

Continental Divide National Scenic Trail
Halfmoon Creek to South Fooses Pass

Plant Biological Assessment/Evaluation
SALIDA AND LEADVILLE RANGER DISTRICTS
SAN ISABEL NATIONAL FOREST
AND
GUNNISON RANGER DISTRICT
GRAND MESA, UNCOMPAHGRE, AND GUNNISON NATIONAL FORESTS

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U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE



The proposed CDNST Trail Alignment along the Continental Divide.

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1.0 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

This biological evaluation (BE) analyzes the potential effects of the proposed Continental Divide National Scenic Trail (CDNST) on federally listed threatened, endangered, and candidate species, and designated or proposed critical habitats pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (ESA). In addition, impacts from the proposed management action on Forest Service (FS) sensitive species identified by the Region 2 Regional Forester (Forest Service 2003) will also be assessed as required in the Forest Service Manual (FSM 2670.31-2670.32). Species meeting the following criteria are addressed in this assessment:

1. known to occur on the Forest based on confirmed sightings;
2. may occur on the Forest based on unconfirmed sightings;
3. potential habitat exists for the species on the Forest; or
4. potential effects may occur to these species.

1.2 CURRENT MANAGEMENT DIRECTION

Current management direction for federally proposed, threatened, endangered and FS sensitive species on the District of the Forest can be found in the following documents, filed at each district office:

- Forest Service Manual and Handbooks (FSM/FSH 2670)
- National Forest Management Act (NFMA)
- Endangered Species Act of 1973, as amended (ESA)
- National Environmental Policy Act (NEPA)
- Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands (PSICC) Land Resource Management Plan (LRMP) (Forest Service 1983), and the Grand Mesa, Uncompahgre, and Gunnison National Forests Land Resource Management Plan (LRMP) (U.S. Forest Service 1991a).
- Species-specific Recovery Plans which establish population goals for recovery
- Species management plans
- Species management guides or conservation strategies
- Regional Forester policy and management direction

The LRMP provides management guidelines, which incorporate regional direction for each species. General FS direction for threatened and endangered species is summarized below.

MANAGEMENT DIRECTION: THREATENED AND ENDANGERED SPECIES

Section 7 of the ESA, requires federal agencies to use their authorities to carry out programs to conserve endangered and threatened species, and to insure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of listed or proposed species, or result in the destruction or adverse modification of their critical habitats. The contents of the biological assessment/evaluation are at the discretion of the federal agency, and will depend on the nature of the federal action (50 CFR 402.12(f)).

The Forest Service has established direction in Forest Service Manual 2670 to guide habitat management for threatened, endangered, proposed, and sensitive species. Preparation of a biological evaluation as part of the NEPA process ensures that these species receive full consideration in the decision-making process. FSM 2600, Section 2671.44 (Supplement 2600-94-2), provides direction on the review of actions and programs authorized, funded or implemented by the FS relative to the requirements of the ESA. FSM 2670.31 further defines FS policy for threatened and endangered species:

- Place top priority on conservation and recovery of endangered, threatened, and proposed species and their habitats through relevant National Forest System, state and private forestry, and research activities and programs.
- Establish through the Forest planning process objectives for habitat management and/or recovery of populations, in cooperation with states, the FWS and other federal agencies.
- Through the biological evaluation process, review actions and programs authorized, funded, or carried out by the FS to determine their potential for effect on threatened and endangered species and species proposed for listing.
- Avoid all adverse impacts on threatened and endangered species and their habitat except when it is possible to compensate adverse effect totally through alternatives identified in a biological opinion rendered by the FWS; when an exemption has been granted under the act, or when the FWS biological opinion recognizes an incidental taking. Avoid adverse impacts on species proposed for listing during the conference period and while their federal status is being determined.
- Initiate consultation or conference with the FWS when the FS determines that proposed activities may have an adverse effect on threatened, endangered, or proposed species or when FS projects are for the specific benefit of a threatened or endangered species.
- Identify and prescribe measures to prevent adverse modification or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened, and proposed species. Protect individual organisms or populations from harm or harassment as appropriate.

MANAGEMENT DIRECTION: FS SENSITIVE SPECIES (FSM 2670.32)

FS sensitive species are those plants and animals identified by the Regional Forester (Forest Service 2003) for which population viability is a concern. Concern is warranted by a downward trend in population numbers, density, or habitat conditions that would reduce a species' existing distribution (FSM 2670.5). Sensitive species are managed so that FS actions ensure that these species do not become threatened or endangered (FSM 2670.22).

The FS is required to manage National Forest lands so that all existing native and desired nonnative wildlife, fish, and plants can maintain viable populations. FS activities are to be conducted so as to avoid actions that may cause a species to become threatened or endangered (FSM 2670.12). Current management direction is to manage FS system habitats for threatened and endangered species to achieve recovery objectives so that special protection measures provided under the Endangered Species Act are no longer necessary (FSM 2670.21).

The FS has developed policy regarding the designation of plant and animal species (Forest Service Manual (FSM) 2670; Supplement 2600-94-2). The Regional Forester's sensitive species list contains taxa when they meet one or more of the following three criteria:

1. species is declining in numbers or occurrences and evidence indicates it could be proposed for federal listing as threatened or endangered if action is not taken to reverse or stop the downward trend;
2. species' habitat is declining and continued loss could result in population declines that lead to federal listing as threatened or endangered if action is not taken to reverse or stop the decline; or
3. species' population or habitat is stable but limited.

Under FSM 2672.41, the objectives for completing biological evaluations for proposed FS programs or activities:

1. ensure that FS actions do not contribute to loss of viability of any native or desired non-native plant or animal species;
2. ensure that activities do not cause any species to move toward federal listing, and
3. incorporate concerns for sensitive species throughout the planning process, reducing negative impacts to species and enhancing opportunities for mitigation.

General FS direction for sensitive species is summarized below (FSM 2670.32):

- Assist states in achieving their goals for conservation of endemic species.
- As part of the NEPA process, review programs and activities, through a biological evaluation, to determine their potential effect on sensitive species.
- Avoid or minimize impacts to species whose viability has been identified as a concern.
- If impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole.
- Establish management objectives in cooperation with states when projects on National Forest System lands may have a significant effect on sensitive species population numbers or distributions. Establish objectives for federal candidate species, in cooperation with the FWS or National Marine Fisheries Service (NMFS) and the states.

2.0 CONSULTATION HISTORY

To date no consultation with the U.S. Fish and Wildlife Service regarding threatened or endangered plant species has taken place.

3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

PROJECT AREA DESCRIPTION AND LOCATION

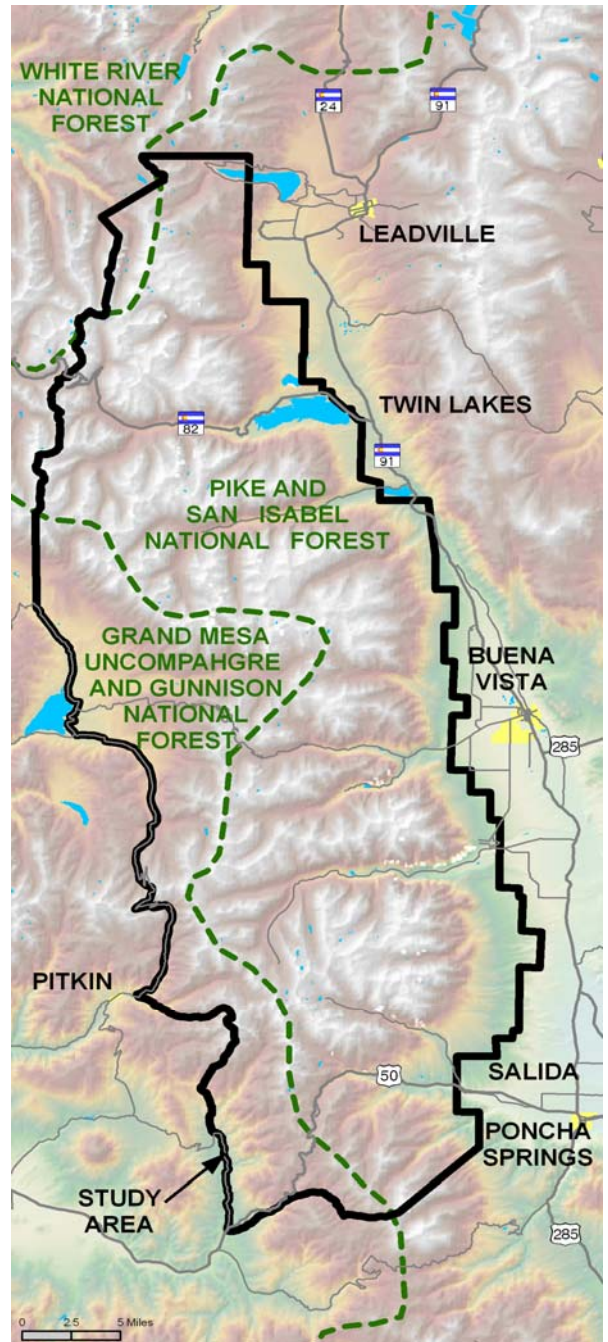
The analysis area is located in the Leadville and Salida Ranger Districts in the Pike and San Isabel National Forests (PSICC) in Lake and Chaffee Counties; and Gunnison Ranger District in the Grand Mesa, Uncompahgre and Gunnison National Forests (GMUG) in Gunnison County. The analysis area is located west of Highways 285/24 that connect Salida and Leadville, Colorado. The analysis area is here defined as that portion of the Sawatch Range that is bounded:

- on the north by the southern boundary of the Holy Cross Wilderness area near Turquoise Lake,
- on the south by the boundary between Gunnison/Chaffee and Saguache counties,
- on the east by an artificial boundary located roughly a few miles west of the boundary between Pitkin/Gunnison counties and Chaffee/Lake counties.
- on the west by the San Isabel National Forest boundary in the upper Arkansas Valley.

The analysis area is shown in Map 1.

The analysis area lies within the Sawatch Range of the Southern Rocky Mountain geographic area. It includes watersheds that flow west to the Colorado River and east to the Arkansas River. Elevations range from approximately 8,000 to over 14,000 feet. Terrestrial vegetation and habitats are varied depending on elevation, aspect, and topographic features, and include areas of sagebrush (*Artemisia* spp.), ponderosa pine (*Pinus ponderosa*), aspen (*Populus tremuloides*), lodgepole pine (*Pinus contorta*), mixed conifer of Douglas-fir (*Pseudotsuga menziesii*), and Engelmann spruce (*Picea engelmannii*) to areas of sub-alpine fir (*Abies bifolia*) and alpine tundra. Aquatic habitats include streams, creeks, ponds, fens, and wetlands. Rock features are common, especially at higher elevations, and include steep rock faces, rock slides along slopes, and rock and boulder fields in flatter areas.

Geology of the project area is primarily granitic but also includes an area of limestone. Plant communities in the project area include mountain big sagebrush with ponderosa pine (*Artemisia tridentata* ssp. *vaseyana*/*Pinus ponderosa*); lodgepole pine with silvertop sedge or whortleberry (*Pinus contorta*/*Carex foenea* or *Vaccinium myrtillus* ssp. *oreophilum*); and subalpine fir – Engelmann spruce (*Abies bifolia* – *Picea engelmannii*) with pachistima (*Paxistima myrsinites*), elk sedge (*Carex geyeri*), moss, buffaloberry (*Shepherdia canadensis*), gooseberry (*Ribes montigenum*), whortleberry (*Vaccinium myrtillus* ssp. *oreophilum*), or grayleaf willow (*Salix*



glauca). Alpine plant communities include Kobresia/curly sedge (*Kobresia myosuroides*/*Carex rupestris*); Kobresia-like sedge/alpine sandwort-alpine sagebrush (*Carex elynoides*/*Lidia obtusiloba*-*Artemisia scopulorum*); alpine rocky forblands; Sibbaldia/alpine avens (*Sibbaldia procumbens*/*Acomastylis rossii* ssp. *turbinata*); and alpine scree or fellfields with little vegetation. Riparian and wetland communities are scattered throughout the project area. All of these communities occur on flat to steep slopes.

4.0 PROPOSED MANAGEMENT ACTION

The Forest Service developed three alternatives to cover the broad range of issues involved in rerouting the CDT. The alternatives include: (1) Alternative A - No Action (no new or reconstruction of trail), (2) Alternative B - use of the existing Colorado Trail, and (3) Alternative C (Proposed Action) – the realignment of the CDNST. A map of the proposed trail alignments is presented in Appendix A. Table 1 provides a comparison of the alternatives by trail distance and type after project implementation. Alternatives B and C have two trail options at Twin Lakes. The mileages for each option are shown (e.g., X / Y) in the following tables. The first number represents the mileage utilizing the Lake Creek bridge option; the second number represents the mileage utilizing the Twin Lakes bridge option. These options are further discussed in the alternative descriptions below.

Table 1. Trail Type and Distance (miles).

	Alternative A	Alternative B	Alternative C Proposed Action
Motorized Trail	19	0	0
Non-Motorized Trail	42	77* / 72**	90* / 84**
Existing Motorized Roads	19	12	0
Total	80	89* / 84**	90* / 84**

Source: USFS GIS

Note: Alternatives A and C end at Monarch Pass, whereas Alternative B ends at South Fooses Pass.

*Lake Bridge option ** Twin Lakes option

Each action alternative would be comprised of a component of existing trail, with Alternatives B and C having portions of new and reconstructed trail reaches. Table 2 describes each alternative by trail construction type. Existing, reconstruction, and new construction are defined as follows:

- **Existing** – Trail segments that are part of the present Forest Service trail system and primarily meet trail standards and specifications for pack and saddle stock use.
- **Reconstruction** – Existing system trail segments will be reconstructed (1) to meet Forest Service pack and saddle stock trail standards as defined in the *Trails Management Handbook* (FSH 2309.18), (2) to avoid known resource issues (e.g., erosion), and (3) to avoid excessively steep sideslopes (U.S. Forest Service 1991b). Reconstruction may include resurfacing the trail tread, relocating trail segments to an adjacent area on appropriate grades or away from sensitive resources, and the installation of stabilization and drainage structures (e.g., water bars, rock steps, and turnpikes). Reconstruction also includes the restoration of associated abandoned trail segments.
- **New construction** – New trail segments will be constructed according to pack and saddle stock trail standards on locations where trails do not presently exist. New construction

segments will provide non-motorized routes parallel to motorized trails and roads that will remain open to motorized use.

Table 2. Existing, Reconstruction and New Construction Mileages.

