorum</i> (=C. calceolus spp. parviflorum)	Yellow lady's slipper	NI	MAII	MAII	MAII	MAII
DICOTS						
<i>Astragalus leptaleus</i>	Park milkvetch	NI	MAII	MAII	MAII	MAII
<i>Drosera rotundifolia</i>	Roundleaf sundew	NI	MAII	MAII	MAII	MAII
<i>Eriogonum exillifolium</i>	Dropleaf buckwheat	NI	MAII	MAII	MAII	MAII
<i>Ipomopsis aggregata</i> ssp. weberi	Weber's scarlet gilia	NI	MAII	MAII	MAII	MAII
<i>Machaeranthera coloradoensis</i>	Colorado tansy-aster	NI	MAII	MAII	MAII	MAII
<i>Penstemon harringtonii</i>	Harrington beardtongue	NI	MAII	MAII	MAII	MAII
<i>Rubus arcticus</i> var. acaulis (Cylactis arctica ssp. Acaulis)	Dwarf raspberry	NI	MAII	MAII	MAII	MAII
<i>Salix candida</i>	Hoary willow	NI	MAII	MAII	MAII	MAII
<i>Salix serisissima</i>	Autumn willow	NI	MAII	MAII	MAII	MAII
<i>Utricularia minor</i>	Lesser bladderpod	NI	MAII	MAII	MAII	MAII
<i>Viola selkirkii</i>	Selkirk violet	NI	MAII	MAII	MAII	MAII

Determinations for FSS Species:

MAII: May adversely impact individuals, but not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing or a loss of species viability rangewide. (For plants, this determination is based on potential presence for species in suitable habitat where some or all of the project area was not surveyed, or which are difficult to find and may have been inadvertently undetected during surveys.)

NI: No impact

¹ Although the determination may be MAII, alternatives have a varying likelihood of impact based on acres of habitat within ROW. A comparison of alternatives is provided in the Determination for All Alternatives discussion under each species.

7.0 Forest Service Management Indicator Species

7.1 Forest Service Guidance

The National Forest Management Act of 1976 requires that national forest planning “provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives.” To implement this mandate, in 1982 the Forest Service developed and implemented regulations requiring the identification of Management Indicator Species (MIS) to be used as planning and analysis tools to set goals, objectives, and minimum management requirements in Forest Plans; to focus the analysis of impacts of plan alternatives; and to monitor the impacts of plan implementation at the project level. MIS species were created to evaluate the impacts of management practices on fisheries and wildlife resources. The Forest Service monitors select species whose population trends are believed to reflect the impacts of management activities on forest ecosystems (36 CFR 219.9). Specifically, the regulations state that “these species shall be selected because their population changes are believed to indicate the impacts of management activities” (36 CFR 219.19). The MIS designation is not intended to provide special protective status, serve as biological diversity benchmarks, nor represent every species of plant or animal found in the forest. This document also includes a Management Indicator Species Report that describes population trend and viability outcomes as a result of this project for all MIS species with potential to occur in the project area.

7.2 Species Considered

Available information regarding MIS populations and trends was considered for this project. Monitoring and evaluation is carried out to address populations across the entire Forest. Forest Plan goals are to maintain or improve MIS habitat. Numerous Forest Plan goals, objectives, standards and guidelines provide coordinated direction for MIS management (Forest Service 1997).

The Forest Plan requires sufficient habitat to support at least a minimum of reproductive MIS individuals. As a result, the Arapaho National Forest tiers their analysis of MIS species to a community-based analysis of habitats. These habitats are designated Management Indicator Communities (MIC). The MICs for the Arapaho National Forest are:

- existing and potential old-growth forests
- interior forests
- young to mature forest structural stages
- openings within/adjacent to forests
- aspen forests
- montane riparian areas and wetlands
- montane aquatic environments

Table 7-1 lists all MIS species considered for analysis; however species noted as “excluded” will not be carried forward for evaluation. Certain MIS are also listed as FSS. These species are denoted in the following table:

Table 7-1. Management Indicator Species (MIS) Considered for Analysis.

Common Name	Scientific Name	Management Indicator Community	Species Excluded?	Reason for exclusion
MAMMALS				
Bighorn sheep	<i>Ovis canadensis</i>	Openings	Yes	No species or habitat within project area
Elk	<i>Cervus elaphus</i>	Young to mature forest and openings	No	
Mule deer	<i>Odocoileus hemionus</i>	Young and mature forest and openings & prairie woodlands	No	
BIRDS				
Golden-crowned kinglet	<i>Regulus satrapa</i>	Interior forests	No	
Hairy woodpecker	<i>Picoides villosus</i>	Young to mature forest	No	
Lark bunting	<i>Calamospiza melanocorys</i>	Midgrass prairie	Yes	No species or habitat within project area: Pawnee National Grassland only.
Mountain bluebird	<i>Sialia currucoides</i>	Openings	No	
Pygmy nuthatch	<i>Sitta pygmaea</i>	Old growth	No	
Warbling vireo	<i>Vireo gilvus</i>	Aspen forest	No	
Wilson's warbler	<i>Wilsonia pusilla</i>	Montane riparian and wetlands	No	
FISH				
Brook trout	<i>Salvelinus fontinalis</i>	Montane aquatic	Yes	No habitat impacted in project area
Brown trout	<i>Salmo trutta</i>	Montane aquatic	Yes	No habitat impacted in project area
Greenback cutthroat trout	<i>Oncorhynchus clarkii stomias</i>	Montane aquatic	Yes	No habitat impacted in project area
Colorado River cutthroat trout	<i>Oncorhynchus clarkii pleuriticus</i>	Montane aquatic	Yes	Not found in project area; historically a west slope species
Plains killfish	<i>Fundulus zebrinus</i>	Prairie aquatic environments	Yes	No species or habitat within project area; Pawnee National Grassland only.
Plains topminnow	<i>Fundulus sciadicus</i>	Prairie aquatic environments	Yes	No species or habitat within project area; Pawnee National Grassland only.
AMPHIBIANS				
Boreal toad*	<i>Anaxyrus boreas</i>	Montane riparian and wetlands	No	

*Species is also included as a FSS species.

The complete list of MIS of the ARNF and Pawnee National Grassland are listed in Appendix G of the Forest Plan. This list was amended by Forest Supervisor decision dated May 3, 2005. Species on the amended list that are found within or adjacent to the project area and are potentially impacted by the project are summarized in Table 7-2 below.

7.3 Species Evaluation

The MIS retained for analysis are shown in Table 7-2. The boreal toad analysis is presented above in the FSS section.

Table 7-2. MIS Carried Forward for Analysis.

Management Indicator Species	
Elk Mule deer	Mammals
Golden-crowned kinglet Hairy woodpecker Mountain bluebird Pygmy nuthatch Warbling vireo Wilson's warbler	Birds
Boreal toad*	Amphibian

*Species is also included as FSS species.

7.3.1 Mammals

Elk, Cervus elaphus

Elk is an MIS for young to mature forest structural stages and openings within/adjacent to forests (Forest Service 1997).

Habitat Status and Requirements: Elk are found throughout the ARNF finding both forage and cover in and near forested ecosystems. They are often associated with semi-open forests and forest edges adjacent to parks, meadows, and alpine tundra. Elk are both grazers and browsers in the northern and central Rocky Mountains. Grasses and shrubs compose most of the winter diet. Forbs become increasingly important in late spring and summer, and grasses dominate again in the fall. Elk tend to inhabit higher elevations during the spring and summer and migrate to lower elevations for winter (Forest Service 1997).

Threats to Species: Threats to elk include loss of winter range habitat quality and quantity and severed migration corridors. Invasive plants such as cheatgrass are threats to habitat quality. Hunting and collisions with vehicles will reduce numbers locally. Disturbance on summer ranges, especially calving and young-rearing areas, may lead to indirect impacts on populations. Chronic wasting disease is also a threat to Colorado elk populations and the first 'CWD positive elk' was detected in Grand County in September 2002 (CDOW, personal communication).

Population Trends: The project area is located within elk severe winter range, winter range, and winter concentration areas, elk migration corridors adjacent to the project area, and also includes elk summer range and production areas (CDOW 2003) (Map 7-1 and Map 7-2). Statewide and ANRF population estimates for elk are displayed in the following table.

Table 7-3. Elk Post-hunt Population Estimates

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ARNF	19,270	20,710	20,680	20,100	20,160	20,070	19,720	16,270	19,280	18,893	20,770
Statewide	218,500	229,400	264,600	263,300	305,500	297,500	278,700	252,000	258,400	271,840	291,960

Source: CDOW 2007b

Forest-wide, early structural stages are 2% (19,600 acres) and natural vegetated openings are 16% (212,000 acres) of forested vegetation. Increasing grass-forb and shrub-seedling forest structural stages Forest-wide is an emphasis objective in Forest Plan for elk (Forest Service 1997). Statewide and in the planning area elk populations are increasing.

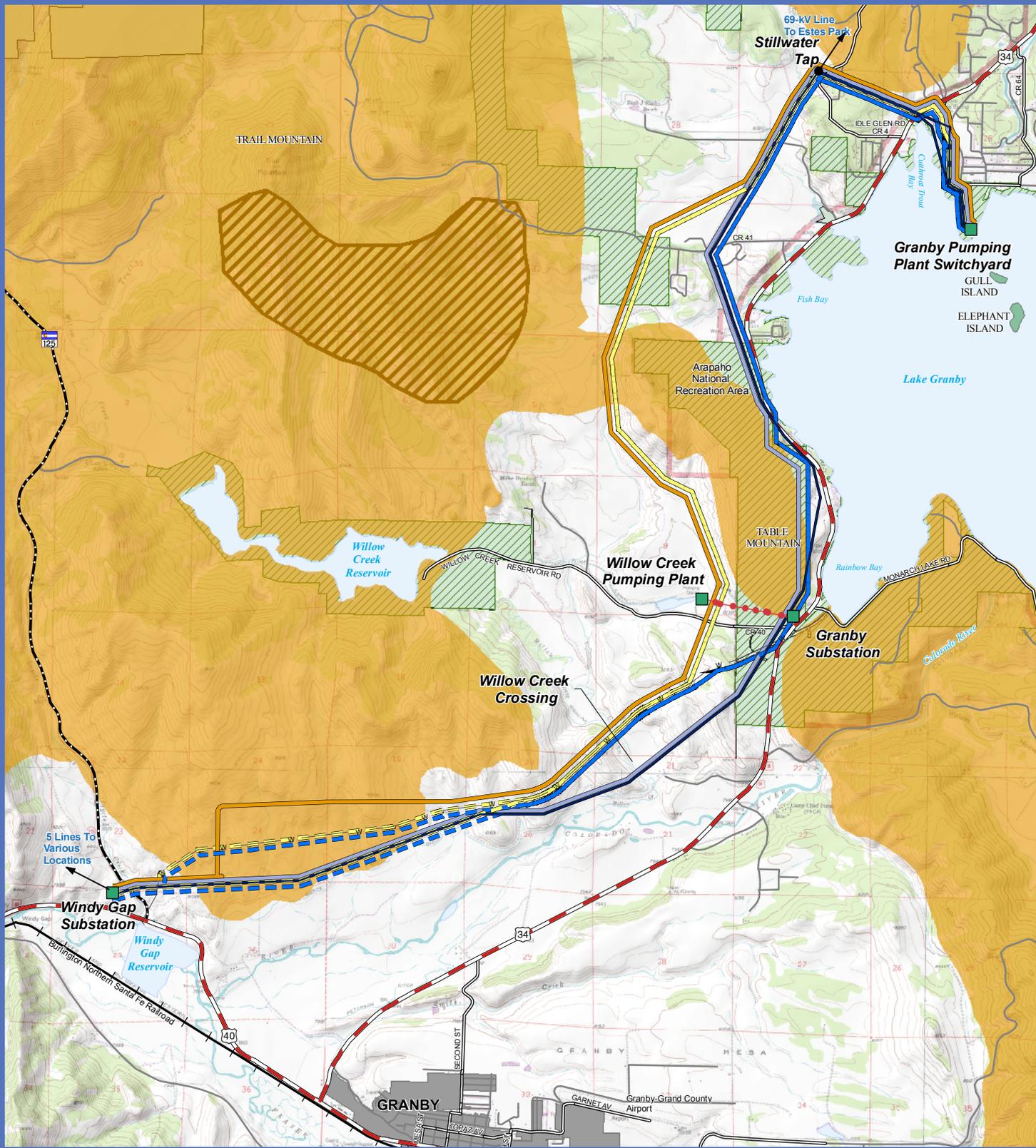
Direct, Indirect, and Cumulative Impacts: The project area for the Proposed Action contains elk winter concentrations/crucial winter range (Oldham 2005 and 2007, pers. comm.). The project area falls within an elk north–south migration corridor running from Willow Creek Reservoir, west of Table Mountain and south to the Colorado River. Habitat surveys conducted in the project area during the summer of 2005 showed extensive sign of elk along the southwestern portion of the Proposed Action alignment. Portions of elk crucial winter range would be directly impacted by the removal of vegetation around the transmission structures bases. These impacts would be mitigated through re-vegetation with regionally native species as described under Western’s standard construction and mitigation practices. Construction during the summer or winter months would temporarily displace elk from the project area. In order to minimize this impact, construction would not occur within elk crucial winter range between November 15 and April 30 on all public and private lands unless an exception is granted by the BLM and CDOW.

In the long-term, if maintenance activities occur during winter months, elk herds could be displaced from critical habitats. Displacement may lead to a lack of viability since some adjacent habitat areas are planned for development. The long-term operation of the transmission line is not considered a significant impact (Holland 2005, pers. comm.). The primary impact would be the increased human presence in critical habitats during winter months.

If the proposed project resulted in an increase of noxious weeds in the project area, specifically in big game summer and winter range habitats, the project would indirectly impact browse for elk and other big game. Western’s standard construction and mitigation practices would ensure these impacts are minimized.

Other activities within the project area that could cumulatively impact elk include the construction of residential and commercial developments adjacent to the project area, hunting on private property, future forest management activities on the Forest, the expansion of the mountain pine beetle epidemic. Residential developments would reduce winter foraging, concentration, migration, and severe winter range within the project area. Increasing development within the Granby area coupled with increasing human presence has reduced crucial habitats for big game. Future forest management activities including prescribed burning may improve elk habitat over time. The BLM land exchange would preserve crucial winter range for big game species including elk.

Determinations of Alternative A (No Action): Alternative A would continue to create intermittent impacts to elk habitat in the project area in the long-term as a result of ongoing maintenance activities in areas used as winter range. The determination across the ARP is **no change**.



Map 7-1

Legend

- | | | |
|---|---------------------------------------|---------------------------|
| Base Data | Transmission Line Alternatives | Elk Summer Habitat |
| ● Existing Willow Creek Tap (69-KV) | — Alternative A - Existing | ■ Summer Range |
| — Windy Gap Water Pipeline (NCWCD) | — Alternative B1 | ▨ Production Area |
| ▨ Arapaho National Recreation Area (ANRA) | — Alternative C1 | |
| ■ U.S. Forest Service (USFS) | — Alternative C2 | |
| | — Alternative C2 - Options 1 and 2 | |
| | — Alternative D | |
| | — Alternative D - Option 1 and 2 | |

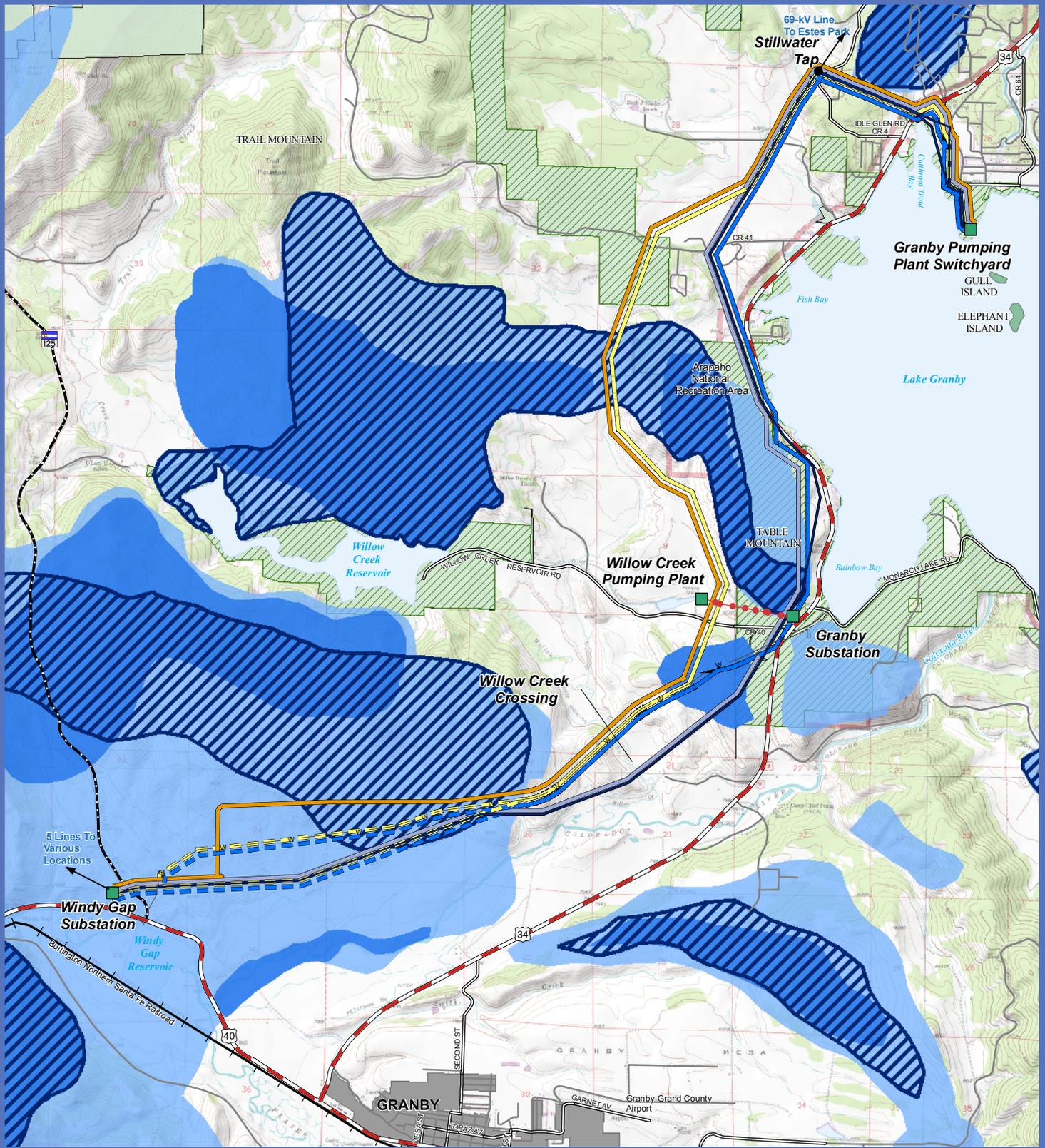
Wildlife - Elk (Summer)
July 23, 2010



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

GRANBY PUMPING PLANT - WINDY GAP TRANSMISSION LINE REBUILD PROJECT

File path: P:\2010\0602\0229_02\GIS\Project\Layouts\ALTB1_8_6X11_060227.mxd



Map 7-2

Legend

- | | | |
|---|---------------------------------------|---------------------------|
| Base Data | Transmission Line Alternatives | Elk Winter Habitat |
| ● Existing Willow Creek Tap (69-KV) | — Alternative A - Existing | ■ Winter Range |
| — Windy Gap Water Pipeline (NCWCD) | — Alternative B1 | ■ Winter Concentration |
| ▨ Arapaho National Recreation Area (ANRA) | — Alternative C1 | ▨ Severe Winter Habitat |
| ■ U.S. Forest Service (USFS) | — Alternative C2 | |
| | — Alternative C2 - Options 1 and 2 | |
| | — Alternative D | |
| | — Alternative D - Option 1 and 2 | |

Wildlife - Elk (Winter)

July 23, 2010



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

GRANBY PUMPING PLANT - WINDY GAP TRANSMISSION LINE REBUILD PROJECT

File path: P:\2010\0603\0229_02\GIS\Project\Layouts\ALT1_8_6X11_060327.mxd

Determinations of Alternative B1: Alternative B1 is located in an area containing big game winter range and winter concentration according to CDOW data. Alternative B1 is also located primarily in a previously disturbed corridor. Alternative B1 would create adverse short-term impacts to elk habitat in the project area if project construction were to occur in areas used as winter range. Restricting construction to non-winter months in winter range would largely minimize impacts to elk within this corridor. Alternative B1 would replace towers in the existing ROW, and construct new towers for approximately 1.8 miles of new ROW. Therefore, the determination across the ARP is no change.

Determinations of Alternatives C1, C2, and D (Proposed Action): The impacts of Alternatives C1, C2, and D (Proposed Action) would be similar to those described for Alternative B1. Therefore, the determination across the ARP for Alternatives C1, C2, and D is no change.

Mule deer, *Odocoileus hemionus*

Mule deer is an MIS for young to mature forest structural stages, openings within/adjacent to forest, and prairie woodlands (Forest Service 1997).

Habitat Status and Requirements: Mule deer occupy all ecosystems in Colorado from grassland to alpine tundra. Spring and summer ranges are most typically mosaics of meadows, aspen woodlands, alpine tundra sub alpine forest edges, or montane forest edges. Seasonally the animals appear to be relatively sedentary, staying within areas of 100 to 2,250 acres. In areas where deer do not migrate significant distances, annual home ranges are 1,700 to 5,500 acres. In the Rocky Mountains, winter diets of mule deer consist mainly of browse from a variety of trees and shrubs with some forbs. In the spring, browse contributes half of the diet, and forbs and grasses make up the remainder. During the summer months, grass consumption declines in favor of forbs. Browse consumption increases and forb use declines throughout the fall and into winter. Over much of Colorado the species is migratory, summering at higher elevations and moving down slope to winter range (Forest Service 1997).

Threats to Species: Threats to deer include loss of winter range habitat quality and quantity and blocked migration corridors. Invasive plants such as cheatgrass are threats to habitat quality. Hunting and collisions with vehicles will reduce numbers locally. Disturbance on summer ranges, especially calving and young-rearing areas, may lead to adverse impacts on populations. Chronic wasting disease is also a threat to Colorado deer populations. In the project area between 2006 and 2008, chronic wasting disease was detected in approximately 1 to 5% of mule deer.

Population Trends: The project area falls within mule deer winter, crucial winter range, and summer ranges, and a north–south mule deer migration corridor runs from Willow Creek Reservoir, west of Table Mountain and south to the Colorado River (Map 7-3). Statewide and Forest population estimates for mule deer are displayed in Table 7-4 below.

Table 7-4. Mule Deer Post-hunt Population Estimates

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Statewide	516,500	526,400	528,700	551,600	565,300	563,700	602,700	590,600	614,100	612,760	N/A
ARNF	45,950	48,300	46,500	41,910	43,280	43,830	43,940	40,350	41,060	37,294	39,820
ARNF + PNG	1/	1/	1/	44,020	45,160	45,430	45,420	41,780	42,560	39,144	41,860

Source: CDOW 2007c

PNG = Pawnee National Grassland

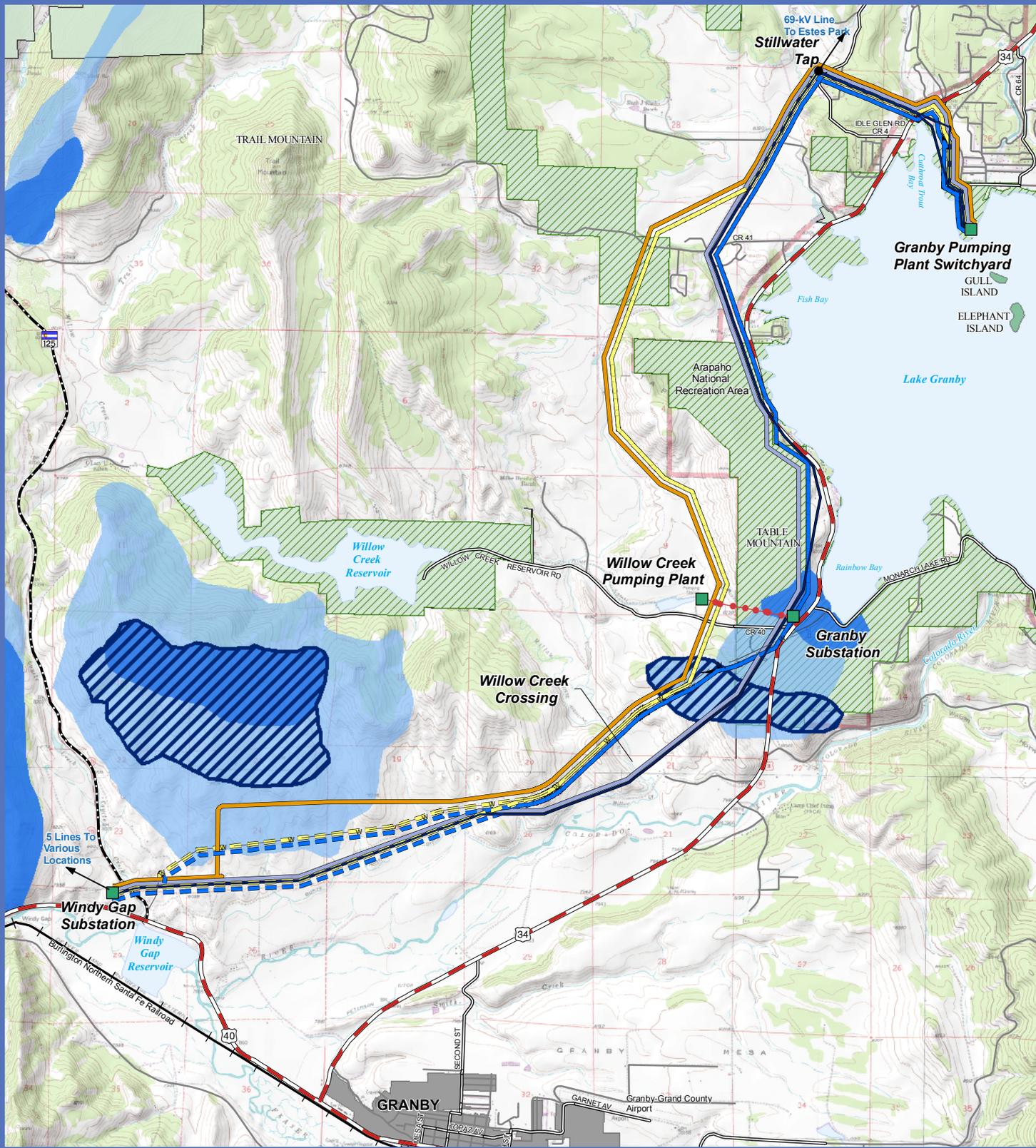
1/ Not comparable at present scale. Prior to 2000, the data analysis unit included a larger area beyond Pawnee National Grassland.

Statewide, the mule deer population trend was generally upward from 1997 to 2006 (16% overall increase). For the planning area, the population trend was relatively stable from 2000 to 2003, but experienced an overall decrease from 1997 to 2006 of 14%. Forest-wide, early structural stages are 2% (19,600 acres) and natural vegetated openings are 16% (212,000 acres) of forested vegetation. Increasing grass-forb and shrub-seedling forest structural stages Forest-wide is an emphasis objective in Forest Plan for mule deer (Forest Service 1997).

Direct, Indirect, and Cumulative Impacts: Impacts to mule deer and mule deer habitat is similar to that described for elk. Project construction and maintenance would temporarily displace mule deer from the active construction area. Project-specific design criteria would minimize construction in mule deer severe or crucial winter range habitat during the period November 15 to April 30. Therefore, short-term disturbances as a result of project construction are anticipated to be negligible on winter habitat grounds. Maintenance activities in the winter would be rare, but if it becomes necessary, could result in minor, short-term avoidance of the immediate area. In the long-term, unavoidable maintenance or repairs may need to occur in these habitats during critical periods. It is anticipated that the impacts of these maintenance activities (e.g., human presence, noise) would be infrequent and brief. These activities may result in some isolated minor adverse impacts, but are not anticipated to reduce population viability in the planning area.

The activities within the project area that could cumulatively impact mule deer include the construction of residential and commercial developments adjacent to the project area, hunting on private property, future forest management activities on the Forest, and the expansion of the mountain pine beetle epidemic. Residential developments would reduce winter foraging, concentration, migration, and severe winter range within the project area. Increasing development within the Granby area coupled with increasing human presence has reduced crucial habitats for big game. Future forest management activities including prescribed burning may improve mule deer habitat over time. The BLM land exchange would preserve crucial winter range for big game species including mule deer.

Determinations of Alternative A (No Action): Alternative A would continue to create intermittent impacts to deer habitat in the project area in the long-term as a result of ongoing maintenance activities in areas used as winter range. The determination across the ARP is **no change**.



Map 7-3

Wildlife - Mule Deer (Winter)

July 23, 2010

Legend

- | | | |
|--|--|---|
| <p>Base Data</p> <ul style="list-style-type: none"> ● Existing Willow Creek Tap (69-KV) -W- Windy Gap Water Pipeline (NCWCD) ▨ Arapaho National Recreation Area (ANRA) ▨ U.S. Forest Service (USFS) | <p>Transmission Line Alternatives</p> <ul style="list-style-type: none"> — Alternative A - Existing — Alternative B1 — Alternative C1 — Alternative C2 — Alternative C2 - Options 1 and 2 — Alternative D — Alternative D - Option 1 and 2 | <p>Mule Deer Winter Habitat</p> <ul style="list-style-type: none"> ▨ Winter Range and General Concentration Area ▨ Winter Concentration ▨ Severe Winter Habitat |
|--|--|---|

Western
SOUTHWESTERN
ADMINISTRATION

EDAW | AECOM

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

File path: P:\2010\0603\0229_02\GIS\Project\Layouts\ALTB1_8_6\XY11_060327.mxd

Determinations of Alternative B1: Alternative B1 is located in an area containing big game winter range and winter concentration according to CDOW data. Alternative B1 is also located primarily in a previously disturbed corridor. Alternative B1 would create adverse short-term impacts to deer habitat in the project area if project construction were to occur in areas used as winter range. Restricting construction to non-winter months in winter range would largely minimize impacts to deer within this corridor. Alternative B1 would replace towers in the existing ROW, and construct new towers for approximately 1.8 miles of new ROW. Therefore, the determination across the ARP is **no change**.

Determinations of Alternatives C1, C2, and D (Proposed Action): The impacts of Alternatives C1, C2, and D (Proposed Action) would be similar to those described for Alternative B1. Therefore, the determination across the ARP for Alternatives C1, C2, and D is **no change**.

7.3.2 *Birds*

Golden-crowned kinglet, *Regulus satrapa*

Golden-crowned kinglet is an MIS for interior forests (Forest Service 1997).

Habitat Status and Requirements: Golden-crowned kinglets utilize Douglas-fir, spruce fir, lodgepole and aspen habitats for feeding and nesting. They breed primarily in dense coniferous forests, especially where spruce is present, and winter in coniferous forests (occasionally in deciduous woodland scrub and brush). This kinglet eats insects and their eggs, and fruit and seeds. Golden-crowned kinglets forage in tall dense conifers, concentrating at medium heights. Food is gleaned from foliage, small twigs, limbs and bark of trees and shrubs or they may also hover to clean food from vegetation. Golden-crowned kinglets are fairly uncommon summer resident on the ARNF. This interior forest species tolerates little change on nesting grounds (Kingery 1998 and Forest Service 1997).

Threats to Species: Severe winter storms can significantly contribute to local mortality rates. Habitat modification due to lumber activities, spruce die-off, burned areas, open canopy, and pure stands of lodgepole pine or hardwoods may reduce local populations. Brown-headed cowbird parasitism is uncommon but has been known to occur (NatureServe 2010ad). Threats to passerines also include suburban and rural sprawl which fragments habitat and increases predation by domestic cats, raccoons, and other species that thrive along with human settlement.

Population Trends: Forest-wide there exists about 193,700 acres of interior forest habitat or 15% of the total NFS land (Forest Service 1997). However as a result of a mountain pine beetle epidemic in lodgepole pine habitats, this interior forest habitat has been reduced to include only the spruce and fir interior forest habitat. The dead mature lodgepole pine component no longer has a closed canopy to provide the attributes needed to provide for interior forest conditions.

The only available golden-crowned kinglet data from ARNF indicates a breeding density of 5.2 pairs per 100 acres, but much higher densities have been recorded elsewhere in the species' range. Transect counts in and near ARNF since 1998 are presented in Table 7-5. Transect survey numbers show an increase in 2000 and a decrease when several typical habitat (spruce-fir) transects were not inventoried. Breeding trends since 1979 and winter trends since 1988 are not available at larger geographic scales (RMBO 2002).

Table 7-5. Golden-crowned Kinglet in and near ARNF.

Transect	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Avg/yr*
AS28	0	NR	0	NR	NR	NR	0	0	NR	NR	0.0
AT02	NR	NR	NR	NR	0	0	0	NR	NR	0	0.0
AT03	NR	0	NR	0	0	0	NR	0	NR	NR	0.0
AT04	NR	0	NR	NR	0	0	0	0	NR	NR	0.0
AT05	NR	1	0	0	0	0	0	0	NR	0	0.0
AT06	NR	0	0	0	0	0	0	0	NR	0	0.0
GR01	NR	0	0	0	0	0	0	0	NR	NR	0.0
GR02	NR	0	0	0	0	0	0	0	NR	NR	0.0
GR03	NR	0	NR	0	0	0	0	0	NR	NR	0.0
GR05-02	NR	NR	NR	NR	0	NR	NR	0	NR	NR	0.0
GR15	NR	NR	0	NR	0	0	0	0	NR	NR	0.0
HR05	NR	NR	17	0	NR	0	0	0	NR	NR	3.4
HR09	NR	4	0	0	0	NR	0	0	NR	0	0.6
HR10	NR	NR	0	0	0	NR	0	NR	NR	0	0.0
HR18	NR	0	NR	NR	0	0	0	1	NR	NR	0.2
HR25	NR	0	0	0	0	0	0	0	NR	0	0.0
MC03	NR	0	0	0	0	0	0	0	NR	NR	0.0
MC27	NR	1	0	0	0	0	0	0	NR	NR	0.1
PP13	0	0	0	0	0	NR	NR	0	NR	NR	0.0
PP15	0	0	NR	0	0	NR	0	0	NR	NR	0.0
PP16	0	0	0	0	0	NR	0	0	NR	NR	0.0
PP21	0	0	0	0	0	NR	0	0	NR	NR	0.0
PP29	0	0	0	0	0	NR	NR	NR	NR	NR	0.0
SF16	0	NR	0	NR	NR	NR	0	NR	1	0	0.25
SF17	10	2	NR	0	1	NR	0	2	1	2	2.25
SF30	NR	2	4	NR	NR	NR	1	5	NR	NR	3.0
Total birds	10	10	21	0	1	0	1	8	2	2	5.5
# of transects w/ hits	1	5	2	0	1	0	1	3	2	1	1.6

Source: RMBO 2007

NR = Transect not conducted in this year

*Avg/yr is calculated without NR years

Direct, Indirect, and Cumulative Impacts: The project area does not contain preferred habitat for this species. The forested portions of the project area are not contiguous and have been recently disturbed by the mountain pine beetle epidemic as well as various human disturbances (e.g., development and salvage harvest). Occurrences of this species are unlikely in the alternative ROW footprints. Other project area actions or activities that may cumulatively impact this species include future development adjacent to the greater project area, the continued forest mortality as a result of the mountain pine beetle epidemic, and past and future forest management activities such as salvage harvests or prescribed fire use.

