

STOVER GULCH HAZARDOUS FUELS REDUCTION PROJECT

**Plant Biological Assessment/Evaluation
SAN CARLOS AND SALIDA RANGER DISTRICT**

26 JUNE 2006

U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE



Picture-leaved wintergreen *Pyrola picta*
Photo by Brian Elliott

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1.0 Introduction

1.1 Purpose of Biological Evaluation/Biological Assessment

This biological evaluation (BE) / biological assessment (BA) analyzes the potential effects of the proposed Stover Gulch Hazardous Fuels Reduction Project within the San Carlos Ranger District (District) on the San Isabel National Forest (Forest) 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 2005) 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

Federally listed species (i.e., threatened and endangered), critical habitat, and candidate species and their effect analysis are separated from FS sensitive species in each of the below sections to assist the U.S. Fish and Wildlife Service (FWS) in their review of federally listed species only.

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 or Act)
- 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)
- 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

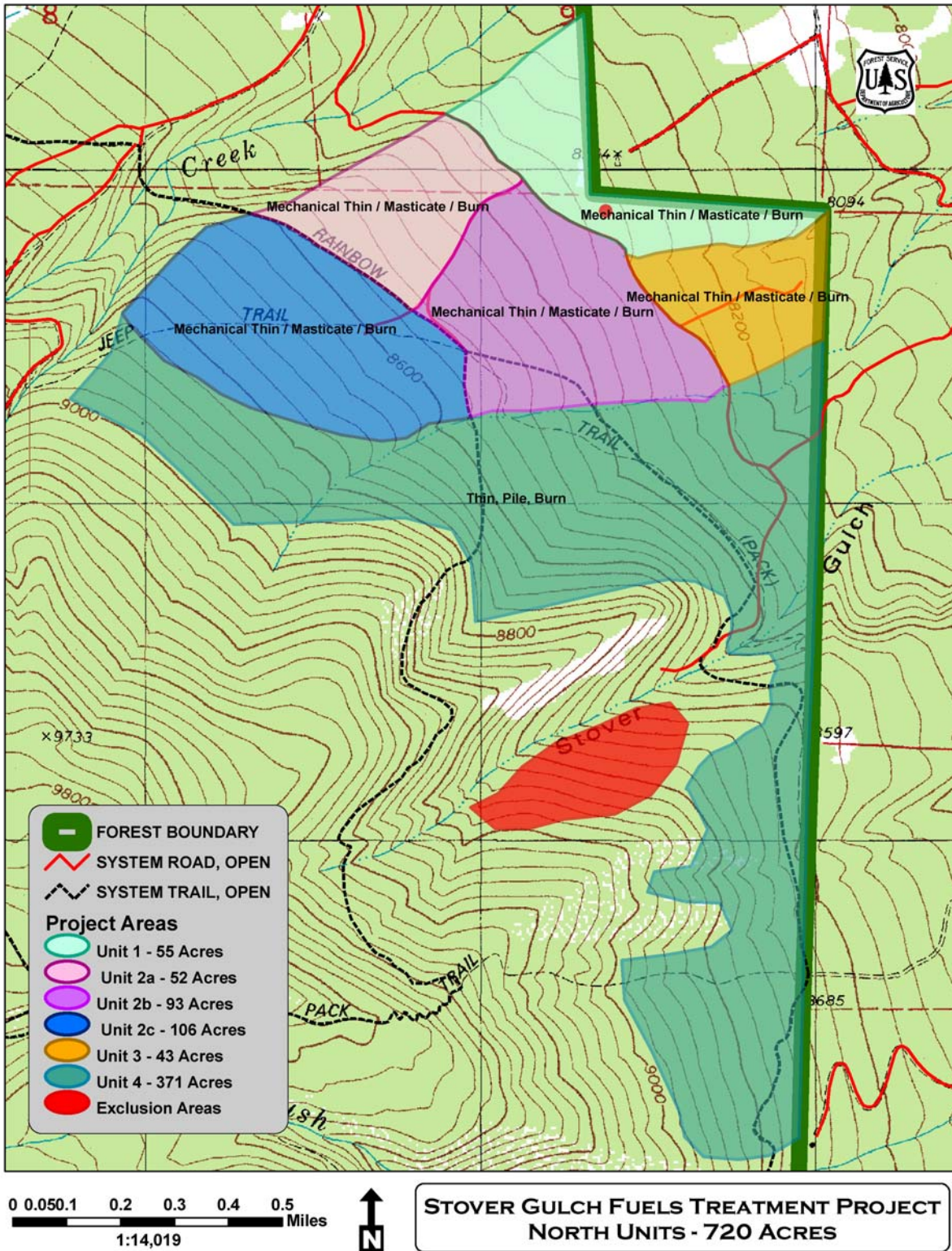
2.0 CONSULTATION HISTORY

No consultation with the U.S. Fish and Wildlife Service has taken place.