	Alternative A	Alternative B	Alternative C
Existing	81	81* / 77**	32* / 28**
Reconstruction	0	3* / 2**	16* / 14**
New Construction	0	4* / 5**	42* / 42**
Totals	81	88* / 84**	90* / 84**
New trail system miles ¹	0	4* / 5**	37* / 36**

Source: USFS GIS

¹New trail system miles are equal to the difference between the new construction mileage and the trail closure mileage. Trail closures are discussed in the individual Alternative descriptions.

*Lake Bridge option ** Twin Lakes option

4.1 ALTERNATIVE A: NO ACTION – EXISTING CDNST

The No Action Alternative includes a total of 81 miles of existing trail; of this, 39 miles are motorized or on existing road and 42 miles are non-motorized (Table 1). This alternative does not include new construction or reconstruction of any trails nor any changes in use (Table 2).

This alternative would retain all existing motorized and non-motorized CDNST alignments. Current trail management direction would continue to guide management of the CDNST in the Study Area. Motorized roads and trails comprise approximately 48% of the existing CDNST. This alternative is located in the general proximity of the Continental Divide. The existing CDNST between Halfmoon Creek and Monarch Pass would continue to be maintained as funding permits.

As described under Actions Common to All Alternatives, use of the existing trail across the Twin Lakes dam is no longer permitted. Trail users would continue to use the bridge on Colorado State Highway 82. Although Colorado Department of Transportation (CDOT) regulations do not specifically prohibit the use of the bridge by trail users (CDOT 2005), this use results in safety concerns, especially for pack and saddle stock trail users because of the lack of a suitable shoulder on the bridge.

Currently, mountain biking is allowed on all segments of trail, except on those segments that are located in Collegiate Peaks Wilderness (mechanized travel is prohibited within all Forest Service designated wilderness). Approximately 75 miles of the existing CDNST is available for mountain bike use with the No Action Alternative. However, of the total miles available to mountain bike use (75 miles), only 35 miles are on non-motorized single track. This alternative would not change the amount of trail available to mountain bike use. Presently, 78 miles of trail are designed for or are passable to pack and saddle stock users. Approximately 3 miles of trail are not presently designed for pack and saddle stock use; this is primarily in the Lake Ann Pass area.

4.2 ALTERNATIVE B – COLORADO TRAIL CORRIDOR

Alternative B includes total mileages of 89 miles or 84 miles, depending on the Twin Lakes area option selected (discussed below). Of the total mileage, 12 miles would utilize existing roads and 77 miles would utilize existing non-motorized trails (Table 1). This alternative would result in new construction or reconstruction of 8 miles of trail with the Lake Creek bridge option, or 7 miles of trail with the Twin Lakes bridge option between Halfmoon Creek and the Twin Lakes area (Table 2).

Alternative B utilizes much of the existing Colorado Trail to create a primarily non-motorized CDNST route between North Halfmoon Creek and South Fooses Pass. Between Halfmoon Creek and Twin Lakes, this alternative generally utilizes the existing CDNST, but incorporates five realignments to address motorized, resource, and safety issues (Table 3). This alternative also includes the construction of an access spur trail from the South Elbert trailhead (adjacent to County Road 24) to the proposed realignment near the west end of Lakeview campground. The portion of the Colorado Trail south of Twin Lakes would be re-designated as both the CDNST and Colorado Trail. From Twin Lakes, this alternative utilizes the existing Colorado Trail and traverses the eastern, forested shoulder of the Sawatch Range to the headwaters of South Fooses Creek, 4.5 miles south of Monarch Pass. The trail alignment in this alternative is primarily below tree line, and in some locations is located up to 10 miles from the Continental Divide.

Table 3. Alternative B Realignment Segments.

Map Symbol	Segment Name	Miles	Action Needed
1	North Elbert	0.69	Reconstruction
2	Herrington Creek	0.17	Reconstruction
3	Herrington Ridge	0.55	Reconstruction
4	South Elbert	2.52	New Construction
5	South Elbert Trailhead	0.18	New Construction
6	Twin Lakes Bridge Option	1.55	New Construction
7	Interlaken (Twin Lakes Bridge option only)	0.53	New Construction
8	Interlaken (Lake Creek Bridge option only)	1.18	Reconstruction
9	Lake Creek Bridge Option	1.72	New Construction
10	South Twin Lakes	0.69	Reconstruction

Approximately 1.4 miles of abandoned trail between Halfmoon Creek and Twin Lakes will be stabilized and naturalized as a result of relocating trail segments during reconstruction efforts. Trail stabilization would include constructing check dams and disguising the trail from trail users. Naturalization includes filling gullied sections with rock and organic soil, transplanting native vegetation, and seeding with native seeds gathered locally.

At Twin Lakes, this alternative includes two options for avoiding Homeland Security issues at the Bureau of Reclamation (BOR) dam and safety concerns at the State Highway 82 bridge crossing: (1) a foot and stock bridge across Lake Creek between the dam and State Highway 82 and, (2) a foot and stock bridge at Twin Lakes bridge between the two lakes at Deception Point. Example bridge photos and drawings are included in the EA (see EA Figures 2-8, 2-9, 2-10, and 2-11). Additional information on the two options, the Lake Creek bridge or the Twin Lakes bridge, can be found in the EA, Appendix B, Bridge Elements and Standards.

The Lake Creek bridge option includes approximately 0.5 mile of new trail construction in order to connect the CDNST to a new 100-foot fixed stringer bridge on the easterly side of Twin Lakes, across Lake Creek. As described in Actions Common to All Alternatives, the rerouted

trail would be compliant with BOR dam safety buffer distances and would avoid the use of the existing State Highway 82 bridge crossing. In addition, the trail from the Interlaken Trailhead to the Interlaken Historic Site would be reconstructed according to American Disabilities Act (ADA) standards.

The Twin Lakes bridge option includes a direct crossing of Twin Lakes on a new non-motorized 300-foot fixed stringer bridge between the two lakes. This option would require the construction of approximately 1.5 miles of new trail to connect the existing CDNST to the proposed bridge. This option provides a direct route for trail users using the CDNST, access to camping and access to the Interlaken Historic District. This direct route would save the user approximately five miles of travel around the reservoir outlet. The Twin Lakes bridge and the trail to the Interlaken Historic Site would be constructed according to ADA standards.

Either bridge option would be constructed according to ADA standards. Bridge dimensions include a 4-foot width, 3 to 4-foot high guardrails along both sides, and would require placing of large abutments. Both of these structures would require engineering design and certification prior to construction.

This alternative includes the construction of two additional bridges north of Twin Lakes at Bartlett Gulch. These bridges would be less than 20 feet in length and would be constructed to pre-approved and pre-designed Forest Service standards and specifications. A summary of the additional types of stream crossings for this project follows:

- Up to two puncheon style bridges, 8-18 feet in length, would utilize either wood or steel truss stringers; include 3-foot high guardrails; and natural appearing wood decking 40-48 inches wide. Abutments would utilize any natural features or be constructed from treated timbers.

If Alternative B were implemented, the alignment would include approximately 12 miles of trail on existing motorized roads. Annual monitoring would occur in this alternative to evaluate interactions between motorized and non-motorized recreational users and overall satisfaction levels related to the nature and purpose of the CDNST. Future reroutes around these roaded sections and subsequent National Environmental Policy Act (NEPA) analyses may be needed if conflicts between user groups occur.

Currently, mountain biking is allowed on all segments of the existing Colorado Trail, except on those segments that are located in Collegiate Peaks Wilderness. Approximately 67 miles of the Alternative B alignment would be available for mountain bike use; this includes 55 miles of single track. This alternative adds approximately 2.6 miles of single track to the total mileage available for mountain bike use within the Study Area. No existing mountain bike routes would be closed with this alternative. Presently, the entire length of this alternative is designed for or is passable to pack and saddle stock users.

4.3 ALTERNATIVE C – PROPOSED ACTION – CDNST REALIGNMENT

Alternative C includes total mileages of 90 miles, or 84 miles depending on the Twin Lakes area option selected. This alignment would be entirely non-motorized (Table 1). It would result in the new construction or reconstruction of 58 miles for the Lake Creek bridge option, or 56 miles of

trail for the Twin Lakes bridge option (Table 2). Alternative C is the proposed action that is being analyzed in the CDNST Environmental Assessment being prepared for the project (EDAW 2005a).

This alternative utilizes portions of the existing CDNST, but also incorporates reroutes in order to provide a non-motorized hiking and pack and saddle stock route into the country along the Continental Divide. The reroutes create a completely non-motorized route between North Halfmoon Creek and Monarch Pass. Key rerouted segments of the trail are located in between Halfmoon Creek and Twin Lakes, Clear Creek to Texas Creek, Texas Creek to Wildcat Gulch, Chalk Creek to Hancock Lake, and Mount Aetna to Hunt Lake (Appendix B, Maps B5 and B6). Specific realignment locations are detailed in Table 4.

The existing motorized road and trail (approximately 39 miles), presently designated as the CDNST, would remain open as local trails and would follow current trail management direction for allowed and managed uses.

Table 4. Alternative C Realignment Segments.

Map Symbol	Segment Name	Miles	Action Needed
1	North Elbert	0.69	Reconstruction
2	Herrington Creek	0.17	Reconstruction
3	Herrington Ridge	0.55	Reconstruction
4	South Elbert	2.52	New Construction
5	South Elbert Trailhead Access	0.18	New Construction
6	Twin Lakes Bridge Option	1.55	New Construction
7	Lake Creek Bridge Option	1.78	Reconstruction
7	Lake Creek Bridge Option	1.7	New Construction
8	Interlaken (both bridge options)	1.25	Reconstruction
9	Rockdale	1.97	New Construction
10	Winfield Access	0.36	New Construction
11	Winfield	0.98	New Construction
12	South Fork Clear Creek	1.88	New Construction
13	Old Silver Creek	0.51	Reconstruction
14	Hamilton	3.35	New Construction
15	Lake Ann Pass	1.83	Reconstruction
16	Prospector	6.17	New Construction
17	Waterloo	0.3	Reconstruction
18	Texas Creek	0.17	Reconstruction
19	South Texas	4.12	Reconstruction
20	Cottonwood View Peak 1 spur	0.06	New Construction
21	Cottonwood View Peak 2 spur	0.67	New Construction
22	CotTin	17.64	New Construction
23	Tunnel Gulch	1.95	Reconstruction
24	Hancock	2.77	New Construction
25	Middle Fork	2.04	New Construction
26	Boss Lake	1.11	Reconstruction
27	Hunt Lake	1.38	Reconstruction

This alternative includes the construction of several trail spurs to provide access from trailheads or to viewpoints:

- The South Elbert trailhead spur (adjacent to County Road 24) would connect to the proposed realignment near the west end of Lakeview campground.

- The Winfield spur, located east of the historic site of Winfield, would allow through-hikers loop access to experience the historic site's interpretive opportunities.
- Two spur trails would be constructed at Cottonwood Pass to provide access to scenic viewpoints.

This alternative would include the construction of up to 11 bridges between 6 feet and 300 feet in length, and up to 4 armored stream fords to protect fragile stream crossings or facilitate access across bodies of water that would normally be difficult to traverse, especially during high water periods. At Twin Lakes, this alternative includes two options for avoiding Homeland Security issues at the BOR dam and safety concerns at the State Highway 82 bridge crossing: (1) a foot and stock bridge across Lake Creek between the dam and State Highway 82 and, (2) a foot and stock bridge at Twin Lakes bridge between the two lakes at Deception Point. Example bridge photos and drawings are included in the Environmental Assessment, Figures 2-8, 2-9, 2-10, and 2-11. Additional information on the two options, the Lake Creek bridge or the Twin Lakes bridge, can be found in the EA, Appendix B, Bridge Elements and Standards.

The Lake Creek bridge option includes approximately 0.5 mile of new trail construction in order to connect the CDNST to a new 100-foot fixed stringer bridge on the easterly side of Twin Lakes, across Lake Creek. As described in Actions Common to All Alternatives, the rerouted trail would be compliant with BOR dam safety buffer distances and would avoid the use of the existing State Highway 82 bridge crossing. In addition, the trail from the Interlaken Trailhead to the Interlaken Historic Site would be reconstructed according to ADA standards.

The Twin Lakes bridge option includes a direct crossing of Twin Lakes on a new non-motorized, 300-foot fixed stringer bridge between the two lakes. This option would require the construction of approximately 1.5 miles of new trail to connect the existing CDNST to the proposed bridge. This option provides a direct route for trail users using the CDNST, access to camping, and access to the Interlaken Historic District. This direct route would save the user approximately five miles of travel around the reservoir outlet. The Twin Lakes bridge and the trail to the Interlaken Historic Site would be constructed according to ADA standards.

Either bridge option would be constructed according to ADA standards. Bridge dimensions include a 4-foot width, 3 to 4-foot high guardrails along both sides, and would require placing of large abutments. Both of these structures would require engineering design and certification prior to construction.

The remaining bridges and fords would be less than 20 feet in length and would be constructed to pre-approved and pre-designed Forest Service standards and specifications. Stream crossings in the Collegiate Peaks Wilderness would include primitive armored fords, except for the crossing of Silver Creek in the South Fork of Clear Creek drainage. This stream would be crossed with an all-wood puncheon style bridge 16 feet in length. A summary of the additional types of streams crossing for this alternative follows:

- Up to 7 puncheon style bridges between 11 and 20 feet in length. These bridges would utilize either wood or steel truss stringers. They would have 3-foot high guardrails. Decking between 40 and 48 inches in width would be natural appearing wood with

running surfaces of structural lumber. Abutments would utilize any natural features or be constructed from treated timbers.

- Up to 3 puncheon style bridges between 5 and 10 feet in length. These bridges would utilize wood stringers. They would not include guardrails but would have 4 to 6-inch high side rails. Decking between 36 and 48 inches in width would be natural appearing wood. Abutments would utilize natural features or rock drywall.
- Up to 4 armored stream fords between 6 and 16 feet in length. All fords will include a cleared midstream pathway between 36 and 48 inches in width for stock passage, upstream stepping rocks placed above the high water level, downstream spillways constructed of either rock or logs, and armored entry and exit ramps (length depends on depth of stream crossing).