Determinations of Alternative A (No Action): Because of the extent of the mountain pine beetle endemic and logging activities, Alternative A does not contain the contiguous forested habitat this species requires. Alternative A would have no change on the golden-crowned kinglet population trends in the planning area.

Determinations of Alternative B1: Because of the extent of the mountain pine beetle epidemic and logging activities, Alternative B1 does not contain the contiguous forested habitat this species requires. Alternative B1 would have no change on the golden-crowned kinglet population trends in the planning area.

Determination C1, C2, and D (Proposed Action):

Because of the extent of the mountain pine beetle epidemic and logging activities, these alternatives do not contain the contiguous forested habitat this species requires. Alternatives C1, C2, and D would have no change on the golden-crowned kinglet population trends in the planning area.

Hairy woodpecker, Picoides villosus

Hairy woodpecker is an MIS for the snag component of young to mature forest structural stages (Forest Service 1997).

Habitat Status and Requirements: Hairy woodpeckers are found in wooded areas throughout North America from the northern tree line to Panama. Mountain forests, mixed woodlands and river groves are all suitable habitat for hairy woodpeckers. Six to nine acres per pair is required for successful breeding. It excavates cavities in snags or in live trees with decaying heartwood, and consumes a diet that is about 80% animal food (wood boring beetles removed from dead and diseased trees are an important source of food). Hairy woodpeckers also eat other insects, fruits, corn, nuts, and cambium (Forest Service 1997).

Threats to Species: Local threats to the species may include loss of cavity trees/snags from forest thinning and competition for nesting cavities by house sparrows or starlings (NatureServe 2010ae). Threats to the woodpecker also include suburban and rural sprawl which fragments habitat and increases predation by domestic cats, raccoons, and other species that thrive along with human settlement.

Population Trends: Forest-wide numbers of snags are generally high, and the project area is no exception. The current mountain pine beetle epidemic has resulted in significant increases in snag density in the project area. Therefore, the existing condition of snags is not a concern or issue for woodpeckers or other snag-dependent wildlife in the project area. Young to mature forests make up about 86% (815,000 acres) of all forest vegetation on ARNF (Forest Service 1997). Since tree mortality, including mountain pine beetle-induced mortality, occurs in most tree sizes, the area provides a continuous source of existing and future snags for woodpeckers.

Most estimates of hairy woodpecker density are in the range of 1 to 3 individuals per 100 acres. The best population density data available for ARNF comes from old growth spruce-fir in the Indian Peaks Wilderness Area, where Hallock (1988) found 2.8 individuals per 100 acres (RMBO 2002). Transect counts in and near ARNF since 1998 are presented in the following table. These data indicate that population trends decreased in 1999, were stable through 2002, and had an increase in 2004 through

2007 with highest densities in aspen, high elevation riparian, ponderosa pine and spruce-fir habitats (RMBO 2007).

There has been one recorded occurrence of the hairy woodpecker just west of the Alternatives C1 and C2 in 2002. A hairy woodpecker was observed in 2008 in a pine beetle infested lodgepole pine stand to the south of Granby Substation. Lodgepole pines in this area have been affected by mountain pine beetle, creating snags in the area now and likely in the future if the beetle continues to spread.

Table 7-6. Hairy Woodpecker in and near ARNF

Transect	1998	1991	2000	2001	2002	2003	2004	2005	2006	2007	Avg/yr*
AS28	2	NR	1	NR	NR	NR	1	2	NR	NR	1.50
AT02	NR	NR	NR	NR	1	0	0	NR	NR	0	0.25
AT03	NR	0	NR	0	0	0	NR	0	NR	0	0.00
AT04	NR	0	NR	NR	0	0	0	0	NR	NR	0.00
AT05	NR	0	0	0	0	0	0	0	NR	1	0.13
AT06	NR	0	0	0	0	0	0	0	NR	0	0.00
GR01	NR	0	0	0	0	0	0	0	NR	NR	0.00
GR02	NR	0	0	0	0	0	0	0	NR	NR	0.00
GR03	NR	0	NR	0	0	0	0	0	NR	NR	0.00
GR05-02	NR	NR	NR	NR	0	NR	NR	0	NR	NR	0.00
GR15	NR	NR	0	NR	0	0	0	0	NR	NR	0.00
HR01	NR	NR	NR	NR	NR	NR	NR	NR	1	1	1.00
HR05	NR	NR	0	0	NR	0	0	0	2	0	0.29
HR09	NR	0	0	0	0	NR	1	0	NR	0	0.14
HR10	NR	NR	2	3	0	NR	0	NR	1	0	1.00
HR18	NR	0	NR	NR	0	0	0	0	NR	1	0.17
HR25	NR	0	0	0	0	0	0	0	NR	0	0.00
MC03	NR	1	0	0	1	0	1	0	NR	0	0.38
MC27	NR	0	0	0	0	0	1	0	NR	1	0.25
NO01-05	NR	NR	NR	NR	NR	NR	NR	NR	2	4	3.00
PP13	6	2	2	0	0	NR	NR	0	1	5	2.00
PP15	0	0	NR	0	0	NR	0	1	1	0	0.25
PP16	4	0	1	0	4	NR	2	13	NR	5	3.63
PP21	3	1	0	4	1	NR	5	2	4	1	2.33
PP29	0	1	1	NR	0	NR	NR	NR	NR	NR	0.50
SF01-05	NR	NR	NR	NR	NR	NR	NR	NR	2	1	1.50
SF04	NR	NR	NR	NR	NR	NR	NR	NR	1	3	2.00
SF15										1	1.00
SF16	0	NR	0	0	NR	NR	0	NR	1	NR	0.20
SF17	0	0	NR	0	0	NR	0	1	1	1	0.38
SF30	NR	2	0	NR	NR	NR	2	0	NR	NR	1.00
Total birds	15	7	7	7	7	0	13	19	17	25	11.7
# of transects w/ hits	4	5	5	2	3	0	7	5	10	12	22

Source: RMBO 2007

NR = Transect not conducted in this year

*Avg/yr is calculated without NR years

Direct, Indirect, and Cumulative Impacts: The proposed project would remove trees and snags within the transmission line corridor. The action alternatives would not affect the overall amount, distribution or current condition of snags on the landscape. It would only affect a limited number of snags within or directly adjacent to the alternate ROWs. The current mountain pine beetle epidemic is dramatically increasing the number of lodgepole pine snags in the project vicinity.

The primary cumulative impact associated with this project is the expansion of the mountain pine beetle within the project area and across the Forest and private lands. Past and future salvage operations may remove suitable habitat for this species. Increased development within and adjacent to the project area may also reduce snag density for this woodpecker.

Determinations of Alternative A (No Action): Alternative A would have **no change** on hairy woodpecker trends in the planning area. Forested areas in the project area and surrounding forest are experiencing a pine beetle epidemic, which enhances snag habitat and insect populations suitable for the hairy woodpecker.

Determinations of Alternative B1: Alternative B1 would have **no change** on hairy woodpecker trends in the planning area. Although snags are removed from the project ROW, forested areas within the project area and surrounding forest are experiencing a pine beetle epidemic, which enhances snag habitat and insect populations suitable for the hairy woodpecker.

Determinations of C1, C2, and D: Alternatives C1, C2, and D would have **no change** on hairy woodpecker trends in the planning area. Although snags are removed from the project ROW, forested areas within the project area and the surrounding forest are experiencing a pine beetle epidemic that enhances snag habitat and insect populations suitable for the hairy woodpecker.

Mountain bluebird, *Sialia currucoides*

Mountain bluebird is an MIS for openings within and adjacent to forests (Forest Service 1997).

Habitat Status and Requirements: Mountain bluebirds are common from Alaska and British Columbia to southern California and Oklahoma. Mountain bluebirds nest in nearly all forest types of the Rocky Mountain region, usually from 7,000 to 11,000 feet in open forests or near forest edges. During migration and in winter, mountain bluebirds also frequent grasslands, open brushy country, and agricultural lands. Mountain bluebirds usually nest in old woodpecker holes, natural cavities or nest boxes in open areas near forest edges. Bluebirds hunt from high perches or fly to the ground to catch prey. Nearly 92% of the bluebird's diet is animal material; the small amount of herbivorous food includes fruits, hackberry seeds, and cedar berries (Forest Service 1997).

Threats to Species: Local threats to the species may include loss of cavity trees/snags from forest thinning and competition for nesting cavities by house sparrows or starlings. Threats to songbirds also include suburban and rural sprawl which fragments habitat and increases predation by domestic cats, raccoons, and other species that thrive along with human settlement.

Population Trends:

Density estimates in lodgepole pine in or near ARNF (RMBO 2002) found 1.1 birds per 100 acres in the interior of a seven year-old clear-cut; less than 1 bird per 100 acres in the interior of a 25 year-old cut;

and 1.8 birds per 100 acres on the edge of the 25 year-old cut. Transect counts in and near ARNF since 1998 are presented in Table 7.7. These data indicate that population trends in or near the ARNF have increased between 2005 and 2007 (RMBO 2007).

Table 7-7. Mountain Bluebird in and near ARNF

Transect	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Avg/yr*
AS28	0	NR	0	NR	NR	NR	0	0	NR	NR	0.0
AT02	NR	NR	NR	NR	1	1	2	NR	NR	0	1.0
AT03	NR	4	NR	3	0	0	NR	0	NR	0	1.17
AT04	NR	3	NR	NR	1	2	2	0	NR	NR	1.6
AT05	NR	2	0	0	0	0	1	0	NR	9	1.5
AT06	NR	0	0	1	0	0	0	0	NR	4	.63
GR01	NR	0	0	0	0	0	NR	0	NR	NR	0.0
GR02	NR	0	0	0	0	0	0	0	NR	NR	0.0
GR03	NR	0	NR	0	0	0	0	0	NR	NR	0.0
GR05-02	NR	NR	NR	NR	0	NR	NR	0	NR	NR	0.0
GR15	NR	NR	0	NR	0	0	0	0	NR	NR	0.0
HR05	NR	NR	0	0	NR	0	0	0	NR	2	.33
HR09	NR	0	0	0	0	NR	0	0	NR	0	0.0
HR10	NR	NR	0	0	0	NR	0	NR	NR	0	0.0
HR18	NR	0	NR	NR	0	0	0	0	NR	0	0.0
HR25	NR	0	0	4	2	1	0	0	6	2	1.67
MC03	NR	0	0	0	0	0	0	0	NR	0	0.0
MC27	NR	0	0	0	0	0	0	0	NR	3	0.38
PP13	0	0	0	0	0	NR	NR	0	NR	0	0.0
PP15	0	0	NR	0	6	NR	1	1	15	1	3.0
PP16	0	0	0	0	1	NR	1	6	16	3	3.0
PP21	3	0	0	0	0	NR	0	2	NR	0	0.63
PP29	0	0	0	NR	NR	NR	NR	NR	NR	NR	0.0
SF16	0	NR	0	0	NR	NR	0	NR	NR	0	0.0
SF17	0	0	NR	0	0	NR	0	0	NR	0	0.0
SF30	NR	0	0	NR	NR	NR	0	0	NR	NR	0.0
Total birds	3	9	0	8	11	4	7	9	37	24	11.2
# of transects w/ hits	1	3	0	3	5	3	5	3	3	7	11

Source: RMBO 2007

NR = Transect not conducted in this year

*Avg/yr is calculated without NR years

Forest-wide, 15% of all NFS lands are in natural openings and 2% of forested types are in natural or created openings of grasses, forbs, shrubs or seedlings (Forest Service 1997).

Direct, Indirect, and Cumulative Impacts: The proposed project area contains suitable habitat for this species. The construction of the transmission line could temporarily displace individuals found within the project area. None of the project alternatives are expected to result in long-term impacts to mountain bluebird populations in the project area or on the Forest. Vegetation clearing conducted

within the ROW could increase edge habitat for this species. Maintenance activities in the future may also temporarily displace individuals. The mountain pine beetle epidemic is benefitting woodpecker habitat which may ultimately provide additional nesting options for the bluebird.

The current mountain pine beetle epidemic could have the greatest impact on mountain bluebirds in the project area. Other activities or actions that may cumulatively impact this species include past and future forest management projects on Table Mountain; recreational uses; proposed and existing developments adjacent to the project area; and the BLM land exchanges.

Determinations of Alternative A (No Action): Alternative A would have **no change** on bluebird trends in the planning area. Vegetation management within the existing transmission ROW would maintain edge habitats for the mountain bluebird. Temporary, direct impacts to habitats or displacement of individuals may occur during conduct of maintenance activities.

Determinations of Alternative B1: Alternative B1 would have **no change** on bluebird trends in the planning area. Vegetation management within the additional 70 feet that would be required for the transmission ROW may open additional edge habitats for the mountain bluebird. Temporary, direct impacts to habitats or displacement of individuals may occur during construction.

Determinations of Alternative C1: The determinations would be similar to Alternative B1. However, the Alternative C1 corridor contains less forested habitat than Alternative B1. Temporary, direct impacts to habitats or displacement of individuals may occur during construction. Alternative C1 would have **no change** on bluebird trends in the planning area.

Determinations of Alternative C2: The determinations would be the same as described for Alternative C1. Temporary, direct impacts to habitats or displacement of individuals may occur during construction. Alternative C1 would have **no change** on bluebird trends in the planning area.

Determinations of Alternative D (Proposed Action): The determinations would be the same as described for Alternative B1. Alternative D would have **no change** on bluebird trends in the planning area. Temporary, direct impacts to habitats or displacement of individuals may occur during construction.

Pygmy nuthatch, *Sitta pygmaea*

Pygmy nuthatch is a MIS for existing and potential old-growth forests (Forest Service 1997).

Habitat Status and Requirements: The pygmy nuthatch typifies Colorado's ponderosa pine forests. They rely on healthy, mature ponderosa pine trees and occur less frequently in logged tracts. Because they excavate their own cavities, they need large trees with old or decayed wood (Kingery 1998), hence their association with old growth and near old growth habitats. Pygmy nuthatches tend to forage in the crowns of ponderosa pine and their diet consists of insects, spiders, and conifer seeds (Kingery 1998).

Although pygmy nuthatches are most often associated with mature ponderosa pine habitats, they also inhabit late-successional lodgepole pine and aspen habitats where cavities are available for nesting. Home range size is approximately 3 acres per breeding pair. They altitudinally migrate during the winter months and are gregarious outside of the breeding season. Food is mainly insects that are gleaned from

bark but they also eat conifer seeds. During poor pine cone years, pygmy nuthatches may switch from pine to spruce and fir seeds (Forest Service 1997).

Threats to Species: Local threats to the species may include loss of cavity trees/snags from forest thinning in the ponderosa woodland and competition for nesting cavities by house sparrows or starlings. Threats to passerines also include suburban and rural sprawl which fragments habitat and increases predation by domestic cats, raccoons, and other species that thrive along with human settlement.

Population Trends: In Colorado, the Heritage Status Rank for the species is S4, apparently stable (NatureServe 20af). Pygmy nuthatch densities vary greatly across the species' range Breeding season densities from the ARNF range from 6.0 to 49.0 pairs per 100 acre. Based on Breeding Bird Atlas methodology, Kingery (1998) estimates the statewide population at between 51,461 and 339,142 breeding pairs. Kingery (1998) reports that since pygmy nuthatches have such a strong affinity to ponderosa pine, their populations will rise and fall with the availability of those trees. Transect counts in and near ARNF from 1998 through 2007 are given in Table 7-8. Transect surveys indicate a general increase in population for the planning area between 1998 and 2007. Note that transect surveys in typical habitat (ponderosa pine) were not conducted in 2003. No trend was discernable at larger geographic scales (RMBO 2002).

Table 7-8. Pygmy Nuthatch in and near ARNF

Transect	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Avg/yr*
AS28	0	NR	0	NR	NR	NR	0	0	NR	NR	0.0
AT02	NR	NR	NR	NR	0	0	0	NR	NR	NR	0.0
AT03	NR	0	NR	0	0	0	NR	0	NR	0	0.0
AT04	NR	0	NR	NR	0	0	0	0	NR	NR	0.0
AT05	NR	0	0	0	0	0	0	0	NR	NR	0.0
AT06	NR	0	0	0	0	0	0	0	NR	NR	0.0
GR01	NR	0	0	0	0	0	0	0	NR	NR	0.0
GR02	NR	0	0	0	0	0	0	0	NR	NR	0.0
GR03	NR	0	NR	0	0	0	0	0	NR	NR	0.0
GR05-02	NR	NR	NR	NR	0	NR	NR	0	NR	NR	0.0
GR15	NR	NR	0	NR	0	0	0	0	NR	NR	0.0
HR05	NR	NR	0	0	NR	0	0	0	NR	0	0.0
HR09	NR	0	0	0	1	NR	0	0	NR	NR	0.17
HR10	NR	NR	0	0	0	NR	0	NR	3	NR	0.6
HR18	NR	0	NR	NR	0	0	0	0	NR	0	0.0
HR25	NR	0	0	0	0	0	0	0	NR	NR	0.0
MC03	NR	0	0	0	0	0	4	0	NR	1	0.63
MC27	NR	0	0	0	0	0	4	0	NR	7	.138
PP13	0	0	0	0	0	NR	NR	1	5	2	1.0
PP15	0	0	NR	3	10	NR	0	1	4	8	325
PP16	0	0	0	0	0	NR	5	3	1	9	2.0
PP21	1	2	0	0	4	NR	14	0	1	12	3.78
PP29	3	0	0	NR	0	NR	NR	NR	NR	NR	0.75
SF16	0	NR	0	0	NR	NR	0	NR	NR	NR	0.0
SF17	0	0	NR	0	0	NR	0	0	NR	NR	0.0

Transect	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Avg/yr*
SF30	NR	0	2	NR	NR	NR	0	0	NR	NR	0.7
Total birds	4	2	2	3	15	0	27	5	14	39	11.1
# of transects w/ hits	2	1	1	1	3	0	4	3	5	6	10

Source: RMBO 2007

NR = Transect not conducted in this year

*Avg/yr is calculated without NR years

Although closely associated with ponderosa pine habitats, pygmy nuthatches are an indicator for old growth habitats in the planning area. On the Sulphur District, lodgepole pine and spruce-fir cover types used to represent this MIC, however, with beetle kill in lodgepole pine, spruce-fir old growth now represents old growth habitat conditions. There are no old-growth forests present within any of the project alternatives.

Direct, Indirect, and Cumulative Impacts: None of the action alternatives would impact pygmy nuthatch preferred habitat. The pygmy nuthatch may be an occasional migrant through the alternative corridors, but it is an unlikely breeding resident within any of the corridors. Impacts to the nuthatch as a result of construction and line maintenance would be short-term in nature.

Determinations of Alternative A (No Action): Alternative A would have no impact on the pygmy nuthatch population trends or habitat. Alternative A would result in **no change** to trends in the planning area.

Determinations of Alternative B1: Alternative B1 would occur within a larger portion of forested habitats relative to the other alternatives; however, most of these forested areas consist of lodgepole pine stands that have been severely affected by the current mountain pine beetle epidemic. Although the lodgepole mortality in the Alternative B1 corridor may increase the available insect population for pygmy nuthatch foraging, the available nesting habitat is marginal. Alternative B1 may result in short-term impacts to pygmy nuthatch habitat as a result of displacement during construction. Alternative B1 may remove some trees from the expanded ROW that may be suitable for nesting. However, the Alternative B1 corridor is not considered to offer extensive, high quality breeding habitat for this species. Overall, Alternative B1 would not result in long-term impacts to pygmy nuthatch habitat within the project area. Alternative B1 would result in **no change** to population trends in the planning area.

Determinations of Alternative C1: Alternative C1 contains less forested habitat than Alternative B1. Short-term impacts to the species are therefore lower. Alternative C1 may require the removal of some suitable nesting trees; however, this corridor is not considered to offer extensive, high quality breeding habitat for this species. Alternative C1 may result in temporary impacts to pygmy nuthatches habitat during construction, but would not result in long term impacts to nuthatch habitat within the project area. Alternative C1 would result in **no change** to population trends in the planning area.

Determinations of Alternative C2: The determinations of Alternative C2 would be similar to those described under C1. It would result in **no change** to population trends in the planning area.

Determinations of Alternative D: The determinations of Alternative D would be similar to those described under B1. It would result in **no change** to population trends in the planning area.

Warbling vireo, Vireo gilvus

The warbling vireo is an MIS for aspen communities (Forest Service 1997).

Habitat Status and Requirements: Warbling vireos forage and breed almost exclusively in deciduous habitats. Warbling vireos in Colorado occupy two main habitat types: riparian stream bottoms and aspen forests. Breeding habitat in Colorado is primarily aspen woodlands. Warbling vireos build their nests in aspens or shrubs within 12 feet of the ground. Warbling vireos glean most of their food from the mid to upper canopy of deciduous trees and their diet consists of caterpillars, beetles, grasshoppers, and ants (Forest Service 1997, Kingery 1998). In Colorado, warbling vireos are common on the plains during migration and in the mountains in summer.

Threats to Species: Brown-headed cowbird parasitism of nests can be up to 80%, creating sink populations in some places (NatureServe 2010ag). Threats to passerines also include suburban and rural sprawl which fragments habitat and increases predation by domestic cats, raccoons, and other species that thrive along with human settlement.

Environmental Baseline: Considered secure in Colorado (NatureServe 2010ag), the warbling vireo is a fairly common summer resident in the foothills and lower mountains. In the western valleys and eastern plains it is considered uncommon to fairly common. As a spring and fall migrant, it is thought to be uncommon in the western valleys, foothills, and eastern plains (Andrews & Righter 1992). Confirmed nesting occurs throughout much of Grand County and in other counties in the planning area. The estimated statewide population in 1998 was 345,820 to 1,572,584 breeding pairs. Densities vary widely in Colorado (3.0 to 78.9 territories per 100 acres) and across the species' range (4.8 to 96.0 pairs per 100 acres) (RMBO 2002).

Transect counts in and near ARNF since 1998 are presented in the following table. Population trends are variable, increasing in 2000 through 2001 and then decreasing through 2004, with highest bird densities in aspen, high elevation riparian, and ponderosa pine habitats.

Surveys conducted in July 2005 by the Forest Service (McCormick 2006) shows occurrences of warbling vireos on Table Mountain, east of Alternatives C1 and C2 and located within or adjacent to Alternatives A, B1, and D. Isolated patches of aspen exist along portions of US Highway 34, adjacent to Alternatives A, B1, and D.

Table 7-9. Warbling Vireo in and near ARNF

Transect	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Avg/yr*
AS28	21	NR	6	NR	NR	NR	1	8	NR	NR	9.00
AT02	NR	NR	NR	NR	0	0	0	NR	NR	0	0.00
AT03	NR	0	NR	0	0	0	NR	0	NR	0	0.00
AT04	NR	1	NR	NR	0	0	0	0	NR	NR	0.20
AT05	NR	0	0	0	0	0	0	0	NR	0	0.00
AT06	NR	0	0	0	0	0	0	0	NR	0	0.00
GR01	NR	0	0	0	0	0	0	0	NR	NR	0.00
GR02	NR	0	0	0	0	0	0	0	NR	NR	0.00
GR03	NR	0	NR	0	0	0	0	0	NR	NR	0.00
GR05-02	NR	NR	NR	NR	0	NR	NR	0	NR	NR	0.00
GR15	NR	NR	0	NR	0	0	0	0	NR	NR	0.00
HR01-05	NR	NR	NR	NR	NR	NR	NR	NR	4	10	7.00
HR05	NR	NR	2	0	NR	0	0	0	NR	0	0.33
HR09	NR	0	7	7	5	NR	1	5	8	3	4.50
HR10	NR	NR	7	14	0	NR	1	NR	NR	1	4.60
HR18	NR	0	NR	NR	0	0	0	0	NR	0	0.00
HR25	NR	7	19	6	3	0	0	0	3	0	4.22
MC03	NR	4	1	7	0	2	3	8	NR	7	4.00
MC27	NR	4	0	2	0	0	4	13	NR	6	3.63
NO01-05	NR	NR	NR	NR	NR	NR	NR	NR	4	7	5.50
PP13	15	4	7	14	4	NR	NR	0	12	10	8.25
PP15	2	0	NR	0	0	NR	0	0	NR	1	0.43
PP16	0	4	6	16	3	NR	5	4	5	6	5.44
PP21	0	0	0	3	6	NR	2	3	1	4	2.11
PP29	7	12	5	NR	5	NR	NR	NR	NR	NR	7.25
SF01-05	NR	NR	NR	NR	NR	NR	NR	NR	19	0	9.50
SF16	0	NR	0	0	NR	NR	0	NR	1	0	0.17
SF17	0	4	NR	1	0	NR	0	0	NR	0	0.71
SF30	NR	0	0	NR	NR	NR	0	0	NR	NR	0.00
Total birds	45	40	60	70	26	2	17	41	57	55	41.3
# of transects w/ hits	4	8	9	9	6	1	7	6	8	10	6.8

Source: RMBO 2007

NR = Transect not conducted in this year

*Avg/yr is calculated without NR years

Direct, Indirect, and Cumulative Impacts: This species is known to occur along the corridors for Alternatives A, B1, and D. Warbling vireos may be displaced as a result of project construction activities in the short-term. In the long-term, this species may be impacted by intermittent maintenance activities.

If construction were to occur during breeding season, surveys would be required prior to ground or overhead disturbance to comply with the MBTA. Aspen stands and riparian areas would be avoided whenever feasible to minimize impacts to preferred habitat types.

Activities in the project area that could cumulatively impact this species include: recreational use, past and future forest management activities, and the proposed developments adjacent to the project areas.

Determinations of Alternative A (No Action): Warbling vireos are known to occur within the project area and along this alternative corridor. Ongoing maintenance activities may intermittently disturb or displace individuals in the long-term. However, the impacts would be limited to periodic, infrequent disturbance and would be negligible to minor. Alternative A would result in **no change** to trends in the planning area.

Determinations of Alternative B1: Warbling vireos are known to occur within the project area and along this alternative corridor. Deciduous forest areas are a minor component of the project area. Surveys conducted prior to construction would be used to minimize disturbance to any present, breeding individuals. Migrating and resident vireos may be displaced in the short-term during project construction activities. Ongoing maintenance activities may intermittently disturb or displace individuals in the long-term. However, the impacts would be limited to periodic, infrequent disturbance and would be negligible to minor and adverse. The frequency of maintenance is anticipated to be lower under Alternative B1 than existing conditions due to the proposed structure type (steel). Alternative B1 would result in **no change** to trends in the planning area.

Determinations of Alternative C1: Warbling vireos are known to occur within the project area and immediately east of this alternative corridor. Deciduous forest areas are a minor component of the project area. Surveys conducted prior to construction would mitigate disturbance to breeding individuals. Migrating and resident vireos may be displaced in the short-term during project construction activities. Ongoing maintenance activities may intermittently disturb or displace individuals in the long-term. Alternative C1 would result in **no change** to trends in the planning area.

Determinations of Alternative C2: The determinations of Alternative C2 would be the same as Alternative C1. It would result in **no change** to trends in the planning area.

Determinations of Alternative D: The determinations of Alternative D would be the same as Alternative B1. It would result in **no change** to trends in the planning area.

Wilson's warbler, *Wilsonia pusilla*

Wilson's warbler is an MIS for montane riparian and wetlands (Forest Service 1997).

Habitat Status and Requirements: Wilson's warbler breeds from northern Alaska, northern Yukon, northern Ontario, southeastern Labrador, and Newfoundland south to southern California, central Nevada, northern Utah, northern New Mexico, central Ontario, northern New England, and Nova Scotia. Wilson's warblers winter from southern California and southern Texas to Panama. They prefer wet clearings in early stages of regeneration. Wilson's warblers also inhabit peat or laurel bogs with scattered young or dwarf spruces, tamaracks, and riparian willow and alder thickets. Wilson's warblers usually build nests at the base of small trees or shrubs, often well concealed in a grass hummock. They eat insects gleaned from the ground and twigs or caught by flycatching and spiders and fruit pulp (Forest Service 1997).

Threats to Species: Habitat change, particularly destruction of riparian habitats, is thought to play a part in regional decreases in the west (. Brown-headed Cowbird parasitism of nests may also be a threat to

this species. Threats to passerines also include suburban and rural sprawl which fragments habitat and increases predation by domestic cats, raccoons, and other species that thrive along with human settlement.

Population Trends: Reported population densities vary widely in Colorado (1.0 to 432 breeding territories per 100 acres) and across the species' range (8.8 to 212 males per 100 acres), probably due to differences in survey technique, scale, and habitat suitability. Breeding Bird Atlas data indicates a slight downward trend at the continental scale for the period 1980 to 2000 (RMBO 2002).

ARNF transect counts increase each year from 1998 through 2001, drop in 2002, and remain fairly consistent from 2003 through 2006. The number of birds increases significantly in 2007, the most recent year of available data (RMBO 2007).

Table 7-10. Wilson's warbler in and near ARNF*

Transect	1998	1999	2000	2001	2002	2003	2005	2006	2007	Avg/yr**
AS28	1	NR	0	NR	NR	NR	0	0	NR	0.25
AT02	NR	NR	NR	NR	0	0	0	NR	0	0.0
AT03	NR	0	NR	0	0	0	NR	0	0	0.0
AT04	NR	0	NR	NR	0	1	0	1	NR	0.4
AT05	NR	0	0	3	0	6	1	0	0	1.25
AT06	NR	0	0	0	0	0	0	0	1	0.13
GR01	NR	0	0	0	0	0	0	0	NR	0.0
GR02	NR	0	0	0	0	0	0	0	NR	0.0
GR03	NR	0	NR	0	0	0	0	0	NR	0.0
GR05-02	NR	NR	NR	NR	0	NR	NR	0	NR	0.0
GR15	NR	NR	0	NR	0	0	0	0	NR	0.0
HR05	NR	NR	4	13	NR	0	4	0	0	3.5
HR09	NR	6	7	16	3	NR	0	5	17	7.71
HR10	NR	NR	4	1	3	NR	6	NR	26	8.0
HR18	NR	0	NR	NR	0	0	0	8	19	4.5
HR25	NR	0	0	6	1	7	2	5	2	2.88
MC03	NR	0	0	0	0	1	0	0	0	0.13
MC27	NR	0	0	0	0	0	0	0	0	0.0
PP13	0	1	0	0	0	NR	NR	0	0	0.14
PP15	0	0	NR	0	0	NR	0	0	0	0.0
PP16	0	0	0	0	0	NR	0	0	0	0.0
PP21	0	0	0	0	0	NR	0	0	0	0.0
PP29	0	0	0	NR	0	NR	NR	NR	NR	0.0
SF16	0	NR	0	0	NR	NR	0	NR	0	0.0
SF17	0	0	NR	0	0	NR	0	0	0	0.0
SF30	NR	0	0	NR	NR	NR	0	0	NR	0.0
Total birds	1	7	15	39	7	15	13	19	65	16.0
# of transects w/ hits	1	2	3	4	3	4	4			3.4

Source: RMBO 2007

NR = Transect not conducted in this year; *Data not available for 2004; **Avg/yr is calculated without NR years

Stillwater and Willow Creek support riparian vegetation which may provide suitable habitat for the warbler within the various alternative corridors.

Direct, Indirect, and Cumulative Impacts: Riparian areas, wet meadows, and creeks would be spanned to the greatest extent feasible. If this species is found within the project area it may be temporarily displaced as a result of project construction activities. If construction is to occur during the breeding season, surveys would be conducted prior to any ground disturbing activity to avoid impacts to this species and other MBTA species. Ongoing maintenance activities may intermittently disturb or displace individuals in the long-term. However, the impacts would be limited to periodic, infrequent disturbance and the impact would be negligible to minor.

Activities within the project area that may cumulatively impact the Wilson' warbler includes recreational use; existing and proposed developments adjacent to the project area; and BLM and Forest Service land exchanges.

Determinations of Alternative A (No Action): Alternative A would have no impact on the Wilson's warbler population trends or habitat and result in **no change** to trends in the planning area.

Determinations of Alternative B1: Alternative B1 may impact Wilson's warbler in the short-term during project construction. However, impacts to this species would be minimized through pre-construction surveys for MBTA compliance. Alternative B1 would result in **no change** to trends in the planning area.

Determinations of Alternative C1: The impacts of Alternative C1 would be similar to those described for Alternative B1. Alternative C1 offers more suitable habitat for this species than the existing alignment or Alternative B1. Wet meadows or clearings and fen wetlands are more common along Alternative C1. Alternative C1 would result in **no change** to trends in the planning area.

Determinations of Alternative C2: The determination for Alternative C2 is the same as described for Alternative C1. Alternative C2 would result in **no change** to trends in the planning area.

Determinations of Alternative D: The determination for Alternative D is the same as described for Alternative B1. Alternative D would result in **no change** to trends in the planning area

7.3.3 Amphibians

Boreal toad, *Anaxyrus boreas boreas*

Refer to the boreal toad description and impact analysis under the FSS species discussion, Section 6.3.15. Boreal toad is an MIS for montane riparian and wetlands (Forest Service 1997). The determination for boreal toad is that all alternatives would result in **no change** to trends in the planning area.

7.4 Relationship of MIC/MIS Impacts to the Forest Plan

7.4.1 Young and Mature Forest Structural Stages

Elk, mule deer and hairy woodpecker: Impacts to this MIC and respective MIS from the proposed project are consistent with Forest Plan direction for these habitats and species. Specifically, direction for this

MIC may be found in Chapter 1, goals 8, 34, 42, 90 and 95; objectives 2 and 12; guidelines 40, 41, 68, 69, 71, 92, 93, 103, 119 and 183; and standards 56, 57, 66 and 166 and also in Chapter 2: Geographic Area Direction for the ANRA Geographic Area, and in Chapter 3: Management Area Direction for 3.5 Forested Flora and Fauna Habitats. Direction specific to elk and deer includes goals 80, 81 and 95, standards 96 and 97, and guidelines 106, 107, 108 and 109; specific to deer only include standard 82; and specific to woodpeckers only include guideline 68.

7.4.2 Openings

Elk, mule deer and mountain bluebird: Impacts to this MIC and respective MISs from the proposed project are consistent with Forest Plan direction for these habitats and species. Specifically, direction for this MIC may be found in Chapter 1, goals 8, 34, 35, 42, 43, 90, and 95; guidelines 36, 40, 41, 68, 69, 71, 92, 93, 103, 119 and 183; objective 12; and standards 56, 57, 66, 83, 84, 102 and 166 and also in Chapter 2: Geographic Area Direction for the ANRA Geographic Area, and in Chapter 3: Management Area Direction for 3.5 Forested Flora and Fauna Habitats. Direction specific to elk and deer includes goals 80, 81 and 95, standards 96 and 97, and guidelines 106, 107, 108 and 109; specific to deer only include standard 82.