3.0 PROPOSED MANAGEMENT ACTION

The Stover Gulch Hazard Fuels Reduction project proposes fuel reduction and forest health treatments in the form of mechanical thinning followed by prescribed fire on approximately 720 acres. Slash residue from these thinning activities would be disposed of using a mix of methods that could include the use of feller-bunchers, hydro-mowing, piling and burning, chipping, lopping and scattering, and hauling some of the material away for utilization as biomass at another site. Small conifers in dense stands would be cut and the slash piled by hand. The hand piles would then be burned. Ground crews using hand-firing devices would conduct the prescribed burning. Engines, hand crews, fuel breaks and constructed fire lines would be used where needed to contain and control prescribed fires.

Map 1: Stover Gulch Hazardous Fuels Reduction Treatment Areas.



4.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

For this analysis, the action (or analysis) area is defined as within one mile of the proposed management action for all species. The project site is defined as the “footprint” or specific site where the proposed action would occur.

The Stover Gulch Project area is located approximately four miles southwest of Hillside, Colorado within T46N, R12E, in sections 9, 16, 17, and 21. The proposed actions would occur on lands managed by the U.S. Forest Service. Adjacent lands are privately owned but may be considered for treatment if landowners are willing to collaborate. The area surrounding public lands in the Stover Gulch area contains a considerable amount of private land intermixed with national forest. There are several homes and other structures near the project area with subdivisions and new home construction continuing on private property. Based on the number of structures and developments in portions of the project area, the more densely populated areas are classed as urban interface while the areas of scattered homes are classed as intermix communities.

The overall historic fire regime for the project area is described as mixed severity. A significant portion of the project proposes to treat forested lands comprised of vegetation condition classes 2 and 3 within and adjacent to areas defined as wildland urban interface and intermix communities. These condition classes are characteristic of forests susceptible to stand replacement or severe wildfires that are associated with a mixed severity regime. (U.S. Forest Service Fire regime Condition Class 2006)

A mosaic of vegetation types exist within the project site. On the lower or eastern boundary of the project site, ponderosa pine (*Pinus ponderosa*) forest is intermixed with dense cover of Gambel oak (*Quercus gambelii*). Small stands of piñon (*Pinus edulis*) and juniper (*Juniperus scopulorum*) are also found at the lowest edge of the project site. Small grass-forb meadows exist amongst the pine-oak area. Above the pine-oak areas are aspen (*Populus tremuloides*) and mixed conifer forest. The mixed conifer forest consists primarily of white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), and lodgepole pine (*Pinus contorta*).

5.0 SPECIES CONSIDERED AND EVALUATED

5.1 Colorado Natural Heritage Program Element Occurrence Records

The Colorado Natural Heritage Program database (CNHP 2006) was reviewed to identify element occurrence records within the action area. No previously documented element occurrences are located within the analysis area. In addition, files from the San Isabel National Forest were reviewed for known species locations. No occurrences of any plant species of conservation concern were known from the analysis area.

5.2 Federally Listed and Candidate Species and FS Sensitive Species

A species list from the FWS (dated November 2005) with all federally listed and candidate species within Colorado was reviewed for this analysis. In addition, the Region 2 Sensitive Species list (Forest Service 2005) was also reviewed for FS sensitive species. Using these lists, it was determined which of those species had a potential to occur within the administrative boundaries (shown in Table 1 below). Species not known from the administrative unit or with no potential of occurring on the administrative unit were documented with a rationale in the following documents: Rationale for Excluding R2 Sensitive Plant Species from Consideration in Environmental Documents on the San Isabel National Forest (Forest Service 2003b), and Rationale for Inclusion or Exclusion of R2 TES Plant Species on the San Isabel National Forest and District Lists (Forest Service 2003a). A list of species with known occurrences, potential habitat, or that could potentially be affected by the proposed action is shown in Table 1 below. Those marked with no potential to occur will not be discussed further in this document.

Species excluded from further analysis have been dropped by meeting one or more of the following conditions:

1. the species does not occur nor is it expected to occur in the project area during the time period the proposed activities would occur;
2. the proposed actions do not occur in the species' habitats;
3. the project is outside of the geographical or elevational range of the species.

In addition, Table 1 below also gives a very brief summary of habitat requirements for federally listed, candidate, and FS sensitive species.

San Isabel National Forest Threatened, Endangered, Proposed and Sensitive Plant Species List

Table 1: Federally Threatened, Endangered, and Proposed plant species and Forest Service sensitive plant species with potential to occur on the San Isabel National Forest. NOTE: The Region 2 Forest Service sensitive species list (Forest Service 2005), and PSICC species list (Forest Service 2003a and 2003b) were reviewed and species not having the potential to occur on the Forest were excluded from this list. Species on the above lists not appearing on this one were excluded for one or more of the following reasons: lack of suitable habitat, outside of species' known distributional range, or outside of elevational range of species.