This alternative proposes the consolidation of the Mt. Huron and existing Silver Creek trailheads in the Upper South Fork of Clear Creek basin. The consolidation is necessary to minimize impacts to fragile riparian resources in the South Fork of the Clear Creek drainage. This trailhead would provide access for the Mt. Huron trail (#1462.22) and the realigned CDNST in the South Fork of Clear Creek drainage. This alternative also proposes closing and naturalizing 1.2 miles of the Silver Basin trail (#1462.1) from above the proposed CDNST location to the terminus in Silver Basin, the closure of 0.9 mile of the Huron Basin trail (#1462.3) from the Hamilton town site to the terminus at the old mine, and the closure of 3.0 miles of the Lake Ann trail from the Mt. Huron trailhead to a point a quarter-mile northwest of Lake Ann. Closing these routes would minimize impacts to fragile sub-alpine resources in the Collegiate Peaks Wilderness. Additionally, the Huron Basin and Silver Basin trails presently receive little use and are located on abandoned roads that are difficult to maintain as a trail. This alternative also includes changing the management objective for The Apostles Basin trail (#1462.2) from a “Most Difficult” hiking trail to a way trail. The reason for this management objective change is to convert the trail to a different trail standard in order to provide a range of travel route opportunities, including minimally developed routes, in the Collegiate Peaks Wilderness.

Relocating trail segments during reconstruction efforts would result in approximately 4.5 miles of abandoned trails. These trails would be stabilized and naturalized. Trail stabilization would include constructing check dams and disguising the trail from trail users. Naturalization includes filling gullied sections with rock and organic soil, transplanting native vegetation, and seeding with native seeds gathered locally.

Trails would be constructed or reconstructed according to the “More Difficult” pack and saddle stock trail standards as found in the *Trails Management Handbook* (FSH 2309.18) and in Table 5 (also see EA Figures 2-2, 2-3, 2-4, and 2-5 for examples) (U.S. Forest Service 1991). Trails would be designed for hiking and pack and saddle stock use during the snow-free season. The location and layout of the realignments would not be designed for winter use. This trail standard would provide a primitive and challenging trail experience. The trail layout and design process has ensured that no segment exceeds a 25% grade as directed by the *Trails Management Handbook*. The majority of the trail averages a maximum of 12-15% grade in order to minimize impacts from pack and saddle stock use on the trail tread, and to minimize maintenance needs and associated costs. The trail would not be designed or managed for mountain biking.

With Alternative C, approximately 46 miles of trail would be available to mountain bike use. However, trail within the Collegiate Peaks Wilderness, between Cottonwood Pass and Tincup Pass road, and between Sheep Gulch and the Silver Basin trail within the Clear Creek drainage would be closed to mountain bike use. Those sections outside of designated wilderness would be closed to mountain bike use to protect resources, particularly fragile alpine soils and plants. Mountain biking would be permitted in those locations where it is not in conflict with the nature and purpose of the CDNST. All 46 miles available to mountain bikes will be located on single track. This alternative would add 7.5 miles to the total mileage available to mountain bike use in the Study Area. No existing mountain bike routes would be closed with this alternative. The entire length of this alternative would be designed for or passable to pack and saddle stock users.

Prior to construction in the Collegiate Peak Wilderness, identified noxious weed populations would be treated. The minimum tool to treat noxious weeds in the wilderness would be utilized.

Fifteen to 20 new campsites would be established along new trail alignments with this alternative; however, trail users would not be required to camp in established camping areas. Approximately 3-6 sites would be designed to accommodate groups larger than six people, 3-6 sites would be designed to accommodate pack and saddle stock users, and the remaining sites would be designed to accommodate small groups of less than six people. Typical features of all established campsites would include natural appearing flattened tent pad areas and one natural rock fire ring per site. No pit toilets would be installed; trail users would instead be encouraged to dispose of human waste using the cathole method. All sites would be located a minimum of 100 feet away from the trail, water sources, and other campsites. The sites designed for pack and saddle stock use would be located in areas with adequate feed and access to water for pack and saddle stock animals; would accommodate larger groups; and, if located outside of wilderness, would potentially have facilities to assist in containing animals such as hitching rails. Campsites located outside of wilderness may be signed. These sites have been located in areas that minimize impacts to soils, vegetation, and water resources. Campsites will be located at or below tree line to provide shelter from inclement weather.

4.4 SUMMARY OF ALTERNATIVES

Impacts to vegetation and habitat will be related to miles of existing trail associated with Alternatives A and B, as well as additional miles of trail that will be constructed under Alternative C. Alternatives A and B are represented by existing CDNST and Colorado Trail reaches. Under all alternatives, the majority of the existing CDNST and Colorado Trail reaches will remain intact; and under Alternative B, minor adjustments related to new construction and reconstruction will occur on some existing trail reaches. In Alternative C, considerable new trail construction and reconstruction will occur as well as some trail closures of unsuitable reaches. As mentioned above under Alternative C, the vast majority of the existing CDNST and Colorado Trail reaches will remain open. Table 5 below summarizes the total distance of CDNST and Colorado Trail in the Study Area associated with each alternative.

Table 5. Total Miles of Trail Associated with Each Alternative.

	Alternative A	Alternative B	Alternative C
Total Miles of Trail in Study Area	155	157	195

4.5 ACTIONS COMMON TO ALL ALTERNATIVES

All alternatives use segments of the existing CDNST and Colorado Trail from Halfmoon Creek to Twin Lakes. All alternatives converge at Twin Lakes Reservoir. Twin Lakes are glacially formed lakes, which have been enlarged to provide additional storage for the Fryingpan-Arkansas Water Storage Project. The BOR is responsible for construction, operation, and maintenance of water reclamation works, which include dams, spillways, a power plant, raceway, forebay, switchyard, maintenance buildings, appurtenant works, roads, administrative sites and other associated facilities. The Forest Service administers all other lands, including the Interlaken Historic District, based on a Memorandum of Agreement (USDI Bureau of Reclamation, 1984).

All routes have the option of following an easterly alignment around Twin Lakes. However, use of the dam is prohibited in all alternatives due to existing BOR dam safety encroachment regulations relating to Homeland Security (USDI Bureau of Reclamation, 2005).

No additional outfitter and guide service days would be allocated, nor would any existing service days be reallocated under any alternative. Service day allocations are not analyzed in this decision process. Additional outfitter and guide service days may be allocated or reallocated on CDNST segments following the completion of a separate capacity study, needs analysis, and environmental analysis.

5.0 SPECIES CONSIDERED AND EVALUATED

5.1 THREATENED, ENDANGERED AND PROPOSED PLANT SPECIES CONSIDERED IN THE ANALYSIS

No threatened, endangered, or proposed plant species have been found to occur on the Gunnison Ranger District. Sources of information included Forest Service records and files, the State Natural Heritage Program database, state wildlife agency information, and published research (citations).

On the San Isabel National Forest, two Threatened, Endangered and Candidate species are known or suspected to occur: *Eutrema penlandii* (alpine fen mustard) - Threatened and *Botrychium lineare* (narrow-leaved moonwort) - sensitive and candidate. *Eutrema penlandii* occupies a narrow habitat niche. It is found on the lee side of ridges downslope from perennial snowfields that provide a year-round source of water. The closest known occurrence is approximately 10 miles from the trail corridor, and some potential habitat is found in the Collegiate Peaks/Sawatch Range. Therefore, *Eutrema penlandii* will be carried forth in the analysis.

Botrychium lineare is known from the Pike National Forest, and like other species of *Botrychium* has a wider ecological amplitude than *Eutrema*, occupying disturbed sites, subalpine grasslands, and aspen stands. The closest known site is approximately 60 miles to the

east of the proposed project, but *Botrychium lineare* has an unusual North American distribution. The known occurrences are widely disjunct from each other, often by hundreds of miles. *Botrychium lineare* is carried forth in the analysis due the wide ecological amplitude of the species and its widely disjunct distribution.

Table 6: Threatened, Endangered, and Proposed plant species of the Gunnison Ranger District and San Isabel National Forest.

Common Name	Scientific Name	Status	Known/suspected to be present in the project area?	Suitable habitat present?	Rationale if not carried forward for analysis
Penland alpine fen mustard	<i>Eutrema penlandii</i>	Threatened	Yes	Yes	
Narrow-leaved moonwort	<i>Botrychium lineare</i>	Candidate, Sensitive	Yes	Yes	

5.2 SENSITIVE PLANT SPECIES CONSIDERED IN THE ANALYSIS

The following list includes sensitive species, or their habitats, which are located on the Gunnison Ranger District of the Grand Mesa, Uncompahgre and Gunnison National Forests (GMUG) and the Salida and Leadville District of the San Isabel National Forest, or that are located adjacent to or downstream of the project and could potentially be affected. Habitat requirements, distribution, and the location of known sites have been considered in determining species that may potentially occur within the project area. No further analysis is needed for species that are not known or suspected to occur in the project area, and for which no suitable habitat is present. The following table documents the rationale for excluding a species. If suitable but unoccupied habitat is present, then potential effects are evaluated. For species not carried forth in this analysis a rationale is provided. Reasons for excluding R2 sensitive species from further analysis include:

- the species is not known from the project area or adjacent mountain ranges.
- the species grows at elevation well below that of the project area.
- the habitat of the species is not found in the project area.

Table 7: Sensitive plant species of the Gunnison Ranger District and San Isabel National Forest.

Scientific Name	Common Name	Status	Habitat	Known/suspected to be present?	Suitable habitat present?	Rationale if not carried forward for analysis
<i>Aquilegia chrysantha</i> ssp. <i>rydbergii</i>	golden columbine	RIP 8,000-9,800 ft.	Streamsides and rocky ravines in the mountains.	No	No	Out of the described range and known elevation for the species.
<i>Armeria maritima</i> ssp. <i>sibirica</i>	Siberian sea thrift	AL, RIP 11,900-13,000 ft.	Riparian and rocky ravines in the mountains.	Yes	Yes	
<i>Asclepias uncialis</i>	dwarf milkweed	4,000-6,500 ft.	Shortgrass prairie, plains, and outwash mesas.	No	No	Out of the described range and known elevation for the species.
<i>Astragalus leptaleus</i>	park milkvetch	RIP, AS	Wet meadows, aspen	No	No	Not known to occur in this area.
<i>Botrychium campestre</i>	lowa moonwort	FM, SU 3,700-10,800 ft.	Dry gravelly hillsides.	No	Yes	

Scientific Name	Common Name	Status	Habitat	Known/suspected to be present?	Suitable habitat present?	Rationale if not carried forward for analysis
<i>Botrychium lineare</i>	narrow-leaved moonwort	AS, GL, FM, SU, AL 7,900-9,500 ft.	Disturbed sites, grassy slopes, alpine areas and aspen forests.	No	Yes	
<i>Botrychium multifidum</i> var. <i>coulteri</i>	leathery grapefern	RIP, FM, LP transition 8,000-9,500 ft.	Old pasture, meadows, woodland margins, riverbanks, bottomland, RIP habitat generalist.	Yes	Yes	
<i>Braya glabella</i>	arctic braya	AL 12,000-13,000 ft.	Alpine tundra on calcareous gravelly soils.	Yes	Yes	
<i>Carex diandra</i>	lesser panicled sedge	RIP 7,400-9,000 ft.	Wet meadows and subalpine willow carrs.	No	No	Out of the described range of the species.
<i>Carex livida</i>	livid sedge	Rip, FEN 9,000-10,000 ft.	Fens and wetlands.	No	No	Out of the described range of the species.
<i>Cirsium perplexans</i>	Rocky Mountain thistle	MS, PP below 8,500 ft.	Dry clay/shale hillsides. Soap Creek?	No	No	Not known to occur in this area.
<i>Cypripedium parviflorum</i>	lesser yellow lady's slipper orchid	AS, CON	7,400-8,500 FT.	No	No	Out of the described range and known elevation for the species.
<i>Draba exunguiculata</i>	clawless draba	AL, RO 12,000-14,000 ft.	Granitic alpine area on rocky slopes or fellfields.	Yes	Yes	
<i>Draba grayana</i>	Gray's Peak whitlow-grass	AL, SU, RO 11,500-14,000 ft.	Alpine or subalpine on tundra, gravelly slopes or fellfields.	Yes	Yes	
<i>Draba smithii</i>	Smith whitlow-grass	SU, AL 9,100-9,800 ft.	Upper montane, subalpine and alpine.	Yes	Yes	
<i>Drosera rotundifolia</i>	round leaf sundew	FEN 9100 to 10,000 ft.	Fens, floating peat mats with Sphagnum moss	No	No	Not known to occur in this area.
<i>Epipactis gigantea</i>	giant helleborine	RIP 4,800-8,000 ft.	Seeps, springs, riparian areas and wetlands.	No	No	Project is outside of upper known elevation for the species.
<i>Eriogonum brandegei</i>	Brandege buckwheat	SA 5,700-7,600 ft.	Pinyon-juniper and sagebrush, usually on Dry Union Formation soils.	No	No	Species is a substrate specialist found at <8,000 ft.
<i>Eriophorum altaicum</i> var. <i>neogaeum</i>	Altai cottongrass	FEN 9,500-14,000 ft.	Fens, wetlands	Yes	Yes	
<i>Eriophorum chamissonis</i>	Chamisso's cottongrass	FEN 9,500-14,000 ft.	Fens, wetlands	Yes	Yes	
<i>Eriophorum gracile</i>	slender cotton grass	FEN 8,100-12,000 ft.	Sedge meadows and floating peat mats, saturated soil to shallow water. 1 site West Elk Wilderness.	Yes	Yes	
<i>Gilia sedifolia</i>	stonecrop gilia	AL above 10,500 ft.	Alpine tundra.	No	Yes	

Scientific Name	Common Name	Status	Habitat	Known/suspected to be present?	Suitable habitat present?	Rationale if not carried forward for analysis
<i>Ipomopsis globularis</i>	globe gilia	AL 12,000-14,000 ft.	Alpine ridgetops and gravelly, calcareous soils.	Yes	Yes	
<i>Kobresia simpliciuscula</i>	simple bog sedge	AL, FEN	Alpine areas including tundra, fens and moist gravel.	Yes	Yes	
<i>Machaeranthera coloradoensis</i>	Colorado tansy aster	MS, AL, PP 8,500-12,500 ft.	Gravelly places in mtn parks, dry tundra, sandstone / limestone.	Yes	Yes	
<i>Mimulus gemmiparus</i>	Weber's monkeyflower	FM, RIP 8,500-10,500 ft.	Granitic seeps, slopes, and alluvium amongst spruce-fir and aspen forests.	No	Yes	
<i>Neoparrya lithophila</i>	rock-loving neoparrya	RO, GL, FM 7,000-10,000 FT.	Pinyon juniper woodland, rocky areas, and montane grasslands.	No	Yes	
<i>Oenothera harringtonii</i>	Arkansas Valley evening primrose	GL 4,700-6,100 ft.	Grasslands.	No	No	Out of the described range and known elevation for the species.
<i>Parnassia kotzebuei</i>	Kotzebue's grass of parnassus	AL, SU, RIP 10,000-12,000 ft.	Wet rocky areas and streams in the alpine and subalpine zones.	Yes	Yes	
<i>Penstemon degeneri</i>	Degener's beardtongue	PP, GL, FM 6,000-9,500 FT.	Pinyon-juniper and ponderosa pine woodlands and montane grasslands.	No	Yes	
<i>Potentilla rupincola</i>	Rocky Mountain cinquefoil	RO 6,900-10,500 ft.	Subalpine or montane granitic outcrops amongst ponderosa or limber pine.	No	Yes	
<i>Primula egaliksensis</i>	Greenland primrose	RIP 9,000-10,000 ft.	Wet meadows, streambanks, and willow carrs.	No	Yes	
<i>Ptilagrostis porteri</i>	Porter feathergrass	RIP 9,200-12,000 ft.	Hummocks in fens and willow carrs.	No	Yes	
<i>Ranunculus gelidus (R. karelinii)</i>	ice cold buttercup, tundra buttercup	AL 11,000-14,100 ft.	Ridgetops and peaks, in rocks and scree, where there have been low-lying snow banks or in the rivulets below them, 11,000-14,100 ft	Yes	Yes	
<i>Rubus arcticus ssp. acaulis</i>	northern blackberry	RIP 8,600-9,700 ft.	Willow carrs and mossy streamsides.	No	Yes	
<i>Salix arizonica</i>	Arizona willow	FM, RIP 8,300-10,800 FT.	Meadows, seeps, springs, and riparian areas.	No	No	Out of the known range of the species.