7.4.3 Interior Forest

Golden-crowned kinglet: Impacts to this MIC and respective MIS from the proposed project are consistent with Forest Plan direction for these habitats and species. Specifically, direction may be found in Chapter 1, goals 8, 34, 39, 40, 42, 43, 90 and 95; objective 1; guidelines 41, 68, 69, 71, 92, 93, 103, 119 and 183; and standards 56, 57, 66 and 166 for MIS and/or interior forest habitats, and also in Chapter 2: Geographic Area Direction for the ANRA Geographic Area, and in Chapter 3: Management Area Direction for 3.5 Forested Flora and Fauna Habitats.

7.4.4 Old Growth

Pygmy nuthatch: Impacts to this MIC and respective MIS from the proposed project are consistent with Forest Plan direction for these habitats and species. Specifically, direction may be found in Chapter 1, goal 3, 8, 34, 42, 90, 95, 116 and 117; objectives 2 and 12; guidelines 40, 41, 68, 69, 71, 92, 93, 103, 118, 119, 120, 121, 121, 122 and 183; and standards 56, 57, 66 and 166 for MIS and/or old growth habitats, and also in Chapter 2: Geographic Area Direction for the ANRA Geographic Area, and in Chapter 3: Management Area Direction for 3.5 Forested Flora and Fauna Habitats.

7.4.5 Aspen Forest

Warbling vireo: Impacts to this MIC and respective MIS from the proposed project are consistent with Forest Plan direction for these habitats and species. Specifically, direction may be found in Chapter 1, goals 8, 34, 42 and 90; guidelines 37, 40, 41, 68, 69, 71, 92, 93, 103 and 183; and standards 56, 57, 66 and 166 for MIS and/or aspen habitats, and also in Chapter 2: Geographic Area Direction for the ANRA Geographic Area, and in Chapter 3: Management Area Direction for 3.5 Forested Flora and Fauna Habitats.

7.4.6 Montane Riparian and Wetland

Boreal toad and Wilson’s warbler: Impacts to this MIC and respective MIS from the proposed project are consistent with Forest Plan direction for these habitats and species. Specifically, direction may be found in Chapter 1, goals 7, 8, 34 and 42; guidelines 41, 92, 93, 103, 104 and 183 and standard 7, 82, 83, 84, 86, 90, 99, 110 and 166 and also in Chapter 2: Geographic Area Direction for the ANRA Geographic Area, and in Chapter 3: Management Area Direction for 3.5 Forested Flora and Fauna Habitats. Direction specific to Wilson’s warbler includes standards 83 and 84; specific to boreal toad include goals 4, 44, 45, 46, 47 and 48, objective 3 and standards 49 and 50.

7.4.7 Montane Aquatic Environments

Brown trout and brook trout: Impacts to this MIC and respective MIS from the proposed project are consistent with Forest Plan direction for these habitats and species. Specifically, direction may be found in Chapter 1, goals 7, 8, 34 and 42; guidelines 41, 92, 93, 103, 104 and 183 and standard 7, 82, 83, 84, 86, 90, 99, 110 and 166 and also in Chapter 2: Geographic Area Direction for the ANRA Geographic Area, and in Chapter 3: Management Area Direction for 3.5 Forested Flora and Fauna Habitats.

7.5 Viability of MIS Species

The results of the analysis indicates that none of the project alternatives are expected to result in adverse impacts to the viability of MIS species that may occur in the project area or on a Forest scale. The project alternatives are not expected to result in changes to population trends Forest-wide as described in the determination discussions above. Table 7-11 summarizes the determinations of impact for MIS.

Table 7-11. Summary of Determinations for Management Indicator Species.

Common Name	Scientific Name	Alt. A (No Action)	Alt. B1	Alt. C1	Alt. C2 Opt. 1/Opt. 2	Alt. D Opt. 1/Opt. 2
MAMMALS						
Elk	<i>Cervus elaphus</i>	No Change	No Change	No Change	No Change	No Change
Mule deer	<i>Odocoileus hemionus</i>	No Change	No Change	No Change	No Change	No Change
BIRDS						
Golden-crowned kinglet	<i>Regulus satrapa</i>	No Change	No Change	No Change	No Change	No Change
Hairy woodpecker	<i>Picoides villosus</i>	No Change	No Change	No Change	No Change	No Change
Mountain bluebird	<i>Sialia currucoides</i>	No Change	No Change	No Change	No Change	No Change
Pygmy nuthatch	<i>Sitta pygmaea</i>	No Change	No Change	No Change	No Change	No Change
Warbling vireo	<i>Vireo gilvus</i>	No Change	No Change	No Change	No Change	No Change
Wilson’s warbler	<i>Wilsonia pusilla</i>	No Change	No Change	No Change	No Change	No Change
AMPHIBIANS						
Boreal toad	<i>Bufo boreas boreas</i>	No Change	No Change	No Change	No Change	No Change

Determinations for MIS species:

Change = change to trends in planning area

No Change - no change to trends in planning area

8.0 Discussion and Consistency with Forest Plan

All alternatives are consistent with the Forest Plan for wildlife, biodiversity, T&E species and MIS. Forest Plan goals, objectives, standards and guidelines related to MIS will be met with for all alternatives. See Forest Plan references in preceding sections; pages 4-7, 16-32, 39-40 and 42; and Forest Plan FEIS Appendices G, H and I. Population trend monitoring for MIS is appropriate at the Forest Planning scale and not at the project level.

8.1 Species Considered

The ARNF tracks plant species of local concern. These species are tracked because of suspected rarity or importance to local biodiversity, previous listing on the Region 2 Sensitive List, or because there is insufficient existing data for an individual species. A list of these species, their habitat, and the likelihood of their occurring within the transmission line corridor is given in Table 8-1.

Table 8-1. Forest Service Plant Species of Local Concern, Arapaho National Forest.

<i>Scientific Name</i>	Common Name	*Potential for Occurrence	Habitat	Elevation	Phenology
<i>Asplenium septentrionale</i>	Forked spleenwort	L	Rock crevices, montane to subalpine	6,500-8,700 ft	Spores in summer
<i>Botrychium echo</i> , <i>hesperium</i> , <i>minganense</i> , <i>lanceolatum</i> , <i>sp. nov.</i> "redbank", <i>pinnatum</i>	Reflected, western, lanceleaf, common, Mingan, "redbank", and northern moonwort	H	Aspen and lodgepole pine forest, rocky hillsides, forest openings; sites often historically disturbed.	9,000 – 12,000 ft	Spores in July – August, doesn't come up every year; leaves until the first frost
<i>Carex lasiocarpa</i>	Slender woolly sedge; woollyfruit sedge	M	Fens, wet meadows	Subalpine and upper montane	Fruiting June – August
<i>Carex limosa</i>	Mud sedge	M	Fens, floating peat mats, peaty meadows and pond margins	Subalpine	Fruiting summer;
<i>Corallorhiza trifida</i>	Northern coralroot	L	Lodgepole pine forest	8,000-10,000 ft	
<i>Corallorhiza wisteriana</i>	Coralroot	L	Lodgepole pine forest	8,000-10,000 ft	Early Spring
<i>Cornus canadensis</i>	Bunchberry, dwarf dogwood	L	Moist, shaded spruce-fir forest; cold air drainages.	3,000-11,000 ft	May-July
<i>Cypripedium fasciculatum</i>	Purple's lady's slipper	M	Lodgepole pine and spruce-fir forests	8,000-10,500 ft	June-July
Fern species except <i>Cystopteris fragilis</i>		H	Moist, rich soils in forest; bases and cracks in rock cliffs	5,000 – 11,000 ft	Spores June-September
<i>Fritillaria atropurpurea</i>	Fritillary	L	Sagebrush, grassy meadows, forest openings		May - July
<i>Goodyera repens</i>	Lesser rattlesnake plantain	L	Shady sites on north to east facing slopes in mixed conifer stands and along banks of small streams, in forest duff and moss	8,000-9,500 ft	Late July to August

*Potential for					
<i>Scientific Name</i>	Common Name	Occurrence	Habitat	Elevation	Phenology
<i>Lewisia rediviva</i>	Bitterroot	L	Gravelly flats, and seasonally wet sagebrush benches		
<i>Lilium philadelphicum</i>	Wood lily	L	Aspen forest	6,800-9,800 ft	June – August
<i>Listera borealis</i>	Northern twayblade	L	Seeps and springs, lodgepole forest, aspen, and spruce-fir forest	8,700-10,800 ft	Late June – July
<i>Listera convallarioides</i>	Broadlipped twayblade	L	Seeps and springs, lodgepole forest, aspen, and spruce	Subalpine	Late June - July
<i>Listera cordata</i>	Heartleaf twayblade	L	Seeps and springs, lodgepole forest, aspen, and spruce	Subalpine	Late June - July
<i>Penstemon cyathophorus</i>	Cupped penstemon	H	Sagebrush communities	7,000-8,500 ft	Late May to June
<i>Penstemon laricifolius</i> ssp. <i>exilifolius</i>	Larch-leaf beardtongue	L	Dry, rocky slopes, foothills, and upland flats of the intermountain basins. Found in North Park – Larimer County.	5,600 – 9,600 ft	June - August
<i>Petasites sagittatus</i>	Arrowhead colt's foot	M	Wetlands, moist meadows	8,000 – 10,500 ft	Leaves in spring - fall, flowers rarely in spring
<i>Primula incana</i>	Bird's eye primrose	M	Fen wetlands, wet meadows in intermountain parks	Upper montane to subalpine	June - July
<i>Primula egaliksensis</i>	Greenland primrose	L	Wet meadows, streambanks, willow carrs, and rich fens	9,000-9,800 ft	Flowers June/July
<i>Pyrola picta</i>	Pictureleaf wintergreen	L	Cool moist slopes and ravines in lodgepole and ponderosa pine, and Douglas-fir	6,000-9,800 ft	June to early August

* Potential for occurrence within the project area is ranked as follows: L = low, M = medium, and H = high

8.2 Species Evaluated

Four species of local concern were documented within the project area during plant surveys in June 2009: *Penstemon cyathophorus*, *Botrychium echo*, *Botrychium hesperium* and *Botrychium minganense*. The three *Botrychium* species were found in one isolated location in a former irrigation ditch almost directly underneath the existing transmission line (Alternative A, B1, D1). The legal description for this *Botrychium* population is SE¼, SW¼, NW¼ of Section 3, Range 76 West, and Township 2 North. The elevation of the population was approximately 8,285 feet. The geographic coordinates are 40°09'48.049" North, 105°53'53.506" West. This site was on the lower edge of a lodgepole pine stand and the ditch provided a previously disturbed site that still maintains more hydric conditions than the surrounding uplands. These plants were limited to very small numbers and it is likely that any work accomplished in this area could adequately avoid the documented population.

Penstemon cyathophorus was detected in several locations throughout the overall project area. The densest populations were on the north end of the project near the Granby Pumping Plant. The legal description for the *Penstemon cyathophorus* population immediately north of the Granby Pumping Plant is NW¼, NW¼, NE¼ of Section 35, Range 76 West, Township 3 North. An estimate of population density was made during the rare plant survey. Using a series of two belt transects (200feet long x 10 feet wide), the population was estimated to be approximately 152 plants per 2,000 square feet, or 3,311 plants per acre. The outer perimeter of this plant population was mapped in the field and covered a total of 4.2 acres, 3.7 acres of which were in the ROW.

All five project alternatives would require some structures (poles) to be erected in this population north of the Granby Pumping Plant. The project would result in direct and possibly indirect impacts to this species, due to construction activities, structure placement, and access through the project ROW. Maintenance activities for any of the proposed alternatives would also likely result in the loss or damage of some number of individuals of this species. These adverse impacts are likely to be minor for this species overall on the Arapaho National Forest.

About 30 *Penstemon cyathophorus* plants were found by the Forest Botanist in past years at the intersection of County Road 41 (Willow Creek Reservoir Rod) and HWY 34. A few of these occurred within the ROW while most plants occurred beyond the ROW. It is estimated that several individuals could be impacted by the action alternatives. There would likely remain sufficient numbers of nearby unimpacted individuals such that local viability would be maintained.

The locally uncommon plants *Penstemon crandallii* and *Pediocactus simpsonii* were encountered near the junction of County Road 41 and HWY 34 by the Forest Botanist during previous surveys at and near the current ROW. All plants of *Penstemon crandallii* are beyond the current ROW in areas that would not be impacted by any action alternatives. The *Pediocactus simpsonii* plants are at the edge of the existing ROW, and could be impacted by action alternatives if the local area were to be used as a staging area or for a service road. Loss of plants at that site would not be anticipated to compromise long-term viability of this species across the Planning Unit, however, because there are numerous other sites containing healthy populations across the Unit.

8.3 Noxious Weeds

Species on the Colorado state noxious weed list are shown in Table 8-2. The following state-listed noxious weeds were identified in the project area:

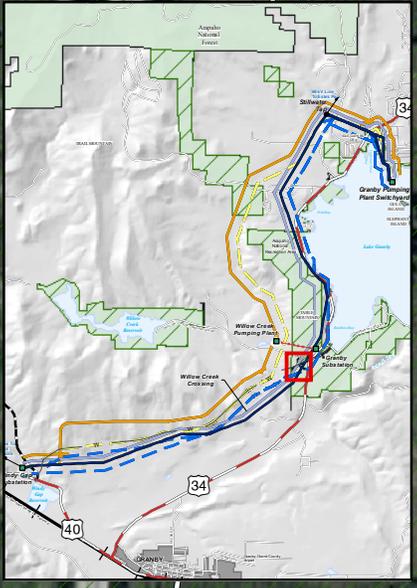
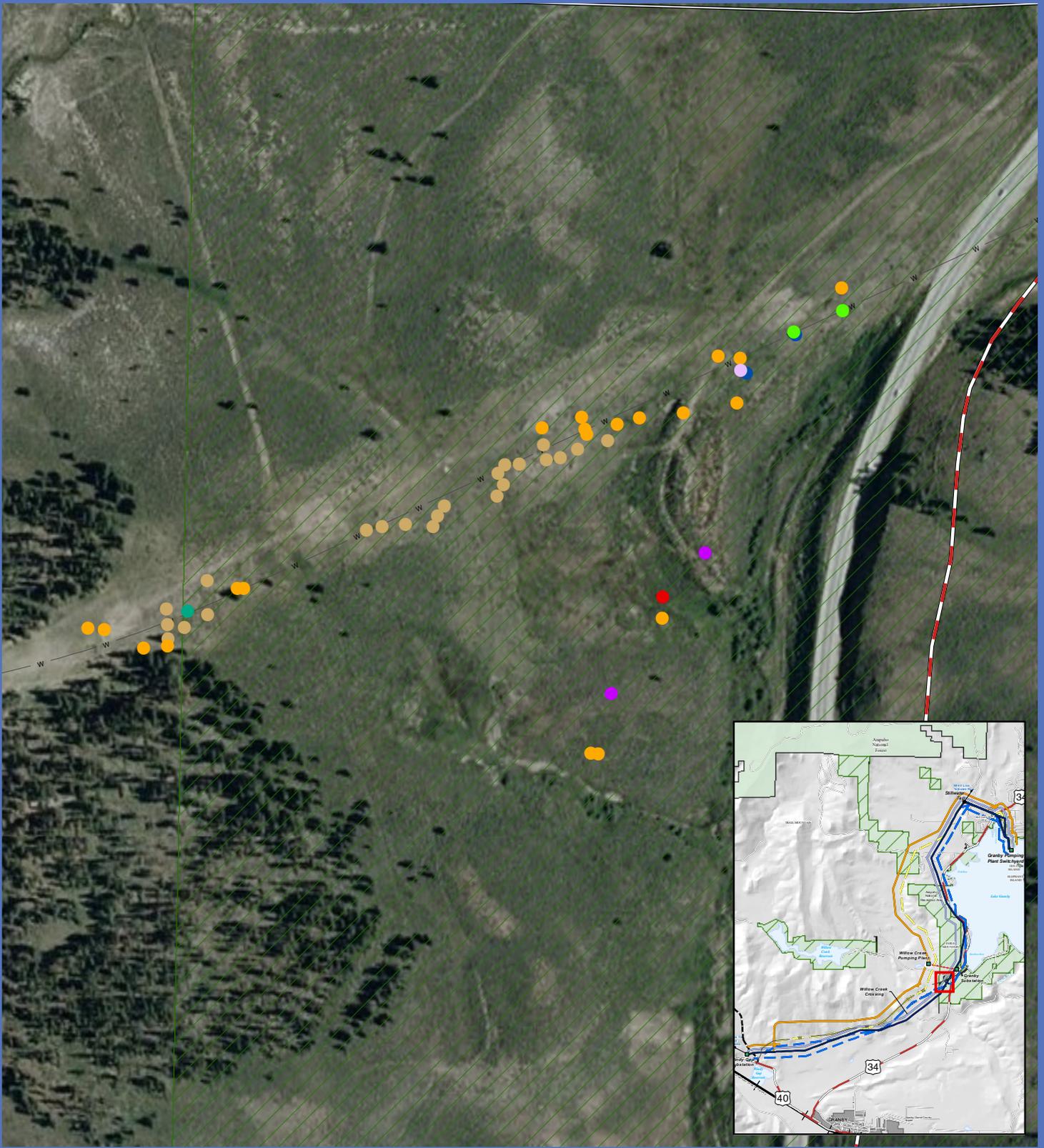
- black henbane (*Hyoscyamus niger*)
- Canada thistle (*Breca arvensis*)
- cheatgrass (*Anisantha tectorum*)
- common mullein (*Verbascum thapsus*)
- field bindweed (*Convolvulus arvensis*)
- hoary cress (*Cardaria draba*)
- houndstongue (*Cynoglossum officinale*)
- musk thistle (*Carduus nutans*)
- scentless chamomile (*Matricaria perforata*)

Occurrences of these weeds are generally more common in the disturbed ROW corridor of the NCWCD Windy Gap buried pipeline. The two areas of greatest concern include a stretch of the revegetated existing water pipeline site south of CR 40 and immediately west of US Highway 34 (where *Cardaria draba*, *Breea arvensis*, and *Carduus nutans* occur), and the exposed shoreline of Lake Granby and adjacent uplands at Cutthroat Bay (where *Breea arvensis* and *Matricaria perforata* occur). Several small polygons of weed populations were mapped for the water pipeline area totaling 0.1 acres within the ROW for Alternative D1 (Options 1 and 2). The weedy shoreline and adjacent upland site was mapped and the resultant polygon covered 2.1 acres. This area encroaches in ROWs for all five project alternatives (A, B1, C1, C2, and D1). Map 8-1 and Map 8-2 depict the mapped weed locations for the project area.

Table 8-2. State Listed Noxious Weeds Observed in the Project Area ROW.

Common Name	Scientific Name	State List
black henbane	<i>Hyoscyamus niger</i>	B
bindweed	<i>Convolvulus arvensis</i>	C
Canada thistle	<i>Breca arvensis</i>	B
chamomile, scentless	<i>Matricaria perforata</i>	B
cheatgrass	<i>Anisantha tectorum</i>	C
field bindweed	<i>Convolvulus arvensis</i>	C
hoary cress (Whitetop)	<i>Cardaria draba</i>	B
houndstongue	<i>Cynoglossum officinale</i>	B
Common mullein	<i>Verbascum thapsus</i>	C
musk thistle	<i>Carduus nutans</i>	B

Source: Colorado Noxious Weed Act, 35-5.5-101-119 C.R.S.



Map 8-1

Legend

- | | | | | | |
|---|----------------------------------|---------------------------------------|----------------------|--------------|--|
| Base Data | | Transmission Line Alternatives | | Weeds | |
| ● Existing Willow Creek Tap (69-KV) | Alternative A - Existing | ● Canada Thistle | ● Leafy Spurge | | |
| —W— Windy Gap Water Pipeline (NCWCD) | Alternative B1 | ● Elongated Mustard | ● Lenspod (Whitetop) | | |
| ▨ Arapaho National Recreation Area (ANRA) | Alternative C1 | ● Horay Cress (Whitetop) | ● Mayweed Chamomile | | |
| ■ U.S. Forest Service (USFS) | Alternative C2 - Options 1 and 2 | ● Houndstongue | ● Musk Thistle | | |
| | Alternative D | | | | |
| | Alternative D - Option 1 and 2 | | | | |

Noxious Weeds – Southwest End
November 4, 2010



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

GRANBY PUMPING PLANT - WINDY GAP TRANSMISSION LINE REBUILD PROJECT

Filepath: P:\2010\06\00\0029_02\GIS\Project\Layouts\ALTB1_8_6X11_090927.mxd



Map 8-2

Legend

- | | | | |
|------------------|---|---------------------------------------|-----------------------|
| Base Data | | Transmission Line Alternatives | Weeds |
| ● | Existing Willow Creek Tap (69-kV) | — | Identified Weed Areas |
| — | Windy Gap Water Pipeline (NCWCD) | — | |
| ▨ | Arapaho National Recreation Area (ANRA) | — | |
| ■ | U.S. Forest Service (USFS) | — | |
| | | — | |
| | | — | |
| | | — | |
| | | — | |
| | | — | |
| | | — | |

Noxious Weeds
July 23, 2010



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

GRANBY PUMPING PLANT - WINDY GAP TRANSMISSION LINE REBUILD PROJECT

File path: P:\2010\0600\0029_02\GIS\Project\Layouts\ALTB1_8_6\XY11_060027.mxd

9.0 State or Other Species of Concern

The CDOW was also consulted to obtain data regarding species and habitats of state concern within the project area. A letter requesting information on state species of concern and habitat was submitted to CDOW on August 24, 2005. CDOW responded and provided a list of agency concerns including: impacts to mule deer and elk winter range; sage grouse nesting and brooding areas; compliance with the Migratory Bird Treaty Act of 1918, as amended; and compliance with the Bald and Golden Eagle Protection Act of 1940. This letter is included in Appendix G. Western met with the CDOW twice in December 2007 to provide project updates and to request any additional information on state listed species that may occur in the project area.

The CDOW provided data regarding raptor, big game, and sage grouse habitats within the project area as well as information regarding state listed species and species of state concern.

The CNHP was contacted to collect information and elemental occurrence data for species of concern within the proposed project area, including a two-mile buffer. The CNHP database search identified one historic occurrence of the state endangered boreal toad and one occurrence for wood frog which are a species of concern in Colorado. Both of these species are carried forward in this analysis.

9.1 Species Evaluation

The following state or other species of concern have been retained for further analysis:

Table 9-1. State or Other Species of Concern Retained for Further Analysis.

State or Other Species of Concern	
American white pelican	Birds
Bald eagle (State Threatened)*	
Golden eagle	
Greater sage-grouse (State Concern)*	
Migratory birds**	
Osprey	
Boreal toad (State Endangered)*	Amphibians
Wood frog (State Concern)*	

*Species is addressed as FSS species, MIS, or both. See Sections 6.0 and 7.0.

**Various migratory bird species are addressed in the FSS species and MIS sections.

9.1.1 American White Pelican, *Pelecanus erythrorhynchos*

Distribution: The American White Pelican occurs throughout western and central North America. Several dozen colonies supporting more than 60,000 nesting pairs occur over a large nesting and winter range in Canada, United States, and Mexico (NatureServe 2010ah). King and Anderson (2005) determined that at least 27 American White Pelican colonies and 48,240 nests occur east of the Continental Divide and at least 15 colonies and 18,790 nests exist west of the Divide, for a total of about 134,000 breeding pelicans in North America.

Nesting colonies occur have also been documented in south-central British Columbia, Alberta, Saskatchewan, Manitoba, southwestern Ontario, northern California, Nevada, Utah, Colorado, South

Dakota, and Minnesota (Knopf and Evans 2004). Wintering range of the American White Pelican includes Florida, Gulf of Mexico coast south to northern Yucatan Peninsula, and central California south to southern Baja California and through western mainland Mexico to Nicaragua (AOU 1983, Knopf and Evans 2004). The area of southern Texas has been documented to have the largest wintering population of American White Pelicans (Root 1988); other important wintering areas include the Gulf coast and Everglades region of Florida (NatureServe 2010ah).

Natural-History: Habitats of the American White Pelican include rivers, lakes, reservoirs, estuaries, bays, and open marshes, and inshore marine habitats. Pelicans are often observed roosting on islands and peninsulas. Nests usually are on islands or peninsulas (natural or dredge spoils) in brackish or freshwater lakes, or on ephemeral islands in shallower wetlands as in the northern Great Plains or on the Texas coast (Knopf and Evans 2004). Eggs are usually laid in a slight depression on the ground or on a mound of earth and debris 24 to 36 inches across, 15 to 20 inches high (Terres 1980), usually on low flat, or gently sloping terrain. Nest sites usually are in open areas but often near vegetation, driftwood, or large rocks (Spendelov and Patton 1988). Winter habitats are mainly coastal, but also include also inland waters such as the Salton Sea and some rivers with open water (Knopf and Evans 2004). Sand bars and similar sites for roosting or loafing have been documented as important components of winter habitat (Knopf and Evans 2004).

This species is highly sensitive to human intrusion into breeding colonies, which cause desertions and exposure of eggs and young to temperature extremes and gull predation (Knopf and Evans 2004). Loud and close passes by motor boats and low flying airplanes can cause bird to flee from nesting colonies or feeding or roosting areas (Knopf and Evans 2004).

Environmental Baseline: American White Pelicans are abundant summer resident on eastern plains and rare in western valleys and mountain parks. Many reservoirs have large populations of non-breeders, especially on eastern plains. The species is also an abundant spring and fall migrant on the eastern plains. They are rare in western valleys and mountain parks and rare in mountains outside parks, mostly only noted flying overhead. There are several observations of individuals spending the winter at eastern plains reservoirs (NDIS 2010a).

Direct, Indirect, and Cumulative Impacts: The primary impact the proposed project may have on this species is collision and electrocution associated with the transmission line. Western would design and construct the transmission line in conformance with Suggested Practices for Avian Protection on Power Lines (APLIC 2006) to minimize impacts to this species.

Bird flight diverters and perch deterrents would be included in transmission line design at sensitive locations to minimize collision and electrocution risks in the project area (see Section 3.0). The location and spacing of these diverters would be determined by Western's biologists in coordination with other interested agencies. The areas identified for flight diverters include the northern end of the project area where the line spans Cutthroat Trout Bay and areas at the southwestern end of the project area that parallel the Colorado River. The project would incorporate appropriate measures from the Suggested Practices for Protection of Raptors on Power Lines (APLIC 2006) to reduce the potential for collision or electrocution..

Other projects or undertakings in the project area that may cumulatively impact this species include future recreational and residential developments, and proposed water developments in the project area and Grand County. Sedimentation from these developments can result in direct impacts to fish

populations that the American white pelican prey upon. Future residential and recreational developments can reduce foraging habitat and potentially lead to disturbance of foraging and winter habitats that occur in the project area.

Water projects may inundate foraging habitats for the American white pelican. Depending on the location and extent, the creation of large reservoirs could expand foraging opportunities.

The cumulative impacts of a second communications tower on Table Mountain, coupled with a new transmission line could increase the collision risk within the project area, particularly when they are located near surface waters.

Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line corridor. Alternative A is the only alternative that would span Cutthroat Bay which provides foraging habitat for this species. Although some American white pelicans are likely used to the existing line, juveniles and migrant individuals have some risk of collision and electrocution.

Alternative B1: Alternative B1 is located in proximity to Lake Granby and the Colorado River which provide forage for this species. The environmental protection measures discussed in Section 3.0, including bird flight diverters would help to minimize impacts to this species.

Alternative C1: Alternative C1 occurs almost entirely within a new transmission ROW. The collision risk is expected to be higher for in the vicinity of Lake Granby and the Colorado River. The environmental protection measures discussed in Section 3.0, including bird flight diverters would help to minimize impacts to this species and foraging habitat in the project area.

Alternative C2: Impacts and rationale would be similar to those described for Alternative C1.

Alternative D: Impacts and rationale of Alternative D would be similar to those described for Alternative B1, with the following exceptions. Alternative D, Option 1 would construct the transmission line outside of the existing transmission corridor and closer to the NCWCD water pipeline. This would be further from the Colorado River and foraging habitat for this species.

9.1.2 *Bald eagle, *Haliaeetus leucocephalus**

Refer to Section 6.0, FSS species for information on this species.

9.1.3 *Golden eagle, *Aquila chrysaetos**

Distribution: In North America, golden eagles occur in western and northern Alaska east through the Northwest Territories to Labrador, south to northern Mexico, Texas, western Oklahoma, western Kansas; in East to New York, New England (rare). The eagle is also known to breed in the Palearctic. This species winters in south-central Alaska, southern Canada south through breeding range, casually southward. In the United States, golden eagles are most numerous in winter in the Rocky Mountain states, Great Basin, and western edge of the Great Plains (Root 1988). Northernmost populations in Eurasia winter south to northern Africa (Sibley and Monroe 1990). Golden eagles are protected under the Migratory Bird Treaty Act of 1918, as amended, and the Bald and Golden Eagle Protection Act of 1940.

In Colorado, the golden eagle is a winter resident in western valleys, foothills, lower mountains, mountain parks, and eastern plains. The greatest winter concentrations occur in Northwestern Colorado. The golden eagle is an uncommon summer resident in western valleys, foothills, mountains, mountain parks, and eastern plains (NDIS 2005). An active golden eagle nest is located in the project area, on the north side of Table Mountain.

Natural History: Golden eagles occur in grasslands, shrublands, pinyon-juniper woodlands, and ponderosa pine forests. They may occur in other habitats during the winter and during migration. Golden eagles nest on cliffs and sometimes in trees in rugged terrain. Breeding birds range widely over surrounding habitats. Hunting territory can extend up to 160 square miles. Golden eagles begin breeding by 4 years of age and can live up to 20 years. Unlike bald eagles, golden eagles do not congregate in the winter. Besides small mammals golden eagles will prey upon birds, reptiles, amphibians, and insects. Studies have shown a positive correlation between breeding success and jackrabbit number in Idaho, Colorado, and Utah (NatureServe 2010ai).

Golden eagle populations declined in the early 1900s due to eradication campaigns (often as a result of the belief that eagles were major predators on livestock) (NatureServe 2010ai). Golden eagles were able to avoid the impacts of DDT contamination because they prey primarily upon grass-eating mammals. Eagles are susceptible to power line electrocution because wings can span phase-to-phase or phase-to-ground wires (Biosystems Analysis 1989). Recent transmission line design modifications have significantly reduced electrocution risk to raptors. Other threats to golden eagles include occasional shootings, and habitat loss to agriculture and suburban land uses.

Environmental Baseline: NatureServe (2010ai), reports that the North American population in the mid-1980s was estimated at about 70,000; perhaps about 20,000 breeding pairs occur in the western United States.

There are two golden eagle nests located near Table Mountain, less than 0.50 miles above the ROW of all alternatives. In 2009, two chicks were produced at one of the nest sites. A juvenile golden eagle was observed perching on the ROW for Alternative C on the west side of Table Mountain during habitat assessment surveys conducted in July of 2005 and again in 2007.

CDOW conducts annual winter surveys for bald and golden eagles; the survey results between 1995 and 2011 are provided in Appendix D. During the surveys, no golden eagles have been documented along the Shadow Mountain to Granby Reservoir or Granby Reservoir to Windy Gap routes. Two golden eagles were observed within the Windy Gap to State Ranch route in 2011 (CDOW 2011).

Direct, Indirect, and Cumulative Impacts: (Discussed by alternative.)

Alternative A (No Action): Alternative A would result in no new construction or changes within the existing transmission line. Impacts resulting from Alternative A include the collision and electrocution hazard of the existing transmission line.

Alternative B1: A majority of Alternative B would be constructed within an existing transmission corridor, with the exception of 1.8 miles. The height of the transmission line would increase within the existing alignment and this may increase collision risk within the corridor. However, since this is an existing condition, golden eagles and other raptors in the area are likely used to a transmission corridor in this location. However, migrant and juvenile individuals are not used to the transmission line and no

individuals would be used to the altered height of the structures. Surveys conducted by the Forest Service have shown that golden eagles are not known to commonly fly and forage to the east of Table Mountain. Collision and electrocution risks would be minimized through transmission line design and mitigation measures as described in the project design criteria.

Alternatives C1 and C2: The Alternative C1 and C2 transmission alignments have the potential to negatively impact golden eagles. The golden eagle nests on Table Mountain are approximately 0.5 to 0.75 mile upslope of the proposed transmission line alignment. The terrain in this area creates a greater potential for collision risk despite the normally acceptable 0.5 mile buffer. The nests are located at approximately 8,600 feet and the line would be placed at approximately 8,200 feet and higher in some locations below the nests within the area of concern. There is a risk of collision for the adult golden eagles and especially for fledglings, which are not able to control flight patterns.

A juvenile golden eagle was observed perching on the ROW for Alternative C on the west side of Table Mountain during habitat assessment surveys conducted in July of 2005 and again in 2007.

Bird flight diverters would be required if this alternative was selected. Conversations with the USFWS and Forest Service biologists indicated that it may not be feasible to mitigate for collision risk associated with this alignment in the vicinity of the golden eagle nest even with the use of flight diverters because of the location of the transmission ROW relative to the nest sites.

In order to avoid disturbance to nesting golden eagles, no surface occupancy (beyond that which historically occurred in the area) will occur within 0.25 mile radius of the nest site and associated alternate nests. Western would also implement a seasonal restriction to human encroachment within 0.5 mile of the nest and any alternate nests from December 15 to July 15.

Alternative D (Proposed Action): Alternatives B1 and D share the same ROW with the exception of the options on the southwestern end of the project area. Impacts discussed above for Alternative B1 also apply to Alternative D.

Determination of Impact: Alternatives A, B1, and D are not expected to result in major impacts to golden eagles with the implementation of mitigation measures discussed above. Alternatives C1 and C2 would result in adverse impacts to golden eagle populations within the project area and on the ANRA because they would result in new ROWs and therefore habitat alteration on the west side of Table Mountain. The operation of the transmission line on the west side of Table Mountain would also increase collision and electrocution risks. Electrocution risks would be minimized with implementation of DC-2.

9.1.4 Greater sage-grouse, *Centrocercus urophasianus*

Refer to Section 6.0, FSS species for information on this species.

9.1.5 Osprey, *Pandion haliaetus*

There are 32 osprey nests located within or in close proximity to the project area and the Granby/Grand Lake Area (Sulphur District Osprey Report 2005). Osprey is seen over Windy Gap and the Fraser River inlet area. According to Sulphur District 2010 records, eight Osprey nests are located in proximity to the project. There are three osprey nests located to the east of Alternative A and the project area, on the

east side of Rainbow Bay. Two nests have been identified near Willow Creek Reservoir to the west of all project alternatives, and another two nests are located to the south of Granby Tap Substation. Of the eight nests in the project area, four osprey nests are located in proximity (within 0.5 mile) to Alternatives A and B1. These nests are located approximately 26, 177, 324, and 2,000 feet away from these two alternatives. Two osprey nests are located in proximity to Alternatives C1 and C2. These nests are located 1,817 and 2,030 feet from the alternatives. Alternative D is similar to Alternatives A and B1, located in proximity to the same four nests, with a slight increase in nest distance. The Osprey nests are located approximately 26, 387, 482, and 2,200 feet away from Alternative D. Osprey have also been observed over windy gap and the Fraser river inlet area. The other 4 nests in the project area are greater than 0.5 mile from any alternative and should not be impacted by the project. It will not always be possible to apply the recommended distance buffers during construction. However, project construction will avoid Osprey nesting season from April 1 to August 30. Avian flight diverters will also be utilized near surface waters to avoid impacts to foraging Osprey. To mitigate impacts to nesting Osprey, some structures may be left standing near Lake Granby during removal of the existing transmission line to provide habitat for nesting Osprey. Western will coordinate with the Forest Service on which structures to leave standing

9.1.6 *Migratory Birds*

The project alternatives contain habitat for a variety of migratory birds including raptors. In order to minimize and mitigate impacts to migratory birds during project construction, the FWS would require Western to conduct pre-construction nesting surveys, if construction occurs during the avian breeding season (species dependant but roughly March 15 to August 15). Surveys would be conducted no earlier than 72 hours prior to any ground-disturbing activities. In addition, if construction occurs in the spring and summer months, raptor surveys would be conducted up to 0.25 miles from the selected alternative to ensure the project does not result in impacts to nesting raptors. The project would be constructed using the recommended buffers and seasonal restrictions approved for Colorado raptors by CDOW and the USFWS. When applying the appropriate distance buffers is not possible, CDOW will be consulted on how to avoid impacts to nesting raptors. This would include seasonal restrictions for construction. The project would be constructed to the extent feasible outside of the avian breeding season.