¹**Status Codes:** E=federally listed endangered; T=federally listed threatened; C= federally proposed/candidate for listing; and S=Forest Service sensitive

²**Exclusion Rationale Codes:** ODR=outside known distributional range of the species; HAB= no habitat present in analysis area; and ELE= outside of elevational range of species

SPECIES COMMON AND SCIENTIFIC NAME	STATUS ¹	POTENTIAL TO OCCUR	RATIONALE FOR EXCLUSION ²	HABITAT DESCRIPTION AND RANGE IN COLORADO
<i>Aquilegia chrysantha</i> var. <i>rydbergii</i> Golden columbine	S	✓		along streams and in rocky ravines in mountains; (5,500 ft?) 8,000-9,800 ft; El Paso and Fremont counties.
<i>Armeria maritima</i> ssp. <i>sibirica</i> Siberian sea thrift	S		HAB ELE	grassy tundra slopes, on wet, sandy, or spongy organic soils; 11,900-13,000 ft; Park & Summit counties.
<i>Asclepias uncialis</i> Dwarf milkweed	S		HAB ELE	plains, short-grass prairie, outwash mesas and gravelly side-slopes; 4,000-6,500 ft; Baca, Fremont, Huerfano, Las Animas, and Pueblo counties.
<i>Astragalus leptaleus</i> Park milkvetch	S	✓		moist swales and meadows; South Park to the Wet Mountain Valley; 7,500-10,000 ft; Park, Fremont, and Custer counties.
<i>Botrychium lineare</i> Narrow-leaved moonwort	C,S	✓		disturbed sites, grassy slopes among medium height grasses, along edges of streamside forests, alpine areas & aspen forests; 7,900-9,500 ft; Boulder & El Paso counties
<i>Botrychium multifidum</i> Leathery grapefern	S		ODR	mountain meadows; 6,700-9,900 ft; Larimer to Routt counties.
<i>Braya glabella</i> Arctic braya	S		HAB ELE	sparsely vegetated slopes above timberline, especially on calcareous substrates; 12,000-13,000 ft; Chaffee, Gunnison, Park, and Pitkin counties.
<i>Carex diandra</i> Lesser panicled sedge	S		ODR	wet meadows and subalpine willow carrs; 7,400-9,000 ft; Boulder, Grand, Jackson, and Larimer counties.
<i>Carex livida</i> Livid sedge	S		HAB	fens and wetlands; 9,000-10,000 ft; Jackson, Larimer, and Park counties.
<i>Cypripedium parviflorum</i> Lesser yellow lady's slipper	S	✓		moist forests and aspen groves; 7,400-8,500 ft; Clear Creek, Custer, El Paso, Huerfano, Jefferson, Las Animas, Park, Pueblo, and Teller counties.
<i>Draba exunguiculata</i> Clawless draba	S		HAB ELE	alpine on rocky and gravelly slopes or fellfields, usually on granitic substrates; 12,000-14,000 ft; north-central Colorado including Lake, Park, and Summit counties.

SPECIES COMMON AND SCIENTIFIC NAME	STATUS ¹	POTENTIAL TO OCCUR	RATIONALE FOR EXCLUSION ²	HABITAT DESCRIPTION AND RANGE IN COLORADO
<i>Draba grayana</i> Gray's peak whitlow-grass	S		HAB ELE	alpine and subalpine on tundra, gravelly slopes or fellfields; 11,500-14,000 ft; central Colorado, including Chaffee, Clear Creek, Huerfano, and Park counties.
<i>Draba smithii</i> Smith whitlow-grass	S	✓		upper montane, subalpine and alpine, 8,000-11,000 ft; Custer, Las Animas, Mineral, and Saguache counties.
<i>Drosera rotundifolia</i> Roundleaf sundew	S		HAB	amongst <i>Sphagnum</i> on the margins of ponds, fens, and floating peat mats; 9,100-9,800 ft; Gunnison and Jackson counties. Also, a new collection from "North Park".
<i>Epipactis gigantea</i> Giant helleborine, stream orchid	S		HAB	seeps, springs, riparian areas and wetlands; 4,800-8,000 ft; western Colorado, also Chaffee, El Paso, Fremont, and Park counties.
<i>Eriogonum brandegei</i> Brandegee's buckwheat	S		HAB	piñon -juniper or sagebrush, often on grayish limestone soils; 5,700-7,600 ft; Chaffee, El Paso, Fremont, and Park counties.
<i>Eriogonum exilifolium</i> Dropleaf buckwheat	S		ODR	sagebrush flats; North and Middle Parks in Jackson and Grand counties.
<i>Eriophorum altaicum</i> var. <i>neogaeum</i> white-bristle cottongrass	S		HAB	alpine wetlands; 9500-14,000 ft; Eagle, Gunnison, Hinsdale, La Plata, Park, Saguache, and San Juan counties.
<i>Eriophorum chamissonis</i> Chamisso's cottongrass	S		HAB	alpine wetlands; 10,400 ft; the Colorado distribution of this species is not known, partially due to taxonomic issues (the species is often confused with <i>Eriophorum altaicum</i> var. <i>neogaeum</i>).
<i>Eriophorum gracile</i> Slender cottongrass	S		HAB	montane and subalpine wetlands, wet meadows and pond edges; 8,100-12,000 ft; Jackson, Las Animas, and Park counties.
<i>Eutrema penlandii</i> Penland alpine fen mustard	T		HAB ELE	alpine areas, downslope from persistent snowfields providing year round moisture, bogs that are wet with a constant source of flowing water; 12,000-12,800 ft; known to occur on the leeward side of the crest of the Mosquito Range, from Hoosier Pass to Mount Sherman, Park and Summit counties
<i>Festuca campestris</i> Rough fescue	S	✓		subalpine meadows; 11,000 ft; Huerfano County
<i>Festuca hallii</i> Plains rough fescue, Hall fescue	S		ODR ELE	alpine and subalpine grasslands and meadows; 11,000-12,000 ft; Larimer County.
<i>Ipomopsis globularis</i> Globe gilia	S		HAB ELE	alpine ridgetops, and gravelly, calcareous soils; 12,000-14,000 ft; Lake, Park, and Summit counties.
<i>Kobresia simpliciuscula</i> Simple bog sedge	S		HAB	alpine areas including tundra, fens, moist gravel, and glacial outwash; Park and Clear Creek counties.
<i>Machaeranthera coloradoensis</i> Colorado tansy-aster	S	✓		mountain parks, slopes & rock outcrops & dry tundra; 8,500-12,500 ft; Gunnison, Hinsdale, La Plata, Lake, Mineral, Park, Pitkin, Saguache, & San Juan counties.
<i>Malaxis brachypoda</i> White adder's-mouth orchid	S		HAB	riparian areas, amongst mosses; 7,200-8,000 ft; El Paso & Jefferson counties.