Scientific Name	Common Name	Status	Habitat	Known/suspected to be present?	Suitable habitat present?	Rationale if not carried forward for analysis
<i>Salix candida</i>	hoary willow	FEN, RIP 8,800-10,600 ft.	Fens, edges of streams, wetlands.	Yes	Yes	
<i>Salix myrtillofolia</i>	blueberry willow	RIP, FENS 9,000 – 10,500ft.?	Wetlands, streambanks, fens.	No	Yes	
<i>Salix serissima</i>	autumn willow	FEN 7,800-10,200 FT.	Marshes, fens and bogs.	No	Yes	
<i>Selaginella selaginoides</i>	club spikemoss	SF Elevation range in the state is unknown.	Marshy areas and wet spruce forests.	No	Yes	
<i>Utricularia minor</i>	lesser bladderwort	FEN, AQ 8,600-10,500 ft.	Shallow H2O fens, fresh H2O wetland, subalpine ponds	No	No	Not known to occur in this area.
<i>Viola selkirkii</i>	Selkirk's violet	SF, AS, CON 6,000-9,100 ft.	Forests from montane zone to subalpine.	No	Yes	

S=suspected, D=Documented, L=Likely, V=Vicinity, Bio L = Biologically likely to occur, Geo L = Geographically likely to occur, (D)=Documented/not concern Gunnison RD

North=NO; South=SO

SF=Spruce Fir, AS=Aspen, LP=Lodgepole Pine, MS=Mountain Shrub, SA=Sagebrush, GL=Grassland, FM = Forest Meadow, FEN= Peat fen, AL=Alpine, SU=Subalpine, RIP=Riparian/Wetland, AQ=Aquatic, RO=Rock/Cliff/Cave/Canyon/Mines, PP=Ponderosa Pine, CON = Mix Conifer Forest

6.0 EVALUATED SPECIES INFORMATION

6.1 PRE-FIELD REVIEW

A pre-field review was conducted of available information to assemble occurrence records, describe habitat needs and ecological requirements, and determine whether field reconnaissance is needed to complete the analysis. Sources of information included Forest Service records and files, the Colorado Natural Heritage Program (CNHP) database, state wildlife agency information, and published research (citations). The CNHP database (CNHP 2003), FWS (2003) species lists, district files, and various references (Elliott 2000, Elliott and Hartman 2000, Holt 2002, Holt and Hartman 2002, Spackman et al. 1997, Weber and Wittman 1996) were reviewed for the presences of TEPS (threatened, endangered, proposed, and sensitive) plant species in the trail corridor.

Four sensitive species (*Braya glabella*, *Draba grayana*, *Ranunculus karelinii*, and *Salix candida*) had known element occurrences (EOs) near the trail corridor. A total of six occurrences are known: one for *Braya glabella*, two for *Draba grayana*, two for *Ranunculus karelinii*, and one for *Salix candida*. Numerous occurrences of several rare species tracked by the Colorado Natural Heritage Program also have EOs in or adjacent to the trail corridor.

6.2 FIELD RECONNAISSANCE

Extensive field work during the 2005 field season has taken place in support of this project. Four botanists from the San Isabel National Forest performed botanical surveys for TEPS plants within the trail corridor for the CDNST: Brian Elliott (San Isabel Forest Botanist), Peter Ebertowski, Janet Prevey, and Joanna Griego (biological technicians, San Isabel National Forest). Gay Austin (Gunnison Ranger District Botanist) assisted with trail reroutes in sensitive areas. Field days were primarily focused on botanical survey for threatened, endangered, proposed, and sensitive (TEPS) plant species, but several days were used for trail reroutes to avoid sensitive plant populations or Colorado Natural Heritage Program tracked species.

During the course of surveys the entire trail corridor (including areas intended for new construction, existing trails subject to reconstruction, and also proposed campsites) was surveyed for TEPS plant species. The survey methodology consisted of walking the corridor (usually in groups of 2) in a zigzag pattern, moving from the central flagline to the outside of the corridor. The search was habitat-driven, and all habitats in the corridor were surveyed. A plant list for each section of the trail was developed. Reroutes of the trail were done to avoid TEPS plants, and also to avoid (where possible) plant species of concern tracked by the CNHP. Thirty-four occurrences of twelve different plant species tracked by the CNHP were found in the trail corridor. Many, though not all, of these occurrences were avoided by rerouting the trail away from the occurrence. Reroutes were performed when the population could be avoided and the new trail route was feasible based on trail construction standards. In some cases a reroute would move the trail into an area that was too steep. In other cases CNHP tracked species were scattered in and adjacent to the trail corridor. Moving the trail avoided one population and impacted another. In such cases the reroute was designed to impact the smallest number of individuals. In the case of *Braya glabella* (arctic braya), a major reroute was done to avoid the population entirely. *Braya glabella* is shown in Photo 1 below.



Photo 1: *Braya glabella*, a Region 2 sensitive plant species discovered in the CDNST trail corridor. The trail alignment was moved to avoid the population.

During the course of botanical surveys performed for the project, a large occurrence of *Braya glabella* (arctic braya-sensitive) was found along approximately one full mile of trail corridor. The trail was rerouted to avoid the species. Limestone habitat for *Braya glabella* is shown in Photo 2. Several species of *Botrychium* were found during the course of botanical surveys. One *Botrychium* site was found within the trail corridor with an undetermined species of *Botrychium*. This was sent to Dr. Donald Farrar, *Botrychium* expert at Iowa State University. To date, no determination regarding its identity has been made. The site has been avoided by rerouting the trail.



Photo 2: Limestone habitat of *Braya glabella*.

6.3 SPECIES INFORMATION FOR SPECIES ADDRESSED

The following species are analyzed in this document for one or more of the following reasons:

- they have known occurrences within the trail corridor,
- they have known occurrences near the trail corridor,
- potential habitat for the species is known from within the trail corridor, and/or
- the known distribution and elevational range of the species makes it likely they could be found within the trail corridor.

Global and state ranks for plant species listed below are determined by the Colorado Natural Heritage Program (2003b) and NatureServe (2003).

FEDERAL THREATENED, ENDANGERED, PROPOSED, AND CANDIDATE SPECIES

Botrychium lineare: narrow-leaved moonwort (federal candidate and sensitive)

Narrow-leaved moonwort (*Botrychium lineare*) is a perennial herb in the adder's-tongue fern family (Ophioglossaceae). Spores are produced in June. It is found in deep grass and forb meadows, under trees in woods, and on shelves on limestone cliffs. Locally, it occurs in coarse, decomposed granite. It has been found among the riparian transition vegetation associated with aspen. This species is found at elevations ranging from 7,900 to 11,000 feet. Narrow-leaved moonwort ranges from WA and MT south to CA and CO, and there are historic records in QC and NB. Narrow-leaved moonwort is ranked G1. It is a candidate for federal listing as an

endangered or threatened species (66 FR 30368). It is rare range-wide with only nine known populations. This plant is small and easily over-looked, and may not be present every year.

Eutrema penlandii: Penland alpine fen mustard (federally listed as threatened)

Penland alpine fen mustard (*Eutrema penlandii*) is a perennial herb of the mustard family that grows in alpine wetlands. It is highly habitat-specific, typically being found in alpine fens on the lee side of mountain crests where deep wind-deposited snow accumulates. It is endemic to Colorado and only found in the Mosquito Range from Hoosier Pass to Mount Sherman in Park and Summit counties at elevations of 12,000-12,800 ft.. It is considered critically imperiled or imperiled both globally and in Colorado (ranked G1G2/S1S2). It is federally listed as Threatened.

FOREST SERVICE REGION 2 SENSITIVE SPECIES

Armeria scabra ssp. *sibirica*: sea pink (FS sensitive)

Sea pink (*Armeria scabra* ssp. *sibirica*, also called *Armeria maritima* ssp. *sibirica*) is a perennial herb in the thrift family (Limoniaceae). It flowers and fruits from late June to August. The subspecies inhabits alpine meadow and alpine wetlands, often at the base of talus slopes. Sea pink grows at high elevation with known sites at 11,900-13,000ft. The plant has an unusual distribution, being found in the Pacific Coast states from Alaska to California. It is disjunct in Colorado, where it is found in Park and Summit counties. Ranked secure globally (G5T5), it is on the edge of its range and considered critically imperiled in Colorado (S1).

Botrychium campestre: prairie moonwort (FS sensitive)

Prairie moonwort (*Botrychium campestre*) is a perennial herb in the adder's-tongue fern family (Ophioglossaceae). In Colorado it grows on dry, gravelly hillsides at elevations ranging from 3,700-10,800 ft. The plant is found across the northern tier of states with Colorado representing the southernmost extension of the range. The Colorado distribution is remarkable; it is known from Yuma County at 3,700 feet on the eastern plains and also from the mountains of Clear Creek County at 10,800. Although the plant is widely distributed in North America, it is not common and considered vulnerable throughout its range (ranked G3). The species is considered critically imperiled in Colorado where it reaches its southernmost distribution (ranked S1).

Botrychium multifidum var. *coulteri*: leathery grapefern (FS sensitive)

Leathery grapefern (*Botrychium multifidum*) is a perennial herb in the adder's-tongue fern family (Ophioglossaceae) that produces spores are produced in mid-summer. In Colorado the species is found in mountain meadows at elevations ranging from 6,700 to 9,900 feet. The Colorado distribution is in the mountains of the north-central portion of the state, ranging from Larimer to Routt counties. The plant is considered secure globally (ranked G5), but is quite rare in Colorado where it is considered critically imperiled due to extreme rarity (ranked S1).

Braya glabella: arctic braya (FS sensitive)

Arctic braya (*Braya glabella*) is a perennial herb of the mustard family (Brassicaceae) that produces flowers and fruits from July through August. It is an alpine species found on sparsely vegetated slopes. It is often found on limestone-derived soils. The species is found in Alaska and Canada with a disjunct population in Colorado where it is found in Chaffee, Gunnison, Park, and Pitkin counties at 12,000-13,000 ft. It is considered secure globally, although there are

taxonomic questions regarding subspecies (hence its ranking of G5T?). In Colorado, however, it is critically imperiled and is ranked S1.

Draba exunguiculata: clawless draba (FS sensitive)

Clawless draba (*Draba exunguiculata*) is a perennial herb of the mustard family (Brassicaceae). It is a Colorado endemic known from rocky alpine areas (including talus slopes) at 12,000-14,000 ft. The species is known from eight counties: Boulder, Clear Creek, El Paso, Gilpin, Grand, Lake, Park and Summit. It is considered imperiled both globally and in Colorado and is ranked G2S2.

Draba grayana: Gray's Peak whitlow-grass (FS sensitive)

Gray's Peak whitlow grass (*Draba grayana*) is a perennial herb of the mustard family (Brassicaceae). It is a Colorado endemic found in rocky alpine areas including talus slopes. It has been found in Clear Creek, Gilpin, Grand, Lake, Larimer, Park, and Summit counties at elevations of 11,500-14,000 ft. It is considered imperiled both globally and in Colorado and is ranked G2S2.

Draba smithii: Smith's whitlow-grass (FS sensitive)

Smith's whitlow-grass (*Draba smithii*) is a perennial herb in the mustard family (Brassicaceae). It flowers and fruits during June and July. This species is found in cliffs and canyons, talus slopes, crevices, and between rocks in shaded, protected sites in upper montane and lower subalpine areas. Elevations range from 8,000 to 11,000 feet. Smith's whitlow-grass is endemic to south-central CO. Smith's whitlow-grass receives a rank of G2S2 since it is considered imperiled both globally and in the Colorado.

Eriophorum altaicum var. *neogaenum*: Altai cottongrass (FS sensitive)

White-bristle cottongrass (*Eriophorum altaicum* var. *neogaenum*) is a perennial graminoid of the sedge family (Cyperaceae). It grows in alpine wetlands at elevations of 9500 ft. or higher. The species is found in Canada and the Rocky Mountain states of the American west. It reaches its southernmost Rocky Mountain distribution in Colorado where it is found in Eagle, Gunnison, Hinsdale, La Plata, Park, Saguache, and San Juan counties. The species has a global rank of G4T?. G4T indicates that the subspecies is secure globally but rare in parts of its range, a common pattern for many of our alpine plants that are rare at the southern end of their range in Colorado but quite common in Canada and Alaska. The question mark indicates uncertainty about the assigned global rank. The species is considered imperiled in Colorado (ranked S2) due to the low number of known occurrences.

Eriophorum chamissonis: Chamisso's cottongrass (FS sensitive)

Chamisso's cottongrass (*Eriophorum chamissonis*) is a perennial graminoid of the sedge family (Cyperaceae) that grows in alpine wetlands. It is found in Alaska, Canada, the Pacific Northwest and upper Midwest. The USDA Plants database (USDA, NRCS. 2004) shows Wyoming as the southernmost Rocky Mountain distribution for the species. The Colorado distribution is unknown, partially due to taxonomic questions that have led to mis-identification of specimens as *Eriophorum altaicum* var. *neogaenum*. The species is considered globally secure (ranked G5) but is considered critically imperiled in Colorado due to its rarity in the state.