The project would be constructed using USFWS and APLIC guidelines for raptor safety to mitigate electrocution impacts. Bird flight diverters would be placed in high risk areas, identified by the Forest Service and Western biologists.

10.0 Cumulative Impacts of the Proposed Action (All species)

Cumulative impacts are the result of the incremental impacts of the proposed action when added to other past, present, and foreseeable future actions, regardless of which agency (federal or non-federal) or person undertakes such actions. Past, ongoing and future activities that may contribute to cumulative impacts in the project area include:

PAST

- Construction and operation of Reclamation reservoirs
- Multiple communications facilities on Table Mountain, including cell phone and microwave towers for Verizon Cellular and Union
- Habitat fragmentation as a result of development and associate infrastructure
- Existing and expanding recreational uses
- Construction of subdivision roads
- Private inholdings, conservation easements, subdivision of large parcels
- Construction of local highways
- Development of gravel pits

PRESENT

- Salvage harvests
- Prescribed fire activities
- Recent and current population growth
- Large-scale residential development and associated infrastructure
- Recreation and tourism development
- Various federal/non-federal land exchanges
- Reservoir water level fluctuations
- Spread of noxious weeds
- Development of gravel pits

FUTURE

- Forest health planning and treatments
- Proposed water development projects, including increased West Slope diversions
- Various land exchanges – Forest Service/NCWCD, NCWCD/BLM
- Habitat fragmentation as a result of development, build-out
- Existing and expanding recreational uses
- New subdivision roads/access
- Private inholdings, conservation easements, subdividing of large parcels
- Reservoir water level fluctuations
- Spread of noxious weeds
- Modifications at the Granby Pumping Plant Switchyard, including the relocation of a transformer

- Development of gravel pits

Existing and planned residential developments, agriculture, and water developments have resulted in habitat loss and fragmentation to the north and south of the project area. Residential developments, like the Shorefox Development have resulted in the loss of wetland, riparian, and sagebrush habitats that support a variety of species in Colorado. The Shorefox Development was historically grazed and the plant communities found within the ranch site were hay meadows (more recently) and big sagebrush. The acreage of impact to wetland, riparian, and sagebrush habitat was not available for this analysis, but review of aerial photographs show the impact to the landscape to be large. Development on the Shorefox Planned residential developments on the northern and southern end of the project area could result in long-term impacts to big game migration corridors as well as big game severe winter range. Planned water developments would result in additional loss and fragmentation of wildlife habitat and migration corridors in the area. Of particular concern, are impacts to the greater sage-grouse population that occurs on the southwestern end of the project area due to habitat loss and fragmentation, and impediments to movement.

The Middle Park sage grouse population is located primarily in Grand County, but also occurs in portions of Eagle and Summit counties. The population is bordered by the Gore Range to the west and includes the areas surround the towns of Kremmling, Hot Sulphur Springs, and Granby. According to the Colorado Greater Sagegrouse Conservation Plan (2008), the lowest density of sage grouse within the Middle Park population is in sagebrush rangelands near Granby. Sage grouse were historically observed along the Colorado River near Granby. Loss of habitat or increased disturbance to these populations may result in the permanent loss or abandonment of this segment of the Middle Park sage grouse population. The sagebrush communities found west of Lake Granby have been identified as suitable habitat for grouse under the Colorado Greater Sage-grouse Conservation Plan and also as areas where restoration activities are recommended. Further residential developments and water developments on the west side of Table Mountain would compromise existing habitats and potential restoration of currently unsuitable habitats.

Residential developments and water developments may result in long-term cumulative impacts on suitable habitat for FSS amphibian species; the boreal toad, leopard frog, and the wood frog. These species are not expected to occur in the project area, but may be used as re-location sites in the future. Impacts from development on water quality, temperature, and level would negatively affect the viability of habitats for sensitive amphibian and fish species. A blowout of a storm water pond on the Shorefox Development has resulted in sedimentation impacts to the Colorado River. Over time, these activities could contribute to cumulative impacts to federally listed fish species that occur downstream. Water depletions and impacts to water quality would have additional impacts to these resources. The project is expected to span all surface waters, wetlands, and riparian communities to avoid impacts to aquatic species; therefore, this project is not anticipated to result in any measurable contributions to these cumulative impacts.

Residential developments to the north and south of the project area and the Colorado River will result in changes to wildlife movement corridors. It will also increase noise and human disturbance which could alter the density of wildlife and wildlife use patterns within the area and increase competition for resources in areas that are left undisturbed.

Residential developments in proximity to the project area have increased the propagation of noxious weeds. This is of particular concern on the planned Shorefox Property where ground has been cleared

and the area has not been re-vegetated. Propagation of noxious weeds can result in decreased foraging opportunities for wildlife and can alter drainage patterns across a landscape. Bare ground and noxious weed populations can result in erosion and sedimentation into surface waters, which can result in adverse impacts to fisheries and other aquatic resources. Impacts to water quality on the Colorado River have recently been a concern on the Shorefox Development.

Operation of transmission lines and the planned communication tower on Table Mountain can increase collision risk for avian species that occur in the project area, including golden eagles.

The mountain pine beetle epidemic also contributes to wildlife impacts in the project area. Forest-dwelling species have been impacted by the loss of lodgepole pine communities on the Sulphur Ranger District. Many of the nest sites observed in the project area are currently found in dead lodgepole pine stands. Over time, suitable nesting sites for raptors is expected to decline across the Forest. Cavity nesting species and insectivores, such as woodpeckers, are expected to benefit from the pine beetle epidemic in the short-term. Over time, stand replacing fires may occur and habitat for these species will also be significantly impacted. The pine beetle epidemic has altered the structure and density of forests and wildlife habitats. Climate change may play a role in the further spread of the mountain pine beetle epidemic in Colorado. The mountain pine beetle thrives during drier and warmer seasons. The loss of forest communities on the Sulphur Ranger District, and throughout the state, will have negative impacts to species that require mature forest habitat in the short-term. The construction and operation of the transmission line is not expected to contribute to the cumulative impacts of the current pine beetle epidemic.

As development increases within and adjacent to the project area, sensitive plant habitat effectiveness may decrease. Recreational activities and trail and road networks usually increase as a result of increased human development. There are a number of projects planned within and adjacent to the project area. These developments would fragment habitats and increase human presence in areas previously undisturbed. The expanding mountain pine beetle infestation will cause loss of mature lodgepole pine canopies across the region and will result in a dramatic increase in ambient light reaching the shrub and herbaceous layers of the forest. This increase in light will also increase ambient temperature at the ground surface and will likely result in changes to plant diversity, as well as plant community structure and function. The number of snags and downed logs (ultimately) on the forest floor presents another considerable cumulative impact. Ultimately, the impacts of the pine beetle epidemic will benefit some species and adversely impact others.

11.0 Responsibility for Revisions to this Biological Report

This Biological Report was prepared based on the best available information and science. If the action is modified in a manner that causes impacts not considered, or if new information becomes available that reveals that the action may impact federally listed or candidate species, FSS species, or state and local species of concern to an extent not previously considered, a new or revised Biological Report may be required.

12.0 References

American Ornithologists' Union (AOU). 1983. Check-list of North American Birds, 6th edition. Allen Press, Inc., Lawrence, Kansas. 877 pp.

Anderson, D.G. 2006. *Eriogonum exilifolium* Reveal (dropleaf buckwheat): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/eriogonumexilifolium.pdf> [accessed February 8, 2006].

Andrews, R.R. and R.R. Righter. 1992. Colorado birds. Denver Museum of Natural History. Denver. 442 p.

Avian Power Line Interaction Committee and United States Fish and Wildlife Service. 2005. Avian Protection Plan (APP) Guidelines.

Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Avian Protection on Power Lines.

Beatty, B.L., W.F. Jennings, and R.C. Rawlinson. 2004. *Machaeranthera coloradoensis* (Colorado tansy aster): a technical conservation assessment. Available at: <http://www.fs.fed.us/r2/projects/scp/assessments/machaerantheracoloradoensis.pdf>.

Beauvais, G.P. and J. McCumber. (2006, November 30). Pygmy Shrew (*Sorex hoyi*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/pygmyshrew>.

Biosystems Analysis, Inc. 1989. Endangered Species Alert Program Manual: Species Accounts and Procedures. Southern California Edison Environmental Affairs Division.

Boyle, S. (2006, September 2). North American River Otter (*Lontra canadensis*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/northamericanriverotter.pdf>

Braun, C.E., J.H. Anderson, M.R. Fuller, Y.B. Linhart, and C.D. Marti. 1996. Northern Goshawk and Forest Management in the Southwestern United States. Wildl. Soc. Tech. Rev. 96-2. 19 pp.

Braun, C. E., O. O. Oedekoven, and C. L. Aldridge. 2002. Oil and gas development in western North America: effects on sagebrush steppe avifauna with particular emphasis on sagegrouse. Transactions of the North American Wildlife and Natural Resources Conferences 67:337-349.

Bureau of Land Management (BLM). 2000. Colorado BLM State Director's Sensitive Species List. Accessed via the internet at http://www.co.blm.gov/botany/sens_species.htm.

_____. 2002. BLM Wyoming Sensitive Species Policy and List. Accessed via the internet at <http://www.blm.gov/pgdata/etc/medialib/blm/wy/wildlife.Par.9226.File.dat/02species.pdf>

Colorado Division of Wildlife (CDOW) 2003. WRIS habitat mapping for Districts 483 and 484.

_____. 2005. Bald Eagle Specie Profile.

_____. 2007a. Report on and the Status and Conservation of the Boreal Toad in the Southern Rocky Mountains 2006-2007.

_____. 2007b. Big Game Statistics. Post Hunt Elk Population Counts.

_____. 2007c. Big Game Statistics. Post Hunt Mule Deer Population Counts.

_____. 2008. Colorado Greater Sage-grouse Steering Committee. 2008. Colorado Greater SageGrouse Conservation Plan. Colorado Division of Wildlife. Denver, Colorado, USA.

_____. 2009. Wildlife Species of Concern Homepage-Wolverine. <http://wildlife.state.co/WildlifeSpecies/SpeciesofConcern/Mammals/Wolverine.htm>

_____. 2010. North American River Otter Species Profile. Online at: <http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/Mammals/RiverOtter.htm>

_____. 2011. Midwinter Eagle Count. Middle Park Dataset.

Colorado Natural Heritage Program (CNHP). 2007. Element Occurance GIS Shapefiles. Dataset requested from EDAW to CNHP.

_____. 2009. CNHP Plant list <http://www.cnhp.colostate.edu/download/list/vascular.asp>

Craig, Gerald. 1980-1999. Mid-winter Bald Eagle Survey Results. Colorado Division of Wildlife. Internal documents.

Craig, Gerald. 2001. 2000 Colorado Bald Eagle Nesting Efforts. Colorado Division of Wildlife. Internal document.

Dawson, C. and T. Grant. 2002. Denver Botanic Gardens, 909 York Street, Denver, CO 80206. Monitoring populations of *Penstemon harringtonii*, a Colorado endemic. POSTER "Southwest Rare and Endangered Plants: Proceedings of Third Conference

Elliot, Brian. 2008. Biological Evaluation/Assessment (BA/BE) for Threatened, Endangered, and Forest Service Sensitive Plant Species on Western Area Power Administration Transmission Lines on the Sulphur District of the Arapaho National Forest and Dillon District of the White River National Forest in Colorado.

Fahrig, L. 2003. Effects of Fragmentation on Biodiversity. *Annual Review of Ecology Evolution and Systematics* 34:487-515.

Federal Register. 1989. ETWP; Final Rule to Determine *Astragalus osterhoustii* and *Penstemon penlandii* to be Endangered Species; 54 FR 29658 29663

Fitzgerald, James P., Carron Meaney, and David M. Armstrong. 1994. Mammals of Colorado. Denver Museum of Natural History. Denver, Colorado.

Flora of North America (FNA) Editorial Committee. 2002. Flora of North America, Volume 26: Liliidae.

Forest Service, United States Department of Agriculture (Forest Service). 1995. Forest Service Manual (FSM) 2670.31-32

_____. 1997 Revision of the Land and Resource Management Plan, Final Environmental Impact Statement, and Appendices). Arapaho and Roosevelt National Forests and Pawnee National Grassland, Supervisor's Office, Fort Collins, Colorado.

_____. 2002. USDA Forest Service Region 2 Species Conservation Project: Rocky Mountain Region (R2) Sensitive Species Recommendations and Evaluations. Retrieved on November 19, 2004 from the World Wide Web, Region 2 Forest Service website: <http://fsweb.r2.fs.fed.us/rr/scp/index.shtml>

_____. 2003 and 2005. Species Conservation Project: Species Conservation Assessments. Available: <http://www.fs.fed.us/r2/projects/scp/assessments>

_____. 2005. Threatened, Endangered, and Sensitive Plants Element Occurrence Field Guide. Rangeland Management Staff, Washington Office. October.

_____. 2007. Forest Service Manual Region 2. Chapter 2670 Threatened, Endangered, and Sensitive Plants and Animals. Approved June.

_____. 2009. Region 2 Regional Forester's Sensitive Species. Available online at <http://www.fs.fed.us/r2/projects/scp/sensitivespecies/index.shtml>. Accessed June 2009 through August 2011.

_____. N.d. Sulphur Ranger District Monitoring Files.

Graham, Russell T.; Rodriguez, Ronald L.; Paulin, Kathleen M.; Player, Rodney L.; Heap, Arlene P.; Williams, Richard. 1999. The northern goshawk in Utah: habitat assessment and management recommendations. General Technical Report RMRS-GTR-22. Ogden UT: USDA Forest Service, Rocky Mountain Research Station. 48 p.

Grant, V. and D.H. Wilken. 1986. Taxonomy of the *Ipomopsis aggregata* group (Polemoniaceae). *Botanical Gazette* 147:359-371. Hammerson, Geoffrey A. 1999. *Amphibians and Reptiles in Colorado: 2nd Edition*. University Press of Colorado. 484 pp.

Harmata. 2010. Personal communication with Jim Bridges, Western Area Power Administration.

Hayward, G. D., and P. H. Hayward. 1993. Boreal Owl (*AEGOLIUS FUNEREUS*). In *The Birds of North America*, No. 63. A. Poole and F. Gill, (eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Hayward, G.D. and J. Verner, tech editors, 1994. *Flammulated, Boreal, and Great Gray Owls in the United States: A Technical Conservation Assessment*. General Technical Report RM-253. Fort Collins, Colorado. USDA Forest Service, Rocky Mountain Range and Forest Experiment.

Hipp, Andrew. 2008. *Field Guide to Wisconsin Sedges: an Introduction to the Genus Carex*. The University of Wisconsin Press, Madison, WI.

Hitchcock, C.L. and A. Cronquist. 1964. Vascular Plants of the Pacific Northwest. Part 2: Salicaceae to Saxifragaceae. University of Washington Press, Seattle.

Holland, Andy (CDOW). 2005. Personal communication: Meeting in CDOW's Sulphur Springs Office to discuss wildlife and habitat issues of concern (big game and sage grouse) for the Granby to Windy Gap Pumping Plant Transmission Rebuild Project.

Holloran, M.J., B.J. Heath, A.G. Lyon, S.J. Slater, J.L. Kuipers and S.H. Anderson. 2005. Greater sage-grouse nesting habitat selection and success in Wyoming. *Journal of Wildlife Management* 69 (2) 638-649.

Hoover, R.L. and D.L. Wills, ed. 1984. Managing Forested Lands for Wildlife. Colorado Division of Wildlife in cooperation with USDA Forest Service, Rocky Mountain Region, Denver, Colorado. 459 pp.

Inman, R. Packila, M. Inman, K. Aber, B. Spence, R. McCauley, D. 2009. Greater Yellowstone Wolverine Progress Report. Wildlife Conservation Society. Ennis MT.

Jasper, David A. and Collins, Walter S. 1987. The Birds of Grand County, Colorado. Third Edition. Boulder, CO.

Kennedy, Patricia L. 2003. Northern goshawk: A technical conservation assessment. Prepared for the USDA Forest Service, Rocky Mountain Region, Species Conservation Project.

King, D. T., and D. W. Anderson. 2005. Recent population status of the American white pelican: a continental perspective. *Waterbirds* 28 (Special Publication 1): 48-54.

Kingery, Hugh, editor. 1998. Colorado Breeding Bird Atlas. Colorado Bird Atlas Partnership and CDOW. Denver CO

Knopf, Fritz L. and Roger M. Evans. 2004. American White Pelican (*Pelecanus erythrorhynchos*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/057>

Kotliar, N.B. 2007. Olive-sided Flycatcher (*Contopus cooperi*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/olivesidedflycatcher.pdf>

Ladyman, J.R.A. 2004. *Ipomopsis aggregata* (Pursh) V. Grant ssp. *weberi* V. Grant and Wilken (scarlet gilia): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/ipomopsisaggregatasspweberi.pdf> [accessed February 8, 2006].

_____. 2006. *Astragalus leptaleus* Gray (park milkvetch): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Available at: <http://www.fs.fed.us/r2/projects/scp/assessments/astragalusleptaleus.pdf>

Lambert, Brad, Malleck, Cynthia and Huhn, Kathryn. 2000. Colorado Natural Heritage Program Boreal Toad Survey and Monitoring Project. Colorado State University. Ft. Collins CO.

Loeffler, C. (ed.), 2001. Conservation plan and agreement for the management and recovery of the southern Rocky Mountain population of the boreal toad (*Anaxyrus boreas boreas*), Boreal Toad Recovery Team. Unpublished Report, Colorado Division of Wildlife, Denver.

McCormick, Brock. 2006. Fauna Locations for Table Mountain Area Report. Sulphur Ranger District Files.

MPCP. 2001. Middle Park Conservation Plan. Middle Park Sage Grouse Committee, Colorado, USA.

Muths, E. 2003. Home Range and Movements of Boreal Toads in Undisturbed Habitat. *Copeia* (1) 160-165.

Natural Diversity Information Source (NDIS). 2005. Colorado Wildlife Species Profiles and Habitat Maps. <http://ndis.nrel.colostate.edu/wildlife.asp>

_____. 2009. Colorado Wildlife Species Profiles American Bittern. <http://ndis.nrel.colostate.edu/wildlife.asp>

_____. 2010a. Colorado Wildlife Species Profiles American White Pelican. <http://ndis.nrel.colostate.edu/wildlife.asp>

_____. 2010b. Colorado Wildlife Species Profiles Loggerhead Shrike. <http://ndis.nrel.colostate.edu/wildlife.asp>

_____. 2010c. Colorado Wildlife Species Profiles North American River Otter. <http://ndis.nrel.colostate.edu/wildlife.asp>

_____. 2010d. Colorado Wildlife Species Profiles Pygmy Shrew. <http://ndis.nrel.colostate.edu/wildlife.asp>

Natural Resources Conservation Service, United States Department of Agriculture (NRCS). 2009. PLANTS Database. <http://plants.usda.gov/index.html>

NatureServe. 2010a. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. Canada Lynx Species Profile (Accessed: July 12, 2011).

_____. 2010b. American Martin Species Profile. <http://www.natureserve.org/explorer/>

_____. 2010c. Pygmy Shrew Species Profile. <http://www.natureserve.org/explorer/>

_____. 2010d. North American Wolverine. <http://www.natureserve.org/explorer/>

_____. 2010e. American Bittern. <http://www.natureserve.org/explorer/>

_____. 2010f. Peregrine Falcon. <http://www.natureserve.org/explorer/>

_____. 2010g. Bald Eagle. <http://www.natureserve.org/explorer/>

_____. 2010h. Black Tern. <http://www.natureserve.org/explorer/>

- _____. 2010i. Boreal Owl. <http://www.natureserve.org/explorer/>
- _____. 2010j. Brewer's Sparrow. <http://www.natureserve.org/explorer/>
- _____. 2010k. Greater Sage-Grouse . <http://www.natureserve.org/explorer/>
- _____. 2010l. Loggerhead Shrike. <http://www.natureserve.org/explorer/>
- _____. 2010m. Northern Goshawk. <http://www.natureserve.org/explorer/>
- _____. 2010n. Northern Harrier. <http://www.natureserve.org/explorer/>
- _____. 2010o. Olive-sided Flycatcher. <http://www.natureserve.org/explorer/>
- _____. 2010p. Northern Leopard Frog. <http://www.natureserve.org/explorer/>
- _____. 2010q. Upward-lobed Moonwort. <http://www.natureserve.org/explorer/>
- _____. 2010r. Narrowleaf Grapefern. <http://www.natureserve.org/explorer/>
- _____. 2010s. Lesser Panicked Sedge. <http://www.natureserve.org/explorer/>
- _____. 2010t. Livid Sedge. <http://www.natureserve.org/explorer/>
- _____. 2010u. Yellow Ladies-Slipper. <http://www.natureserve.org/explorer/>
- _____. 2010v. Dropleaf Buckwheat. <http://www.natureserve.org/explorer/>
- _____. 2010w. Weber's Scarlet Gilia. <http://www.natureserve.org/explorer/>
- _____. 2010x. Colorado Tansy-aster. <http://www.natureserve.org/explorer/>
- _____. 2010y. Harrington's Beardtongue. <http://www.natureserve.org/explorer/>
- _____. 2010z. *Rubus arcticus* ssp. *acaulis*. <http://www.natureserve.org/explorer/>
- _____. 2010aa. Autumn Willow. <http://www.natureserve.org/explorer/>
- _____. 2010ab. Lesser Bladderwort. <http://www.natureserve.org/explorer/>
- _____. 2010ac. Selkirk Violet. <http://www.natureserve.org/explorer/>
- _____. 2010ad. Golden-crowned Kinglet. <http://www.natureserve.org/explorer/>
- _____. 2010ae. Hairy Woodpecker. <http://www.natureserve.org/explorer/>
- _____. 2010af. Pygmy Nuthatch. <http://www.natureserve.org/explorer/>
- _____. 2010ag. Warbling Vireo. <http://www.natureserve.org/explorer/>

_____. 2010ah. American White Pelican. <http://www.natureserve.org/explorer/>

_____. 2010ai. Golden Eagle. <http://www.natureserve.org/explorer/>

Naugle, D.E. (2004, August 10). Black Tern (*Chlidonias niger surinamensis*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/blacktern.pdf> (Accessed August 4, 2011).

Oldham, Kirk. 2005. Personal communication (meeting) with Kirk Oldham of Colorado Division of Wildlife, Hot Sulphur Springs, Colorado to discuss wildlife and habitat issues of concern (big game and sage grouse) for the Granby to Windy Gap Pumping Plant Transmission Rebuild Project.

Oldham, Kirk. 2007. Personal communication (interview) with Kirk Oldham of Colorado Division of Wildlife to discuss wildlife and habitat issues of concern (big game and sage grouse) for the Granby to Windy Gap Pumping Plant Transmission Rebuild Project.

Panjabi, S.S. and D.G. Anderson. (2006, June 30). *Penstemon harringtonii* Penland (Harrington's beardtongue): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/penstemonharringtonii.pdf>

Reynolds, Richard T.; Graham, Russell T.; Reiser, M. Hildegard; and others. 1992. Management recommendations for the northern goshawk in the southwestern United States. Gen. Tech. Rep. RM-217. Ft. Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. 90 p.

Rocky Mountain Bird Observatory (RMBO). 2002. Population Data for U.S. Forest Service Avian Management Indicator Species on the Arapaho-Roosevelt National Forests and Pawnee National Grassland. Rocky Mountain Bird Observatory, Brighton, Colorado. 57 pp.

_____. 2004. Monitoring Colorado Birds Relational Access Database, 1998-2004. Computer compact disc. Rocky Mountain Bird Observatory, Brighton Colorado.

_____. 2005. Colorado Partners in Flight (Rocky Mountain Bird Observatory). Physiographic Region 87: Colorado Plateau-Sagebrush Shrubland. <http://www.rmbo.org/pif/bcp/phy87/sage.html> accessed on December 15, 2005.

_____. 2007. Population Data for U.S. Forest Service Avian Management Indicator Species on the Arapaho-Roosevelt National Forests and Pawnee National Grassland. Rocky Mountain Bird Observatory, Brighton, Colorado.

Root, T. 1988. Atlas of wintering North American birds: An analysis of Christmas Bird Count data. University of Chicago Press. 336 pp.

Rotenbury, J.T. and J.A. Wiens. 1998. Forage Patch Selection by Shrubsteppe sparrows. *Ecological Society of America* 79:1160-1173.

Ruediger, B., J. Claar, S. Gniadek, B. Holt, L. Lewis, S. Mighton, B. Naney, G. Patton, T. Rinaldi, J. Trick, A. Vandehey, F. Wahl, N. Warren, D. Wenger, and A. Williamson. 2000. Canada lynx conservation assessment and strategy. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Missoula, MT.

Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires. 2000. Ecology and Conservation of Lynx in the United States. University Press of Colorado and USDA, Rocky Mountain Research Station.

Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, J.L. Lyon, and W.J. Zielinski, tech eds. 1994. The Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx, and Wolverine in the Western United States. USDA Forest Service General Technical Report RM-254. 184 pp.

Sibley, Charles G. and Burt L. Monroe, Jr. 1990. Distribution and Taxonomy of Birds of the World. Yale University Press. New Haven, Connecticut and London. 1111pp.

Spackman, S., B. Jennings, J. Coles, C. Dawson, M. Minton, A. Kratz, and C. Spurrier. 1997. Colorado Rare Plant Field Guide. Prepared for the Bureau of Land Management, the U.S. Forest Service, and the U.S. Fish and Wildlife Service by the Colorado Natural Heritage Program.

Spendelow, J.S., and S.R. Patton. 1988. National atlas of coastal waterbird colonies in the contiguous United States: 1976-1982. U.S. Fish Wildl. Serv. Biol. Rept. 88(5), Washington, D.C.

Smith, B.E. and D.A. Keinath. 2007. Northern Leopard Frog (*Rana pipiens*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Available online: <http://www.fs.fed.us/r2/projects/scp/assessments/northernleopardfrog.pdf> [Accessed 7/12/2011].

Sumerlin, Doreen. 2005. Personal communication (interview) with Doreen Sumerlin, USDA Forest Service, Sulphur Ranger District Biologist, to discuss biological resource issues associated with the Granby to Windy Gap Transmission Rebuild Project.

Sumerlin, Doreen. 2006. Personal communication (interview) with Doreen Sumerlin, USDA Forest Service, Sulphur Ranger District Biologist, to discuss biological resource issues associated with the Granby to Windy Gap Transmission Rebuild Project.

Terres, JK. 1980. *The Audubon Society Encyclopedia of North American Birds*. Alfred A. Knopf. New York. USA. 1109 pp.

United States Fish and Wildlife Service (USFWS). 1992. Osterhout milk-vetch and Penland Beardtongue Recovery Plan. Denver, Colorado.

_____. 2000. Commonly Asked Questions about the Canada Lynx. [http://library.fws.gov/Pubs/lynx_faqs.pdf] Accessed on April 5, 2010

_____. 2003. Draft candidate assessment and listing priority assignment form for *Botrychium lineare*.

_____. 2005. News release. Southern Rocky Mountain Population of Boreal Toad No Longer Candidate for Listing. Wagner, W.H. and F.S. Wagner. 1994. Another Widely Disjunct, Rare and Local North American Moonwort (Ophioglossaceae: *Botrychium* subg. *Botrychium*). *American Fern Journal* 84(1): 5-10.

_____. 2010. Threatened, Endangered, and Proposed Species by County July 2010.

Weber, W.A. and R.C. Wittmann. 2001. Colorado Flora: Western Slope. Third Edition. University Press of Colorado, Boulder, Colorado.

Weller, M.W., and C. S. Spatcher. 1965. Role of habitat in the distribution and abundance of marsh birds. Iowa State University Agricultural and Home Economics Experiment Station Special Report No. 43. Ames, Iowa. 31 pp

Western Regional Climate Center (WRCC). 2010. <http://www.wrcc.dri.edu/CLIMATEDATA.html>.

Wolfe, M.L., N.V. Debyle, C.S. Winchell, and T.R. McCabe. 1982. Snowshoe hare cover relationships in northern Utah. *Journal of Wildlife Management*: 46 662-670.

Wyoming Natural Diversity Database (WNDD). 2009. State Species Abstract, *Utricularia minor*. Accessed online at: http://www.uwyo.edu/wynddsupport/docs/Reports/SpeciesAbstracts/Utricularia_minor.pdf

13.0 Appendices

Appendix A	Western's Transmission Vegetation Management Program
Appendix B	Colorado Division of Wildlife Raptor Buffer Guidelines, 2008
Appendix C	U.S. Fish and Wildlife Service Species Lists
Appendix D	Bald Eagle Data Tables
Appendix E	Colorado Natural Heritage Program Boreal Toad Technical Report
Appendix F	Boreal Toad Recovery Team Data Tables
Appendix G	Colorado Division of Wildlife Consultation Letter

Appendix A

WESTERN'S TRANSMISSION VEGETATION MANAGEMENT PROGRAM

U.S. Department of Energy



ORDER

WAPA O 430.1A

DATE: 03-18-08

SUBJECT: RIGHT-OF-WAY MANAGEMENT GUIDANCE FOR VEGETATION,
ENCROACHMENTS, AND ACCESS ROUTES

1. PURPOSE. This Order delegates and clarifies responsibilities and establishes Right of Way (ROW) guidance and organizational support for the safe and reliable operation of the power system owned and/or maintained by the Western Area Power Administration (Western).
2. CANCELLATION. This Order cancels WAPA Order 430.1, Right-of-Way Management Guidance for Danger Trees, Encroachments, and Access Routes, dated 11-21-01.
3. SCOPE. The provisions of this Order apply to all organizational elements of Western.
4. DEFINITIONS.
 - a. Danger Trees. Trees located within or adjacent to the easement or permit area that present a hazard to employees, the public, or power system facilities. Characteristics used in identifying a danger tree include but are not limited to the following:
 - encroachment within the safe distance to the conductor as a result of the tree bending, growing, swinging, or falling toward the conductor;
 - deterioration or physical damage to the root system, trunk, stem or limbs and/or the direction and lean of the tree;
 - vertical or horizontal conductor movement and increased sag as a result of thermal, wind, and ice loading;
 - exceeding facility design specifications;
 - fire risk;
 - other threats to the electric power system facilities or worker/public safety.

DISTRIBUTION:
All Supervisors - Western-Wide
Available Online: <http://www.int.wapa.gov/Directives/alphadir.htm>

INITIATED BY:
CSO Natural
Resources Office

- b. Emergency Situations. An emergency situation occurs when a danger tree or encroachment poses an immediate danger to Western's facility as well as the welfare of the public and Western's maintenance personnel. For these situations it is not necessary to notify a landowner or government entity prior to removing the danger tree or encroachment.
 - c. Encroachments. Encroachments are conditions or developments that occur within the transmission line ROW that impair Western's rights to operate and maintain the facilities or present a hazard to the safe operation of the power system. Examples of potential encroachments are houses, businesses, signs, light structures, outbuildings, landfills, roadways, vegetation, etc.
 - d. Maintenance Manager. The individual located in the Regional or Field Office who is accountable for managing maintenance and/or operations functions. For example, in the Rocky Mountain Region this would be the Maintenance Manager; in the Bismarck Office this would be the North Dakota Maintenance Manager.
 - e. Right-Of-Way (ROW). Western acquires easements across State and private lands, is issued grants, permits or easements across Federal lands, and assumed the Bureau of Reclamation (Reclamation) responsibilities set forth in various agreements historically negotiated between Reclamation and other Federal agencies, such as the Bureau of Land Management, Bureau of Indian Affairs, National Park Service and U.S. Forest Service. As applied to a specific situation, ROW refers to rights acquired by Western as set forth in the applicable granting document.
 - f. Western Authorized Representative. The Western field representative in the Region who has the authority to take a maintenance action (this will be the Regional Manager or his designee).
5. POLICY. Maintenance Managers have the authority and responsibility for implementing and overseeing the proper maintenance of Western's ROWs. This includes all activities within ROWs that ensure the safe and reliable operation of the power system, as well as protection of the environment, the public, and Western's maintenance personnel. These activities include routine maintenance of access routes; vegetation management; identification of potential encroachments; and development of positive landowner relations. Regional Realty Officers, Environmental Managers, and Safety Managers, and, when necessary, the Corporate Services Office (CSO) Office of General Counsel (OGC) and CSO Natural Resources Office (NRO), will provide support to Maintenance Managers.
6. BACKGROUND. Western acquires easements across State and private lands, is issued grants, permits or easements across Federal lands, and assumed the Bureau of Reclamation (Reclamation) responsibilities set forth in various agreements

historically negotiated between Reclamation and other Federal agencies, such as the Bureau of Land Management, Bureau of Indian Affairs, National Park Service and U.S. Forest Service. Western's rights to maintain vegetation, to challenge a use that is considered to impair or encroach upon Western's rights, and to access the power facilities are dictated by the language contained in these agreements.

- a. State and Private Land. Generally, the easement agreement provides for the perpetual right to access, construct, operate, and maintain the power system facility in a manner that ensures safe operation and system integrity.
 - (1) Vegetation Management and Control. Responsibility for these functions is often Western's and may, based upon the terms of the easement contract, or other agreements, require compensation to the landowner for damages to crops or trees. Contracts are generally reviewed by the Regional Realty Officers to determine the extent of Western's right to maintain or clear vegetation.
 - (2) Landowner's Use of the Easement Area. Easement provisions specify Western's rights to operate and maintain the power facilities. Where landowners add uses or developments in the easement area, the Maintenance Managers must determine, through the review of the easement contract, whether the use or development must cease, or be removed or mitigated some other way to protect Western's rights.
 - (3) General Access Rights Language. Language defining Western's access rights is usually provided in the easement agreement. To ensure that open and safe access is available across private land, the easement agreement must be thoroughly researched and verified to identify access routes and any restrictions that regulate their use.
- b. Federal Land. ROW agreements are sometimes limited to a specific term and specify stipulations or conditions associated with vegetation management, compatible land uses, and access rights.
 - (1) Vegetation Management and Control. Responsibility for these functions is Western's, but is affected by land and resource plans, resource management plans, or other planning instruments approved by the land management agency, and these dictate tree removal or trimming criteria within and adjacent to the ROW, as well as other uses allowed on the same lands traversed by the power facility.
 - (2) ROW Use and Development. Uses or developments within Western's ROWs are authorized by the government entity managing the land and are usually reviewed and concurred upon by a Western authorized representative prior to the use being authorized.