SPECIES COMMON AND SCIENTIFIC NAME	STATUS ¹	POTENTIAL TO OCCUR	RATIONALE FOR EXCLUSION ²	HABITAT DESCRIPTION AND RANGE IN COLORADO
<i>Mimulus gemmiparus</i> Weber's monkeyflower	S	✓		granitic seeps, slopes, and alluvium in open sites within spruce-fir and aspen forests; 8,500-10,500 ft; Grand, Jefferson, Larimer, and Park counties.
<i>Neoparrya lithophila</i> Rock-loving aletes	S	✓		piñon/juniper woodlands, rocky places, montane grasslands and openings, and sometimes on Dry Union formation; 7,000-10,000 ft; Chaffee, Conejos, Fremont, Huerfano, Mineral, Rio Grande, and Saguache counties.
<i>Oenothera harringtonii</i> Arkansas Valley evening primrose	S		HAB ELE	grasslands; 4,700-6,100 ft; El Paso, Fremont, Huerfano, Las Animas, and Pueblo counties.
<i>Parnassia kotzebuei</i> Kotzebue's grass of parnassus	S		HAB	alpine and subalpine, in wet rocky areas, amongst moss mats and along streamlets; 10,000-12,000 ft; north-central and southwestern Colorado, including Park and Summit counties.
<i>Penstemon degeneri</i> Degener's beardtongue	S	✓		piñon/juniper, ponderosa pine woodlands, & montane grasslands with coarse gravelly or rocky reddish soil with igneous bedrock, rock slab cracks; 6,000-9,500 ft; Fremont & Custer counties
<i>Potentilla rupincola</i> Rocky Mountain cinquefoil	S	✓		subalpine or montane granitic outcrops amongst ponderosa or limber pine; 6,900-10,500 ft; Boulder, Clear Creek, Larimer, and Park counties.
<i>Primula egaliksensis</i> Greenland primrose	S		HAB	wet meadows, streambanks, willow carrs, fens, and on hummocks; 9000-10,000 ft; Park County.
<i>Ptilagrostis porteri</i> Colorado false needlegrass/Porter feathergrass	S		HAB	hummocks in fens and willow carrs; 9,200-12,000 ft; El Paso, Lake, Park, and Summit counties.
<i>Ranunculus karelinii</i> tundra buttercup	S		HAB	alpine slopes and summits amongst rocks and scree; 12,000-14,100 ft; central Colorado, including Chaffee, Clear Creek, Gunnison, Lake, Park, & Summit counties
<i>Rubus arcticus</i> ssp. <i>acaulis</i> Northern blackberry	S		HAB	wetlands in willow carrs and mossy streambanks; 8,600-9,700 ft; Clear Creek and Park counties.
<i>Salix arizonica</i> Arizona willow	S	✓		meadows, springs, seeps, riparian areas and wetlands; 8,300-10,800 ft; Conejos county
<i>Salix candida</i> Sageleaf willow	S		HAB	fens and pond and stream edges in foothill/montane wetlands; 8,800-10,600 ft; Gunnison, Hinsdale, Lake, La Plata, Larimer, and Park counties.
<i>Salix myrtilifolia</i> Blueberry willow	S		HAB	in fens from foothills to alpine; 9,300 ft; Park County.
<i>Salix serissima</i> Autumn willow	S		HAB	wetland areas including marshes, fens, and bogs; 7,800-10,200 ft; Custer, Park, Larimer, and Routt counties.
<i>Selaginella selaginoides</i> Club spikemoss	S		HAB	marshy areas and wet spruce forests; east side of the Park Range (possibly in Park, Teller, Jefferson, and Douglas counties?); little is known about the distribution of this species in Colorado.