Eriophorum gracile: slender cottongrass (FS sensitive)

Slender cottongrass (*Eriophorum gracile*) is a perennial graminoid of the sedge family (Cyperaceae) that grows in montane and subalpine wetlands as well as wet meadows and pond edges. The species is found from Alaska, Canada and the northern states south to California and Colorado. It reaches its southernmost Rocky Mountain distribution in Colorado where it is known from elevations of 8100-12000 ft. The known sites are widely scattered in Jackson, Las Animas and Park counties. The species is secure globally (ranked G5) but imperiled in Colorado (ranked S2).

Gilia sedifolia: stonecrop gilia (FS sensitive)

Stonecrop gilia is a perennial forb of the phlox family (Polemoniaceae) that grows on volcanic scree in alpine tundra above 11,750' in elevation. The species is known only from 2 occurrences in southwestern Colorado, 1 on the Gunnison Ranger District near Lake City and 1 on the San Juan National Forest. It is imperiled globally (G1) as well as in Colorado (S1).

Ipomopsis globularis: globe gilia

Globe gilia is a perennial herb of the phlox family (Polemoniaceae) that grows in gravelly, calcareous soils of alpine areas. It is a Colorado endemic known only from Mosquito Range in Lake, Park, and Summit counties. It has been found only at elevations between 12,000' and 14,000'. The species is considered imperiled both globally and in Colorado (ranked G2S2).

Kobresia simpliciuscula: simple kobresia (FS sensitive)

Simple kobresia (*Kobresia simpliciuscula*) is a perennial graminoid of the sedge family (Cyperaceae) that grows in alpine areas including tundra, fens, moist gravel and glacial outwash. The species is found in Alaska, Canada, the Pacific Northwest (except Washington), Wyoming, Utah, and Colorado. In Colorado known occurrences are found in Boulder, Clear Creek and Park counties at 9,000 to 13,000 ft.

Machaeranthera coloradoensis: Colorado tansy-aster (FS sensitive)

Colorado tansy-aster is a perennial herb of the sunflowers family (Asteraceae) that inhabits mountain parks, slopes, rock outcrops and dry tundra at elevations ranging from 8,500-12,500 ft. The species is found only in Wyoming and Colorado. In Colorado known occurrences exist in Chaffee, Gunnison, Hinsdale, La Plata, Lake, Mineral, Park, Pitkin, Saguache, and San Juan counties. The species is considered imperiled both globally and in Colorado (ranked G2S2).

Mimulus gemmiparus: Weber's monkeyflower (FS sensitive)

Weber's monkeyflower (*Mimulus gemmiparus*) is a perennial herb of the figwort family (Scrophulariaceae) found in granitic seeps, slopes, and alluvium in open sites within spruce-fir and aspen forests at 8,500-10,500 ft. The species is endemic to the mountains of central and northern Colorado where it is found in Grand, Jefferson, Larimer, and Park counties. The species has a unique reproductive strategy; the leaf petioles are modified to contain dormant embryos (the specific epithet *gemma* refers to a gemma, an asexual reproductive mechanism often found in mosses). The flowers, if present at all, have sterile pollen. The plant is considered imperiled both globally and in Colorado (ranked G2S2).

Neoparrya lithophila: rock-loving neoparrya (FS sensitive)

Rock-loving aletes (*Neoparrya lithophila*, also called *Aletes lithophilus*) is a perennial herb in the carrot family (Apiaceae). It flowers from May to early July, and fruits from late June to

September. This plant is found in pinyon-juniper woodlands on north-facing ledges, cliffs and canyons associated with volcanic dikes composed of igneous outcrops or sedimentary rock. It is found at elevations ranging from 7,000 to 10,000 feet. Rock-loving aletes is endemic to south-central Colorado. Rock-loving aletes is ranked G3S3, indicating that it is vulnerable throughout its range due to its limited distribution.

Parnassia kotzebuei: Kotzebue's grass-of-pannassus (FS sensitive)

Kotzebue's grass-of-pannassus (*Parnassia kotzebuei*) is a perennial herb. Most botanists consider it a member of the saxifrage family (Saxifragaceae), but Dr. Weber places it in its own family (Parnassiaceae- the grass of Parnassus family). The species inhabits wet rocky areas, especially along small streams and amongst moss mats, in the alpine and subalpine zones. The plant ranges from Alaska and Canada to Washington, Idaho, Montana, Wyoming, Nevada and Colorado. It reaches its southernmost Rocky Mountain distribution in Colorado where it is found at 10000-12000 ft. Known occurrences are found in the north-central and southwestern portions of the state, including Clear Creek, San Juan, Park and Summit counties.

Penstemon degeneri: Degener's beardtongue (FS sensitive)

Degener's beardtongue (*Penstemon degeneri*) is a perennial herb in the figwort family (Scrophulariaceae), flowering in June and July, and fruiting in late July. It is found in pinyon-juniper woodlands, montane grasslands and mountain meadows on rocky soils with igneous bedrock (Spackman et al. 1997). It is found at elevations ranging from 6,000 to 9,500 feet. Degener's beardtongue is often associated with Parry's oatgrass (*Danthonia parryi*), prairie sagewort (*Artemisia frigida*), mountain goldenbanner (*Thermopsis montana*), and mountain muhly (*Muhlenbergia montana*). Degener's beardtongue is endemic to central CO where it is found at 6,000-9,500 ft. in Fremont, Chaffee, and Custer counties. Degener's beardtongue is ranked G2S2 (critically imperiled) due to its limited distribution.

Potentilla rupincola: Front Range cinquefoil (FS sensitive)

Front Range cinquefoil (*Potentilla rupincola*, also called *P. effusa* var. *rupincola*) is a perennial herb in the rose family (Rosaceae). It flowers from mid June through August. It is found on granitic outcrops or on thin, gravelly granitic soils, at elevations of 6,900 to 10,500 feet. Front Range cinquefoil is endemic to Colorado where it is found in Boulder, Clear Creek, Larimer and Park counties. Front Range cinquefoil is ranked as G5?T2/S2. This can be interpreted as the species being globally secure (with some uncertainty concerning the global rank), but the subspecies being considered imperiled both globally and in Colorado.

Primula egaliksensis: Greenland primrose (FS sensitive)

Greenland primrose (*Primula egaliksensis*) is a perennial herb of the primrose family (Primulaceae) that inhabits wet meadows, streambanks, willow carrs, and fens. The species has an unusual distribution; it is widespread in Alaska and Canada with disjunct populations in Wyoming and Colorado. The Colorado populations are located in Park County at elevations of 9,000-10,000 ft. Greenland primrose is considered secure globally although rare in portions of its range (ranked G4), but is imperiled in Colorado (ranked S2).

Ptilagrostis porteri: Colorado false needle grass or Porter feathergrass (FS sensitive)

Porter feathergrass (*Ptilagrostis porteri*) is a perennial graminoid of the grass family (Poaceae) that grows on hummocks located in fens and willow carrs. The species is endemic to central

Colorado where it is found from 9,200-12,000 ft. in El Paso, Lake, Park and Summit counties. The species is ranked G3G5T2/S2.

Ranunculus karelinii: tundra buttercup (FS sensitive)

Tundra buttercup (*Ranunculus karelinii*; also called *Ranunculu gelidus* in the past) is a perennial herb of the buttercup family (Ranunculaceae) that inhabits alpine slopes and summits, and is often found amongst rocks and scree. Tundra buttercup ranges from Alaska and Canada south to Idaho, Montana, Wyoming, Utah and Colorado. It reaches its southernmost Rocky Mountain distribution in Colorado where it is found at 12,000-14,100 ft. in the central mountains of the state. The Colorado county distribution includes Chaffee, Clear Creek, Gunnison, Lake, Park, and Summit counties. The species has a global rank of G4G5, indicating that the species is secure globally but sometimes rare at the edges of its distribution. In Colorado the species is ranked S2 (imperiled) due to the few known occurrences.

Rubus arcticus var. *acaulis*: dwarf raspberry (FS sensitive)

Dwarf raspberry (*Rubus arcticus* var. *acaulis*, also called *Cylactis arctica* ssp. *acaulis*) is an herbaceous perennial plant in the rose family (Rosaceae). It flowers from late June to early July, fruiting late July to August; however, the species seldom sets fruit in Colorado. It is a wetland species found in willow carrs and on mossy streamsides that is found at elevations ranging from 8,600 to 9,700 feet. Species that have been found in association with dwarf raspberry include shrubby cinquefoil, dwarf birch, diamondleaf willow, water sedge, and alpine meadow-rue. Dwarf raspberry is circumboreal, ranging south in North America to Oregon, Colorado, Michigan, and Maine. Dwarf raspberry is ranked G5T5 indicating that the species and subspecies are secure globally. Populations in this area are at the southern extreme of the species range. The species is considered critically imperiled in Colorado with a rank of S1.

Salix candida: sageleaf willow (FS sensitive)

Sageleaf willow (*Salix candida*) is a woody shrub of the willow family (Salicaceae) found in pond and stream edges as well as in fens of the foothill and montane wetlands. The species is found in Alaska, Canada and across the northern tier of American states. It reaches its southernmost distribution in Colorado where it is found from 8,800-10,600 ft. in Gunnison, Hinsdale, La Plata, Larimer, and Park counties. Although sageleaf willow is considered secure globally (ranked G5), it is critically imperiled in Colorado with a rank of S1.

Salix myrtilifolia: blueberry willow (FS sensitive)

Blueberry willow (*Salix myrtilifolia*) is a woody shrub of the willow family (Salicaceae) that inhabits fens over a wide elevation gradient from the foothills to alpine. The species is common in Alaska and Canada with widely disjunct populations northwest Wyoming and Park County, Colorado. Although blueberry willow is considered secure globally (ranked G5), it is critically imperiled in Colorado with a rank of S1.

Salix serissima: autumn willow (FS sensitive)

Autumn willow (*Salix serissima*) is a woody shrub of the willow family (Salicaceae) that grows in wetland areas including marshes, fens, and bogs. The species ranges from Canada to the northern U.S. 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, Park, Larimer, and Routt counties at elevation ranging from 7,800-10,200 ft. It is

apparently secure globally, although it is rare in portions of its range and thus is ranked G4. In Colorado, however, it is critically imperiled (ranked S1).

Selaginella selaginelloides: club spike-moss (FS sensitive)

Club spike-moss (*Selaginella selaginelloides*) is a perennial, mat-forming herb of the little spike-moss family (Selaginellaceae) that grows in marshy areas and wet spruce forests. Club spikemoss is found in Alaska, Canada, several eastern states, Idaho, Montana, Nevada, Wyoming and Colorado. Little is known about the Colorado distribution of this species, but one report comes from the east side of the Park Range in eastern Park County. The species is difficult to identify in the field and this may contribute to the lack of information on the species' Colorado distribution. The species is considered secure globally (ranked G5). The Colorado ranking is SH (state historical).

Viola selkirkii: great-spurred violet

Great-spurred violet (*Viola selkirkii*) is a perennial herb of the violet family (Violaceae) that inhabits cold mountain aspen forests, moist woods, and thickets. The species ranges from Alaska and Canada to the upper Midwest, northeast, and Washington. Disjunct populations are found in New Mexico and Colorado. . It flowers during May and June. In Colorado, this violet is known from only two areas; Rocky Mountain National Park, where it was last seen in 1965, and at the base of Devil's Head in the Rampart Range, where it was last seen in 1923. Its known distribution in Colorado includes Douglas County and there is a known site near Devil's Head. It is found at elevations ranging from 8,500-9,100 ft..

The species is considered secure globally, although there is some uncertainty about the ranking (G5?). In Colorado is critically imperiled and receives a rank of S1.

7.0 Environmental Baseline

An environmental baseline includes the past and present actions of all federal, state, and private actions in the analysis or action area. This section lists and discusses the known actions in the analysis area. Many of these actions are ongoing activities. Knowledge of the past, present, and reasonably foreseeable future actions are discussed below in the cumulative effects analysis.

PAST AND CURRENT ACTIVITIES WITHIN THE ANALYSIS AREA

Mining

Throughout the Forest and adjacent state and private lands, there are many mining claims and districts, a few of which are still active today. Much of the Forest and surrounding region lies within the region commonly referred to as the "Mineral Belt" that has had active small- and large-scale mineral activities for a variety of locatable minerals including: placer gold, iron ore, manganese, molybdenum, tungsten, thorium, uranium, and gemstones, among others. In the Monarch Pass area, a large private mining operation (Monarch and Madonna Mine) began operation in 1878 (currently inactive). This mine produced a variety of minerals and limestone. Throughout the project area and vicinity, there have been many smaller mining operations on federal and private lands. Many of these smaller operations utilized hand tools, sluice box, and small suction dredging operations for the extraction of free flowing gold in placer operations and other mineral extraction techniques for a variety of mining operations. Roads were built to access these operations that have fragmented the landscape, increased erosion and sediment into streams, and removed habitat throughout the Forest. Roads have facilitated the spread of

invasive species and noxious weeds which have changed species composition of the Forest, increased competition with native plant species, and altered fire regimes which all have adversely affected many of the plant.

Past and present mining actions in the project area include:

- Stewart Mine
- Upper Banker Mine
- Stonewall Mine
- Mt. Antero mining claims
- Bull Gulch-Taylor Park Ranger Station gravel prospects
- Small Placer operations-Suction Dredging

Recreation

Approximately 84% of the recreation use on the Forest occurs within the Roaded Natural, Rural, and Urban classes (LRMP). The remaining 16% takes place in Primitive and Semiprimitive classes. Where resources attract intensive recreational use (i.e., developed recreation such as the Monarch Ski Area) major investments in recreational facilities and visitor assistance are made. Specific management direction for these areas is to provide for resource protection and for public health, safety and enjoyment. Both kinds of recreation use occur in Roaded Natural settings which include scenic drives, highways, timber harvest areas, and adjacent lands. Because Roaded Natural areas are located on relatively gentle terrain with abundant access, most of the total acreage is usable by recreational activities.

Historically, recreation use on the Forest and adjacent BLM, state, and private lands has fluctuated dramatically, although it has increased substantially over the past two decades. Use has increased and is expected to continue this trend because of expanding populations in the Front Range cities (e.g., Denver, Colorado Springs, Pueblo). Recreation is the major use of the Forest within the project area. Motorized touring (e.g., automobiles, four-wheeled drive vehicles, off-road vehicles (ORVs), and snowmobiles) is the most prevalent recreational activity on the Forest, followed by camping, hiking, and mountain climbing, and other activities such as fishing, hunting, and horseback riding.