- (3) Access Routes. Access routes can be authorized in the same ROW agreement or in a separate permit or agreement. These authorizations may contain specific terms and conditions that restrict the season of use and/or construction or road improvement activities allowed on the authorized access routes.

7. RESPONSIBILITIES.

- a. Regional Managers. Provide oversight of the ROW maintenance program in their respective Regions.
 - b. Regional Maintenance Managers. Develop long-term strategies and programs, in coordination with Regional safety, environment, and realty personnel, to resolve vegetation, encroachment, and access problems in and along Western's transmission line ROWs.
 - c. Regional Safety Managers. Support the Maintenance Managers in providing guidance for resolution of safety concerns as well as ensuring the Regional ROW program meets Western's safety goals and objectives.
 - d. Regional Environmental Managers. Support the Maintenance Managers in ensuring that maintenance activities employed to resolve vegetation, encroachment, and access problems comply with environmental laws and regulations.
 - e. Regional Realty Officers. Support the Maintenance Managers in the identification and resolution of vegetation, encroachment, public relations, and access problems. The Regional Realty Officers also provide coordination in working with the landowners and have the responsibility of identifying land rights, including vegetation control rights.
 - f. Office of General Counsel (OGC). Provides legal advice, counsel, and representation.
 - g. CSO Natural Resources Office (NRO). Provides advice and support to the Regional Maintenance Managers, Realty Officers and Environmental Managers in order to resolve vegetation, encroachment, and access problems.
8. GENERAL GUIDANCE. As a component of each Regional Office's routine maintenance activities, Maintenance Managers will develop a ROW management program, including performance measures and will coordinate its development and implementation with Regional safety, environment, and realty personnel as well as CSO NRO and OGC, when necessary. This program will include a long-term strategy to inventory Western's rights as they pertain to vegetation management,

use restrictions, encroachments and access. The program will identify potential problem areas or situations to be resolved and the resolution process.

- a. Vegetation Management. It shall be the responsibility of the Regional Realty Officers to inventory the vegetation management rights, including any compensation rights to landowners, for a power facility on an as needed basis. The following guidance is provided for vegetation management practices within and adjacent to the ROW. Prior to vegetation management activities, an effort will be made to notify landowners. Such notifications or attempts to notify landowners shall be documented.

(1) Easements on State and Private Lands.

- (a) Where provided in the easement agreement, Maintenance Managers shall manage the vegetation within and adjacent to the easement in accordance with WAPA Order 450.3A (latest version).
- (b) Where the easement agreement does not provide for the rights to manage vegetation in or adjacent to the easement area, or if the rights are limited, the following shall apply in accordance with each Region's Vegetation Management Plan:
 - 1) Emergency Situations. If the vegetation is creating an emergency situation, the Maintenance Managers have the discretion to address emergency situations, including removing danger trees.
 - 2) Non-Emergencies. If vegetation is not causing an emergency situation, Western will work with the landowner to conduct the required vegetation management activity. If necessary, Western will expand its land rights to manage the vegetation within or adjacent to the easement.
- (c) CSO OGC and NRO will provide assistance and consultation to support the Maintenance Managers and support the future expansion of easement rights to include all required vegetation management activities.

(2) ROW Agreements on Federal Lands.

- (a) Where provided in the ROW agreement, the Maintenance Managers shall manage vegetation within the ROW.
- (b) Where land use plans or terms contained in the agreement with the Federal land management agency and Western dictate trees may only be trimmed (sides or on top) within the ROW, the NRO will assist the

Maintenance Manager and Realty Officer in obtaining modifications to the ROW agreement to allow for all required vegetation management activities.

- (c) Where the ROW agreement does not provide for the removal of trees in or adjacent to the ROW, the Maintenance Managers have discretion in removing danger trees without notification to the Federal land managers. Western will contact the Federal agency following removal of danger trees. The CSO NRO will provide assistance to the Maintenance Managers to expand ROW rights to allow more extensive vegetation management activities consistent with current industry standards and requirements as provided for in Western's Transmission Vegetation Management Program.
- (3) Tree Removal Criteria. Criteria that will be used to determine the need for tree removal activities include either of the following two conditions:
- (a) Any tree classified as being a "Danger Tree" as defined in 4a above.
 - (b) Requirements established in WAPA Order 450.3A (latest version).
- (4) Vegetation Management Clearances. The following table provides the minimum clearance distances (lateral and vertical) to be achieved at the time of transmission vegetation management work as required by the North American Electric Reliability Council (NERC) Standard FAC-003-1 ("Clearance 1" values). However, it is Western's policy to proactively manage to a desired condition of much lower growth and low vegetation density. The desired condition considers the reduction of fuel loading to reduce the risk and intensity of wildfire on and adjacent to the ROW. It is also Western's policy to encourage the land management agencies to manage lands adjacent to the ROWs in a manner which further reduces vegetation and wildfire hazards that are a threat to the safe and reliable operation of the power facility.¹

¹ The minimum clearance is based on the OSHA 29 CFR § 1910.333 minimum approach distance for non-electrical workers (rounded up to the nearest foot) plus 5 feet to account for conductor and tree movement due to wind and ice loading or increased conductor sag as a result of thermal loading. In addition, another 5 feet is added to allow for an average tree growth of 12 inches per year and a re-treatment interval of not less than 5 years. In situations where more rapid tree growth can be expected because of species or better than average growing conditions, a distance (either horizontal or vertical) greater than 5 feet is required.

TRANSMISSION LINE ROW MINIMUM CLEARANCE¹ REQUIREMENTS FOR VEGETATION AFTER TREATMENT	
Line Voltage	Minimum Clearance ¹ Between Conductor and Vegetation
69 kV	20 feet
115 kV	21 feet
138 kV	22 feet
161 kV	22 feet
230 kV	23 feet
345 kV	26 feet
500 kV	29 feet

- (5) Customer Focus. It is Western's policy that landowners are our customers. Maintenance Managers have the responsibility to ensure early notification to the private landowner or government entity prior to the vegetation management or encroachment removal activities within or adjacent to the ROW. Where emergency removal of danger trees is necessary within or adjacent to the ROW and prior notice is not possible, the Maintenance Manager is responsible for initiating or coordinating notification after the fact. The Regional Realty Officers will provide support in mitigating such actions.

b. Encroachments.

- (1) State and private land. The Maintenance Managers shall be accountable for identifying potential encroachments. The Regional Realty Officer is accountable for verification and resolution. Where encroachments are found to be compatible with Western's rights, a license will be issued by the Western authorized representative. Where the encroachment is found to be incompatible, the Realty Officer shall coordinate the removal or mitigate the use or development. The Regional Realty Officer may consult or ask assistance from the NRO and OGC in those cases involving complex legal issues and landowner investments.
- (2) Federal land. For situations where uses or developments are located within ROWs on Federal lands that appear to impair Western's rights to operate and maintain its facilities, the Regional Realty Officer will be responsible for contacting the government entity and resolving the problem. If necessary, the Regional Realty Officer may consult with or ask assistance from the NRO and OGC.

c. Access Routes.

- (1) To ensure safe, reliable access to Western's facilities for maintenance purposes, it shall be the responsibility of the Maintenance Managers to

identify and locate access routes in support of facility maintenance programs across private, State and Federal lands, where necessary. Maintenance Managers have the discretion to reopen blocked access routes where Western's right of access is being impeded. Regional Realty Officers will be responsible to respond to the Maintenance Managers when requested to coordinate the reopening of such routes with the landowners and/or land management agency and will be supported by the NRO and OGC, when necessary.

- (2) Where new access is needed across State or private land, the Regional Realty Officer must consult with the Environmental Manager and the NRO to develop an acquisition plan to obtain access easements. Where access is needed across Federal lands, the Regional Realty Officer shall perform the same coordination as for State or private lands except that Western will obtain an amendment to its ROW authorization. In either case, Western will strive to obtain access routes with the fewest restrictions as to season of use or impacts to resources.

9. REFERENCES.

- a. WAPA 450.1B, Environmental Considerations in the Planning, Design, Construction, and Maintenance of Power Facilities and Activities, latest version.
- b. WAPA Engineering Manual (EM) 6460.3, Property Damage Investigation Appraisal and Settlement, latest version.
- c. WAPA EM 6404, Construction Management Practices and Procedures, Chapter V, Real Estate, of 02-20-90, latest version.
- d. Transmission Line Right-of-Way Handbook, latest version.
- e. WAPA Order 450.3A, Transmission Vegetation Management Program, latest version.
- f. www.arboday.org/treeguide
- g. Code of Federal Regulations (CFR) 29 CFR § 1910.333.
- h. Alcoa Conductor Accessories Sag 10, version 3.0 Software.
- i. National Electric Safety Code (NESC).

10. CONTACT. Questions concerning this Order should be addressed to the CSO NRO at (720) 962-7272.



Timothy J. Meeks
Administrator

U.S. Department of Energy



ORDER

WAPA O 450.3A

DATE: 03-13-08
Page Change: 02-23-09

SUBJECT: TRANSMISSION VEGETATION MANAGEMENT PROGRAM

1. OBJECTIVES. The objective of this Order is to define the Transmission Vegetation Management Program (TVMP) for the Western Area Power Administration (Western); to ensure the safe and reliable operation of the electrical transmission system in an environmentally sensitive, cost effective, and socially responsible manner.
2. CANCELLATION. This Order cancels WAPA Order 450.3, Transmission Vegetation Management Program, dated 05-10-07.
3. BACKGROUND. This Order is in accordance with the requirements defined in the North American Electric Reliability Council (NERC) Standard FAC-003-1.
4. APPLICABILITY.
 - a. Western Program Areas. This Order applies to all Western programs involved with vegetation management beneath and adjacent to transmission lines and associated facilities that make up the transmission system maintained by Western. At a minimum, this standard shall apply to all 200 kV and above transmission lines and to any lower voltage lines designated by the Regional Reliability Organization (RRO) as critical to the reliability of each Region's electric system.
 - b. Contractors. Contractors in support of Western's TVMP are responsible for ensuring full compliance with the requirements set forth in applicable Contracts and are also responsible for any subcontractor's compliance.
5. POLICY. It is Western's policy to identify and perform maintenance management activities in support of obtaining a desired condition for transmission line rights-of-way (ROW) and associated facilities. Western will apply the concept of Integrated Vegetation Management (IVM) as a practice for creating and maintaining a desired condition. Western's IVM Guidance Manual (see paragraph 13 of this Order) provides guidance for these practices.

DISTRIBUTION:
All Supervisors – Western-Wide
Available Online: <http://www.int.wapa.gov/Directives/alphadir.htm>

INITIATED BY:
CSO Engineering

6. RESPONSIBILITIES.

- a. Chief Operating Officer. Ensures full compliance with NERC and RRO reliability standards
 - b. CSO Engineering. Provides oversight in the development of Engineering and Maintenance policies and standards.
 - c. CSO Natural Resources Office. Provides support to the Regions relative to environment and lands programs. Serves as a point of contact with DOE Headquarters offices for the purpose of policy development, reporting, regulatory review, Native American issues, and other requirements.
 - d. Office of General Counsel. Provides legal advice, counsel, and representation.
 - e. Regional Managers. Provide oversight of the maintenance and safety policy and programs in their respective regions.
 - f. Regional Maintenance Managers. Develop long-term strategies and programs, in coordination with Regional safety, environmental, and realty personnel, to address vegetation issues in and along all Western maintained transmission lines and associated facilities.
 - g. Regional Environmental Managers. Support the Maintenance Managers in ensuring that the maintenance activities employed to manage Western's TVMP are in compliance with environmental laws and regulations.
 - h. Regional Safety Managers. Support the Maintenance Managers in advising supervisors and foremen on the applications of the Power System Safety Manual and applicable safety and health regulations.
 - i. Regional Realty Officers. Support the Maintenance Managers in the resolution of vegetation management problems by working with landowners in identifying and enforcing vegetation control rights
7. DESIRED CONDITION. Western's desired condition beneath and adjacent to its transmission line facilities is characterized by stable, low growth plant communities free from noxious or invasive plants. These communities will typically be comprised of herbaceous plants and low growing shrubs which ideally are native to the local area. Vegetation on the bordering areas of transmission line easements/ROWs can be managed so that increased tree height is allowed in relation to an increasing distance from the transmission line. Accumulations of vegetation debris from intensive or repetitive vegetation treatments may require mitigation to reduce risks from wildfire and enhance the fire survivability of the transmission facility. The

density of the remaining vegetation will also be a consideration in assessing overall fire risk. Adequate access routes are required and must be maintained to provide for efficient, cost effective vegetation treatment activities.

- a. Areas of Concern. The desired condition will allow Western to manage vegetation such that it does not threaten power system safety or reliability. Vegetation management activities will be undertaken to the maximum extent that is reasonable and practical within three main areas of concern:

- (1) Vegetation within the defined boundary of a facility (ROW, fence line, etc.);
- (2) Vegetation adjacent to the facility; and
- (3) Prevention of wildfire on and off the facility.

- b. Guidance. On-the-ground conditions can be extremely variable and specific for each transmission facility or unique section of a facility. In general, it is Western's practice to perform vegetation management activities in support of achieving the desired condition of low, stable growth plant communities. However, reasonable accommodations can be made in consideration of other critical resources or management issues. The principal purpose of the transmission facility is for the safe and reliable operation of the power system and all other resource and management issues are considered secondary. When constraints do not allow for the immediate removal of trees and other taller vegetation, the desired condition should identify the maximum tree height and density thresholds allowed. American National Standards, ANSI A300, part 7, *Tree, Shrub, and Other Woody Plant Maintenance - Standard Practices (Integrated Vegetation Management, a. Electrical Utility Rights-of-way)*, may be used for additional guidance and reference.

- c. Objective. Western's intent is to secure and maintain a manageable landscape that minimizes vegetative threats to transmission system reliability and safety, and ultimately does not require frequent re-treatments. Achieving a desired condition is a process that may take several iterations over an extended period of time. However, once defined, the desired condition will serve as the guide for future vegetation management decisions. All subsequent vegetation treatment activities should consistently move toward achieving and maintaining the desired condition. Once achieved, the desired condition will be proactively maintained by occasional re-treatments.

8. PRACTICES. Western's TVMP practices are guided by internal manuals, handbooks, guidelines, orders, and standards outlining objectives, practices, approved procedures, and work specifications set forth in paragraph 14. These various formal documents are kept current through internal working committees from the functional organizations where the document resides.

9. REQUIREMENTS.

- a. Maintenance Schedule. Aerial and ground patrol schedules for each transmission facility are developed and maintained by each regional maintenance organization. Maintenance schedules are based on requirements and procedures set forth in Western's maintenance program. Other conditions where additional inspections may be necessary are those where catastrophic results could occur. Aerial or ground patrols may be conducted after an outage occurrence.
- b. Vegetation clearance levels for each transmission line. Clearance 1 distances required by NERC FAC-003-1 are provided in Western Order 430.1A, Right-of-Way Management Guidance for Vegetation, Encroachments, and Access Routes. Western's desired condition is a condition of low growth plant communities; these values represent the maximum but not preferred vegetation height thresholds allowed. NERC FAC-003-1, Clearance 2 distances are provided in Western's Power System Safety Manual (PSSM), Table A-1.
- c. Qualifications and Training. Personnel involved in the design, implementation, and execution of the TVMP shall be qualified and trained as provided in individual position descriptions and contract language. The Western Transmission Vegetation Management Committee was established to design and provide oversight of the TVMP, and committee membership qualifications are outlined in the charter. Western staff involved in the preparation and implementation of annual plans discussed in paragraph 9 of this Order shall be included. PSMM Chapter 11 also addresses field crew training requirements for trimming and felling trees and brush near power lines. Contractors hired by Western must be fully qualified with respect to all certifications, licenses, training, and other skills and requirements as presented in the most recent version of Western's statement of work.
- d. Mitigation Measures. WAPA Order 430.1A and the Regional Transmission Vegetation Management Program Statements provide mitigation measures and processes to achieve sufficient clearances for the protection of the transmission systems in identified locations where Western is restricted from attaining the clearances specified in paragraph 9b.
- e. Inspections and Emergency Procedures. Transmission line maintenance personnel are responsible for inspection of Western's transmission facilities from vehicles, on foot or from aircraft. Routine inspections of vegetation are made during scheduled ground and aerial line patrols. Any encroachments, including vegetation, are documented and forwarded to the proper functional organization for assessment and resolution. Typical patrol reports will describe the

encroachment, clearance between the conductor and encroachment, and other pertinent information, such as when the reading was taken, and why there is a problem. If an imminent threat of a transmission line outage is identified and requires action (such as switching the line out of service), the threat shall immediately be reported verbally for resolution.

Western's craft personnel and IVM contractors are responsible for complying with prescribed clearance and safety rules and regulations, are qualified to recognize safety hazards and unsafe conditions, and are required to initiate action to alleviate or eliminate the hazards. Duties include the immediate reporting of safety hazards and unsafe conditions and initiating action to correct the safety hazard. Line crew members are required to report potential power system troubles to their Foreman. While on patrol, they are qualified to make on-the-spot decisions as to the urgency for immediate communication of vegetation conditions that present an imminent threat of a transmission system outage so that action may be taken.

10. ANNUAL PLANS FOR VEGETATION MANAGEMENT WORK. Each Regional Maintenance Organization shall create and implement an annual plan for vegetation management activities to ensure the reliability of the power system. The plan shall describe the methods used, such as manual clearing, mechanical clearing, herbicide treatment, or other actions. The plan should be flexible enough to adjust to changing conditions, taking into consideration anticipated growth of vegetation and all other environmental factors that may have an impact on the reliability of the transmission systems. Adjustments to the plan shall be documented as they occur. The plan should take into consideration the time required to obtain permissions or authorizations from landowners or regulatory authorities and also to conduct the appropriate environmental review. Each maintenance organization shall have systems and procedures for documenting and tracking the planned vegetation management work and ensuring that the vegetation management work is completed according to work specifications

11. REPORTING REQUIREMENTS. Each Region will report quarterly to their RRO, and upon request, will also report sustained transmission line outages determined to have been caused by vegetation. If there are no sustained transmission line outages for the quarter, the report shall be submitted indicating full compliance. Multiple sustained outages on an individual line, if caused by the same vegetation, shall be reported as one outage regardless of the actual number of outages within a 24-hour period.

- a. Western is not required to report to the RRO, or the RRO's designee, certain sustained transmission line outages caused by vegetation. These outages are:
(1) vegetation-related outages that result from vegetation falling into lines from outside the ROW that result from natural disasters (examples of disasters that

could create non-reportable outages include, but are not limited to, earthquakes, fires, tornados, hurricanes, landslides, wind shear, major storms as defined either by Western or an applicable regulatory body, ice storms, and floods); and (2) vegetation-related outages due to human or animal activity (examples of human or animal activity that could cause a non-reportable outage include, but are not limited to, logging, animal severing tree, vehicle contact with tree, arboricultural, horticultural, agricultural activities, or removal or digging of vegetation).

- b. The outage information provided by Western to the RRO, or the RRO's designee, shall include at a minimum: the name of the circuit(s) experiencing the outage, the date, time and duration of the outage; a description of the cause of the outage; other pertinent comments; and any countermeasures taken by Western.
- c. An outage shall be categorized as one of the following:
 - Category 1 — Grow-ins: Outages caused by vegetation growing into lines from vegetation inside and/or outside of the ROW;
 - Category 2 — Fall-ins: Outages caused by vegetation falling into lines from inside the ROW;
 - Category 3 — Fall-ins: Outages caused by vegetation falling into lines from outside the ROW.

12. DOCUMENTATION. All documentation required in this section shall be retained for a minimum period of 5 years.

- a. Each Region shall document that they have performed the vegetation inspections identified in 8a above. This information shall be retained in Western's maintenance management databases (Maximo, TAMIS, SIMS, TLDB, etc.).
- b. Western shall retain documentation that describes the clearances identified in 8b above. This information shall be retained in Western's PSSM, Table A1 (Clearance 2), and WAPA Order 430.1A (Clearance 1).
- c. Western shall retain documentation that describes the qualifications of personnel directly involved in the design, implementation, and execution of the TVMP as required in 8c. This information shall be retained in the employee's position descriptions and training records maintained by Western and the Corporate Human Resource Information System (CHRIS).
- d. Each Region shall document any areas identified as not meeting this Order for vegetation management and any mitigating measures taken to address these deficiencies as identified in 8d. This information shall be retained by each

Regional Lands Office and attached to the appropriate authorizing document (easement, permit, etc.). It should also be noted in the geographic information system (GIS) database so that it is available to the maintenance organization responsible for planning and completing vegetation management activities.

- e. Western shall maintain a documented process for the immediate communication of imminent threats by vegetation as required in 8e above. This information shall be retained in the employee's position description and the Standard Operating Procedures.
 - f. Each Region shall document that the annual work plan identified in paragraph 9 has been implemented. This will be documented in the appropriate procurement records (for contract work) and in Western's maintenance management databases (Maximo, TAMIS, SIMS, TLDB, etc.).
 - g. Each Region shall retain copies of all quarterly reports and additional outage reports submitted to the RRO, or the RRO's designee, as identified in paragraph 10.
 - h. Each Region shall develop a Transmission Vegetation Management Program statement which identifies Regional specific practices.
13. CERTIFICATION. Each Region shall demonstrate compliance through self-certification submitted to the compliance monitor (RRO or RRO's designee) in accordance with the requirements of NERC FAC-003-1.

14. REFERENCES.

- a. North American Electric Reliability Council (NERC) Reliability Standard FAC-003-1.
- b. Western Area Power Administration Integrated Vegetation Management Guidance Manual, latest version.
- c. American National Standards, ANSI A300 (part 7)-2006 IVM for Tree Care Operations – Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Integrated Vegetation Management, a. Electrical Utility Rights-of-Way).
- d. Chapter 13, Power System Maintenance Manual (PSMM), latest revision.
- e. WAPA Order 430.1A, Right-of-Way Management Guidance for Vegetation, Encroachments, and Access Routes, latest revision.

- f. Chapter 11, PSMM, Trimming and Felling of Trees and Brush Near Power Lines, latest revision.
 - g. Chapter 1, Power System Operations Manual (PSOM), Power System Switching Procedure, latest revision.
 - h. Chapter 4, PSOM, Power System Operating Guidelines, latest revision.
 - i. Power System Safety Manual (PSSM), latest revision.
 - j. Regional Transmission Vegetation Management Program Statements.
 - k. ANSI A300, (Part 1) – 2001 Pruning for Tree Care Operations – Tree, Shrub, and Other Woody Plant Maintenance.
 - l. ANSI Z133.1 – 2000, for Arboricultural Operations – Pruning, Repairing, Maintaining, and Removing Trees, and Cutting Brush – Safety Requirements.
 - m. Western Transmission Vegetation Management Committee (TVMC) Charter.
15. CONTACT. Questions concerning this Order should be addressed to the CSO Engineering Office at (720) 962-7296.



Timothy J. Meeks
Administrator

Appendix B

COLORADO DIVISION OF WILDLIFE RAPTOR BUFFER GUIDELINES, 2008



RECOMMENDED BUFFER ZONES AND SEASONAL RESTRICTIONS FOR COLORADO RAPTORS

Tolerance limits to disturbance vary among as well as within raptor species. As a general rule, Ferruginous Hawks and Golden Eagles respond to human activities at greater distances than do Ospreys and America Kestrels. Some individuals within a species also habituate and tolerate human activity at a proximity that would cause the majority of the group to abandon their nests. Other individuals become sensitized to repeated encroachment and react at greater distances. The tolerance of a particular pair may change when a mate is replaced with a less tolerant individual and this may cause the pair to react to activities that were previously ignored. Responses will also vary depending upon the reproductive stage. Although the level of stress is the same, the pair may be more secretive during egg laying and incubation and more demonstrative when the chicks hatch.

The term "disturbance" is ambiguous and experts disagree on what actually constitutes a disturbance. Reactions may be as subtle as elevated pulse rate or as obvious as vigorous defense or abandonment. Impacts of disturbance may not be immediately evident. A pair of raptors may respond to human intrusion by defending the nest, but well after the disturbance has passed, the male may remain in the vicinity for protection rather than forage to feed the nestlings. Golden eagles rarely defend their nests, but merely fly a half mile or more away and perch and watch. Chilling and over heating of eggs or chicks and starvation of nestlings can result from human activities that appeared not to have caused an immediate response.

A 'holistic' approach is recommended when protecting raptor habitats. While it is important for land managers to focus on protecting nest sites, equal attention should focus on defining important foraging areas that support the pair's nesting effort. Hunting habitats of many raptor species are extensive and may necessitate interagency cooperation to assure the continued nest occupancy. Unfortunately, basic knowledge of habitat use is lacking and may require documentation through telemetry investigations or intensive observation. Telemetry is expensive and may be disruptive so a more practical approach is to assume that current open space is important and should be protected.

Although there are exceptions, the buffer areas and seasonal restrictions suggested here reflect an informed opinion that if implemented, should assure that the majority of individuals within a species will continue to occupy the area. Additional factors, such as intervening terrain, vegetation screens, and the cumulative impacts of activities should be considered.

These guidelines were originally developed by CDOW raptor biologist Gerald R. Craig (retired) in December 2002. To provide additional clarity in guidance, incorporate new information, and update the conservation status of some species, the guidelines were revised in January 2008. Further revisions of this document may become necessary as additional information becomes available.

RECOMMENDED BUFFER ZONES AND SEASONAL RESTRICTIONS

BALD EAGLE

Nest Site:

No surface occupancy (beyond that which historically occurred in the area; see 'Definitions' below) within ¼ mile radius of active nests (see 'Definitions' below). Seasonal restriction to human encroachment (see 'Definitions' below) within ½ mile radius of active nests from October 15 through July 31. This closure is more extensive than the National Bald Eagle Management Guidelines (USFWS 2007) due to the generally open habitat used by Colorado's nesting bald eagles.

Winter Night Roost:

No human encroachment from November 15 through March 15 within ¼ mile radius of an active winter night roost (see 'Definitions' below) if there is no direct line of sight between the roost and the encroachment activities. No human encroachment from November 15 through March 15 within ½ mile radius of an active winter night roost if there is a direct line of sight between the roost and the encroachment activities. If periodic visits (such as oil well maintenance work) are required within the buffer zone after development, activity should be restricted to the period between 1000 and 1400 hours from November 15 to March 15.

Hunting Perch:

Diurnal hunting perches (see 'Definitions' below) associated with important foraging areas should also be protected from human encroachment. Preferred perches may be at varying distances from human encroachment and buffer areas will vary. Consult the Colorado Division of Wildlife for recommendations for specific hunting perches.

GOLDEN EAGLE

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ¼ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile radius of active nests from December 15 through July 15.

OSPREY

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ¼ mile radius of active nests. Seasonal restriction to human encroachment within ¼ mile radius of active nests from April 1 through August 31. Some osprey populations have habituated and are tolerant to human activity in the immediate vicinity of their nests.

FERRUGINOUS HAWK

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ½ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile radius of active nests from February 1 through July 15. This species is especially prone to nest abandonment during incubation if disturbed.

RED-TAILED HAWK

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within 1/3 mile radius of active nests. Seasonal restriction to human encroachment within 1/3 mile radius of active nests from February 15 through July 15. Some members of this species have adapted to urbanization and may

tolerate human habitation to within 200 yards of their nest. Development that encroaches on rural sites is likely to cause abandonment.

SWAINSON'S HAWK

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ¼ mile radius of active nests. Seasonal restriction to human encroachment within ¼ mile radius of active nests from April 1 through July 15. Some members of this species have adapted to urbanization and may tolerate human habitation to within 100 yards of their nest.

PEREGRINE FALCON

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ½ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile of the nest cliff(s) from March 15 to July 31. Due to propensity to relocate nest sites, sometimes up to ½ mile along cliff faces, it is more appropriate to designate 'Nesting Areas' that encompass the cliff system and a ½ mile buffer around the cliff complex.

PRAIRIE FALCON

Nest Site:

No surface occupancy (beyond that which historically occurred in the area) within ½ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile radius of active nests from March 15 through July 15.

NORTHERN GOSHAWK

No surface occupancy (beyond that which historically occurred in the area) within ½ mile radius of active nests. Seasonal restriction to human encroachment within ½ mile radius of active nests from March 1 through September 15.

BURROWING OWL

Nest Site:

No human encroachment within 150 feet of the nest site from March 15 through October 31. Although Burrowing Owls may not be actively nesting during this entire period, they may be present at burrows up to a month before egg laying and several months after young have fledged. Therefore it is recommended that efforts to eradicate prairie dogs or destroy abandoned towns not occur between March 15 and October 31 when owls may be present. Because nesting Burrowing Owls may not be easily visible, it is recommended that targeted surveys be implemented to determine if burrows are occupied. More detailed recommendations are available in a document entitled "Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls" which is available from the Colorado Division of Wildlife

Recommended Buffer Zones and Seasonal Restrictions Around Raptor Use Sites

Species and Use	Buffer	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Bald Eagle													
ACTIVE NEST - No Surface Occupancy	¼ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	½ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE WINTER NIGHT ROOST without a direct line of sight- No Human Encroachment	¼ Mile	■	■	■								■	■
ACTIVE WINTER NIGHT ROOST with a direct line of sight - No Human Encroachment	½ Mile	■	■	■								■	■
HUNTING PERCH - No Human Encroachment	Contact CDOW												
Golden Eagle													
ACTIVE NEST - No Surface Occupancy	¼ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	½ Mile	■	■	■	■	■	■	■	■	■	■	■	■
Osprey													
ACTIVE NEST - No Surface Occupancy	¼ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	¼ Mile	■	■	■	■	■	■	■	■	■	■	■	■
Ferruginous Hawk													
ACTIVE NEST - No Surface Occupancy	½ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	½ Mile	■	■	■	■	■	■	■	■	■	■	■	■
Red-tailed Hawk													
ACTIVE NEST - No Surface Occupancy	1/3 Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	1/3 Mile	■	■	■	■	■	■	■	■	■	■	■	■
Swainson's Hawk													
ACTIVE NEST - No Surface Occupancy	¼ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	¼ Mile	■	■	■	■	■	■	■	■	■	■	■	■
Peregrine Falcon													
ACTIVE NEST - No Surface Occupancy	½ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	½ Mile	■	■	■	■	■	■	■	■	■	■	■	■
Prairie Falcon													
ACTIVE NEST - No Surface Occupancy	½ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	½ Mile	■	■	■	■	■	■	■	■	■	■	■	■
Northern Goshawk													
ACTIVE NEST - No Surface Occupancy	½ Mile	■	■	■	■	■	■	■	■	■	■	■	■
ACTIVE NEST - No Human Encroachment	½ Mile	■	■	■	■	■	■	■	■	■	■	■	■
Burrowing Owl													
ACTIVE NEST - No Human Encroachment	150 feet			■	■	■	■	■	■	■	■	■	■
		= time period for which seasonal restrictions are in place.											

DEFINITIONS

Active nest – Any nest that is frequented or occupied by a raptor during the breeding season, or which has been active in any of the five previous breeding seasons. Many raptors use alternate nests in various years. Thus, a nest may be active even if it is not occupied in a given year.

Active winter night roost – Areas where Bald Eagles gather and perch overnight, and sometimes during the day in the event of inclement weather. Communal roost sites are usually in large trees (live or dead) that are relatively sheltered from wind and are generally in close proximity to foraging areas. These roosts may also serve a social purpose for pair bond formation and communication among eagles. Many roost sites are used year after year.

Human encroachment – Any activity that brings humans in the area. Examples include driving, facilities maintenance, boating, trail access (e.g., hiking, biking), etc.

Hunting perch – Any structure on which a raptor perches for the purpose of hunting for prey. Hunting perches provide a view of suitable foraging habitat. Trees are often used as hunting perches, but other structures may also be used (utility poles, buildings, etc.).

Surface occupancy – Any physical object that is intended to remain on the landscape permanently or for a significant amount of time. Examples include houses, oil and gas wells, tanks, wind turbines, roads, tracks, etc.

CONTACT

For further information contact:

David Klute
Bird Conservation Coordinator
Colorado Division of Wildlife
6060 Broadway
Denver, CO 80216
Phone: 303-291-7320
Email: david.klute@state.co.us

REFERENCES

- Bechard, M.J., and J.K. Schmutz. 1995. Ferruginous Hawk (*Buteo regalis*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/172>
- Buehler, D.A. 2000. Bald Eagle (*Haliaeetus leucocephalus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/506>
- Call, M. 1979. Habitat management guides for birds of prey. Technical Note No.338, U.S. Bureau of Land Management, Denver Service Center, Denver, CO. 69pp.

- Energy Research and Development Administration (ERDA). 1977. EIA for CUI Venture application for geothermal loan guarantee (Beryl and Lund, Utah). EIA/GE/77-8. Washington, D.C. 109pp.
- England, A.S., M.J. Bechard, and C.S. Houston. 1997. Swainson's Hawk (*Buteo swainsoni*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/265>
- Greater Yellowstone Bald Eagle Working Group. 1996. Greater Yellowstone bald eagle management plan: 1995 update. Greater Yellowstone Bald Eagle Working Group, Wyoming Game & Fish Dept., Lander WY 82520. 47p
- Grier, J.W., F.J. Gramlich, J. Mattisson, J.E. Mathisen, J.V. Kussman, J.B. Elder, and N.F. Green. 1983. The bald eagle in the northern United States. Bird Cons. 144-66.
- Haug, E.A., B.A. Millsap, and M.S. Martell. 1993. Burrowing Owl (*Athene cunicularia*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/061>
- Holmes, Tamara L. 1993. Behavioral responses of grassland raptors to human disturbance. MS Thesis. Colo. State Univ., Fort Collins. 62pp.
- Holthuijzen, A.M.A., W.G. Eastland, A.R. Ansell, M.N. Kochert, R.D. Williams, and L.S. Young. 1990. Effects of blasting on behavior and productivity of nesting prairie falcons. Wildl. Soc. Bull. 18:270-281.
- Kochert, M. N., K. Steenhof, C. L. McIntyre, and E. H. Craig. 2002. Golden Eagle (*Aquila chrysaetos*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/684>
- Martin, D.J. 1973. Selected aspects of burrowing owl ecology and behavior. Condor 75:446-456.
- Northern States Bald Eagle Recovery Team. 1983. Northern States Bald Eagle Recovery Plan. U.S. Fish and Wildlife Service. 75pp.
- Olendorff, R. R., and W.D. Zeedyk. 1978. Land management for the conservation of endangered birds. Pages 419-428 in S.A. Temple, ed. *Endangered birds*. University of Wisconsin Press, Madison, Wisconsin.
- Poole, A.F., R.O. Bierregaard, and M.S. Martell. 2002. Osprey (*Pandion haliaetus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/683>
- Preston, C.R., and R.D. Beane. 1993. Red-tailed Hawk (*Buteo jamaicensis*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/052>

- Reynolds, R., R.T. Graham, H.M. Reiser. 1992. Management recommendations for the northern goshawk in the southwestern United States. Gen. Tech. Rep. RM-217. Fort Collins, CO. U.S. Dept of Agri., Forest Service, Rocky Mountain Forest and Range Experiment Station. 90pp.
- Richardson, C.T. and C.K. Miller. 1997. Recommendations for protecting raptors from human disturbance: a review. Wildl. Soc. Bull. 25(3):634-638.
- Rocky Mountain/Southwest Peregrine Falcon Recovery Team. 1984. American peregrine falcon Rocky Mountain/Southwest population recovery plan. U.S. Fish and Wildlife Serv. 105pp.
- Squires, J.R., S.H. Anderson, and R. Oakleaf. 1993. Home range size and habitat-use patterns of nesting prairie falcons near oil developments in northeastern Wyoming. J. Field Ornithol. 64:1-10.
- Steenhof, Karen. 1998. Prairie Falcon (*Falco mexicanus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/346>
- Squires, J.R., and R.T. Reynolds. 1997. Northern Goshawk (*Accipiter gentilis*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/298>
- Suter, G.W. and J.L. Jones. 1981. Criteria for Golden Eagle, Ferruginous Hawk, and Prairie Falcon nest site protection. J. Raptor Res. 15(1):12-18.
- Swenson, J.E. 1979. Factors affecting status and reproduction of ospreys in Yellowstone National Park. J. Wildl. Manage. 43:595-601.
- Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal Airport. Condor 73:177-192.
- U.S. Fish and Wildlife Service. 2007. National Bald Eagle Management Guidelines. <http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf>
- White, C.M., N.J. Clum, T.J. Cade, and W.G. Hunt. 2002. Peregrine Falcon (*Falco peregrinus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/660>

Revised 02/2008

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix C

U.S. FISH AND WILDLIFE SERVICE SPECIES LISTS



United States Department of the Interior



FISH AND WILDLIFE SERVICE ECOLOGICAL SERVICES COLORADO FIELD OFFICES

P.O. Box 25486 – DFC
Denver, Colorado 80225
Phone 303-236-4773

764 Horizon Drive, Bld. B
Grand Junction, Colorado 81502
Phone 970-243-2778

THREATENED, ENDANGERED, CANDIDATE, AND PROPOSED SPECIES BY COUNTY July 2010

Symbols:

* Water depletions in the Upper Colorado River and San Juan River Basins, may affect the species and/or critical habitat in downstream reaches in other states.