SPECIES COMMON AND SCIENTIFIC NAME	STATUS ¹	POTENTIAL TO OCCUR	RATIONALE FOR EXCLUSION ²	HABITAT DESCRIPTION AND RANGE IN COLORADO
<i>Utricularia minor</i> Lesser bladderwort	S		HAB	shallow water of subalpine ponds; 5,500-9,000 ft; north-central and west-central Colorado; little is known about the Colorado distribution of this easily overlooked plant.
<i>Viola selkirkii</i> Selkirk's violet	S	✓		forests from montane to subalpine; 6,000-9,100 ft; Douglas, El Paso, and Larimer counties.

6.0 Evaluated Species Information

6.1 Field Reconnaissance

Botanical surveys were performed throughout the Stover Gulch project site. Surveys were performed on 23 May 2005, 24 May 2005, 16 June 2005, and on 20 June 2005. Surveys were performed by the following Forest Service botanists and biological technicians: Brian Elliott, Janet Prevey, Peter Ebertowski, and Joanna Griego.

Surveys were performed in late spring and early summer because the majority of TES plants with potential habitat in that area are flowering and most easily identified during that time period. The survey methodology was intuitive-controlled, consisting of a meander search with closer inspections in areas of potential habitat for TES plant species. A total of 10 person days were spent on botanical surveys in the project area, with an average of 72 acres being surveyed per person per day.

Field surveys revealed the following new occurrences:

- a new occurrence of *Draba rectifracta* (mountain whitlow-grass, G3?/S2).
- a new occurrence of *Pyrola picta* (picture-leaf wintergreen, G4G5/S3S4).
- a new occurrence on *Cirsium arvense* (Canada thistle).

Although not currently on the sensitive species list, occurrences of *Pyrola picta* and *Draba rectifracta* will be protected through the use of an exclusion zone.

6.2 Species Information for Species Addressed

FEDERALLY THREATENED, ENDANGERED AND PROPOSED SPECIES

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

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

Narrow-leaved moonwort (*Botrychium lineare*) is a perennial herb of the adder's-tongue family (Ophioglossaceae). that produces spores 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 and has been found among the riparian transition vegetation associated with aspen., and is found at elevations ranging from 7,900 to 11,000 feet. Narrow-leaved moonwort ranges from Washington and Montana south to California and Colorado, and there are historic

records in Quebec and Nebraska. Narrow-leaved moonwort is ranked G1S1. 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. Surveying for the species is difficult due to its small size and the possibility that it may not emerge in some years.

FOREST SERVICE REGION 2 SENSITIVE SPECIES

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

***Aquilegia chrysantha* var. *rydbergii*: golden columbine**

Golden columbine (*Aquilegia chrysantha* var. *rydbergii*) is a perennial herb in the buttercup family (Ranunculaceae). It flowers in June and grows in riparian areas in the mountains from 5,500-6,000 feet elevation. The species is endemic to Colorado, found only in El Paso and Fremont counties. Golden columbine is ranked G4T1Q globally and has a state rank of S1.

***Astragalus leptaleus*: Park milkvetch**

Park milkvetch (*Astragalus leptaleus*) is a perennial herb of the bean family (Fabaceae) that grows in moist swales and meadows. It has been found in Idaho, Montana, Wyoming, and Colorado. The species is more common in Colorado than in the other states (Moseley, 1991). In Colorado, this milkvetch is found from South Park to the Wet Mountain Valley in Park, Fremont, and Custer counties at elevations ranging from 7,500-10,000 feet.

***Cypripedium parviflorum*: yellow lady's slipper**

Yellow lady's-slipper (*Cypripedium parviflorum*) is a perennial herb of the orchid family (Orchidaceae) that inhabits moist forests and aspen groves. The species is widespread in North America, growing in Alaska and Canada as well as most of the northern and eastern states. It reaches its southern Rocky Mountain distribution in Colorado. Although widespread, it is uncommon in most of its range. Populations are widely scattered in Colorado where the species is known from ten counties at a narrow elevation range of 7,400-8,500 feet. The species is considered secure globally (ranked G5), reflecting its wide distribution. In Colorado, the species is considered imperiled (ranked S2).

***Draba smithii*: Smith's whitlow-grass**

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.

***Festuca campestris*: big rough fescue**

Big rough fescue (*Festuca campestris*) is a perennial graminoid of the grass family (Poaceae) that grows in subalpine meadows. The species is widely disjunct, growing in Canada and the Pacific Northwest with one population in Huerfano County, Colorado at 11,000 feet. (H.D. Harrington reports a second population in Custer County that is not mentioned in any subsequent texts). The species has a global rank of G4?, indicating that the species is considered apparently secure globally but rare in portions of its range. The question mark indicates uncertainty about

the appropriate global rank for the species. Although the Colorado rank is SH (state historical, a rank given to species not seen in the state since 1920), the University of Colorado Museum has a specimen from 1978.