Recreation activities have greatly influenced the travel system throughout the Forest. Increased use of ORVs for recreational use has resulted in an extensive “user-created” network of travel routes (i.e., non-system routes). These new routes become established over time and eventually are viewed by the public as system roads or trails; thereby increasing their use. Roads have facilitated the spread of invasive and noxious weeds which have changed species composition of the Forest, increased competition with native plant species, and altered fire regimes which has adversely affected many plant and wildlife species addressed here. For dispersed recreation, many people utilize the extensive roads network (both system and non-system) to walk their dogs, run, bike, hunt, target shoot, drive four-wheel vehicles, hunt, cross-country ski, and snowmobile. Each of the above activities have incrementally impacted many plant species addressed in this assessment directly, indirectly, and cumulatively. A discussion of the effects of recreational activities on TEPS plant species is located in the Effects Section below.

Past and present recreation-related actions include:

- Lily and Bear Lakes Trail and Trailhead Construction

- Willow Creek Trailhead Construction
- Blanks Cabin Trailhead Construction
- Mt. Antero Trail Construction
- Sheep Gulch Parking Area
- Henry Lake Trail reroute

Special Use Permits (SUP)

A variety of SUPs occur throughout the Forest including: right-of-ways (water and gas pipelines and overland electronic transmission lines) communication sites (e.g., radio repeaters, cell towers, etc.). In particular, a major transmission/communication site is located at Monarch Pass and the Monarch Tram and Restaurant facility is located there as well. These uses are existing long-term structures or facilities, and are likely to continue to operate into the future. The Forest includes the headwaters of the Arkansas River and other sub-watersheds, providing municipal water supplies for Front Range cities and agricultural uses (e.g., North Fork, Boss, and O’Haver reservoirs, Salida Hydroelectric project). There are also many of small-scale recreational and non-recreational special uses (e.g., single residence powerlines, waterlines, road access permits, irrigation ditches/pipelines, etc.) within the analysis area. These facilities have caused habitat loss and degradation, habitat fragmentation, and mortality to species addressed in this assessment.

Past and present special use permit-related actions include:

- Numerous recreational events, including bike races, snowmobile rallies, foot races, and weddings.
- Numerous road right-of-ways for inholdings.
- Monarch Ski Area Master Development Plan
- Powerline maintenance
- Cottonwood Pass Weather Station
- Nature Trail Bridge
- Monarch Ski Area summer operations.

Wildfires and Prescribed Fires

Except for changes in climate, wildfires probably had the largest single impact in shaping the ecology of Front Range forests prior to Euro-American settlement. Whether lightning-caused, started by native peoples, unintentionally or deliberately set by settlers, wildfires were a frequent occurrence over much of this area. Major consequences of such frequent fires were the maintenance of a relatively open forest structure in many mid-elevation forests, the prevention of tree encroachment into mountain meadows and grasslands, and in some areas the replacement of forested land with grassland, savannah, and other fire-adapted shrub communities such as oak (*Quercus gambellii*) or mountain mahogany (*Cercocarpus montanus*) over the landscape.

Historically fire has been a frequent and major ecological factor on the Forest and adjacent lands. Fire regimes are based on fuel type and condition, ignition sources, topography, and the weather at the time of ignition. Fire exclusion efforts in the past 100 years or so, combined with other land-use practices have in many places dramatically altered fire regimes so that present day fires tend to be larger and more severe, having substantial effects to the ecosystem and species dependant on them for survival. Fuel buildup is perhaps one of the biggest contributors to current trends of larger and higher intensity wildland fires. It is widely believed over much of

the west that fuel loading is currently outside the historical range of variability (HRV). HRV considers: (1) the range and variation in characteristics of the “natural” regime; (2) “natural” regimes are considered to be the period prior to Euro-American settlement with climate similar to current; and (3) generally described by the average, minimum, maximum, and measures of central tendency for a 300 to 400 year time period. The historic fire regimes have changed dramatically since settlement suggesting that fuel amounts may have been limiting in the area where fire intervals were once very short. Livestock grazing may have played a role in removing fine fuels that carried frequent, surface fires; roads and trails broke up the continuity of forest fuels and became barriers, further reducing fire frequency and size. Fire suppression beginning in the early half of the twentieth century by settlers and land management agencies also played a major role in the cessation of these frequent, natural fires. Forests with historically frequent, low intensity fires have been most affected with shifts in forest structure and historically unprecedented increases in tree density (Brown et al. 1999). Forests generally are more dense and have a higher canopy closure which have benefited some species and adversely affected others that require more open, less dense areas.

Prescribed fires also change habitats within the Forest and adjacent areas. Prescribed fires are used alone and with other management activities to restore or maintain desirable plant community attributes, as well as important ecological processes. Prescribed fire is used as a tool to enhance ecosystem resiliency and to maintain desired fuel levels. Projects within the Forest and nearby BLM, state, and private lands have included slash and pile burning within designated public fuelwood areas and other areas to reduce fuel loading. These projects typically include an emphasis on fire-risk reduction in and around human communities and hazard fuel reduction to reduce the risk of crown fires, and larger projects with a goal to enhance resilience and sustainability of ecosystems. Prescribed fire may however, burn too hot or outside of the normal (historic) fire season that may lead to changes in species composition including invasive and noxious weeds which may adversely affect many species addressed here.

Past and present fire-related actions include:

(note that many fuel-reduction projects contains a timber harvest as well as a prescribed fire component, and therefore those projects will be listed under both sections)

- Box Creek Vegetation and Travel Management Plan
- Westside Ecosystem Management
- Tincup Fuels Reduction
- Old Monarch Fuels treatment
- Tomichi Fuels Reduction

Timber Harvest

Historically, the amount of timber harvesting on the Forest and nearby lands has fluctuated dramatically since it was established. There were four general periods with relatively high volumes of timber harvested on the Forests. The first period was during the 1880's to 1910's, during the mining boom when the area was first being settled. In addition, with increased accessibility of the region by railroads, greater numbers of people were also lured into the region, resulting in increased demands for timber products. Vast areas of the Forest including those within the analysis area were harvested to support mining activities. Timber use by mining operations included charcoal operations, and timbers needed for mining, railroad expansions,

housing, furniture, fuelwood, and other needs. Much of the more accessible areas were initially high-graded, with the most valuable trees harvested first, and then as supplies dwindled, smaller lower valued trees were harvested. Much of the trees harvested were product driven. Harvest levels decreased, then increased again during World War II to support a number of local lumber mills in the area. Harvesting primarily occurred in spruce-fir forests that were typically harvested by clearcutting. There was an extensive spruce beetle (*Dendroctonus rufipennis*) outbreak during 1939 to 1952, which affected old-growth spruce and fir. Some of these trees were salvaged during this time. The third and fourth periods of relatively high timber harvest activity came during the 1960's, and again in the 1980's, as a result of increased fuelwood and salvage sales. Harvest methods varied from selective harvests such as shelterwood, and selection cuts, to relatively small clearcut harvests. Roads constructed to access these areas have facilitated the spread of invasive and noxious weeds which have changed species composition of the Forest, increased competition with native plant species, and altered fire regimes which has adversely affected many plant and wildlife species addressed here.

A number of timber stand improvement projects have occurred on the Forest recently, including mountain pine beetle (MPB) (*Dendroctonus ponderosae*) infestation salvage sales, fuel reduction timber sales, and fuelwood sales. MPB infestations have periodically occurred in ponderosa pine and other forest types historically on the Forest, and have been at epidemic levels in portions of the Forest over the past several years. In addition to MPB, Ips beetle (*Ips confuses*) infestations in piñon pine are also increasing on the Forest, partially as a result of recent drought conditions and overcrowding making them more susceptible to infections. As a result, a number of salvage timber sales included in the Westside Ecosystem Management Project are currently underway along the eastern slopes of the Sawatch Range at this time. Fuelwood harvests have occurred and are currently underway over many portions of the Forest. These activities cause direct and indirect effects to many plant species, primarily from direct disturbance and the introduction of highly competitive non-native species.

In general, these activities have drastically altered the landscape with the removal of much of the late-successional and old-growth trees, snags, and coarse woody debris (CWD) that was present pre-Euro-American settlement that has reduced the vertical and horizontal structural diversity throughout much of the harvested areas, depending on harvest methods and intensities. In addition, species composition has changed over time as particular species have been selected over others, and regeneration species were of different composition, or forests reverted to earlier successional stages. For instance, the occurrence of Douglas-fir was likely more prevalent on portions of the Forest prior to Euro-American settlement that currently occurs on the Forest. As a result of these past management practices taking place across the landscape, fish, wildlife, and plant populations have been substantially affected.. Past timber harvest activities, particularly those that occurred on the Forest in the late 1800's and early 1900's caused substantial effects to many of the species addressed in this assessment by changing the vegetation composition and the horizontal and vertical structure of the Forest. These activities compacted soil, increased erosion and sediment in streams, facilitated the spread of noxious weeds, etc.

Past and present timber-related actions include:

(note that many fuel-reduction projects contains a timber harvest as well as a prescribed fire component, and will therefore those projects will be listed under both sections)

- Box Creek Vegetation and Travel Management Plan
- Westside Ecosystem Management

- Numerous firewood sales
- Millswitch Timber Sale
- Tincup Fuels Reduction
- Old Monarch Fuels treatment
- Tomichi Fuels Reduction

Livestock Grazing

Grazing (e.g., cattle and sheep) on the Forest and adjacent lands has fluctuated over years, reaching a peak in the early 1900's to the 1930's. The number of animals was reduced on the Forest from the 1930's through 60's because allotments were overstocked. Logging in the 1960's and 1970's created openings that improved forage production and livestock distribution. As a result, in the 1980's the amount of grazing slightly increased. Over the last 60 years canopy cover in forested areas, open parks, and meadows have increased in many areas of the Forest. This has resulted in reduced forage production for a variety of species directly and indirectly.

Allotments within the analysis area include the Fooses Creek Cattle and Horse (C&H) (currently inactive), Arkansas (C&H), Little Cochetopa C&H, and Browns Creek (C&H) on the Salida District. On the Gunnison District are the Taylor Park, Pitkin, Tomichi, and Agate allotments. No grazing allotments exist within the project area occupied by the Leadville District. Direct effects of grazing include the removal of vegetative cover (biomass) and trampling of grass and shrubs. Indirect effects of grazing include altered forage composition, reduced vigor of plants, increased soil compaction, and accelerated soil erosion resulting in a reduction of land productivity (Page et al. 1978). All of these factors have affected species abundance and richness that are addressed in this assessment. Many variables play roles in the effects of livestock grazing has on the ecosystem, especially in riparian areas. The most extensive human-caused influence on riparian zones in the western U.S. has been livestock grazing (Ehrhart and Hansen 1997). Cattle in particular exhibit a strong preference for riparian areas and tend to concentrate there activities there for a number of reasons. They prefer the increased quantity and variety of quality forage available, and the palatability is typically higher than upland areas because of increased moisture regimes. These areas represent a small but important percentage of the total range area that many plant and animal species depend upon. It has been well documented in a multitude of studies that improper grazing practices can adversely affect riparian areas and species that depend on them. Exclosure studies throughout the western U.S. have shown the effects of livestock grazing on grass, shrub, and tree regeneration cover. The compatibility of grazing in riparian areas depends on the extent to which grazing management has considered and adapted to certain basic ecological relationships. Past grazing practices have affected natural functions on riparian ecosystems; the growth and reproduction of woody and herbaceous plants in these areas; hydrologic and geomorphic conditions and processes (e.g., downcutting); soils (e.g., erosion); and water quality, altering species' habitat directly and indirectly.

Past and present grazing-related actions include:

- Numerous fence and spring development projects in support of livestock grazing

Development

The Front Range Region of Colorado and areas surrounding the Forest have experienced exponential growth over the past few decades. Although residential development is not

occurring on the National Forest itself, adjacent private lands are experiencing substantial growth. Population trends have increased dramatically over the past decade and are expected to continue to increase in the region into the future. For example, the estimated population of Chaffee County in April 1990 was 12,684 and it increased to 16,242 in April 2000, an average of 2.4% increase per year (CDLA 2003). While much of this growth occurred in towns and other urban areas, certainly a high portion of this growth was outside of urban areas. For example, several new subdivisions have been built adjacent to the Forest and within inholdings that are adversely affecting plant and wildlife species addressed in this assessment by increasing fragmentation, human disturbance, increased recreational use, and other associated activities. In addition, housing units and human developments within wildland/urban interface areas immediately adjacent to the Forest substantially increase the risk of catastrophic wildfires on the Forest. Efforts are currently underway to decrease these threats; however, vast areas have yet to be treated and new areas adjacent to the Forest are continuing to be developed.

One of most urgent threats to species throughout the U.S. is the loss and fragmentation of habitat. The removal of vegetation and natural features required for many large-scale and high-density developments directly and indirectly impacts many species. Habitat fragmentation is the process by which a large and continuous block of natural habitat is transformed into much smaller and isolated patches by human activity (Noss and Csuti 1994). Fragmentation has two components (1) reduction of the total amount of habitat type and (2) apportionment of remaining habitat into smaller, more isolated patches (Wilcove et al. 1986, Saunders et al. 1991).

Note that most development-related projects occur on private lands adjacent to the Forest boundary. Habitat fragmentation as a result of development on the Forest may result from new roads (under a special use permit) or development of campgrounds. See those sections above for a list of Forest development-related projects

Past, present, and reasonably foreseeable future development-related actions include:

- Numerous private developments taking place adjacent to the Forest boundary on the western fringe of the analysis area.

8.0 EFFECTS TO SPECIES EVALUATED

8.1 ALTERNATIVE A: NO ACTION ALTERNATIVE

Under Alternative A (the no-action alternative), existing use in the area and associated impacts to TEPS plant species would remain approximately the same. Implementation of Alternative A would result in no new trail construction and no new or increased recreational use. Recreational use will continue in the project area, but selecting the No-Action Alternative will cause no additional direct or indirect impacts to TEPS plants above the current environmental baseline.

Cumulative effects, which are similar for all three Alternatives, are discussed under Alternative C below.

8.2 ALTERNATIVE B: COLORADO TRAIL CORRIDOR ALTERNATIVE

Under Alternative B, the existing Colorado Trail would primarily be used for the CDNST. Future reroutes around sections where the trail is on existing roads may be needed if conflicts between user groups occur, but these reroutes would be subject to the NEPA process and an

effects analysis would be performed at that time. At Twin Lakes, Alternative B will follow one of two possible routes. One route crosses Lake Creek on a new bridge east of the dam, and a second potential route is a direct crossing of Twin Lakes on a new fixed bridge between the two Lakes.

