Biological Assessment / Biological Evaluation
for
Threatened, Endangered, Proposed, and Sensitive Plant Species

Klamath National Forest

PROJECT NAME: **Eddy Gulch Late-Successional Reserve Fuels / Habitat Protection Project**

RANGER DISTRICT: **Salmon River and Scott River Ranger Districts**

COMPARTMENT(S): 416, 430, 431, 433, 437, 438, 439

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PROJECT NAME:	Eddy Gulch Late-Successional Reserve Fuels / Habitat Protection Project (Eddy Gulch LSR Project)
ADMINISTRATIVE UNIT:	Klamath National Forest, Salmon River and Scott River Ranger Districts
NEPA DOCUMENTATION:	Eddy Gulch LSR Fuels / Habitat Protection Project Draft Environmental Impact Statement (draft EIS, in progress)
ESA SPECIES CONSIDERED:	McDonald's rock-cress (*Arabis macdonaldiana*) Applegate's milk-vetch (*Astragalus applegatei*) Gentner mission-bells (*Fritillaria gentneri*) Yreka phlox (*Phlox hirsuta*)
ESA DETERMINATIONS:	The Eddy Gulch LSR Project Assessment Area is not within the range of, and does not include habitat for, the four federally *Endangered* plant species listed above; therefore, these plant species would not be affected by the project. No federally *Threatened* plant species occur on the Klamath National Forest.
SENSITIVE SPECIES CONSIDERED:	*Botrychium virginianum*, *Campanula wilkinsiana*, *Chaenactis suffrutescens*, *Cypripedium fasciculatum*, *Cypripedium montanum*, *Eriogonum hirtellum*, *Eriogonum ursinum* var. *erubescens*, *Minuartia stolonifera*, *Eucephalis vialis*, *Pedicularis howellii*, *Smilax jamesii*, *Boletus pulcherrimus*, *Phaeocollybia olivacea*, *Dendrocollybia racemosa*, *Cudonia monticola*, *Sowerbyella rhenana*, *Ptilidium californicum* *Hydrothyria venosa*, and *Tricholomopsis fulvescens*)
SENSITIVE SPECIES DETERMINATIONS:	The Eddy Gulch LSR Project may impact individuals but is not likely to cause a trend toward federal listing or a loss of species viability.
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I. Introduction

The purpose of this document is to evaluate the Eddy Gulch LSR Project in sufficient detail to determine its effects on Endangered, Threatened, Proposed, and Sensitive plant species. This Biological Assessment / Biological Evaluation (BA/BE) is prepared in accordance with the legal requirements set forth under Section 7 of the *Endangered Species Act* (19 United States Code [USC] 1536 (c)) and follows the standards established in Forest Service Manual (FSM 2672.42) direction.

Terms

Eddy Gulch LSR — The entire 61,900-acre LSR.

Assessment Area — The 37,239-acre portion of the Eddy Gulch LSR west of Etna Summit where various treatments are proposed. All released roadless areas that occur in the LSR were excluded from planning efforts and are therefore not part of the Assessment Area.

Treatment Unit — The acres proposed for some type of on-the-ground treatment under a particular alternative.

Analysis Area — The area around treatment units considered in the effects analysis (the analysis area may be larger than the LSR Assessment Area). The analysis area varies by resource.

A. Location Information

The Eddy Gulch LSR Project Assessment Area is located on the Salmon River and Scott River Ranger Districts, Klamath National Forest, in southwestern Siskiyou County. The LSR is located mostly west of Etna Summit, south of North Russian Creek and the town of Sawyers Bar, east of Forks of Salmon, and north of Cecilville. The LSR is about 61,900 acres in size, making it one of the largest LSRs on the Klamath National Forest. The LSR encompasses much of the area between the North and South Forks of the Salmon River, as well as headwaters of Etna Creek. Elevations range from 1,100 feet to about 8,000 feet. The terrain is generally steep and dissected by sharp ridges and streams. There are a few private inholdings in the LSR and along the main Salmon River and other stream corridors adjacent to the LSR.

The legal description for the Eddy Gulch LSR includes the following (all Mount Diablo Meridian):

T38N, R11W, Sections 2-5, 8-10, and 17-19;
T38N, R12W, Sections 1-3, 9-16, and 22-24;
T39N, R10W, Sections 2-10, 15-21, and 29-31;
T39N, R11W, Sections 1-18, 20-29, and 32-36;
T39N, R12W, Sections 11-14, 23-25, and 36;
T40N, R10W, Sections 3-5, 8-11, and 13-35;
T40N, R11W, Sections 24-27 and 34-36;
T41N, R10W, Sections 2-5, 8-17, 20-24, 26-29, and 31-34;
T42N, R10W, Sections 28-29 and 32-35

For a map of the Eddy Gulch LSR Project Assessment Area and proposed treatment units, see Appendix A of this BA/BE.