▲ Water depletions in the North Platte, South Platte and Laramie River Basins may affect the species and/or critical habitat associated with the Platte River in Nebraska.

© There is designated critical habitat for the species within the county.

Recent genetic tests identified cutthroat population as GB lineage, therefore, consultation is an interim measure until genetic and taxonomic issues are resolved.

§ This applies only to white-tailed or Gunnison's prairie dog habitats. All black-tailed prairie dog habitats within Colorado have been block-cleared from the requirements of ferret surveys.

T Threatened
E Endangered
P Proposed
X Experimental
C Candidate

*For additional information contact: U.S. Fish and Wildlife Service, Colorado Field Office, PO Box 25486 DFC (MS 65412), Denver, Colorado 80225-0486, telephone 303-236-4773
U.S. Fish and Wildlife Service, Western Colorado Field Office, 764 Horizon Drive, Building B, Grand Junction, Colorado 81506, telephone 970-243-2778*

Species	Scientific Name	Status
ADAMS		
Least tern (interior population) ▲	<i>Sternula antillarum</i>	E
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T
Mountain Plover	<i>Charadrius montanus</i>	P
Pallid sturgeon ▲	<i>Scaphirhynchus albus</i>	E
Piping plover ▲	<i>Charadrius melodus</i>	T
Preble's meadow jumping mouse	<i>Zapus hudsonius preblei</i>	T
Ute ladies'-tresses orchid	<i>Spiranthes diluvialis</i>	T
Western prairie fringed orchid ▲	<i>Platanthera praeclara</i>	T
Whooping crane ▲	<i>Grus americana</i>	E

BOULDER

Canada lynx	<i>Lynx canadensis</i>	T
Colorado butterfly plant	<i>Gaura neomexicana</i> spp. <i>coloradensis</i>	T
Greenback cutthroat trout	<i>Oncorhynchus clarki stomias</i>	T
Least tern (interior population) ▲	<i>Sternula antillarum</i>	E
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T
Pallid sturgeon ▲	<i>Scaphirhynchus albus</i>	E
Piping plover ▲	<i>Charadrius melodus</i>	T
Preble's meadow jumping mouse	<i>Zapus hudsonius preblei</i>	T
Ute ladies' -tresses	<i>Spiranthes diluvialis</i>	T
Western prairie fringed orchid ▲	<i>Platanthera praeclara</i>	T
Whooping crane ▲	<i>Grus americana</i>	E

BROOMFIELD

Colorado butterfly plant	<i>Gaura neomexicana</i> spp. <i>coloradensis</i>	T
Least tern (interior population) ▲	<i>Sternula antillarum</i>	E
Pallid sturgeon ▲	<i>Scaphirhynchus albus</i>	E
Piping plover ▲	<i>Charadrius melodus</i>	T
Preble's meadow jumping mouse	<i>Zapus hudsonius preblei</i>	T
Ute ladies' -tresses orchid	<i>Spiranthes diluvialis</i>	T
Western prairie fringed orchid ▲	<i>Platanthera praeclara</i>	T
Whooping crane ▲	<i>Grus americana</i>	E

CHAFFEE

Canada lynx	<i>Lynx canadensis</i>	T
Gunnison's prairie dog	<i>Cynomys gunnisoni</i>	C
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T
Uncompahgre fritillary butterfly	<i>Boloria acrocne</i>	E

CHEYENNE

Arkansas darter	<i>Etheostoma cragini</i>	C
Lesser prairie chicken	<i>Tympanuchus pallidicinctus</i>	C
Mountain Plover	<i>Charadrius montanus</i>	P

CLEAR CREEK

Canada lynx	<i>Lynx canadensis</i>	T
Greenback cutthroat trout	<i>Oncorhynchus clarki stomias</i>	T
Least tern (interior population) ▲	<i>Sternula antillarum</i>	E
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T
Pallid sturgeon ▲	<i>Scaphirhynchus albus</i>	E
Piping plover ▲	<i>Charadrius melodus</i>	T
Western prairie fringed orchid ▲	<i>Platanthera praeclara</i>	T
Whooping crane ▲	<i>Grus americana</i>	E

CONEJOS

Black-footed ferret	<i>Mustela nigripes</i>	E
---------------------	-------------------------	---

Least tern (interior population) ▲
 Pallid sturgeon▲
 Piping plover▲
 Preble's meadow jumping mouse
 Ute ladies'-tresses orchid
 Western prairie fringed orchid▲
 Whooping crane▲

Sternula antillarum E
Scaphirhynchus albus E
Charadrius melodus T
Zapus hudsonius preblei T
Spiranthes diluvialis T
Platanthera praeclara T
Grus americana E

DOLORES

Bonytail*
 Canada lynx
 Colorado pikeminnow*
 Humpback chub*
 Mexican spotted owl
 Razorback sucker*
 Southwestern willow flycatcher
 Uncompahgre fritillary butterfly
 Yellow-billed cuckoo

Gila elegans E
Lynx canadensis T
Ptychocheilus lucius E
Gila cypha E
Strix occidentalis lucida T
Xyrauchen texanus E
Empidonax traillii extimus E
Boloria acrocnema E
Coccyzus americanus C

DOUGLAS

Colorado butterfly plant
 Greenback cutthroat trout
 Gunnison's prairie dog
 Least tern (interior population)▲
 Mexican spotted owl
 Pallid sturgeon▲
 Pawnee montane skipper
 Piping plover▲
 Preble's meadow jumping mouse©
 Ute ladies'-tresses orchid
 Western prairie fringed orchid▲
 Whooping crane▲

Gaura neomexicana spp. *coloradensis* T
Oncorhynchus clarki stomias T
Cynomys gunnisoni C
Sternula antillarum E
Strix occidentalis lucida T
Scaphirhynchus albus E
Hesperia leonardus montana T
Charadrius melodus T
Zapus hudsonius preblei T
Spiranthes diluvialis T
Platanthera praeclara T
Grus americana E

EAGLE

Black-footed ferret
 Bonytail*
 Canada lynx
 Colorado pikeminnow*
 Greater Sage-grouse
 Greenback cutthroat trout#
 Humpback chub*
 Mexican spotted owl
 Razorback sucker*
 Uncompahgre fritillary butterfly
 Ute ladies'-tresses orchid
 Yellow-billed cuckoo

Mustela nigripes E
Gila elegans E
Lynx canadensis T
Ptychocheilus lucius E
Centrocercus urophasianus C
Oncorhynchus clarki stomias T
Gila cypha E
Strix occidentalis lucida T
Xyrauchen texanus E
Boloria acrocnema E
Spiranthes diluvialis T
Coccyzus americanus C

GILPIN

Canada lynx	<i>Lynx canadensis</i>	T
Least tern (interior population) ▲	<i>Sternula antillarum</i>	E
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T
Pallid sturgeon▲	<i>Scaphirhynchus albus</i>	E
Piping plover▲	<i>Charadrius melodus</i>	T
Western prairie fringed orchid▲	<i>Platanthera praeclara</i>	T
Whooping crane▲	<i>Grus americana</i>	E

GRAND

Bonytail*	<i>Gila elegans</i>	E
Canada lynx	<i>Lynx canadensis</i>	T
Colorado pikeminnow*	<i>Ptychocheilus lucius</i>	E
Greater Sage-grouse	<i>Centrocercus urophasianus</i>	C
Greenback cutthroat trout#	<i>Oncorhynchus clarki stomias</i>	T
Humpback chub*	<i>Gila cypha</i>	E
Osterhout milkvetch	<i>Astragalus osterhoutii</i>	E
Penland beardtongue	<i>Penstemon penlandii</i>	E
Razorback sucker*	<i>Xyrauchen texanus</i>	E
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C

GUNNISON

Bonytail*	<i>Gila elegans</i>	E
Canada lynx	<i>Lynx canadensis</i>	T
Colorado pikeminnow*	<i>Ptychocheilus lucius</i>	E
Greenback cutthroat trout#	<i>Oncorhynchus clarki stomias</i>	T
Gunnison's prairie dog	<i>Cynomys gunnisoni</i>	C
Humpback chub*	<i>Gila cypha</i>	E
Razorback sucker*	<i>Xyrauchen texanus</i>	E
Uncompahgre fritillary butterfly	<i>Boloria acrocneuma</i>	E
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C

HINSDALE

Bonytail*	<i>Gila elegans</i>	E
Canada lynx	<i>Lynx canadensis</i>	T
Colorado pikeminnow*	<i>Ptychocheilus lucius</i>	E
Gunnison's prairie dog	<i>Cynomys gunnisoni</i>	C
Humpback chub*	<i>Gila cypha</i>	E
Razorback sucker*	<i>Xyrauchen texanus</i>	E
Rio Grande cutthroat trout	<i>Oncorhynchus clarki virginalis</i>	C
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E
Uncompahgre fritillary butterfly	<i>Boloria acrocneuma</i>	E
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C

HUERFANO

Uncompahgre fritillary butterfly

Boloria acrocnema

E

LA PLATA

Black-footed ferret

Mustela nigripes

E

Canada lynx

Lynx canadensis

T

Colorado pikeminnow*

Ptychocheilus lucius

E

Knowlton cactus

Pediocactus knowltonii

E

Mexican spotted owl

Strix occidentalis lucida

T

New Mexico meadow jumping mouse

Zapus hudsonius luteus

C

Razorback sucker*

Xyrauchen texanus

E

Southwestern willow flycatcher

Empidonax traillii extimus

E

Uncompahgre fritillary butterfly

Boloria acrocnema

E

Yellow-billed cuckoo

Coccyzus americanus

C

LARIMER

Black-footed ferret §

Mustela nigripes

E

Canada lynx

Lynx canadensis

T

Colorado butterfly plant

Gaura neomexicana spp. *coloradensis*

T

Greater Sage-grouse

Centrocercus urophasianus ←

C

Greenback cutthroat trout

Oncorhynchus clarki stomias

T

Least tern (interior population) ▲

Sternula antillarum

E

Mexican spotted owl

Strix occidentalis lucida

T

Mountain Plover

Charadrius montanus ←

P

North Park phacelia

Phacelia formosula

E

Pallid sturgeon ▲

Scaphirhynchus albus

E

Piping plover ▲ ↘

Charadrius melodus

T

Preble's meadow jumping mouse ©

Zapus hudsonius preblei

T

Ute ladies'-tresses orchid

Spiranthes diluvialis

T

Western prairie fringed orchid ▲

Platanthera praeclara

T

Whooping crane ▲

Grus americana

E

LAS ANIMAS

Arkansas darter

Etheostoma cragini

C

Black-footed ferret §

Mustela nigripes

E

Canada lynx

Lynx canadensis

T

Gunnison's prairie dog

Cynomys gunnisoni

C

Mexican spotted owl

Strix occidentalis lucida

T

Mountain Plover

Charadrius montanus

P

New Mexico meadow jumping mouse

Zapus hudsonius luteus

C

LINCOLN

Arkansas darter

Etheostoma cragini

C

Least tern (interior population) ▲

Sternula antillarum

E

Lesser prairie chicken

Tympanuchus pallidicinctus

C

Mountain Plover

Charadrius montanus

P

Pallid sturgeon ▲

Scaphirhynchus albus

E

MONTEZUMA

Black-footed ferret	<i>Mustela nigripes</i>	E
Canada lynx	<i>Lynx canadensis</i>	T
Colorado pikeminnow*	<i>Ptychocheilus lucius</i>	E
Greenback cutthroat trout#	<i>Oncorhynchus clarki stomias</i>	T
Mancos milkvetch	<i>Astragalus humillimus</i>	E
Mesa Verde cactus	<i>Sclerocactus mesae-verdae</i>	T
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T
New Mexico meadow jumping mouse	<i>Zapus hudsonius luteus</i>	C
Razorback sucker*	<i>Xyrauchen texanus</i>	E
Sleeping Ute milkvetch	<i>Astragalus tortipes</i>	C
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C

MONTROSE

Black-footed ferret	<i>Mustela nigripes</i>	E
Bonytail*	<i>Gila elegans</i>	E
Canada lynx	<i>Lynx canadensis</i>	T
Clay-loving wild buckwheat	<i>Eriogonum pelinophilum</i>	E
Colorado hookless cactus	<i>Sclerocactus glaucus</i>	T
Colorado pikeminnow*	<i>Ptychocheilus lucius</i>	E
Gunnison's prairie dog	<i>Cynomys gunnisoni</i>	C
Humpback chub*	<i>Gila cypha</i>	E
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T
Razorback sucker*	<i>Xyrauchen texanus</i>	E
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C

MORGAN

Least tern (interior population)	<i>Sternula antillarum</i>	E
Mountain Plover	<i>Charadrius montanus</i>	P
Pallid sturgeon▲	<i>Scaphirhynchus albus</i>	E
Piping plover	<i>Charadrius melodus</i>	T
Preble's meadow jumping mouse	<i>Zapus hudsonius preblei</i>	T
Ute ladies'-tresses orchid	<i>Spiranthes diluvialis</i>	T
Western prairie fringed orchid▲	<i>Platanthera praeclara</i>	T
Whooping crane▲	<i>Grus americana</i>	E

OTERO

Arkansas darter	<i>Etheostoma cragini</i>	C
Least tern (interior population)	<i>Sternula antillarum</i>	E
Mountain Plover	<i>Charadrius montanus</i>	P
Piping plover	<i>Charadrius melodus</i>	T

OURAY

Bonytail*	<i>Gila elegans</i>	E
Canada lynx	<i>Lynx canadensis</i>	T

Black-footed ferret §	<i>Mustela nigripes</i>	E
Canada lynx	<i>Lynx canadensis</i>	T
Greenback cutthroat trout	<i>Oncorhynchus clarki stomias</i>	T
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T
Mountain Plover	<i>Charadrius montanus</i>	P

RIO BLANCO

Black-footed ferret	<i>Mustela nigripes</i>	E
Bonytail*	<i>Gila elegans</i>	E
Canada lynx	<i>Lynx canadensis</i>	T
Colorado pikeminnow©	<i>Ptychocheilus lucius</i>	E
Dudley Bluffs bladderpod	<i>Physaria congesta</i>	T
Dudley Bluffs twinpod	<i>Physaria obcordata</i>	T
Greater Sage-grouse	<i>Centrocercus urophasianus</i>	C
Humpback chub*	<i>Gila cypha</i>	E
Razorback sucker*	<i>Xyrauchen texanus</i>	E
White River beardtongue	<i>Penstemon scariosus</i> var. <i>albifluvis</i>	C
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C

RIO GRANDE

Canada lynx	<i>Lynx canadensis</i>	T
Colorado pikeminnow*	<i>Ptychocheilus lucius</i>	E
Gunnison's prairie dog	<i>Cynomys gunnisoni</i>	C
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T
Razorback sucker*	<i>Xyrauchen texanus</i>	E
Rio Grande cutthroat trout	<i>Oncorhynchus clarki virginalis</i>	C
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E
Uncompahgre fritillary butterfly	<i>Boloria acrocynema</i>	E
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C

ROUTT

Bonytail*	<i>Gila elegans</i>	E
Canada lynx	<i>Lynx canadensis</i>	T
Colorado pikeminnow*	<i>Ptychocheilus lucius</i>	E
Greater Sage-grouse	<i>Centrocercus urophasianus</i>	C
Greenback cutthroat trout#	<i>Oncorhynchus clarki stomias</i>	T
Humpback chub*	<i>Gila cypha</i>	E
Razorback sucker*	<i>Xyrauchen texanus</i>	E
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C

SAGUACHE

Black-footed ferret	<i>Mustela nigripes</i>	E
Bonytail*	<i>Gila elegans</i>	E
Canada lynx	<i>Lynx canadensis</i>	T
Colorado pikeminnow*	<i>Ptychocheilus lucius</i>	E
Greenback cutthroat trout#	<i>Oncorhynchus clarki stomias</i>	T

Mexican spotted owl
 Penland alpine fen mustard
 Razorback sucker*
 Uncompahgre fritillary butterfly
 Yellow-billed cuckoo

Strix occidentalis lucida
Eutrema penlandii
Xyrauchen texanus
Boloria acrocynema
Coccyzus americanus

T
T
E
E
C

TELLER

Gunnison's prairie dog
 Least tern (interior population) ▲
 Mexican spotted owl
 Pallid sturgeon ▲
 Pawnee montane skipper
 Piping plover ▲
 Preble's meadow jumping mouse ©
 Western prairie fringed orchid ▲
 Whooping crane ▲

Cynomys gunnisoni
Sternula antillarum
Strix occidentalis lucida
Scaphirhynchus albus
Hesperia leonardus montana
Charadrius melodus
Zapus hudsonius preblei
Platanthera praeclara
Grus americana

C
E
T
E
T
T
T
E

WASHINGTON

Least tern (interior population) ▲
 Mountain Plover
 Pallid sturgeon ▲
 Piping plover ▲
 Western prairie fringed orchid ▲
 Whooping crane ▲

Sternula antillarum
Charadrius montanus
Scaphirhynchus albus
Charadrius melodus
Platanthera praeclara
Grus americana

E
P
E
T
T
E

WELD

Colorado butterfly plant
 Least tern (interior population) ▲
 Mexican spotted owl
 Mountain Plover
 Pallid sturgeon ▲
 Piping plover ▲
 Preble's meadow jumping mouse
 Ute ladies'-tresses orchid
 Western prairie fringed orchid ▲
 Whooping crane ▲

Gaura neomexicana spp. *coloradensis*
Sternula antillarum
Strix occidentalis lucida
Charadrius montanus
Scaphirhynchus albus
Charadrius melodus
Zapus hudsonius preblei
Spiranthes diluvialis
Platanthera praeclara
Grus americana

T
E
T
P
E
T
T
T
T
E

YUMA

Mountain Plover

Charadrius montanus

P

Appendix D

BALD EAGLE DATA TABLES

**Colorado Division of Wildlife Midwinter Eagle Counts Middle Park, CO Colorado River
2008 through 2011**

January 2008			
LOCATION	Adults	Imm.	Total
Colorado River			
Shadow Mtn. Res. to Granby Reservoir	3	1	4
Granby Res. to Windy Gap	0	0	0
Windy Gap to State Ranch	0	0	0
State Ranch to Troublesome Creek	10	2	12
Troublesome Creek to Kremmling	2	0	2
Kremmling to Bond	4	1	5
TOTALS	19	7	33

* No unknown eagle species reported in 2008

January 2009			
SURVEY LOCATION	Adults	Imm	Total
Colorado River			
Shadow Mountain Reservoir to Granby Reservoir	2	0	2
Granby Reservoir. to Windy Gap	2	0	2
Windy Gap to State Ranch	1	0	1
State Ranch to Troublesome Creek	4	1	5
Troublesome Creek to Kremmling	4	0	4
Kremmling to Bond	3	1	0
TOTALS	16	2	14

January 2010			
SURVEY LOCATION	Adults	Imm	Total
Colorado River			
Shadow Mountain Reservoir to Granby Reservoir	2	1	3
Granby Reservoir. to Windy Gap	2	0	2
Windy Gap to State Ranch	0	0	0
State Ranch to Troublesome Creek	4	0	4
Troublesome Creek to Kremmling	3	0	3
Kremmling to Bond	8	0	8
TOTALS	19	1	20

January 2011

LOCATION	Adults	Imm.	Total
Colorado River			
Shadow Mtn. Res. to Granby Reservoir	1	1	2
Granby Res. to Windy Gap	0	0	0
Windy Gap to State Ranch	2	0	2
State Ranch to Troublesome Creek	6	1	7
Troublesome Creek to Kremmling	1	0	1
Kremmling to Bond	9	1	10
TOTALS	19	3	22

Appendix E

COLORADO NATURAL HERITAGE PROGRAM BOREAL TOAD TECHNICAL REPORT

**Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings for
the Boreal Toad (*Bufo boreas boreas*)
November 2007**

Prepared for:
EDAW

Prepared by:
Chris Gaughan
Zoologist/Assistant Information Manager
Colorado Natural Heritage Program
gaughan@lamar.colostate.edu
<http://www.cnhp.colostate.edu/>
(970) 491-3342



**Colorado
State
University**

Knowledge to Go Places

Project Summary

The Colorado Natural Heritage Program (CNHP) conducted an inventory focused on the boreal toad (*Bufo boreas boreas*) within and adjacent to the proposed Granby – Windy Gap Transmission Line Rebuild Project area during the summer breeding season of 2007. The objectives of the inventory were to quantify the amount and quality of habitat, find potential breeding sites, and evaluate historic or current activity of boreal toads and other amphibians along the alternative transmission line corridors. Site visits to the project areas were made during July, 2007. GIS analysis and documentation review of all amphibian species in the area found that there are no known current or historical boreal toad sightings or breeding within the project area. However, active boreal toad breeding sites occur within about 15 kilometers (9 miles). Our results suggest that there is currently no known occupied habitat for the State Endangered boreal toad (*Bufo boreas boreas*), the State Species of Special Concern northern leopard frog (*Rana pipiens*), or the State Species of Special Concern wood frog (*Rana sylvatica*) and therefore the transmission line rebuild project is not likely to adversely affect these species within the project area. As a part of the survey, potential amphibian habitat was quantified and mapped. The report includes a discussion of potential direct and indirect impacts along with recommendations for minimizing potential impacts.

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

Introduction and Species Information.....	4
Project Background.....	4
Status of the boreal toad and other amphibians occurring in Grand County	6
Boreal Toad Habitat, Behavior, Diet, and Movement Patterns	7
Regional	8
<i>Trends</i>	8
Methods.....	8
Existing Environment	9
Potential amphibian distribution within the project area	9
Prior amphibian records within the project area	10
Proximate amphibian breeding sites	10
Field survey results	13
<i>Stillwater Creek</i>	13
<i>Willow Creek</i>	16
<i>Other surveyed areas</i>	19
Discussion.....	21
Site specific.....	21
<i>Direct Impacts</i>	21
<i>Indirect Impacts</i>	21
<i>Site Specific Best Management Practices</i>	22
<i>Non-site specific Impacts</i>	23
<i>Off-site habitat protection, enhancement, and research</i>	23
Literature Cited	25

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

Introduction and Species Information

Project Background

The proposed Granby – Windy Gap Transmission Line Rebuild Project runs generally north to south covering about twelve miles, from Cutthroat Trout Bay on Lake Granby to the town of Granby, Colorado. The transmission line would connect the Granby pumping plant with the Windy Gap substation. The stated objectives of Western Area Power Administration's (Western) proposed transmission line are to:

- Provide a second source of power to the area between Grand Lake and Granby before the failure of the 69-kV Adams Tunnel cable.
- Continue to provide reliable, looped transmission supply to MPEI customers in advance of the Adams Tunnel cable failure.
- Ensure that the electric system in the area will continue to operate within acceptable voltage criteria while accommodating future load growth.
- Allow Tri-State Generation and Transmission (Tri-State) to serve its local member (MPEI) with reliable power.
- Replace a 60-year old overhead transmission line and add shield wires for improved lightning protection.

The proposed project has three alternatives to cover the range of issues involved in rebuilding and upgrading the transmission line. The alternatives include: keeping the existing transmission line (Alternative A – No Action), rebuilding and upgrading the existing transmission line (Alternative B), and rerouting and upgrading the transmission line (Alternative C – Proposed Action). Complete descriptions of the project alternatives will be provided in the DEIS. The primary drainages in the project area are Stillwater Creek and Willow Creek. These drainages occur within the right-of-way for all three alternatives (Figure 1).

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings
November, 2007

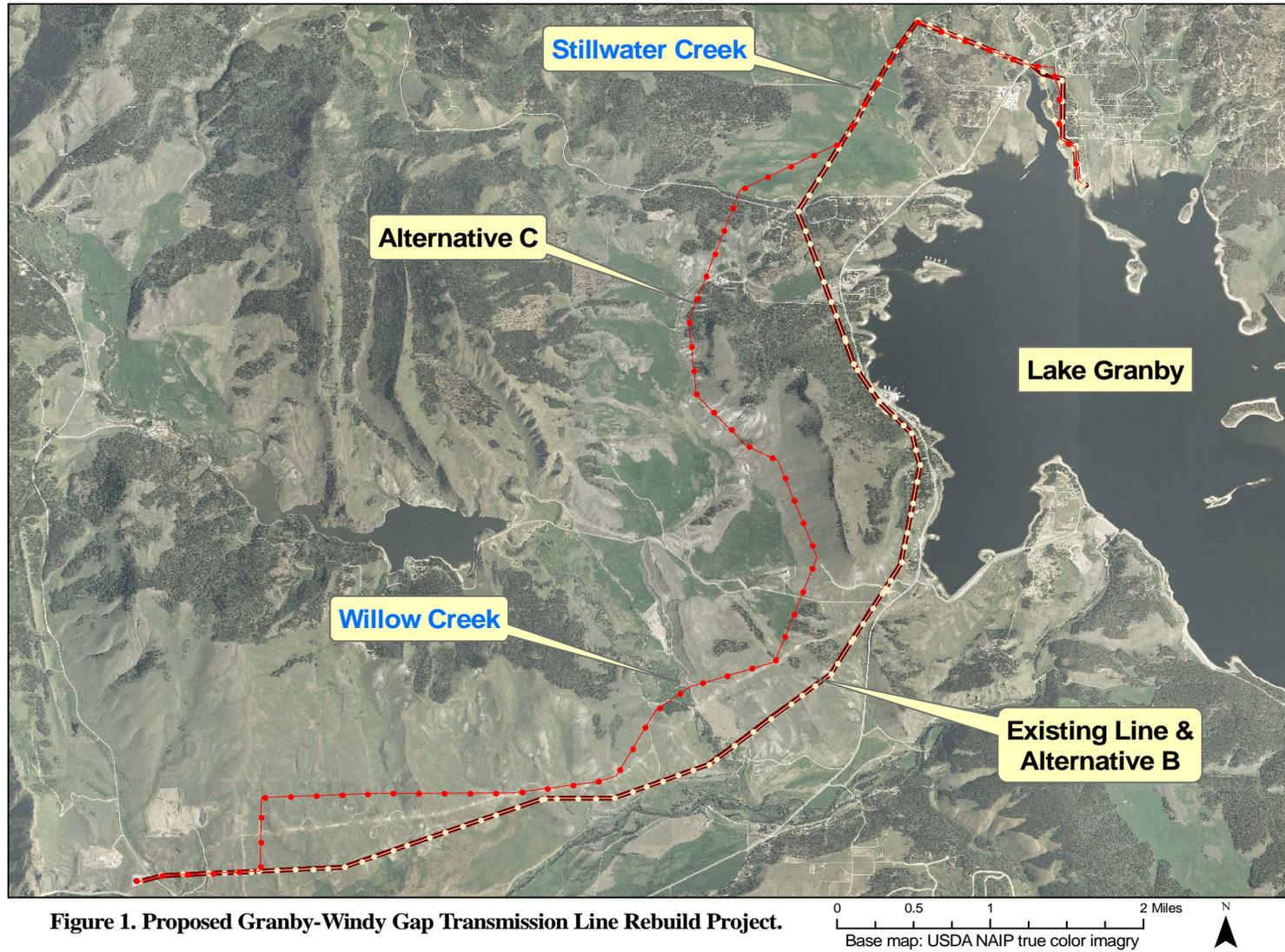


Figure 1. Proposed Granby-Windy Gap Transmission Line Rebuild Project.

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

Status of the boreal toad and other amphibians occurring in Grand County

The primary focus of the survey is the Southern Rocky Mountain population (SRMP) of the boreal toad (*Bufo boreas boreas*). Beginning in the early to mid-1980s, the boreal toad experienced dramatic declines in its population in Colorado, New Mexico, and Wyoming (USFWS 2004). Reasons for the declining boreal toad population are still being investigated. Proposed causes include chytrid fungus (*Batrachochytrium dendrobatidis*), acid rain, drought, pollution, increased UV radiation, natural population flux, or some synergistic combination of these and/or other factors (USFWS 2004). The major source of decline is believed to be chytrid fungus, which has been linked to major declines in proximate areas such as Rocky Mountain National Park (Muths et al. 2003, USFWS 2004). Examinations of infected toads show that chytrid fungus suppresses the immune system to a point that a secondary infection (e.g. red-leg disease) is usually the ultimate cause of death (USFWS 2004). Researchers hypothesize that one or a combination of environmental stressors is reducing the toads' ability to survive this pathogen (Loeffler 2001a). At this time, researchers do not know whether or not populations can persist in the presence of chytrid fungus. Research is on-going, but it may be several more years before this question can be answered (T. Jackson, CDOW, pers. comm.).

Because of these declines, the boreal toad is currently listed as “State Endangered” by the Colorado Division of Wildlife (CDOW, Appendix B), is a former Candidate for federal listing under the Endangered Species Act (ESA), is on the United States Forest Service (USFS) sensitive species list, and ranked G4T1/S1 (critically imperiled) by NatureServe (NatureServe 2007). In 1995, the United States Fish and Wildlife Service (USFWS) published their 12-month finding on the listing petition, which concluded that listing the boreal toad under ESA was “warranted but precluded” (Loeffler 2001a). “Warranted but precluded” suggests that available information supports federal listing under the ESA, but completion of the listing process is precluded by higher priority species. In September of 2005, the USFWS announced that the listing is not warranted at this time because the SRMP does not constitute a species, subspecies, or distinct population segment under ESA (Jackson 2005). Therefore the boreal toad has no current federal designation and is currently tracked only at the state levels. The SRMP is currently being reevaluated to determine whether or not it is a distinct species or a subspecies of the Western toad (*Bufo boreas*), however preliminary genetics work suggests that it may be a separate species (Goebel 1996 as cited in Loeffler 2001a). For the purposes of this report, the SRMP (hereafter referred to as the boreal toad) is referred to at the species level.

The boreal toad is currently found in 67 known breeding locations comprising 32 populations in Colorado and Southern Wyoming, only two of which are considered viable (T. Jackson, CDOW, pers. comm.). This species has disappeared from 83 percent of its historic locations in Colorado, 94 percent in Wyoming, and is believed to be extirpated from New Mexico (USFWS 2004). The boreal toad was once known from 25 counties in Colorado, including Grand County, where it was considered common. Its distribution in Colorado is now restricted to 14 counties. Available information suggests that boreal toad populations continue to decline (Keinath and McGee 2005).

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

Other amphibian species tracked by CNHP that are known to breed in the upper Colorado River headwaters in Grand County include the wood frog (*Rana sylvatica*) and the northern leopard frog (*Rana pipiens*). Both are designated as CDOW Colorado State Species of Special Concern, USFS sensitive species, and ranked G5/S3 (secure) by NatureServe (NatureServe 2007). The northern leopard frog is also on the Bureau of Land Management (BLM) sensitive species list. The designation as a Colorado State Species of Special Concern is not a statutory category (CDOW 2007a). Two other common amphibians that are not tracked by CNHP but known to breed in the area are the boreal chorus frog (*Pseudacris maculata*) and the tiger salamander (*Ambystoma tigrinum*); both are ranked G5/S5 (secure) by NatureServe (NatureServe 2007). These two species have no current designation but records of their occurrence in Colorado are recorded in CDOW's "Colorado Herpetofaunal Atlas" (CDOW 2007b).

Boreal Toad Habitat, Behavior, Diet, and Movement Patterns

The boreal toad occupies habitat mainly between 8,500 and 11,500 feet, with higher and lower occurrences in some locales (Hammerson 1999). The majority (about 90 percent) of known boreal toad breeding habitat falls on federal land (USFWS 2004). Breeding habitat occurs in beaver (*Castor canadensis*) ponds, high elevation lakes and ponds, glacial kettle ponds, and human excavated ponds. Ideally, breeding ponds have a gradually sloping shallow margin (≤ 10 cm deep) and persistent water levels lasting into August (Holland et al. 2006). Adult males and females congregate at ponds to breed in May and early June depending on elevation. The tadpoles generally hatch within 1-2 weeks after the eggs are laid. Metamorphosis is usually completed in 60-90 days. Summer habitat can consist of the breeding ponds, or toads may become more terrestrial and occupy wetlands, floodplains, meadows, shrubland, or forests. Generally, though, upland habitat is damp and close to water. Inactive toads often use rocks, logs, or rodent burrows to hide beneath or within (Hammerson 1999). Winter hibernacula are found in areas below the frost line, or in areas where the flow of ground water maintains a microclimate above freezing. These may include burrows created by rodents such as ground squirrels (*Spermophilus* sp.) or beaver lodges and dams. Hibernacula are usually not far from summer habitat (Hammerson 1999, USFWS 2004).

Boreal toads are mainly insectivorous and their diet is relatively flexible, feeding on prey that is plentiful and easy to catch. They eat wide varieties of invertebrates, including grasshoppers, beetles, mosquitoes, flies, spiders, moths, ants, wasps, bees, mites, and snails (Hammerson 1999). The majority of their diet consists of ants, beetles, and spiders (Keinath and McGee 2005).

Maximum yearly movements of the boreal toad in Colorado have been estimated at 0.97 km (0.6 miles) for males and 2.3 km (1.4 miles) for females (Muths 2003). Similar results were found in Idaho (0.94 km/0.58 miles for males and 2.44 km/1.5 miles for females; Bartelt 2000), suggesting the validity of the Colorado results and giving researchers a baseline for yearly toad dispersal patterns. However, between 1999 and 2007 a mark/recapture study documented multiple individuals moving between breeding sites 7 and 8 km apart (4.3-4.97 miles) (Lambert and Gaughan 2007). The distance of

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

intervening suitable habitat to effectively separate boreal toads by limiting dispersal or movements of individuals is estimated at 8 km (4.97 miles) (NatureServe 2007).