***Machaeranthera coloradoensis*:** Colorado tansyaster

Colorado tansy-aster (*Machaeranthera coloradoensis*) 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 feet. The species is found only in Wyoming and Colorado. In Colorado known occurrences exist in 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

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 feet. 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 *gemmiparus* 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

Rock-loving neoparrya (*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.

***Penstemon degeneri*:** Degener's beardtongue

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). 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 feet in Fremont, Chaffee, and Custer counties. Degener's beardtongue is ranked G2S2 (critically imperiled) due to its limited distribution.

***Potentilla rupincola*:** Front Range cinquefoil

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.

***Salix arizonica*:** Arizona willow

Arizona willow (*Salix arizonica*) is a woody shrub of the willow family (Salicaceae) that inhabits meadows, springs, seeps, riparian and wetlands. Unlike many of our rare species that are circumboreal and reach their southern distribution in Colorado, the center of distribution for Arizona willow is in Arizona and New Mexico with Colorado (and Utah) on the *northern* edge of the species' range. Arizona willow is known in Colorado only from Conejos County at elevations ranging from 8,300-10,800 feet. The species is considered globally vulnerable to imperiled and is ranked G2G3. It is extremely rare in Colorado and receives a rank of S1 (critically imperiled).

***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 three 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, and on the east slopes of the Wet Mountains where it was discovered in 2006. It is found at elevations ranging from 8,500-9,100 feet. 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

As defined under the ESA, the environmental baseline includes past and present impacts of all federal, state, and private actions in the action area; the anticipated impacts of all proposed federal actions in the action area that have undergone formal or early section 7 consultation; and the impact of state and private actions which are contemporaneous with the section 7 consultation process. Future actions and their potential effects are not included in the environmental baseline. The Environmental Baseline and the Evaluated Species Information Sections define the current status of these species and their habitat and provides a platform to assess the effects of the proposed action under consultation with the FWS (if applicable). The LRMP identifies past and planned FS activities on the PSICC, which includes the San Isabel National Forest. In addition to the activities identified below, refer to the LRMP for additional information regarding federal actions on the Forest. Many of these are ongoing activities can be also considered as cumulative effects that are applicable to the cumulative effects analysis in the *Effects to Species* (Section 8.0) below.

Past and current activities have altered sensitive plant occurrences and their habitats. These activities have the potential to cumulatively effect TEPS plant species. These activities include: historic grazing, timber harvest and thinning, fire suppression, prescribed fire, mining, motorized and non-motorized recreational use, road construction, urban development (sub-dividing and development of private land), and noxious weed infestation.

Federal actions currently being implemented in the area include:

- Fuels reduction, forest thinning, and prescribed fire in the Grape Creek and Horn Creek Trailhead areas, near the Rainbow Lutheran Camp, adjacent to the Tanglewood Acres subdivision, and near Sullivan Creek.
- Construction of the North Taylor Creek greenback cut-throat trout barrier.

Some of the effects of Federal Actions and ongoing activities on TEPS plants are as follows:

- Grazing leads to 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 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, 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.

8.0 EFFECTS TO SPECIES EVALUATED

Direct/Indirect Effects

Direct Effects: Direct effects occur when TEPS plant species are physically impacted by activities associated with fuels management through prescribed fire or hand or mechanical treatments. Direct impacts can physically burn, break, crush, uproot, or kill TEPS plants by driving over them, by covering them, by falling trees on them, or by burning them. Direct impacts to sensitive plants can physically damage TEPS plants or the habitats where they grow. When an individual plant is damaged, that plant may experience altered growth and development, and reduced or eliminated seed-set and reproduction. Severe disturbance may cause mortality of TEPS plants. These impacts to individual plants can reduce the growth and development, population size, and potentially the viability of TEPS plant species across the landscape. For annual plant species, the timing of impacts is critical. Management actions taking place after annual species have set seed have much less impact than management actions performed prior to seed-set. Direct effects being considered in this discussion may result from timber falling, skidding, yarding, hand and mechanical fuels treatment, skid trail ripping, road construction, prescribed fire, prescribed fire control lines and slash pile burning.

Direct Effects from Prescribed Fire: Direct effects resulting from prescribed fire may include death or injury of individuals from fire or heat. Fire control line and operation of machinery to construct firelines or control fires may trample or uproot plants and may also cause soil compaction. Timing of prescribed burns is critical for annual plant species. Annual species are less impacted by fall burns, which take place after they have set seed, but could be greatly affected by spring burns that take place while they are growing and flowering. However, if prescribed burns result in high-intensity fires, then the impact to TEPS plant species could be greater since high intensity fires may kill the seedbank and sterilize the soil. Burning hand piles, for example, has the potential to eliminate the herbaceous layer below the pile for years after the pile has burned.