Since Alternative B would primarily follow the existing routes on the Colorado Trail or on existing roads, little new trail construction would take place as a result of implementing Alternative B. A small reroute (0.5 miles) would be implemented near Twin Lakes, and a bridge crossing either east of the dam across Lake Creek, or between Twin Lakes would also be built. While implementation of Alternative B would result in additional use, this use would occur primarily on existing trails and roads. Since these trails and roads are already heavily used, the impacts to TEPS plants would primarily be associated with the direct effects of new trail and bridge construction at Twin Lakes, and the indirect effects of increased trail use. Since the effects of construction activity are similar under both alternatives *the direct, indirect, and cumulative effects resulting from implementation of Alternative B are described under Alternative C below*. However, under Alternative B the scale of construction is less, and no construction would take place in the alpine zone where most of the TEPS plant species of concern reside. Therefore, the effects to TEPS plant species would be less severe and widespread than described under Alternative C.

8.3 ALTERNATIVE C (THE PROPOSED ACTION): REALIGNMENT OF THE CDNST

Direct/Indirect Effects

In the following effects analysis and discussion, “construction activity” refers to all of the proposed trail construction and reconstruction activities, including the use of hand tools, blasting, trail dozers and trackhoes.

Construction activity has the potential to directly impact TEPS plants by crushing plants, displacing soil and plants, or smothering plants with slash or soil. Even those species that may benefit from soil disturbance or additional light exposure could suffer adverse direct effects as a result of construction activity. Furthermore, once the trail is built, that habitat is no longer available for colonization of use by TES plant species.

The primary indirect threat from CDNST construction comes from an increased utilization of adjacent areas by hikers, backpackers, mountain bikers, and especially from horse traffic. Increased traffic on the trail will result in dispersed camping near the trail corridor. Dispersed camping will lead to soil disturbance, trampling of vegetation, and the potential for weed introduction and establishment. Additional human and horse use in these area will lead to additional trampling of areas adjacent to the trail as well as the development of social trails near the campsite and riparian areas. Watering of stock in riparian areas will lead to bank trampling and churning. Firewood gathering and fire rings, stock pasturing and containment, soil compaction, and gathering of plant material will also be likely in the areas adjacent to the trail. Areas near water and attractive camping areas will receive greater use than steep or rocky terrain.

Unauthorized motorized traffic is likely to take place in and along the trail corridor without additional measures to ensure this does not occur. Field crews observed motorcycle tracks

following the flagline off-trail above timberline in upper Mineral Basin and also above Tincup Pass during botanical surveys. Unauthorized motorized activity in the alpine zone will lead to localized areas of soil compaction, ground disturbance, and potentially destruction of the alpine turf. The scars of motorized activity are clearly visible on the hillsides to the north and south of Tincup Pass.

In addition to trampling and uprooting vegetation, increased human activity and associated ground disturbance along the CDNST may introduce noxious weeds or non-native plant species. Noxious weeds may be brought into the trail corridor by construction machinery during trail construction, by foot traffic, mountain bikes, unauthorized motorized vehicles, or by horse traffic. Horses pose the greatest threat for noxious weed and non-native species invasion since they may carry seeds or plant parts on their body, in their gut, or with their feed. During the course of botanical surveys 2 noxious weed occurrences were located, both of them Canada thistle (*Cirsium arvense*). One site was in the Twin Lakes area very close to the proposed Lake Creek bridge, and one was in the Collegiate Peaks Wilderness. Ground disturbance and vectoring of seed in the trail corridor from these or other undetected noxious weed sites has the potential to impact TEPS plants and habitat through noxious weed invasion. Since this trail will be used by hikers and livestock, if these sites are left untreated we can expect Canada thistle to be spread in the trail corridor and adjacent campground areas. Once established, noxious weeds can be difficult to control or eradicate. Noxious weeds displace native plant habitat and degrade watershed functions. They also directly compete with other plant species and have the potential to extirpate rare plant sites through direct competition for light, nutrients, and water. The spread of weeds in the trail corridor poses a serious and possibly *significant* adverse effect to sensitive plant species in the project area. Standard management practices such as inventory, avoidance or pre-treatment of known noxious weed sites, cleaning equipment, and using weed free material and mulch greatly minimize the threat to sensitive plant species. The threat from these noxious weed sites in the trail corridor will be minimized by four methods:

- weed surveys and mapping,
- treatment of the sites *prior* to implementation, and/or
- avoidance by rerouting the trail, and
- cleaning of construction equipment prior to arrival at trailhead.

Another indirect threat to TEPS plant species results from increasing the number of users in the alpine and subalpine zones where several TEPS plant species grow will increase the opportunity for collection of these species. Many of the species have charismatic life forms (such as pincushion or mat plants) and are actively sought by collectors of seed or whole plants. These collections are valued in the landscape trade for rock gardens. Scientific collection may also be a concern with rare and unusual species. As a result of easing access to alpine and subalpine areas, these TEPS species may become less common.

Trail construction or reconstruction may also cause local changes in hydrology that could indirectly impact riparian or wetland TEPS species adjacent to the trail. Changes in drainage patterns, which cause wet areas to dry more quickly, or conversely may cause prolonged inundation could make the habitat unsuitable for TEPS plant species. Construction activities may also lead to increased erosion or sedimentation that can smother or erode plants or seeds in the riparian corridor.

Cumulative Effects

Past and current activities have altered TEPS plant populations and their habitats. A list of past and current activities is given in Section 7.0 (Environmental Baseline). These activities have the potential to cumulatively affect TEPS plant species. These activities include: historic grazing, timber harvest and thinning, fire suppression, prescribed fire, mining, motorized and non-motorized recreational use, road and trail construction, urban development (sub-dividing and development of private land), and noxious weed infestation. Future state, tribal, or private activities that may produce cumulative effects in the reasonably foreseeable future within the analysis area include the following:

Commercial

- Various Lodges
- Restaurants
- Small Stores
- Pitkin Community
- Tincup Community
- St Elmo Community
- Various Summer and Year-round Residences

Mining

- Mining
- Stonewall and Florabell Mine Closure

Federal activities that may produce cumulative effects in the reasonably foreseeable future within the Study Area will be related to the following projects:

Recreation

- Mt. Antero Trail Construction
- Mt. Yale Trail Construction
- Crystal Lakes Nature Watch Site Development
- Nature Trail Bridge
- Sheep Gulch Parking Area
- Green Creek Trail Reconstruction
- Poplar Gulch Trail Reconstruction
- Nature Trail Bridge

Special Use Permits

- Monarch Ski Area Master Development Plan implementation
- North Fork, O'Haver, and Boss Reservoirs Reauthorization

Timber Harvest and Prescribed Burning

- Various Timber Harvest projects
- Numerous Firewood Sales
- Cree Creek Salvage and Burn
- Spruce Creek Salvage and Burn
- NW Leadville Hazardous Fuel Reduction
- Bald Mountain Salvage and Burn

- Spruce Creek Salvage and Burn
- Bald Mountain Salvage and Burn

Wildfire and Prescribed Burns

- Twin Lakes Prescribed Burn

Range Allotments

- Range Allotment Management Plans (RAMPS), including Taylor River C&H, Pitkin, C&H, Tomichi C&H, and Agate C&H
- Numerous fence and spring development projects in support of livestock grazing

The effects of these types of activities on TEPS plants are as follows:

- Grazing leads results in biomass removal and trampling. It has led to changes in species composition, compaction of soils, changes in fuel loading and the fire regime, downcutting of riparian areas with subsequent drying of adjacent meadows, and noxious weed invasion. Within riparian areas and wet meadows livestock grazing has also led to churning of the soil and hummocking.
- Timber harvest and thinning has led to a more open canopy with additional light reaching the forest floor (which may be beneficial or detrimental depending on the species), soil disturbance and compaction, development of skid roads, and noxious weed invasion. Changes in forest composition, structure and fire frequency have also taken place.
- Fire suppression has led to increased fuel loading and canopy closure.
- Prescribed fire ideally mimics natural fire processes, but may burn too hot and kill the native vegetation and lead to invasion by non-native plant species. Prescribed fire usually takes place during the spring or fall, which is outside of the normal fire season and may lead to additional mortality of perennial plant species.
- Mining has caused destruction of habitat, leaching of heavy metals in to streams, and changes in stream pH. Activities associated with mining that affect TEPS plants include road and railroad development, timber harvest, weed invasion and revegetation efforts.
- Motorized and non-motorized recreational use (including OHV use, camping, horseback riding, mountain biking, hiking, hunting, and fishing) has led to the development of non-system roads and trails, development of dispersed campsites, erosion, and the vectoring of noxious weeds in previously pristine areas.
- Road construction causes soil disturbance and erosion, destruction of habitat, and noxious weed invasion. It also increases the impacts from recreational activities by allowing improved access for those activities.
- Urban development destroys TEPS plant habitat, fragments populations, and increases the risk of weed invasion and fire.
- Noxious weed infestation is often the result of the ground disturbing activities listed above. Noxious weeds displace native plants, mostly through direct competition.

Current management direction is designed to eliminate or reduce possible negative cumulative impacts by protecting TEPS plant species from direct and indirect impacts. MacDonald (2000) reports that a critical step in cumulative effects analysis is to compare the current condition of the resource (in this case TEPS plants) and the projected changes due to management activities (in this case trail construction) with the natural variability over time in the resources and processes of concern. This approach is difficult or impossible for TEPS plants since long-term population

trend data are usually lacking, and many TEPS plant habitats have a long history of disturbance (i.e., an undisturbed reference is often lacking). For some species, particularly those which do not tolerate disturbance or are found under dense canopy conditions, minimizing on-site changes to TEPS plants is an effective way of reducing cumulative impacts. MacDonald (2000) states, "If the largest effect of a given action is local and immediate, then these are the spatial and temporal scales at which the effect would be easiest to detect. If one can minimize the adverse effects at this local scale, it follows that there would be a greatly reduced potential for larger-scale effects". Even though the cumulative effects analysis for TEPS plants is hampered by the absence of historic data and the lack of an undisturbed reference, we can minimize the potential cumulative effects by minimizing the local (direct and indirect) effects. For other species, particularly those that are disturbance tolerators or fire-followers, minimizing on-site changes can be detrimental. These species tolerate or benefit from on-site changes, which result in opening the stand, reducing the potential for catastrophic fire, and increasing light reception in the understory. Thus, the response of TEPS plant species to the management activities is species-dependent.

If adverse effects are not minimized at the local level, cumulative effects may occur. Past and present management activities have caused changes in plant community structure and composition across the forests. These management activities have altered the present landscape to various degrees and have had direct, indirect, and possibly cumulative effects on TEPS plant species. These effects can be minimized by following Forest Service standards and guidelines and by implementing integrated design features or mitigation measures to monitor or offset impacts to TEPS plant species. With these protective measures in place, cumulative effects are less likely to be adverse.

For many of the TEPS plant species analyzed in this document historical population data is unavailable. It is unknown whether these species have always been rare or if management activities have made them less common across the landscape due to cumulative effects. In this project cumulative effects are minimized by the following methods:

- botanical survey of the entire CDNST trail corridor were completed.
- avoidance of TEPS and Colorado Natural Heritage Program tracked plant species by trail reroutes wherever possible.
- implementation of integrated design features and best management practices, particularly the requirement of pre-treatment of known noxious weed species in the trail corridor and requiring weed-free forage for recreational livestock.

Actions associated with this project that are most likely to contribute to cumulative effects include:

- recreational livestock use due to localized grazing, weed dispersal, ground disturbance, and churning and compaction of riparian soils.
- unauthorized motorized use leading to soil compaction and disturbance of the fragile alpine turf.

9.0 EFFECTS DETERMINATION

9.1 ALTERNATIVE A: NO ACTION – EXISTING CDNST

Federally Threatened, Endangered, or Proposed Plant Species:

There will be no effect to *Botrychium lineare* or *Eutrema penlandii* resulting from implementation of Alternative A for the following reasons:

- a review of the existing information shows no known occurrences of *Botrychium lineare* or *Eutrema penlandii* in the analysis area,
- no new trail construction or reconstruction would take place.

Therefore, there will be **no effect** to *Botrychium lineare* or *Eutrema penlandii*.

Forest Service Sensitive Species:

There will be no effect to any of the Forest Service sensitive plant species analyzed in this document as a result of implementing Alternative A for the following reasons:

- no new trail construction or reconstruction would take place.

Therefore, there will be **no impact** to *Armeria scabra* ssp. *sibirica*, *Botrychium campestre*, *Botrychium multifidum* var. *coulteri*, *Braya glabella*, *Draba exunguiculata*, *Draba smithii*, *Eriophorum altaicum* ssp. *neogeum*, *Eriophorum chamissonis*, *Eriophorum gracile*, *Gilia sedifolia*, *Ipomopsis globularis*, *Kobresia simpliciuscula*, *Machaeranthera coloradoensis*, *Mimulus gemmiparus*, *Neoparrya lithophila*, *Parnassia kotzebuei*, *Penstemon degeneri*, *Potentilla rupicola*, *Primula egaliksensis*, *Ptilagrostis porteri*, *Ranunculus karelinii*, *Rubus arcticus* var. *acaulis*, *Salix candida*, *Salix myrtilifolia*, *Salix serrisima*, *Selaginella selaginelloides* and *Viola selkirkii*.

9.2 ALTERNATIVE B – COLORADO TRAIL CORRIDOR

Federally Threatened or Endangered Species:

Some individuals of *Botrychium lineare* may be impacted as a result of implementation of Alternative B for one or both of the following reasons:

- although site-specific botanical surveys have been performed in the proposed reroutes at Twin lakes, it is possible that individuals went undetected,
- indirect effects may impact individuals outside of the trail corridor.

Therefore, implementation of Alternative B **may affect - is not likely to adversely affect** *Botrychium lineare*. However, the effects to *Botrychium lineare* are discountable (unlikely to occur) due to the level of botanical survey work performed in the trail corridor, leading to the conclusion that the species is most likely not found in the surveyed trail corridor.

There will be no effect to *Eutrema penlandii* from this action for the following reasons:

- a review of the existing information shows no known occurrences of *Eutrema penlandii* in the analysis area, and
- the species has no potential habitat within the proposed new construction or reconstruction.

Therefore, there will be ***no effect*** to *Eutrema penlandii*.

Forest Service Sensitive Species:

There will be no impact to *Eriophorum altaicum* ssp. *neogeum*, *Eriophorum chamissonis*, or *Salix serrisima* from implementation of the Alternative B for the following reasons:

- a review of the existing information shows no known occurrences of the species listed above in the analysis area,
- none of the species listed above were found in the trail corridor during intensive botanical surveys,
- all of species listed above inhabit marshes, fens, or aquatic habitats which will not be impacted by implementation of the proposed action. While wet meadows and riparian areas may be impacted, the trail does not cross fens.