Regional

Trends

Regional trends for the boreal toad in Grand County are mixed. Historically the boreal toad was considered common to abundant throughout the higher elevations in Colorado including Grand County (Loeffler 2001a). However, recent successful breeding in Grand County has been documented at only three sites; Big Meadows, Pole Creek, and the Upper Williams Fork. Both Big Meadows and Pole Creek have tested positive for chytrid fungus since 2004 and 2002, respectively. Chytrid fungus is widely recognized as a primary factor in the decline of the boreal toad, but because Pole Creek and Big Meadows are chytrid positive and continue to persist, they are an asset to understanding the species-fungal interaction.

Boreal toad and amphibian decline is also likely to result from current and future residential and commercial development in the area. Increases in human population have been linked to localized increases in adaptable wildlife (DeStefano and DeGraaf 2001). For the boreal toad and other amphibians this would most likely increase the number of predators such as raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), western terrestrial garter snake (*Thamnophis elegans*), grey jay (*Perisoreus canadensis*), American robin (*Turdus migratorius*), mallard (*Anas platyrhynchos*), and domestic dog (*Canis familiaris*) (USFWS 2004). Other potential hazards to the toad from an increase in human population in the area would include runoff of chemicals such as lawn fertilizers, de-icing salts or cinders, vehicle anti-freeze and oil, insect foggers, and possibly the most destructive would be the increased movement between watersheds of chytrid fungus. Development and increased resource use also has the potential to change surface and ground water levels, which would impact most aquatic species including amphibians.

This area makes up one of only 32 known populations within the current range of the Southern Rocky Mountain boreal toad and thus should be considered an important part of protecting the species continued existence. Given the status of the boreal toad (absent from 83% of previously known sites, and only two remaining viable breeding locations), all impacts to toads and to suitable habitat are potentially significant and the long-term conservation success is greater if all remaining known localities can be conserved.

Methods

Prior to conducting field inventories, CNHP reviewed existing GIS information and literature/reports related to boreal toad and other amphibian species occurrence within Grand County and potential habitats within the proposed project area. CNHP has been monitoring the boreal toad since the organizations inception in the early 1990's and has been a primary contractor for CDOW in the effort to understand the ecology of the boreal toad in Colorado for the past decade. The targeted field inventories were performed by Chris Gaughan, a biologist who has a Master's of Science in Wildlife Conservation and

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

ten years of experience in identification and monitoring of amphibian species including four years experience with inventory and monitoring for the boreal toad in Colorado. The field surveys concentrated on the riparian crossings, isolated pond/wetland areas, and selected upland areas occurring within and adjacent to the Granby – Windy Gap Transmission Line Rebuild Project area. Survey areas were identified prior to field investigations by a preliminary GIS analysis using hydrology layers, USDA NAIP true color satellite imagery, digital USGS quad maps, and amphibian data from CDOW and CNHP databases (CDOW 2007b, CNHP 2007, Appendix A, USDA 2007). Multiple databases (CNHP 2007, CDOW 2007b) as well as field data from CNHP biologists (Doyle 2005, Gaughan 2007) were combined in a GIS to analyze and report on the amphibians in the Upper Colorado River watershed around the project area. These data were used to measure distance to historic and current sightings, breeding activity, and generally represent the local amphibian distribution (Figure 2).

On-site surveys were performed in accordance with the accepted protocol of the Boreal Toad Conservation Plan and Agreement (Loeffler 2001a) and paying close attention to the habitat characteristics described by Holland et al. (2006) during July, 2007. The inventories consisted of slowly walking through targeted areas (e.g., slow or stagnated water, along creek banks, around isolated wetlands, etc.) during late morning to early afternoon when amphibians are most active. Upland areas were surveyed where amphibians are most likely to be found (e.g., under logs, near rodent burrows, etc.). Providing field documentation of the boreal toad, or any of the amphibians found in the area, is most reliable during the spring and summer seasons. CNHP survey dates occurred during one of the most conspicuous stages of amphibian tadpole/larvae development.

The areas of potential habitat for the boreal toad and other amphibians were mapped in ArcGIS (ESRI Redlands, CA) over USDA NAIP imagery at a scale of 1:3,000 using field GPS point data collected. The survey included qualitative and quantitative assessment of wetland and suitable amphibian habitats in the project area as well as potential breeding sites and current activity of boreal toads and other amphibians. The survey also included habitat assessment and recording of other amphibian and terrestrial species that occur or have the potential to occur in the proposed project area. The presence of other terrestrial species sighted is noted. Areas on the C Lazy U Ranch were not surveyed because access was not permitted.

Existing Environment

Potential amphibian distribution within the project area

The northern terminus of the transmission line is located at approximately 8,400 feet, at Lake Granby, dropping to about 7,900 feet, west of Granby, Colorado. The project area crosses the Willow Creek and Stillwater Creek drainages as well as areas of wet meadow, and irrigated ditches and fields. The entire project area is within the general geographic and elevation range of the boreal toad, albeit at the lower extent. The project also falls within the known range of the wood frog, northern leopard frog, boreal chorus frog, and tiger salamander (Hammerson 1999).

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

Prior amphibian records within the project area

Preliminary analysis showed no prior records of boreal toad, wood frog, northern leopard frog, or tiger salamander within the project alternative corridors (CDOW 2007b, CNHP 2007). However, a boreal chorus frog was observed in a small seep within the existing right-of-way by EDAW in 2005.

There have been no prior records of boreal toad, wood frog, or northern leopard frog in the Willow Creek or Stillwater Creek drainage basins including the segments associated with the alternative corridors (CDOW 2007b, CNHP 2007). In locations outside of the right-of-way the Willow Creek drainage has had previous records of boreal chorus frog from a 2005 CNHP county survey as well as a 1946 record from Maslin in CDOW's Herpetofaunal Atlas (Doyle 2005, CDOW 2007b). Doyle (2005) also found both the boreal chorus frog and tiger salamander outside of the right-of-way in the Stillwater Creek drainage during a 2005 CNHP county survey (Table 1, Figure 2).

Proximate amphibian breeding sites

The elevational and riparian characteristics of both the Stillwater and Willow Creek crossings of the right-of-way include suitable habitat for the boreal toad. However there has been no known boreal toad breeding documented in the project right-of-way (CDOW 2007b, CNHP 2007). As suggested above, the maximum movements for the boreal toad are between 1 and 8 km (Bartelt 2000, Muths 2003, Lambert and Gaughan 2007). Although a lack of prior information does not mean the species is absent, the closest known active boreal toad breeding sites are the Big Meadows site about 14.5 km (9 miles) up the Colorado River drainage in Rocky Mountain National Park and the Pole Creek Golf Course site about 16 km (10 miles) up the Fraser River drainage from the project area (CNHP 2007). Given these distances the closest known breeding for boreal toad is outside the estimated maximum dispersal distance. The Big Meadows site has had active breeding recorded from 2004 to 2007 and the site has tested positive for chytrid fungus since 2004 (Jackson 2005, E. Muths, USGS, pers comm). The Pole Creek Golf Course site has had breeding recorded over multiple years between 1995 and 2007 and has also tested positive for chytrid fungus since 2002. The presence of chytrid fungus brings the long-term viability of both sites into question (Jackson 2005, T. Jackson, CDOW, pers comm). Other active boreal toad breeding sites in Grand County include areas in the Upper Williams Fork that are well outside a practical dispersal range for the boreal toad (Jackson 2005, CNHP 2007).

The elevational and riparian characteristics of both the Stillwater and Willow Creek crossings of the right-of-way also include suitable habitat for all the other amphibian species known from Grand County. There has been documentation of boreal chorus frog breeding within the right-of-way at Stillwater Creek (Gaughan 2007). There has been no known wood frog, northern leopard frog, or tiger salamander breeding documented in the project right-of-way (CDOW 2007b, CNHP 2007). Although a lack of prior information does not mean the species is absent, the closest known active wood frog breeding site is the Grand Lake Golf Course site about 6.5 km (4 miles) up the Colorado River drainage from the project area (Doyle 2005). The closest known breeding site for the northern

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

leopard frog is about 35 km from the project area on Muddy Creek (Doyle 2005). Breeding sites for the tiger salamander have been documented in both Stillwater (9 km) and Willow Creek (13 km) upstream of the right-of-way (Doyle 2005).

Table 1: Distances of Amphibian Occurrence from the Project Area*

Species	Approx. kilometers (miles) to project area	Year	Breeding confirmed
Boreal toad	14.5 (9)	2007	Yes
Boreal toad	16 (10)	2007	Yes
Boreal toad	10.5 (6.5)	1994	No
Boreal toad	13.5 (8.5)	1980	No
Boreal toad	9 (5.5)	1963	No
Boreal toad	11 (7)	1963	No
Boreal toad	3 (2)	1961	No
Boreal toad	1.5 (1)	1947	No
Wood frog	5.5 (3.5)	2005	Yes
Wood frog	13.5 (8.5)	1993	No
Wood frog	9 (5.5)	1988	No
Wood frog	11 (7)	1980	No
Wood frog	6.5 (4)	1977	No
Northern leopard frog	2.5 (1.5)	1994	No
Northern leopard frog	14.5 (9)	1994	No
Northern leopard frog	5 (3)	1961	No
Boreal chorus frog	0 (0)	2007	Yes
Boreal chorus frog	9 (5.5)	2005	Yes
Boreal chorus frog	19 (12)	1946	No
Tiger salamander	9 (5.5)	2005	Yes
Tiger salamander	13 (8)	2005	Yes

Calculated distances of amphibian occurrence from the project area were collected using multiple databases (CNHP 2007, CDOW 2007b). Locations are approximate and absence of data does not necessarily mean that the species do not occur in other locations.

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

Field survey results

Stillwater Creek

Field visits to the project right-of-way (Alternatives A, B, and C on the same alignment) where it crosses the Stillwater Creek riparian area (See Figure 1) were made on July 24th and 25th of 2007. The boreal toad, boreal toad tadpoles, or boreal toad eggs were not found during the CNHP survey. The area is dominated by a riparian corridor with meanders, oxbow areas with standing water, beaver flowages, irrigated ditches, and farm ponds (figure 3). The vegetation includes willows and sedges, both of which occur as emergent vegetation from shallow water in places. This reach of Stillwater Creek has about 4 hectares (10 acres) of estimated potential breeding habitat (e.g., beaver flowages with shallow emergent vegetation), foraging habitat (wet floodplain meadow), and hibernacula (beaver dams and lodges) for boreal toads (figure 4). However, due to the distance to the nearest known boreal toad population (~15km to Big Meadows, ~24 km to Pole Creek) this area has only a small chance of being used by boreal toads in the foreseeable future given the current data available on boreal toad movement patterns (Bartelt 2000, Muths 2003, Lambert and Gaughan 2007).



Figure 3. Stillwater Creek looking upstream

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

This area would also be suitable habitat for all the other amphibians occurring in Grand County. The wood frog, northern leopard frog, or tiger salamander, adults, juveniles or eggmasses were not found during the CNHP survey. The distance to the nearest known wood frog population (~6.5 km) gives this area only a small chance of being used by wood frogs in the foreseeable future given the current data available on wood frog movement patterns (Bellis 1965, Baldwin 2006). The area also has the potential to be suitable habitat for the northern leopard frog, but there is no known breeding in the area. The tiger salamander has been recorded breeding 8 km upstream in Stillwater Creek and therefore has potential to use this area. The one amphibian species found present and breeding in the right-of-way during the 2007 CNHP survey was the boreal chorus frog. Between 100 and 500 boreal chorus frog tadpoles were found along Stillwater Creek within the 200 foot transmission line corridor. The breeding areas consisted of sections of Stillwater Creek where it was slowed by beaver dams as well as an off channel pond. The nearest pole location would most likely be situated across a current road and at least 50 meters and from the breeding activity. All approximate transmission line pole locations are outside of the suitable breeding habitat for amphibians (figure 4).

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings
November, 2007



Figure 4. Stillwater Creek estimated potential habitat (Acreages are approximate, based on field notes and onscreen digitizing at a scale of 1:3,000)

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

Willow Creek

Field visits to the project right-of-way (Alternative C alignment) where it crosses the Willow Creek riparian area were made on July 24th and 25th of 2007. The boreal toad, boreal toad tadpoles, or boreal toad eggs were not found during the CNHP survey. The area is dominated by a riparian corridor with standing water, and beaver flowage. The vegetation includes dense willows and sedges, both of which occur as emergent vegetation from shallow water in places (figure 5). This reach of Willow Creek has about 2 hectares (5 acres) of estimated potential breeding habitat (e.g., beaver flowages with shallow emergent vegetation), foraging habitat (wet floodplain meadow), and hibernacula (beaver dams and lodges) for boreal toads (figure 6). However, due to the distance to the nearest known population (~17 km to Pole Creek, ~22 km to Big Meadows) this area has only a small chance of being used by boreal toads in the foreseeable future given the current data available on boreal toad movement patterns (Bartelt 2000, Muths 2003, Lambert and Gaughan 2007).



Figure 5. Willow Creek looking upstream

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

This area would also be suitable habitat for all the other amphibians occurring in Grand County. The wood frog, northern leopard frog, boreal chorus frog, or tiger salamander, adults, juveniles or eggmasses were not found during the CNHP survey. The distance to the nearest known wood frog population (~14 km) gives this area only a small chance of being used by wood frogs in the foreseeable future given the current data available on wood frog movement patterns (Bellis 1965, Baldwin 2006). The area also has the potential to be suitable habitat for the northern leopard frog, but there is no known breeding in the area. The tiger salamander has been recorded breeding at the headwaters of Willow Creek (~37 riparian km upstream) and therefore has potential to use this area. There is also a historic record of boreal chorus frogs upstream in Willow Creek as well as in neighboring Stillwater Creek (see above). This area would have the potential to have boreal chorus frogs. All approximate transmission line pole locations are outside of the suitable breeding habitat for amphibians, therefore there is little concern for construction activities to have any direct impacts on amphibians (figure 6).

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings
November, 2007



Figure 6. Willow Creek estimated potential habitat (Acreages are approximate, based on field notes and onscreen digitizing at a scale of 1:3,000)

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

Other surveyed areas

During visits to other wetland and upland areas CNHP failed to find any occurrences of amphibian species. These areas included sites where the transmission line crossed irrigated ditches and wet meadows or had vegetation that suggested periods of inundation or proximate wetlands (Figure 7).

Although some of these sites had standing water, none of these areas had suitable habitat for the boreal toad. These areas had signs of rapid water fluctuation including complete drying. Therefore, if used by amphibians at all, these areas may even be considered “population sinks” if they attract amphibians during inundation but lead to high mortality rates and lack suitable conditions for successful breeding.

During visits to the project area other wildlife species observed included Western terrestrial garter snake (*Thamnophis elegans*), pronghorn (*Antilocapra americana*), beaver (*Castor canadensis*), red fox (*Vulpes vulpes*), great blue heron (*Ardea herodias*), barn swallows (*Hirundo rustica*), red-wing blackbird (*Agelaius phoeniceus*), mountain bluebird (*Sialia currucoides*), snipe (*Gallinago delicata*), red-tailed hawk (*Buteo jamaicensis*), Northern harrier (*Circus cyaneus*), and Western tanager (*Piranga ludoviciana*).

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings
November, 2007

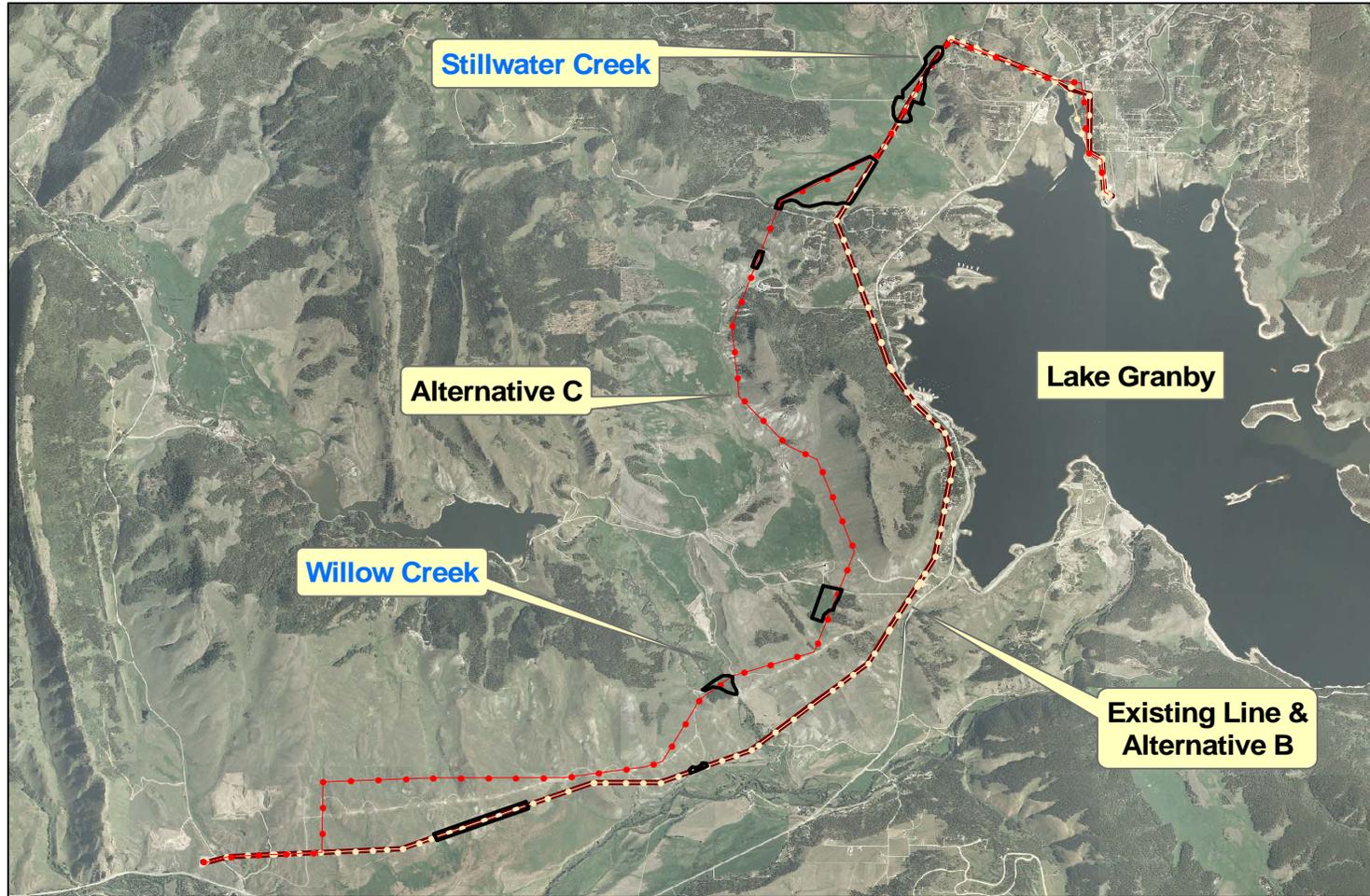
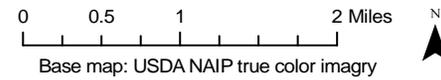


Figure 7. Areas surveyed by CNHP in 2007 for amphibians (shown in black outline).



Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

Discussion

Site specific

Direct Impacts

Within the Granby – Windy Gap Transmission Line Rebuild Project area there are no known records of boreal toad, wood frog, or northern leopard frog occurrence in the direct impacted area or within the Stillwater and Willow Creek drainage basins. During field visits to the two major wetland areas as well as the other wet irrigated fields and ditches in the project area we did not find the boreal toad, wood frog, or northern leopard frog. The only amphibian species found in the project area was the boreal chorus frog. The only other amphibian species within the Stillwater and Willow Creek drainage basins was the tiger salamander, found upstream of the right-of-way. Both the boreal chorus frog and the tiger salamander are considered common.

Suitable habitat for all amphibian species found in Grand County, including the boreal toad, was documented within the project area. As discussed above separation of the right-of-way from any known active populations of boreal toad, wood frog, or northern leopard frog makes it unlikely that any of these species would use this area within the foreseeable future. Also, it is noted that the approximate pole structures locations for the transmission line would not be within the suitable habitat for amphibian species. Suitable habitat would be spanned by the transmission line and all impacts to vegetation would be limited to the footprint of the pole structures. Therefore, the Granby – Windy Gap Transmission Line Rebuild Project is not likely to adversely affect the boreal toad or any of the amphibians known to occur in Grand County or contribute to a direct loss of suitable habitat.

Based on the proposed pole locations in relation to the estimated potential habitat mapped, it is assumed that all direct impacts to potential amphibian habitat and direct amphibian mortality can be avoided by following the Best Management Practices (BMPs).

Indirect Impacts

There is also potential for degradation of amphibian habitat via indirect sources, if implementation of the project results in changes to water quality, velocity, changes in wildlife behavior, or changes to vegetation structure and/or composition. Increased velocity would be of particular concern if beaver activity is affected by the project (e.g., increased stress on beavers from construction activities or changes in the willow communities leading to abandonment of the area) and the current shallow standing waters necessary for amphibian breeding are lost. Also, any changes to local hydrology or water quality that resulted in a decrease in insects (the primary food source for boreal toads and amphibians in general) would also have a negative effect. Impacts to vegetation could include reduced plant cover and altered plant composition. Construction projects commonly result in the introduction or spread of weeds. From an ecological system standpoint, increased weed cover is not a desirable condition. To our knowledge, there are no data on whether or not the spread of weeds per se would have direct negative effects on boreal toads. However, use of chemicals to control weeds would negatively

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

affect boreal toads and other amphibians. These chemicals are known to impact amphibians through direct mortality, reduced resistance to disease, alteration in growth and development, and reduced reproductive success (Relyea 2005, Keinath and McGee 2005). Chemical contaminants and their detrimental effects can persist in amphibian habitats for many years (Russell et al. 1995, Keinath and McGee 2005).

Based on the proposed pole locations in relation to the estimated potential habitat mapped, it is assumed that all indirect impacts to potential amphibian habitat can be avoided by following the Best Management Practices (BMPs) discussed below.

Site Specific Best Management Practices

Suitable boreal toad habitat (as well as habitat for other amphibian species) exists in and around the project area. However, adverse impacts to the species and their habitat are unlikely if all suitable habitat is avoided during project construction and best management practices are implemented. The recommendations provided below offer options for offsetting local scale impacts. These recommendations are consistent with the proposed strategies in the Boreal Toad Conservation Plan (Loeffler 2001a), which include protection of existing breeding sites, occupied habitat, unoccupied suitable habitat, and research.

If possible, the construction activities should avoid suitable habitat and wetlands in general. If this is not possible, the use of appropriate design and on-site BMPs can help avoid and minimize direct impacts to amphibians and their habitat during construction and on-going maintenance. The following suggestions should help reduce impacts to amphibians and their habitat within the project area:

- If possible, schedule construction activities for areas containing suitable habitat for prior to early May or after early September.
- If construction activities are scheduled from May through the end of August in areas that contain suitable habitat, survey the particular areas for presence of amphibians prior to any disturbance. If evidence of activity is found, consult with a qualified biologist to identify necessary site-specific measures for avoiding direct impacts.
- If eggs, tadpoles, or adults are present, avoid de-watering ponds and other areas of standing water, and trampling (by foot or machinery) individuals or emergent/bank vegetation. Clearly communicate with construction personnel regarding the sensitivity of amphibians, the location(s) of their habitat, and the importance of avoiding impacts.
- Implement measures to control erosion or sedimentation that could bury egg masses.
- Restore riparian and wetland vegetation, and maintain habitat connectivity. Isolation of small populations is often a threat to the persistence of sensitive species. It will be important to maintain the ability of amphibians to move between suitable patches in response to changing local conditions, and to accommodate dispersing individuals.
- Complete construction and re-vegetation in as timely a fashion as possible.

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

- The Boreal Toad Conservation Plan and Agreement recommends maintaining a 300 ft. (100m) buffer zone between suitable toad habitat and human disturbances in wetlands. The plan also calls for lost wetlands to be mitigated at a 2:1 ratio.
- Avoid use of pesticides in boreal toad habitat. These chemicals are likely to at least reduce food supply, and at worst, could cause direct toad mortality (Relyea 2005). As much as possible, use non-chemical methods of weed control in these areas. Keinath and McGee (2005) recommend avoiding the use of chemicals within 100m of wetlands.

Non-site specific Impacts

Chances are that any individual residential, commercial or infrastructure project may not result in significant detriment to the boreal toad or amphibians in and of themselves. However, the collective impacts of regional infrastructure and development can be additive and eventually reduce or extirpate threatened and/or common amphibian species in an area.

The collective impacts of increasing infrastructure, the continued rapid residential and commercial development in the region, and the continued release of greenhouse gasses can be considered detrimental to amphibians in a regional context. If development in mountain areas is accommodated by a remote fossil fuel power supply the growth has the potential to be more rapid and less sustainable than if the power supply was provided by local sources (e.g., solar). Mountain communities and high elevation wildlife species have a real potential to see the impacts of climate change stressors first and at more intense levels. Given that the boreal toad currently exists in only 1% of its historical range (Keinath and McGee 2005) and continues to decline, any impact (albeit collective) could be the last straw for a species dependent on the high elevation climate found in Colorado's high country. Certainly, all reasonable efforts to prevent further declines of amphibian species are in everyone's best interest. From a species conservation perspective, a low-risk (i.e., err on the side of caution) approach would assume that the project has the potential to impact the amphibian populations in Grand County (three of five species being of special conservation concern), and would contribute in some way to research or conservation. The recommendations provided below offer options for offsetting regional scale impacts. These recommendations are consistent with the proposed strategies in the Boreal Toad Conservation Plan (Loeffler 2001a), which include protection of existing breeding sites, occupied habitat, unoccupied suitable habitat, and research.

Off-site habitat protection, enhancement, and research

For this project construction design and BMPs will offset the impacts to amphibians and suitable habitat within the project right-of-way. However, a responsible planning measure should include addressing regional or collective impacts that result from the associated increase in regional residential and commercial development given an increase in power supply. An appropriate strategy for Western and other groups that are planning for an increase in regional development (e.g., local government) could include sponsoring habitat protection and enhancement or research at a scale sufficient to offset the collective impacts. All else being equal, chances of maintaining long-term population

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

persistence are assumed to be greater in higher quality habitats that are experiencing fewer threats. Thus, protection of core habitat in more remote settings would make a greater contribution to the species as a whole than protection of small, individual sub-populations in areas that are under high development pressure. Fortunately, the majority of the known breeding sites for the boreal toad are on public land, and therefore considered protected from habitat conversion. However, there may be high quality habitat on private lands that could be protected through conservation easement, management agreement, or some other measure. Also, efforts to improve and enhance degraded or sub-optimal habitats, similar to efforts underway at Pole Creek Golf Course, could increase the number of successful breeding localities in Grand County. Enhancement efforts at Pole Creek appear to have improved breeding success of boreal toads at that site, at least in the short-term. Similar efforts at other carefully chosen sites in the County would increase Grand County's contribution to boreal toad conservation. If this option is pursued, coordination with the Boreal Toad Recovery Team to identify and prioritize opportunities is recommended.

There is one important caveat to the concept of habitat enhancement for boreal toads in Grand County: protection of existing natural systems is preferable to created wetlands. Created wetlands that are isolated in fields and not connected to functioning riparian systems would not likely provide viable toad habitat, and would probably not benefit toads. From the perspective of boreal toad biology, high quality breeding habitat would specify north shorelines on open water (east and south facing), with shallow water present May – August, and emergent vegetation. Areas where breaks in shrub or tree canopy that allow sunlight to reach the ground are used frequently (Bartelt 2000, Keinath and McGee 2005). Holland et al. (2006) provides the following characterization of optimal boreal toad breeding sites:

- shallows \leq 10 cm deep are preferred for breeding;
- tadpoles develop best in sites where water temps are warmest and least variable, and water levels are persistent (i.e., persistent enough to prevent dessication of eggs);
- Breeding sites with gradually sloping banks are desirable to “ensure that suitable breeding habitat exists at a variety of water levels;”
- Old, active beaver pond complexes provide good breeding habitat because they have shallow ponds and beaver maintain water levels.

Alternatively, sponsoring research could be a way of addressing collective impacts. The Boreal Toad Recovery Team has identified research needs on a number of key factors that could help inform conservation strategies. According to the USFWS (2004), many of the conservation activities undertaken to date have not been able to reverse boreal toad declines. Additional information on how various threats are interacting to drive these declines is needed. Refer to the Boreal Toad Conservation Plan and Agreement, revised 2001, or contact members of the Boreal Toad Recovery Team for additional information.

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

Literature Cited

- Baldwin, Robert F., Calhoun, Aram J.K., deMaynadier, Philip G., Demaynadier, Phillip C. 2006. Conservation planning for amphibian species with complex habitat requirements: a case study using movements and habitat selection of the wood frog *Rana sylvatica*. *Journal of Herpetology*, 40(4): 442-453.
- Bartelt, P.E. 2000. A biophysical analysis of habitat selection in western toads (*Bufo boreas*) in southeastern Idaho. Unpublished Ph.D. dissertation, Idaho State University, Pocatello.
- Bellis, Edward D. 1965. Home Range and Movements of the Wood Frog in a Northern Bog. *Ecology*, 46(1&2): 90-98.
- CNHP 2007. Colorado Natural Heritage Program Biodiversity Tracking and Conservation System. Colorado State University, Fort Collins, Colorado, U.S.A. Data exported 08/15/2007.
- CDOW 2007a. Accessed online July 30, 2007.
<http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/Amphibians/AmphibiansOfConcern.htm>
- CDOW 2007b. Colorado Herpetofaunal Atlas. Accessed online July 30, 2007.
<http://ndis.nrel.colostate.edu/herpatlas/coherpatlasD/viewer.htm>
- DeStefano, S. and DeGraaf, R.M. 2001. Exploring the ecology of suburban wildlife. *Frontiers in Ecology and the Environment*. 1, 95-101.
- Doyle, G. 2005. Amphibian surveys of Grand County.
- Gaughan, C. 2007. Amphibian surveys of the Western Area Power Administration's Granby – Windy Gap Transmission Line Rebuild Project.
- Goebel, A. M. 1996. Systematics and conservation of bufonids in North America and in the *Bufo boreas* species group. PhD dissertation. University of Colorado, Boulder. 274pp.
- Hammerson, G.A. 1999. Amphibians and reptiles in Colorado. University Press of Colorado, Niwot.
- Holland A., K. Wilson, M. Jones 2006. Characteristics of Boreal Toad (*Bufo boreas*) Breeding Habitat in Colorado. *Herpetology Review*, 37(2), 157-159.
- Jackson T. 2005. Report on the status and conservation of the boreal toad (*Bufo boreas boreas*) in the southern Rocky Mountains. Colorado Division of Wildlife.

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

- Keinath, D. and M. McGee. 2005. Boreal toad (*Bufo boreas boreas*) – a technical conservation assessment. U.S. Forest Service, Rocky Mountain Region. Available online at <http://www.fs.fed.us/r2/projects/scp/assessments/borealtoad.pdf>. Accessed August 1, 2005.
- Lambert B. and C. Gaughan 2007. Colorado Natural Heritage Program Boreal Toad Survey and Monitoring Project 2006. Prepared for the Colorado Division of Wildlife by the Colorado Natural Heritage Program, Colorado State University.
- Loeffler, C. (ed.), 2001a. Conservation plan and agreement for the management and recovery of the southern Rocky Mountain population of the boreal toad (*Bufo boreas boreas*), Boreal Toad Recovery Team. 76 pp. + appendices.
- Muths, E. 2003. Home range and movements of boreal toads in undisturbed habitat. *Copeia* 2003(1): 160-165.
- _____, E., Corn, P.S.; Pessier, A.P.; Green, D.E.. 2003. Evidence for disease-related amphibian decline in Colorado. *Biological Conservation*. 110(3): 357-365.
- NatureServe 2007. NatureServe Explorer. Accessed online July 30, 2007.
<http://www.natureserve.org/explorer/index.htm>
- Relyea, R. A. 2005. The impact of insecticides and herbicides on the biodiversity and productivity of aquatic communities. *Ecological Applications* 15:618-627.
- Russell, R.W., S.J. Hecnar, and G.D. Haffner. 1995. Organochlorine pesticide residues in Southern Ontario spring peepers. *Environmental Toxicology and Chemistry* 14:815-817.
- USDA 2007. FSA Aerial Photography Field Office.
<http://www.fsa.usda.gov/FSA/apfoapp?area=apfohome&subject=landing&topic=landing>
- USFWS. 2004. U.S. Fish and Wildlife Service Species Assessment and Listing Priority Assignment Form for Boreal toad, southern Rocky Mountain Distinct Population Segment. Available online at http://ecos.fws.gov/docs/candforms_pdf/r6/D026_V01.pdf. Accessed August 1, 2005.

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

Appendix A. Excerpts from CNHP Biodiversity Tracking and Conservation System Metadata (complete metadata can be found on-line at <http://www.cnhp.colostate.edu/gis.html>).

Originator: The Colorado Natural Heritage Program, Colorado State University

Publication Date: 20050506

Title: Element Occurrence Polygons (SENSITIVE DATA!)

Database Version: Biodiversity Tracking and Conservation System, Version 4.0

Description:

Abstract:

The Colorado Natural Heritage Program (CNHP) collects data on rare and imperiled species, subspecies and unique natural communities in Colorado. An element occurrence (EO) represents a location in which a species, subspecies or natural community is, or was, present. An EO has potential continued (or historic) presence and/or regular recurrence at a given location and has practical conservation value.

Purpose:

CNHP provides information on the distribution of Colorado's rare and imperiled species, subspecies and unique natural communities to public and private agencies and individuals for environmental review, proprietary land management, resource planning, biological and ecological research and general scientific reference.

Supplemental Information:

Data were derived from field surveys performed by CNHP and other credible sources such as Forest Service personnel, Bureau of Land Management staff, etc. Data are available in Arc/Info export format (subclass eors) or ArcView shapefile format; feature type is regions or multi-part shapes. Note attributes for the EO regions coverage are stored in .pateors.

Access Constraints:

The distribution of polygon EO data is restricted to land managers and land owners, although some special circumstances may warrant polygon data. Hence, the enclosed data are CONFIDENTIAL AND SHOULD BE TREATED AS SUCH. The user must comply with any additional criteria specified in the Memorandum of Understanding (MOU) or Data Use Agreement. If other individuals or agencies are interested in these data, contact CNHP's Data Distribution Coordinator directly at (970) 491-7331.

Use_Constraints:

Note that the bounding coordinates, bounding altitudes and taxonomic information reflect statewide values. These data are strictly "on loan" and should be considered "works in progress". Under no circumstances are data to be DISTRIBUTED in any fashion to outside parties. Only element occurrence locations on properties owned or managed by the data receiver can be displayed on external maps. All other maps must be made for internal use only and labeled as such. Acknowledgement of the Colorado Natural Heritage Program would be appreciated in products derived from these data. Please cite this particular dataset as follows: Colorado Natural Heritage Program. 2005. Element Occurrence Polygons. Biodiversity Tracking and Conservation System. Colorado State University, Fort Collins, Colorado, U.S.A. Data exported 05/06/2005.