Direct Effects from Hand or Mechanical Treatment: Direct effects from hand or mechanical treatments may also result in death or injury of individuals. Mechanical treatment and hand treatment have the potential to directly impact TEPS plant species by trampling and crushing plants, displacing soil and plants, or smothering plants with slash, chips, or soil. The timing of hand or mechanical treatment is critical in management of annual plant species, which are less impacted by disturbance that takes place after they have completed their life-cycle and set seed.

Indirect Effects: Fuels management, mechanical or hand treatment can indirectly impact TEPS plants by changing the in vegetation composition and successional pathways of that vegetation, changing local hydrologic patterns in TEPS plant habitat, changing the fire regime, or by changing the soil characteristics of the habitat. Some of these changes may result from shifts in hydrologic, solar, and soil characteristics of their habitat. Management actions can also lead to changes in forage condition, and this can lead to changes in the foraging behavior of livestock and wildlife within the analysis area. New use patterns can result in different potential impacts to sensitive species. Indirect effects can also occur from noxious weed invasion, or from impacts to pollinators or mycorrhizae associated with TEPS plant species. Indirect impacts can have positive or negative effects.

Some indirect effects, such as noxious weed invasion, potentially pose a highly negative impact to all plant habitats, although different habitats may be invaded by different species of noxious weeds. In riparian areas or wet meadows, Canada thistle (*Cirsium arvense*) and perennial pepperweed (*Lepidium latifolium*) may invade with potentially catastrophic results. Upland areas may be invaded by a host of noxious weeds such as leafy spurge (*Euphorbia esula*) or the knapweeds (*Centaurea* spp.). These noxious weeds can lead to habitat changes detrimental to TEPS plant species. Noxious weeds, once established, could indirectly impact sensitive plant species through allelopathy (the production and release of plant compounds that inhibit the growth of other plants), by changing the fire regime, or by direct competition for nutrients, light, or water. Subsequent weed control efforts such as hand-pulling, hoeing, mowing, or herbicide application could also negatively impact TEPS plants.

Indirect Effects from Prescribed Fire: Indirect effects from prescribed fire could impact TEPS plant species by enhanced noxious weed invasion, changes in vegetation structure, and changes in local hydrological function. These potential effects result from removal of vegetation and opening up the area to additional light. The level of indirect effects from fire may vary depending on the seasonal timing of the fire, the intensity of the fire, and the sensitivity of individual species to fire. While fire is detrimental to some species (particularly those which inhabit the interior forest), fire suppression is detrimental to plants, which inhabit forest openings. No single fire regime will be advantageous to all species. Thus, response to fire will be highly species-dependent with changes being beneficial to some TEPS plant species and detrimental to others.

Indirect Effects from Hand or Mechanical Treatments: Many of the indirect effects resulting from hand or mechanical treatment are similar to those indirect effects resulting from prescribed fire. Indirect effects from changes in vegetation structure, for example, will be similar regardless of the cause of the change. Two major differences, however, between indirect effects resulting from the use of prescribed fire versus mechanical treatment are the level of ground disturbance caused by mechanical equipment, and the potential vectoring of noxious weed seed by off-road equipment. Like prescribed fire, indirect effects from hand or mechanical treatment could include impacts to TEPS plant species from noxious weed invasion, changes in vegetation structure, and changes in local hydrological function. These potential effects result from removal of vegetation, disturbance of the soil, opening up the area to additional light, and transport of noxious weed seeds or plant parts on equipment.

Mechanical and hand treatments cause changes in vegetation structure. Many TEPS plant species should not be affected by mechanical treatment since existing regulations prevent the use of mechanical equipment in their habitat. For example, riparian areas and wet meadows are typically not mechanically treated. Hand treatment, however, may take place in these habitats. Rock outcrop and cliff habitats may also escape indirect (or direct) effects from mechanical treatment since these areas are unsuitable for the operation of machinery. In some cases, however, rock outcrops have been used for staging of equipment.

Other TEPS plant species may benefit from mechanical or hand treatment. These species colonize open areas, multiply rapidly, and persist for a short while. They may be out-competed by other colonizers, or they may persist until woody species move in and shade them out. They are well adapted to take advantage of the high light intensities found in forest openings. These species have become less common as result of fire suppression. Mechanical or hand treatment

may have a beneficial effect on these species since such treatment will maintain areas in a more open condition. However, beneficial indirect effects could easily be overcome by negative direct effects (trampling), excessive soil disturbance (leading to soil erosion or degradation of the seedbed), and noxious weed introduction and spread.

By contrast, species which inhabit the interior forest are adapted to closed canopy forests and low light conditions. Such species thrive in cool, moist and shaded conditions. Changing the vegetation structure to more open, warmer, and drier conditions, regardless of the method, is detrimental to these species. Furthermore, many of these species, (particularly the orchids and moonworts), have complex mycorrhizal associations. Mycorrhizae require organic matter found in the duff layer, and mechanical treatment is much more likely to disturb and disrupt the duff layer.