Therefore, there will be ***no impact*** to *Eriophorum altaicum* ssp. *neogeum*, *Eriophorum chamissonis*, *Gilia sedifolia*, or *Salix serrisima*.

For the remainder of the species analyzed in this document, including: *Armeria scabra* ssp. *sibirica*, *Botrychium campestre*, *Botrychium multifidum* var. *coulteri*, *Braya glabella*, *Draba exunguiculata*, *Draba smithii*, *Eriophorum gracile*, *Gilia sedifolia*, *Ipomopsis globularis*, *Kobresia simpliciuscula*, *Machaeranthera coloradoensis*, *Mimulus gemmiparus*, *Neoparrya lithophila*, *Parnassia kotzebuei*, *Penstemon degeneri*, *Potentilla rupincola*, *Primula egaliksensis*, *Ptilagrostis porteri*, *Ranunculus karelinii*, *Rubus arcticus* var. *acaulis*, *Salix candida*, *Salix myrtilifolia*, *Selaginella selaginelloides* and *Viola selkirkii*, some individuals may be impacted as a result of implementation of Alternative B for one or both of the following reasons:

- although site-specific botanical surveys have been performed in the proposed reroutes at Twin lakes, it is possible that individuals of any of these FS sensitive species went undetected during botanical surveys,
- indirect effects may impact individuals outside of the trail corridor.

Therefore, based on the above-stated rationale, implementation of the proposed action ***may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federally listing or a loss of species viability rangewide*** for any of the above species.

9.3 ALTERNATIVE C (THE PROPOSED ACTION): REALIGNMENT OF THE CDNST

Federally Threatened or Endangered Species:

Some individuals of *Botrychium lineare* may be affected as a result of implementation of Alternative C for one or both of the following reasons:

- although site-specific botanical surveys have been performed in the trail corridor, it is possible that individuals went undetected during botanical surveys,
- indirect effects may impact individuals outside of the trail corridor.

Therefore, implementation of Alternative C **may affect - is not likely to adversely affect** *Botrychium lineare*. However, the effects to *Botrychium lineare* are discountable (unlikely to occur) due to the level of botanical survey work performed in the trail corridor, leading to the conclusion that the species is most likely not found in the surveyed trail corridor.

There will be no impact to *Eutrema penlandii* from this action for the following reasons:

- a review of the existing information shows no known occurrences of *Eutrema penlandii* in the analysis area,
- the species was not found in the trail corridor during intensive botanical surveys,
- *Eutrema penlandii* occupies a well-defined habitat niche (downslope from perennial snowfields that provide season-long moisture) that will not be impacted by trail construction. Perennial snowfields and season-long wet soils are poor places to put a trail.

Therefore, there will be **no effect** to *Eutrema penlandii*.

Forest Service Sensitive Species:

There will be no impact to *Eriophorum altaicum* ssp. *neogeum*, *Eriophorum chamissonis*, or *Salix serrisima* from implementation of Alternative C for the following reasons:

- a review of the existing information shows no known occurrences of the species listed above in the analysis area,
- none of the species listed above were found in the trail corridor during intensive botanical surveys,
- all of species listed above inhabit marshes, fens, or aquatic habitats which will not be impacted by implementation of the proposed action. While wet meadows and riparian areas may be impacted, the trail does not cross fens.

Therefore, there will be **no impact** to *Eriophorum altaicum* ssp. *neogeum*, *Eriophorum chamissonis*, *Gilia sedifolia*, or *Salix serrisima*.

A large occurrence of *Braya glabella* was found in the trail corridor during botanical surveys. Some individuals may be impacted as a result of implementation of the proposed project for the following reasons:

- although the trail has been rerouted to avoid the populations and limestone habitat, it is possible that individuals of any of these FS sensitive species were undetected during field

- surveys,
- indirect effects may impact individuals outside of the surveyed trail corridor.

Therefore, based on the above-stated rationale, implementation of Alternative C **may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federally listing or a loss of species viability rangewide** for *Braya glabella*.

For the remainder of the species analyzed in this document, including: *Armeria maritima* ssp. *sibirica*, *Botrychium campestre*, *Botrychium multifidum* var. *coulteri*, *Draba exunguiculata*, *Draba grayana*, *Draba smithii*, *Eriophorum gracile*, *Gilia sedifolia*, *Ipomopsis globularis*, *Kobresia simpliciuscula*, *Machaeranthera coloradoensis*, *Mimulus gemmiparus*, *Neoparrya lithophila*, *Parnassia kotzebuei*, *Penstemon degeneri*, *Potentilla rupincola*, *Primula egaliksensis*, *Ptilagrostis porteri*, *Ranunculus karelinii*, *Rubus arcticus* ssp. *acaulis*, *Salix candida*, *Salix myrtilifolia*, *Selaginella selaginelloides* and *Viola selkirkii*, some individuals may be impacted as a result of implementation of the proposed project for the following reasons:

- although site-specific botanical surveys have been performed throughout the length of the trail corridor, it is possible that individuals of any of these FS sensitive species went undetected,
- indirect effects may impact individuals outside of the surveyed trail corridor.

Therefore, based on the above-stated rationale, implementation of the Alternative C **may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federally listing or a loss of species viability rangewide** for any of the above-listed species.

10.0 RESPONSIBILITY FOR A REVISED BIOLOGICAL EVALUATION

This Biological Evaluation was prepared based on presently available information. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact endangered, threatened, proposed, or sensitive species that in a manner or to an extent not previously considered, a new or revised Biological Evaluation will be required.

12.0 REFERENCES

- Colorado Natural Heritage Program (CNHP). 2003a. Rare and imperiled animals, plants and plant communities database. Fort Collins, CO.
- Colorado Natural Heritage Program. 2003b. Tracked Vascular Plant Species. [Online]. Available: <http://www.cnhp.colostate.edu/tracking/vascular.html>
- EDAW, 2005a. Environmental Assessment for Continental Divide National Scenic Trail Relocation, Halfmoon Creek to South Fooses Pass.
- EDAW, 2005a. Wildlife Biological Evaluation. Continental Divide National Scenic Trail Relocation Halfmoon Creek to South Fooses Pass.
- Elliott, B.E. 2000. Vascular flora of south-central Colorado. M.S. Thesis. Department of Botany. Univ. of WY, Laramie, WY.
- Elliott, B.E., and R.L. Hartman. 2000. A general floristic survey of the San Isabel and Rio Grande National Forests south of the Arkansas and South Arkansas Rivers. Unpubl. rpt.
- Harrington, H.D. 1954. Manual of the plants of Colorado. Sage Books, Denver, CO.
- Holt, E.A. 2002. Vascular Flora of the Sawatch, West Mosquito, and West Gore Ranges and Castle Peak Area, Colorado. Department of Botany. Univ. of WY, Laramie, WY.
- Holt, E.A. and R.L. Hartman. 2002. Vascular Flora of the Sawatch, West Mosquito, and West Gore Ranges and Castle Peak Area, Colorado. Unpubl. rpt.
- MacDonald, L.H., 2000. Evaluating and managing cumulative effects: process and constraints. *Environmental Management* 26(3): 299-315.
- Moseley, R.K. 1991. A Field Investigation of Park Milkvetch in Idaho. Idaho Dept. of Fish and Game. Boise, ID.
- NatureServe Explorer: An online encyclopedia of life [web application]. 2003. Version 1.6. Arlington, VA, USA: NatureServe. Available: <http://www.natureserve.org/explorer>.
- 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.
- University of Colorado Herbarium. 2004. Database of taxa by county. [Online]. Available: http://cumuseum.colorado.edu/Research/Botany/Databases/county_species.html
- United States Department of the Interior, Bureau of Reclamation (U.S. BOR). 2005. Letter Victor Grizzle to Jim Zorne. October, 2004.
- United States Department of the Interior, Bureau of Reclamation (U.S. BOR). 1984. Memorandum of Agreement between the Bureau of Reclamation and the U.S. Forest Service regarding the operation, use, and administration of Twin Lakes Reservoir.
- U.S. Forest Service (Forest Service). 2003a. Rationale for inclusion or exclusion of R2 TES plant species from the San Isabel National Forest and District lists. Unpubl. rpt.
- U.S. Forest Service (Forest Service). 2003b. Rationale for excluding R2 TES plant species from consideration in environmental documents on the San Isabel National Forest. Unpubl. rpt.
- U.S. Forest Service (Forest Service). 2003c. Ryke, N., S. Olson, T. Wagner, and M. Elson. Threatened, Endangered and Sensitive Species of the Pike & San Isabel National Forests and Comanche & Cimarron National Grasslands (November 1, 2003).
- U.S. Forest Service (Forest Service). 2005. Region 2 Regional Foresters sensitive species list. R2 supplement 2600-2005-1 (May 17, 2005).
- U.S. Fish and Wildlife Service (FWS). 2001. Endangered and threatened wildlife and plants; 12-month finding for a petition to list the plant *Botrychium lineare* (Slender Moonwort) as threatened. Federal Register. 66 FR 30368. Department of the Interior, Washington, D.C.

- U.S. Fish and Wildlife Service (FWS). 2003. Federally listed and candidate species and their status in Colorado (by county). Ecological Services Colorado Field Office (October 17, 2003).
- U.S. Forest Service. 1991. Forest Service Handbook. FSH 2309.18. Trails Management Handbook.
- Weber, W.A., and R.C. Wittmann. 1996. Colorado Flora: Eastern Slope. University Press of Colorado, Niwot, Colorado.

PLANTS - R2 SPECIES ASSESSMENTS

- Anderson, D.G. (2004, September 28). *Potentilla rupincola* Osterhout (rock cinquefoil): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/potentillarupincola.pdf> [Accessed October 26, 2005].
- Anderson, D.G. (2004, November 8). *Neoparrya lithophila* Mathias (Bill's neoparrya): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/neoparryalithophila.pdf> [Accessed October 26, 2005].
- Anderson, D.G. and D. Cariveau (2003, November 17). *Botrychium campestre* (Iowa moonwort): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/Botrychiumcampestre.pdf> [Accessed October 26, 2005].
- Beatty, B.L., W.F. Jennings, and R.C. Rawlinson (2003, November 12). *Botrychium ascendens* (trianglelobe moonwort), *B. crenulatum* (scalloped moonwort), and *B. lineare* (narrowleaf grapefern): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/botrychiums.pdf> [Accessed October 26, 2005].
- Beatty, B.L., W.F. Jennings, and R.C. Rawlinson (2003, November 21). *Mimulus gemmiparus* (Rocky Mountain monkeyflower): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/mimulusgemmaiparus.pdf> [Accessed October 26, 2005].
- Beatty, B.L., W.F. Jennings, and R.C. Rawlinson (2004, January 30). *Machaeranthera coloradoensis* (Colorado tansyaster): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/machaerantheracoloradoensis.pdf> [Accessed October 26, 2005].
- Beatty, B.L., W.F. Jennings, and R.C. Rawlinson (2004, February 23). *Penstemon degeneri* (Degener's beardtongue): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/penstemondegeneri.pdf> [Accessed October 26, 2005].
- Glisson, B.T. 2002. Conservation Assessment of Hoary Willow (*Salix candida* Fluegge ex. Willd.) in the Black Hills National Forest, South Dakota and Wyoming. [Online]. USDA Forest Service, Rocky Mountain Region, Black Hills National Forest. Available: http://www.fs.fed.us/r2/blackhills/projects/planning/assessments/hoary_willow_salix_candida.pdf [Accessed October 26, 2005].
- Hornbeck, J.H., D.J. Reyher, C.H. Sieg, and R.W. Crook. 2003. Conservation Assessment of Southern Maidenhair Fern (*Adiantum capillus-veneris* L.) and Stream Orchid (*Epipactis gigantea* Dougl. ex Hook.) in the Black Hills National Forest, South Dakota and Wyoming. [Online]. USDA Forest Service, Rocky Mountain Region, Black Hills National Forest. Available: http://www.rmrs.nau.edu/lab/people/csieg/sieg_pubs/maidenhair_orchid.pdf [Accessed October 26, 2005].
- Hornbeck, H.J., C.H. Sieg and D.J. Reyher. 2003. Conservation Assessment of Autumn willow (*Salix serissima* (Bailey) Fern.) in the Black Hills National Forest, South Dakota and Wyoming. [Online]. USDA Forest Service, Rocky Mountain Region, Black Hills National Forest. Available:

http://www.fs.fed.us/r2/blackhills/projects/planning/assessments/autumn_willow.pdf [Accessed October 26, 2005].

Hornbeck, H.J., C.H. Sieg, and D.J. Reyher. 2003. Conservation Assessment for Great-spurred Violet (*Viola selkirkii* Pursh ex Goldie) in the Black Hills National Forest, South Dakota and Wyoming. [Online]. USDA Forest Service, Rocky Mountain Region, Black Hills National Forest. Available: http://www.fs.fed.us/r2/blackhills/projects/planning/assessments/great_spurred_violet.pdf [Accessed October 26, 2005].

Ladyman, J.A.R. (2005, February 7). *Aquilegia chrysantha* A.Gray var. *rydbergii* Munz (Rydberg's golden columbine): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/aquilegiachrysanthavarrydbergii.pdf> [Accessed October 26, 2005].

Ladyman, J.A.R. (2004, July 14). *Draba exunguiculata* (O.E.Schulz) C.L. Hitchcock (Garys Peak draba): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/drabaexunguiculata.pdf> [Accessed October 26, 2005].

Ladyman, J.A.R. (2004, July 28). *Draba grayana* (Rydb.) C.L. Hitchcock (Gray's draba): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/drabagrayana.pdf> [Accessed October 26, 2005].

Ladyman, J.A.R. (2004, February 3). *Draba smithii* (Smith's draba): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/drabasmithii.pdf> [Accessed October 26, 2005].

Ladyman, J.A.R. (2004, October 29). *Eriophorum altaicum* Meinshausen var. *neogaeum* Raymond (whitebristle cottongrass): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/eriphorumaltaicumvarneogaeum.pdf> [Accessed October 26, 2005].

Ladyman, J.A.R. (2005, February 1). *Oenothera harringtonii* Wagner, Stockhouse & Klein (Colorado Springs evening-primrose): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/oenotheraharringtonii.pdf> [Accessed October 26, 2005].

Panjabi, S.S. and D.G. Anderson (2005, March 15). *Ipomopsis globularis* (Brand) W.A. Weber (Hoosier Pass ipomopsis): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/ipomopsisglobularis.pdf> [Accessed October 26, 2005].

APPENDIX A: PROPOSED TRAIL ALIGNMENTS

APPENDIX A: PROPOSED TRAIL REALIGNMENTS