The element occurrence coverage is a product and property of the Colorado Natural Heritage Program, a sponsored program at Colorado State University. CNHP data are supplemental and care should be taken in interpreting these data. CNHP data include spatial, tabular and narrative components. While element locations are defined by spatial components, the tabular and narrative components define quality and usability of the EO record. To ensure accurate application of CNHP data, tabular and narrative components must be evaluated in conjunction with spatial components. Failure to do so constitutes as misuse of the data.

These data are dependent on the research and observations of many scientists and institutions and reflect our current state of knowledge. Data are acquired from various sources, with varying levels of accuracy, and are continually updated and revised. Many areas have never been surveyed and the absence of data in any particular geographic area does not necessarily mean that species or ecological communities of concern are not present. These data should not be regarded as a substitute for on-site surveys required for environmental assessments. Absence of evidence is NOT evidence of absence. Absence of any data does not mean that other resources of special concern do not occur, but rather CNHP files do not currently contain information to document this presence.

The data contained herein are provided on an as-is, as-available basis without warranties of any kind, expressed or implied, including (but not limited to) warranties of merchantability, fitness for a particular purpose, and non-infringement. CNHP, Colorado State University and the State of Colorado further expressly disclaim any warranty that the data are error-free or current as of the date supplied.

Copyright 2005

Colorado State University

Colorado Natural Heritage Program

All Rights Reserved

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

Appendix B. Colorado State Laws concerning Threatened and Endangered Species.

33-2-101. Short title.

This article shall be known and may be cited as the "Nongame, Endangered, or Threatened Species Conservation Act".

Source: L. 84: Entire article R&RE, p. 862, § 1, effective January 1, 1985.

Editor's note: This section was contained in an article that was repealed and reenacted in 1984. Provisions of this section, as it existed in 1984, were similar to those contained in § 33-8-101 as said section existed in 1983, the year prior to the repeal and reenactment of this article.

33-2-102. Legislative declaration.

The general assembly finds and declares that it is the policy of this state to manage all nongame wildlife, recognizing the private property rights of individual property owners, for human enjoyment and welfare, for scientific purposes, and to insure their perpetuation as members of ecosystems; that species or subspecies of wildlife indigenous to this state which may be found to be endangered or threatened within the state should be accorded protection in order to maintain and enhance their numbers to the extent possible; that this state should assist in the protection of species or subspecies of wildlife which are deemed to be endangered or threatened elsewhere; and that adequate funding be made available to the division annually by appropriations from the general fund.

Source: L. 84: Entire article R&RE, p. 862, § 1, effective January 1, 1985.

Editor's note: This section was contained in an article that was repealed and reenacted in 1984. Provisions of this section, as it existed in 1984, were similar to those contained in § 33-8-102 as said section existed in 1983, the year prior to the repeal and reenactment of this article.

33-2-103. Definitions.

As used in this article, unless the context otherwise requires:

(1) "Management" means the collection and application of biological information for the purposes of increasing the number of individuals within species and populations of wildlife up to the optimum carrying capacity of their habitat and maintaining such levels. The term includes the entire range of activities that constitute a modern, scientific resource program including, but not limited to, research, census, law enforcement, habitat acquisition and improvement, and education. Also included within the term, when and where appropriate, is the periodic or total protection of species or populations. "Management" may include artificial propagation to maintain threatened or endangered species populations, in concert with the exercise of water rights, and may also include restriction of stocking of species which are in competition with threatened or endangered species for the available habitat.

Source: L. 84: Entire article R&RE, p. 863, § 1, effective January 1, 1985.

Editor's note: This section was contained in an article that was repealed and reenacted in 1984. Provisions of this section, as it existed in 1984, were similar to those contained in § 33-8-103 as said section existed in 1983, the year prior to the repeal and reenactment of this article.

33-2-104. Nongame species - regulations.

(1) The division shall conduct investigations on nongame wildlife in order to develop information relating to population, distribution, habitat needs, limiting factors, and other biological and ecological data to determine management measures necessary for their continued ability to sustain themselves successfully.

On the basis of such determinations, the commission shall issue regulations and develop management programs designed to insure the continued ability of nongame wildlife to perpetuate themselves successfully. Such regulations shall set forth species or subspecies of nongame wildlife which the commission deems in need of management pursuant to this section, giving their common and scientific names by species and, where necessary, by subspecies. The commission shall conduct ongoing investigations of nongame wildlife and may from time to time amend such regulations by adding or deleting therefrom species or subspecies of nongame wildlife.

(2) The commission shall by regulation establish limitations relating to the taking, possession, transportation, exportation, processing, sale or offering for sale, or shipment as may be deemed necessary to manage nongame wildlife.

(3) Except as provided in regulations issued by the commission, it is unlawful for any person to take, possess, transport, export, process, sell or offer for sale, or ship nongame wildlife deemed by the commission to be in need of management pursuant to this section. Subject to the same exception, it is also unlawful for any common or contract carrier to knowingly transport or receive for shipment nongame wildlife deemed by the commission to be in need of management pursuant to this section.

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

Source: L. 84: Entire article R&RE, p. 863, § 1, effective January 1, 1985.

Editor's note: This section was contained in an article that was repealed and reenacted in 1984. This section, as it existed in 1984, was the same as § 33-8-104 as said section existed in 1983, the year prior to the repeal and reenactment of this article.

33-2-105. Endangered or threatened species.

(1) On the basis of investigations of nongame wildlife provided for in section 33-2-104 and other available scientific and commercial data and after consultation with other state wildlife agencies, the Colorado water conservation board, the Colorado water and power development authority, water conservancy districts, and other water conservation districts of the state, and other water resource development agencies within the state, appropriate federal agencies, and other interested persons and organizations, the commission shall by regulation adopted pursuant to the procedures specified in sections 33-1-111 and 24-4-103, C.R.S., establish a list of those species and, where necessary, subspecies of wildlife indigenous to this state which are determined to be endangered or threatened within this state, giving their common and scientific names by species and, where necessary, by subspecies.

(2) The commission shall:

(a) Conduct, by July 1, 1986, and at least once every five years thereafter, a review of all species included in the state lists of endangered or threatened species established pursuant to subsection (1) of this section; and

(b) Determine on the basis of such review whether any such species should:

(I) Be removed from such list;

(II) Be changed in status from an endangered species to a threatened species; or

(III) Be changed in status from a threatened species to an endangered species.

(3) Except as otherwise provided in this article, it is unlawful for any person to take, possess, transport, export, process, sell or offer for sale, or ship and for any common or contract carrier to knowingly transport or receive for shipment any species or subspecies of wildlife appearing on the list of wildlife indigenous to this state determined to be endangered within the state pursuant to subsection (1) of this section.

(4) Except as otherwise provided in this article, it is unlawful for any person to take, possess, transport, export, process, sell or offer for sale, or ship and for any common or contract carrier to knowingly transport or receive for shipment any species or subspecies of wildlife appearing on the list of wildlife indigenous to this state determined to be threatened within the state pursuant to subsection (1) of this section.

Source: L. 84: Entire article R&RE, p. 863, § 1, effective January 1, 1985.

Editor's note: This section was contained in an article that was repealed and reenacted in 1984. Provisions of this section, as it existed in 1984, were similar to those contained in § 33-8-105 as said section existed in 1983, the year prior to the repeal and reenactment of this article.

33-2-105.5. Reintroduction of endangered species - legislative declaration.

(1) The general assembly determines and declares that pursuant to the tenth amendment of the United States constitution, the state of Colorado has primacy over affairs that are of statewide concern and that matters concerning the environment, including the introduction or reintroduction of species that are currently not found or no longer found in this state is a statewide concern and should be conducted by the state through specific legislation. Reintroduction drives enormous land use questions and impacts property and water rights throughout Colorado.

(2) Before any species may be introduced or reintroduced into this state through action by any state or local government entity, the general assembly shall act by bill to specifically name such species and to specify the manner of introduction or reintroduction. The species to be introduced or reintroduced shall be:

(a) Not, or no longer, found in this state; and

(b) A candidate for listing or has been placed in the threatened or endangered species list pursuant to the federal "Endangered Species Act of 1973", 16 U.S.C. sec. 1531 et seq., as amended.

Source: L. 99: Entire section added, p. 415, § 1, effective October 15. L. 2000: (1) amended, p. 23, § 5, effective August 2.

33-2-105.6. Reintroduction of the bonytail and the black-footed ferret.

(1) In accordance with section 33-2-105.5, the general assembly hereby determines that the following species are not currently found in the state and are listed under the federal "Endangered Species Act of 1973", 16 U.S.C. sec. 1531 et seq., as amended, and therefore require approval by the general assembly prior to reintroduction by the division. The general assembly hereby approves the reintroduction of the following species into the state of Colorado:

(a) (I) The bonytail (*gila elegans*).

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

(II) The reintroduction of the bonytail shall be conducted consistent with the five-year stocking plan for endangered Colorado river fish species in Colorado, as approved by the Colorado river fishes recovery program biology committee on September 1, 1998, or as may be amended.

(b) (I) The black-footed ferret (*Mustela nigripes*).

(II) The reintroduction of the black-footed ferret shall be conducted consistent with the approach described in the black-footed ferret cooperative management plan dated June, 1995, developed by the division, the United States fish and wildlife service, and the United States bureau of land management. The reintroduction program shall provide for regular updates for the local community on the status of the reintroduction and shall involve representatives of local government and affected interests in resolving issues that may arise during the reintroduction effort.

(2) Reintroduction of the species listed in subsection (1) of this section shall commence before December 31, 2002.

(3) The division shall submit annual reports, no later than January 15 of each year, to the house agriculture, livestock, and natural resources committee and the senate agriculture, natural resources, and energy committee on the status of the reintroduction of the bonytail and the black-footed ferret and the progress towards meeting the goals of the recovery program and the removal of the species from the federal "Endangered Species Act of 1973", 16 U.S.C. sec. 1531 et seq., as amended.

(4) In addition to the requirements of paragraph (b) of subsection (1) of this section, the reintroduction of the black-footed ferret shall be conducted in accordance with the following requirements:

(a) Each annual report prepared pursuant to subsection (3) of this section shall include an assessment evaluating whether the reintroduction of the black-footed ferret will impair any use of private land or beneficial use of water existing at the time of such reintroduction. If the assessment in any annual report concludes that any such use of land will be impaired by reintroduction of the black-footed ferret, the annual report shall also describe the reason for the impact and possible actions to reduce such impact.

(b) Any effort to reintroduce the black-footed ferret in any areas outside the experimental population boundaries described in the black-footed ferret cooperative management plan dated June, 1995, shall require further legislative approval.

(c) The state of Colorado shall ensure enforcement of the provisions of the black-footed ferret cooperative management plan dated June, 1995, up to and including litigation if the memorandum of understanding between Colorado and any federal agency implementing such plan is violated.

(d) If requested, the state of Colorado shall relocate any black-footed ferrets within the state of Colorado that move outside of the experimental population boundaries described in the black-footed ferret cooperative management plan dated June, 1995, into the area originally designated in the plan.

(e) Nothing in the black-footed ferret cooperative management plan dated June, 1995, shall affect current prairie dog management efforts on private lands.

Source: L. 2000: Entire section added, p. 436, § 1, effective April 18.

33-2-105.7. Reintroduction of species - legislative declaration - report.

(1) (a) As used in this section, unless the context otherwise requires, "introduction" means the release of a nonaquatic wildlife species that is currently not found or no longer found in this state into the environment of Colorado, and shall include reintroduction; except that introduction shall not include any nonaquatic wildlife species the actual initial release of which occurred prior to May 24, 2000, or any release that has previously been approved by the general assembly acting by bill.

(b) The general assembly determines and declares that the introduction of species is a matter of statewide concern and should be conducted by the state through specific legislation. Such introduction may cause substantial harm to the state's overall ecosystem, including native plants and animal wildlife. The introduction of wildlife species also has far-reaching impacts on benefits from the use of both public and private lands within the state.

(2) Before any wildlife species may be introduced, the department shall prepare a report that includes, at a minimum, the following information:

(a) The potential ecological and economic impacts, including whether the introduction of a wildlife species will prevent or impair the then-existing use or uses of private land, and the benefits of the introduction;

(b) The probable survival rates of the introduced animals;

(c) The possible impacts should the introduction not take place; and

(d) An assessment evaluating whether the introduction of the wildlife species will impair any use of private land or beneficial use of water existing at the time of such introduction. If the assessment concludes that

Granby – Windy Gap Transmission Line Rebuild Project Summary of Findings

November, 2007

any such use will be impaired by the introduction, the report shall also describe the reason for the impact and possible actions to reduce such impact.

(3) The department shall deliver the report prepared pursuant to subsection (2) of this section to the general assembly, in accordance with section 24-1-136 (9), C.R.S., within thirty days after its completion.

(4) The department shall annually prepare a report for each of the five years after an introduction occurs that shall include, at a minimum, the following information:

(a) The status of the introduction effort;

(b) A report on the estimated survival rates of the introduced wildlife species and their progeny;

(c) If the survival rate of the introduced wildlife species and their progeny is below the initial projected range, an assessment of why the survival rate is lower than expected and the steps that have been considered and put in place to increase survival rates; and

(d) The recovery goals and anticipated timelines of the recovery program.

Source: L. 2000: Entire section added, p. 812, § 1, effective May 24 33-2-106. Management programs.

(1) The division shall establish such programs including acquisition of land or aquatic habitat as are deemed necessary for management of nongame, endangered, or threatened wildlife.

(2) In carrying out programs authorized by this section, the division may enter into agreements with federal agencies or political subdivisions of this state or with private persons for administration and management of any area established under this section or utilized for management of nongame, endangered, or threatened wildlife.

(3) The commission may permit, under such terms and conditions as may be prescribed by regulation, the taking, possession, transportation, exportation, or shipment of species or subspecies of wildlife which appear on the state lists of endangered or threatened species for scientific, zoological, or educational purposes, for propagation in captivity of such wildlife, or for other special purposes.

(4) Upon good cause shown and where necessary to alleviate damage to property or to protect human health, endangered or threatened species may be removed, captured, or destroyed but only pursuant to permit issued by the division and, where possible, by or under the supervision of an agent of the division. Provisions for removal, capture, or destruction of nongame wildlife for the purposes set forth in this subsection (4) shall be set forth in regulations issued by the commission pursuant to section 33-2-104 (1).

Source: L. 84: Entire article R&RE, p. 864, § 1, effective January 1, 1985.

Editor's note: This section was contained in an article that was repealed and reenacted in 1984. Provisions of this section, as it existed in 1984, were similar to those contained in § 33-8-106 as said section existed in 1983, the year prior to the repeal and reenactment of this article.

ANNOTATION

Law reviews. For article, "Plans and Studies: The Recent Quest for a Utopia in the Utilization of Colorado's Water Resources" which discusses endangered species legislation in Colorado, see 55 U. Colo. L. Rev. 391 (1984). For article, "Property Rights and Endangered Species", see 61 U. Colo. L. Rev. 283 (1990).

33-2-107. Regulations.

The commission shall issue such regulations as are necessary to carry out the purposes of this article.

Source: L. 84: Entire article R&RE, p. 865, § 1, effective January 1, 1985.

Editor's note: This section was contained in an article that was repealed and reenacted in 1984. This section, as it existed in 1984, was the same as § 33-8-107 as said section existed in 1983, the year prior to the repeal and reenactment of this article.

Boreal toad population trend data in and near Arapaho Roosevelt National Forests
 (Boreal Toad Recovery Team, 2007; document excerpt)

Column headers in the following tables are defined as follows.

- **Males/Females/Egg Masses:** This column shows the minimum number of breeding age males and females and number of viable egg masses at the locality in each year.
- **Recruitment:** A 'yes' entry means that one-year-old toadlets were observed at the site in the spring of the following year, or two-year-old toads were seen the second year.
- **Age Classes:** The first number in the entry indicates the minimum number of age classes observed/reported at a specific site. Numbers within parentheses indicate which age classes were observed: M=metamorphs (young of the year), 1=one year olds (new 'recruits'), S=subadults (generally two or three year old toads), 2 or 3=subadults which were specifically identified as either two or three year old toads, A=adult toads (generally 4 years old and older).

Boulder County

BO01 – Lost Lake (Middle Boulder Creek) – ARNF

Bd: Negative (2001)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1996	0/1/0	No	2(M,A)	Toadlets introduced
1997	0/1/0	No	3(M,1,A)	Toadlets introduced*
1998	0/2/0	No	3(1,2,A)	No breeding observed
1999	0/0/0	No	None	Minimal surveys done
2000	0/0/0	No	None	Adequate monitoring
2001	0/0/0	No	None	Adequate monitoring**
2002	0/0/0	Unk	None	Adequate monitoring
2003	0/0/0	Unk	None	3 visits
2004	0/0/0	Unk	None	2 visits
2005	0/0/0	Unk	None seen	Site visited 2 times
2006	0/0/0	Unk	None seen	Site visited once

*Tadpoles observed, possibly from mating of a resident female and a translocated male toad.

**PCR test results were negative for samples from 5 groups of sentinel tadpoles placed at Lost Lake in 2001.

Appendix F

BOREAL TOAD RECOVERY TEAM DATA TABLES

Clear Creek County

CC01 - Vintage (Clear Creek West Fork) – ARNF

Bd: Not tested

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1994	??/?	Unk	Multiple	Little data available
1995	3/2/2	Unk	2(M,A)	Probably few metamorphs
1996	1/1/1	No	1(A)	No production
1997	1/1/1	No	1(A)	Eggs froze
1998	3/0/0	No	1(A)	No breeding observed
1999	3/0/0	No	1(A)	No breeding observed
2000	0/0/0	No	None seen	Minimal monitoring
2001	0/0/0	Unk	None seen	No breeding observed*
2002				Not monitored
2003	0/0/0	Unk	None Seen	No evidence of breeding
2004				Not monitored
2005	0/0/0	Unk	None seen	No evidence of breeding
2006	0/0/0	Unk	None seen	Site is drying

*All site visits in 2001, including night surveys, conducted in May.

CC02 – Urad/Henderson (Clear Creek West Fork) – Henderson Mine

Bd: Positive (2004)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1995	131/19/19	Yes	4(M,1,S,A)	
1996	142/18/18	Yes	4(M,1,S,A)	Few metamorphs
1997	167/33/23	Yes	4+(M,1,S,A)	
1998	203/107/55	Yes	4(M,1,S,A)	Many metamorphs
1999	141/60/60	Unk	4(M,1,S,A)	Bd mortality
2000	34/34/34	Yes	2(M,A)	
2001	14/14/14	Unk	3(M,1,A)	Some egg mortality*
2002	25/22/22	Unk	2(M,A)	Several sites dry
2003	15/15/15	Yes	1(A)	
2004	10/16/16	Yes	3(M,A,1)	Several sites dried up
2005	2/12/12	Yes	2(M,A)	Poor hatching success
2006	2/1/4	Unk	4(M,1,S,A)	Some water level issues

*Egg mass mortality due to a water fungus observed at the hesbo site; other sites had good egg mass survival.

CC03 – Herman Gulch (Clear Creek) – ARNF
 Bd: Positive (2004)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1993	??/?	Unk	2(M,A)	Breeding observed
1994	11/11/11	Unk	2(M,A)	
1995	52/12/12	Unk	3(M,S,A)	Good production
1996	20/12/12	No	1(A)	Poor larvae survival
1997	19/10/10	Unk	3(M,S,A)	Many metamorphs
1998	10/10/10	Unk	2(M,A)	Few metamorphs seen
1999	11/11/11	Yes	1(A)	High egg mortality
2000	9/5/5	Unk	3(1,S,A)	No metamorphs seen
2001	2/2/4	Unk	3(M,S,A)	<50 metamorphs
2002	0/1/0	Unk	1(A0	No evidence of breeding
2003	1/1/1	Yes	1(M)	<50 metamorphs
2004	4/4/4	Unk	2(1,A)	
2005	0/0/0	Unk	None seen	
2006	0/0/0	Unk	None seen	Site visited once

CC04 – Mount Bethel (Clear Creek) – ARNF
 Bd: Positive (2005/2006)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1993	Yes	Unk	2(M,A)	Many metamorphs
1994	Yes	Unk	2(M,A)	
1995	4/1/1	No	2(S,A)	Few, if any metamorphs
1996	3/3/3	Unk	2(M,A)	Few metamorphs
1997	9/1/1	Unk	2(M,A)	
1998	11/3/3	Unk	2(M,A)	36 + metamorphs seen
1999	23/1/1	Yes	2(M,A)	500 + metamorphs
2000	29/3/3	Yes	4(M,1,S,A)	Many metamorphs seen
2001	28/6/5	Yes	4(M,1,S,A)	500+ metamorphs seen
2002	16/4/4	Yes	3(M,1,A)	Early metamorphosis
2003	7/7/7	Unk	3(M,1,A)	<50 metamorphs
2004	68/8/8	Unk	3(M,S,A)	<50 metamorphs
2005	33/6/6	Unk	2(M,A)	Tested Bd positive
2006	5/0/7	Unk	2(M,A)	Early breeding

CC05 – Bakerville (Clear Creek) – ARNF

Bd: Not tested

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1994	1/1/1	Unk	2(M,A)	Limited data
1995	Unk.	Unk	Unk	Site not monitored
1996	0/0/0	No	None seen	
1997	Unk.	Unk	Unk	Site not monitored
1998	0/0/0	Unk	None seen	Inadequate monitoring
1999	0/1/0	Unk	1(A)	Inadequate monitoring
2000	0/0/0	Unk	None seen	Monitoring adequate
2001	3/0/0	Unk	1(A)	Inadequate monitoring
2002				Site not monitored
2003	1/1/1	Unk	1(A)	Few tadpoles found
2004	0/0/0	Unk	None seen	
2005	0/0/0	Unk	None seen	
2006	0/0/0	Unk	None seen	Site visited once

CC06 – Silverdale (Clear Creek South), ARNF

Bd: Negative (2003)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1993	??/0	Unk	Multiple	First survey of site
1994	??/0	Unk	Multiple	No metamorphs
1995	2/0/0	Unk	2(S,A)	No breeding observed
1996	5/0/0	No	1(A)	No breeding observed
1997	0/0/0	No	None	Inadequate monitoring
1998	1/1/0	Unk	2(S,A)	Monitoring marginal
1999	0/0/0	Yes	1(S)	41 sub-adults seen
2000	0/0/0	Unk	2(1,S)	Many sub-adults seen
2001	0/0/0	Unk	2(S,A)	65 subadults, 7 adults*
2002				Site not monitored
2003				Site not monitored
2004	0/0/0	Unk	None Seen	
2005	0/0/0	Unk	1(A)	9 unsexed adults seen
2006	0/0/0	Unk	None seen	Site visited twice

*Breeding site used in 1990s apparently not being used at present, and location of current breeding site unknown.

CC07 – Otter Mountain (Clear Creek South), ARNF

Bd: Negative (2003/2006)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
2003	1/1/1	Unk		200 tadpoles seen
2004	2/2/2	Unk	1(A)	50 tadpoles seen
2005	0/0/0	Unk	1(A)	1 adult seen
2006	2/2/2	Unk	1(A)	5 adults seen

Grand County**GR01 – Jim Creek (Winter Park) – ARNF**

Bd: Not tested

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1995	5/1/?	Unk	3+(S,A)	Substantial population
1996	?/?/0	Unk	3+(S,A)	Substantial population
1997	0/0/0	Unk	None	Monitoring inadequate
1998	0/0/0	Unk	None	Monitoring inadequate
1999	0/0/0	Unk	None	No night survey done
2000	0/0/0	Unk	None	Monitoring adequate
2001	0/0/0	Unk	None	No night survey done
2002	0/0/0	Unk	None	Not monitored
2003	0/0/0	Unk	None	Site visited 7 times
2004	0/0/0	Unk	None	
2005				Not monitored
2006				Monitoring report not received

GR02 – Pole Creek – (Pole Creek)

Bd: Positive (2002/2003)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1995	5/3/3	Unk	2(M,A)	Numerous metamorphs
1996	3/3/3	Yes	2(M,A)	Few metamorphs
1997	10/4/2	No	2(1,A)	Few, if any, metamorphs
1998	5/2/2	Yes*	2(M,A)	Monitoring marginal
1999	5/5/5	Unk	2(M,A)	Metamorphs at #4
2000	6/2/2	Yes	3(M,S,A)	One clutch desiccated
2001	9/7/7	Yes	4(M,1,S,A)	>500 metamorphs
2002	14/6/6	Yes	4(M,1,S,A)	Metamorphs present**
2003	7/2/2	Yes	4(M,1,S,A)	>500 metamorphs
2004	2/2/2	Yes	3(M,S,A)	>150 metamorphs
2005	34/8/8	Yes	4(M,1,S,A)	>3000 metamorphs
2006	5/5/5	Unk	3(M,1,A)	35 adults seen

This locality is on Pole Creek Golf Course, near holes 4 and 15

*Recruitment from 1998 production based on observations of sub-adult toads in 2000.

**Metamorphs sampled on 9/23/02 Bd positive

GR03 – Vasquez Creek (Vasquez Creek) – ARNF

Bd: Not tested

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1999	1/1/1	Yes*	1(A)	Found late in the season
2000	0/0/0	Unk	None	Monitoring adequate
2001	0/0/0	Unk	1(S)	1 sub-adult seen*
2002	0/0/0	Unk	None	1 site visit
2003				Site not monitored
2004	0/0/0	Unk	None	
2005	0/0/0	Unk	1(A)	1 adult seen
2006	0/0/0	Unk	None seen	

*16 toadlets from 1999 clutch were captive reared and released in Vasquez Creek drainage in 2000; the sub-adult observed in 2001 was observed at the release site. No toads were observed then or since at the 1999 breeding site (tire rut).

GR04 – McQueary Lake (Upper Williams Fork) – ARNF
 Bd: Positive (2003)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
2001	2/3/3	Yes	2(1,A)	No metamorphs observed
2002	8/6/6	Unk	2(M,A)	<50 metamorphs
2003	2/2/2	Unk	2(S,A)	Desiccation and predation
2004	0/0/0	Unk	None	
2005	0/0/0	Unk	None seen	
2006	0/0/0	Unk	None seen	Possible adult sighting

GR05 – Upper Williams Fork (Upper Williams Fork) – ARNF
 Bd: Positive (2006)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
2001	2/2/2	Yes	3(A,M,1)	Metamorphs observed
2002	1/1/1	Yes	3(A,S,1)	No metamorphs seen
2003	1/2/1	Yes	4(M,1,S,A)	<50 metamorphs
2004	2/2/2	Yes	4(M,1,S,A)	Cold water temps
2005	2/1/1	Unk	2(1,S,A)	Metamorphs possible
2006	2/0/1	Unk	2(M,A)	

GR06 – Big Meadow (Big Meadow) – RMNP
 Bd: Positive (2004/2005)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
2004	1/1/0	Yes	3(M,1,A)	
2005	2/2/2	Unk	2(1,A)	
2006	0/0/2	Unk	1(S)	Pond dried

Larimer County

LR01 – Lost Lake (North Fork Big Thompson) – Rocky Mountain NP
Bd: Positive (2000/2005)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1990	??/?22	Unk	1(A)	Incomplete data
1991	206/28/15	Unk	1(A)	No data on subadults
1992	143/23/23	Unk	1(A)	No data on subadults
1993	77/10/?	Unk	1(A)	Incomplete data
1994	110/35/35	Unk	Unk	No data on subadults
1995	122/32/32	Yes*	1(A)	No data on subadults
1996	43/15/152	No	1(A)	No data on subadults
1997	112/15/15+	No	3(M,2*,A)	15-20 egg masses
1998	106/12/12	Unk	2(M,A)	150+ metamorphs seen
1999	10/10/10	Unk	1(A)	Metamorphs possible
2000	3/3/3	Unk	1(A)	Bd positive
2001	0/3/0	Unk	1(A)	Only females observed
2002	0/1/0	Unk	1(A)	One female observed
2003	0/0/0	Unk	None	Surveys adequate
2004	0/0/0	Unk	None seen	Juveniles found along trail
2005	3/3/3	Unk	1(A)	Larvae seen
2006	0/0/0	Unk		Larvae seen

*Recruitment in 1995 based on observation of 2 year old toads in 1997.

LR02 – Kettle Tarn (North Fork Big Thompson) – RMNP
Bd: Positive (2001/2005); Negative (2006)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1990	??/?13	Unk	1(A)	Incomplete data
1991	21+/23/23	Unk	1(A)	No data on subadults
1992	63/18/18	Unk	1(A)	No data on subadults
1993	54/25/25	Unk	2(M,A)	
1994	120/21/21	Unk	2(M,A)	
1995	210/24/24	Unk	2(M,A)	
1996	29/13/8	Unk	3(M,2,A)	
1997	15/11/0	No	1(A)	
1998	18/13/10	Unk	1(A)	
1999	15/8/2	Yes*	1(A)	No metamorphs seen
2000	13/5/3	Unk	2(1,A)	One 1 year old seen*
2001	2/4/3	Yes	3(M,S,A)	Metamorphs observed*
2002	2/2/2	Yes	3(M,1,A)	NASRF tadpoles released**
2003	3/3/3	Yes	3(M,1,A)	500+ metamorphs
2004	2/2/2	Unk	3(1,S,A)	Site dry by late July
2005	0/1/0	Unk	1(A)	Good water levels
2006	0/3/1	Unk	1(A)	Desiccation loss

*Metamorphs observed but not estimated on monitoring form.

**Tadpoles from NASRF released at site; it is unknown whether metamorphs observed in 2002 derived from naturally produced clutches or from these released tadpoles.

LR03 – Spruce Lake (Big Thompson) – RMNP
 Bd: Negative (2003/2005/2006)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1996	Unk	Yes	Unk	Reproduction presumed
1997	3/1/?	Unk	3(1,S,A)	Limited monitoring
1998	9/3/1	Unk	1(A)	Inadequate monitoring
1999	9/3/1	Yes	2(S,A)	Inadequate monitoring
2000	10/4/2	Unk	3(M,1,A)	Three 1-year old seen
2001	10/2/2	Unk	2(S,A)	Larvae observed*
2002	15/3/3	Unk	1(A)	No metamorphs observed
2003	12/1/1	Unk	1(A)	No larvae observed
2004	10/2/2	Unk	1(A)	No larvae observed
2005	7/5/5	Unk	1(A)	Larvae observed
2006	7/1/3	Unk	2(M,A)	Eggs collected from site

*Last site visit June 20, prior to time of metamorphosis

LR04 – Glacier Basin (Big Thompson) – RMNP
 Bd: Not tested

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1995	1/1/0	Unk	1(A)	
1996	1/1/1	Yes	1(A)	Translocation site
1997	0/1/0	No	2(1,A)	
1998	3/0/0	Unk	1(A)	No breeding activity seen
1999	3/0/0	Unk	1(A)	No night survey done
2000	0/0/0	Unk	None	Monitoring adequate
2001				Not monitored *

*This site will no longer be regularly monitored after 2000. Translocation appears unsuccessful (Muths et. al. 2001).

LR05 – Twin Lake (South Cache la Poudre) – ARNF
 Bd: Positive (2001)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
1998	1/1/1	Unk	1(A)	Tadpoles observed
1999	0/0/0	Unk	None	Site disturbed/dam work*
2000	0/0/0	Yes	None	Low water
2001	3/2/2	Yes	3(1,S,A)	No metamorphs seen
2002	1/1/1	Unk	2(S,A)	No metamorphs seen
2003	0/0/0	Unk	0	Site disturbed
2004				Not monitored
2005				Not monitored
2006				Not monitored

*In 1999 there was temporary disturbance at this site due to testing of reconstructed dam.

LR06 – Trout Creek (Trout Creek) – ARNF
 Bd: Negative (2004/2006)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
2004	2/2/2	Yes	1(A)	Site found 6/22/04
2005	0/0/0	Yes	None seen	
2006	0/0/3	Unk	3(1,S,M)	Good year at site

LR07 – Panhandle Creek (Panhandle Creek) – ARNF
 Bd: Negative (2006)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
2004	3/2/0	Yes	2(S,A)	Exact site not found
2005	0/0/0	Yes	None seen	
2006	5/0/1	Unk	4(M,1,S,A)	Exact site located

LR09 – Faye Lakes (Faye Lakes) – RMNP
 Bd: Negative (2005/2006)

Year	Males/Females /Egg Masses	Recruitment	Age Classes	Comments
2004	4/4/0	Yes	2(M,A)	
2005	2/2/2	Yes	2(1,A)	
2006	3/2/0	Unk	3(M,1,A)	

Boreal Toad Breeding Sites on the Planning Area.

# Sites	Boulder County	Clear Creek County	Grand County	Larimer County
ARNF	1	6	4	3
RMNP	0	0	1	5
Private	0	1	1	0
Bd+	0	3 (2 neg: 2 unk.)	4 (2 unk.)	2 (5 neg:1 unk.)

Appendix G

COLORADO DIVISION OF WILDLIFE CONSULTATION LETTER

STATE OF COLORADO

Bill Owens, Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE

AN EQUAL OPPORTUNITY EMPLOYER

Bruce McCloskey, Director
6060 Broadway
Denver, Colorado 80216
Telephone: (303) 297-1192



*For Wildlife-
For People*

Rodney Jones
Western Area Power Administration
Rocky Mountain Region
5555 East Crossroads Boulevard
Loveland, CO 80539-3003

August 24, 2005

Mr. Jones,

The Colorado Division of Wildlife (CDOW) has had the opportunity to review the project description of the Granby Pumping Plant - Windy Gap Transmission Line Rebuild project. There are several wildlife impacts that the preliminary review of the project has presented. These include impacts to big game winter range, sage grouse, and raptors/migratory birds.

The area of Table Mountain and the surrounding habitats are utilized as winter range for elk and deer. Maintenance and construction of this line in this winter range between the months of November through April may reduce the use of this limiting habitat. Elk may be displaced to other adjacent private lands with activities associated with the power line.

Other parts of the alternative may be built on areas utilized by sage grouse. Impacts to sage grouse nesting areas, brooding areas, and possible breeding areas may occur by the addition and utilization of the new alignment. The significant increase in height of the proposed power line may also increase sage grouse predation due to raptor perches at a greater distance from the power line.

The CDOW concurs with the United State Fish and Wildlife Service (USFWS) on its comments received on July 13, 2005 with respect to the Migratory Bird Treaty Act of 1918 (MBTA) and the Bald and Golden Eagle Protection Act of 1940 (BGEPA) and the protective measures that the USFWS may require. The area is regularly used by a variety of raptors including golden eagle, bald eagle, red tailed hawk, osprey, goshawk, Swainsons hawk, coopers hawk, kestrel, prairie falcon and great horned owl. These species also may be affected as a result of collisions with guy wires and lines.

If the CDOW can be of further assistance in further addressing the wildlife impacts that this project will have, please contact Kirk Oldham, District Wildlife Manager at (970) 627-3775.

Sincerely

Tom Kroening
Acting Area Wildlife Manager

DEPARTMENT OF NATURAL RESOURCES, Russell George, Executive Director
WILDLIFE COMMISSION, Jeffrey Crawford, Chair • Tom Burke, Vice Chair • Ken Torres, Secretary
Members, Robert Bray • Rick Enstrom • Philip James • Claire O'Neal • Richard Ray • Robert Shoemaker
Ex Officio Members, Russell George and Don Ament