Changes in hydrologic function resulting from the use of hand or mechanical treatment could potentially impact TEPS plant species. Concerns regarding changes in hydrologic function resulting from the use of hand or mechanical treatment are similar to those concerns regarding prescribed fire. The primary difference is the level of soil disturbance resulting from the use of mechanical equipment. Some areas (those that are particularly steep or have loose soils) are more at risk than others. Heavy soil disturbance exacerbates soil erosion and sedimentation. A more open environment with increased runoff could increase erosion in the uplands as well as peak flows, scouring, and sedimentation in the riparian zones. Erosion in the uplands could remove organic matter and soil cover leading to changes in microclimates. Increased flows could also result in stream downcutting and the subsequent drying of adjacent riparian areas. Sedimentation could affect seed germination and recruitment by covering the seed bank.

Cumulative Effects

Cumulative effects under the National Environmental Policy Act (NEPA) can be defined as:

“...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time” (Federal Register 1986b).

Cumulative Effects is defined differently under the Endangered Species Act as Amended (Federal Register 1986a), in which only the effects of unrelated future state or private activities reasonably certain to occur are considered. Future Federal actions, which will have their own analysis are not considered in evaluating cumulative effects.

Federal actions currently being implemented in the area include:

- Fuels reduction, forest thinning, and prescribed fire in the Grape Creek and Horn Creek Trailhead areas, near the Rainbow Lutheran Camp, adjacent to the Tanglewood Acres subdivision, and near Sullivan Creek.
- Construction of the North Taylor Creek greenback cut-throat trout barrier.
- Numerous special use permits for road access, outfitter and guide activities, and rights of way.

Future Federal actions planned in the area include:

- Fuels reduction, forest thinning, and prescribed fire at Alvarado Campground.

- Campground reconstruction at Alvarado Campground and along South Colony Creek.

Actions being implemented by the State include:

- Road maintenance.

Actions being undertaken and planned by private entities on private lands in the area include:

- grazing
- fuels reduction, including projects in partnership with the USFS.
- timber harvest.
- road construction.
- housing construction.

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 fuels management, mechanical or hand treatment) with the natural variability over time in the resources and processes of concern. This approach is difficult for TEPS plants since long-term 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 sensitive 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 sensitive 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 forest management activities have caused changes in plant community structure and composition across the forests as discussed above. 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.

At this time there are no known TEPS plant population within the analysis area, although abundant habitat exists. General botanical surveys have been performed in support of this project and other small hazardous fuels reduction projects (Alvarado Campground, Tanglewood

Acres, Horn Creek, Grape Creek) in the area. These site-specific surveys have resulted in the discovery of several Colorado Natural Heritage Program tracked plant species and several noxious weed populations but no TEPS plant species. Although no populations of TEPS plant species have been found in the analysis area, it is possible that a small population exists within the analysis area but escaped discovery during surveys. It is unlikely that substantial populations escaped detection during these surveys. Therefore, any effects (including cumulative effects) to TEPS plant species are expected to be insignificant and discountable.

9.0 EFFECTS DETERMINATION

9.1 Federally Threatened, Endangered, or Proposed Plant Species:

The effect of implementing the proposed action on *Botrychium lineare* is *may affect, but not likely to adversely affect*. This determination is based on the following rationale:

- no occurrences are known from the project area.
- although site-specific surveys have been performed, the presence of *Botrychium lineare* cannot be discounted since it is a small and easily overlooked species that may escape detection during standard botanical surveys.
- should the species be present, mechanical treatments and prescribed fire would cause direct and indirect effects.

9.2 Region 2 Sensitive Plant Species

The effect of implementing the proposed action on R2 sensitive plant species *Aquilegia chrysantha* var. *rydbergii*, *Astragalus leptaleus*, *Cypripedium parviflorum*, *Draba smithii*, *Festuca campestris*, *Machaeranthera coloradoensis*, *Mimulus gemmiparus*, *Neoparrya lithophila*, *Penstemon degeneri*, *Potentilla rupincola*, *Salix arizonica*, and *Viola selkirkii* is **MAY ADVERSELY IMPACT INDIVIDUALS, BUT NOT LIKELY TO RESULT IN A LOSS OF VIABILITY ON THE PLANNING AREA, NOR CAUSE A TREND TO FEDERAL LISTING OR A LOSS OF SPECIES VIABILITY RANGEWIDE**. This determination is based on the following rationale:

- there are no known occurrences of any R2 sensitive plant species in the project.
- site-specific surveys revealed no new occurrences of R2 sensitive plant species.
- an occurrence of an R2 sensitive plant species could have been overlooked during surveys, leading to direct or indirect effects to the species; however, these effects would be localized and would not be of sufficient intensity or scale to cause a significant effect to any of the species.

10.0 MITIGATION MEASURES

Mitigation measures are not necessary for the species addressed in this assessment. Measures needed to protect species and enhance their habitat have been incorporated into the project design criteria in Section 3.0 of this assessment.

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