B. Species of Concern

Threatened, Endangered, and Proposed Plant Species

On November 18, 2008, the Arcata Field Office of the United States Fish and Wildlife Service (USFWS) provided the Klamath National Forest with the following list (USFWS 2008) of four federally *Endangered* plant species (the list shows no federally *Threatened* species occurring on the forest):

- McDonald's rock-cress (*Arabis macdonaldiana*)
- Applegate's milk-vetch (*Astragalus applegatei*)
- Gentner mission-bells (*Fritillaria gentneri*)
- Yreka phlox (*Phlox hirsuta*)

The Eddy Gulch LSR Project Assessment Area is not within the range of, nor does it include habitat for, these four federally Endangered plant species. These species are, therefore, not addressed further in this document because they would not be affected by the Eddy Gulch LSR Project.

Forest Service Sensitive Plant Species

The Region 5 Regional Forester has listed plants as "Sensitive" for which there is a concern for species viability. Sensitive plants are those species that may occur in few to large numbers in a small localized area or that may occur in a wide geographical area but in few numbers in restricted specialized habitats. Fifty-one Sensitive plant species (vascular and nonvascular) are known to occur, or thought likely to occur, on the Klamath National Forest (USFS 2006c). Only those species of concern that have potentially suitable habitat or documented occurrences in areas that may be affected by the proposed project are discussed in this document. These affected areas include all activities discussed in the Proposed Action. The following preliminary botanical review was done to determine which species would have suitable habitat in the Assessment Area, which species are present, and the potential for species to be present.

C. Preliminary Botanical Review

An office pre-field review and a preliminary field review were conducted to determine if the Assessment Area is within the range of any federally listed Threatened, Endangered, or Proposed or Forest Service Sensitive plant species and if suitable habitat is present in the project Assessment Area. All federally Threatened, Endangered, and Proposed (USFWS 2008) and Forest Service Sensitive plant species (USFS 2006c) listed for the Klamath National Forest were considered during this review. As stated above, the Eddy Gulch LSR Project Assessment Area is not within the range of, nor does it include habitat for, the four federally *Endangered* plant species, and there are no federally *Threatened* plant species on the forest. Surveys are not required for species for which suitable habitat is not present or if the Assessment Area is outside the currently known range of the species.

The pre-field review determined that the Eddy Gulch LSR Project Assessment Area contains documented occurrences or potential suitable habitat for 23 of the 51 Forest Sensitive vascular and nonvascular plant species. A Geographic Information System (GIS) query of the Assessment Area was conducted to identify potential suitable habitat for the 23 species. Data layers included vegetation (vegetation type, density, and size class), riparian, soils, aspect, and elevation. Table 1 summarizes the 23 species and acres of potential suitable habitat identified in the Assessment Area. The GIS analysis

determined that for five species, no acres of potential suitable habitat occur in the Assessment Area. The GIS analysis is considered a coarse-grained tool in the pre-field review process and cannot be used to ultimately determine if suitable habitat is present.

The GIS analysis identified 24,827 total acres of potential suitable habitat, including acres of overlapping suitable habitat for multiple species. When acres of overlapping similar habitat were consolidated, approximately 9,139 total individual acres of suitable habitat were identified. A map (Map B-1) of the acres identified in the GIS query is included in Appendix B.

Of the 23 Forest Service Sensitive species, 10 Sensitive species (identified with note "b" in Table 1) were determined to not have potential to occur in the proposed treatment units (Knight 2008). The remaining 13 (of the 23) target Forest Service Sensitive species are identified with note "c" in Table 1. All 13 target Forest Service Sensitive species are considered to have potential to occur in the project Assessment Area (see Table 2 for assessment methods). The 13 species include 11 vascular species, 1 bryophyte, and 1 lichen.

The six Sensitive fungi species listed at the end of Table 1 were previously listed as "Survey and Manage Category B, Pre-Disturbance Surveys Not Practical or Category E, Status Undetermined," where pre-disturbance surveys are not required. Surveys are not required because it was determined that surveys would not be practical due to seasonal timing, difficulty in identification, or lack of habitat specificity or because there was not adequate information available to conduct targeted field surveys (USDA, USDI 2004). For these fungi species an analysis of species-habitat associations, presence of suitable or potential habitat, and a review of the literature on the effects to the species group of concern were used in the biological evaluation to determine effects.

It was further determined that 4 (identified by bold italics in Table 1) of the 13 target Forest Service Sensitive species (*Cypripedium fasciculatum*, *Cypripedium montanum*, *Ptilidum californicum*, and *Hydrothyria venosa*) were most likely to occur in the Assessment Area. The Assessment Area is within the range of the remaining 9 (of the 13) target Forest Service Sensitive species, and potential suitable habitat appears to be present.

Table 1. Acres of Suitable Habitat Identified by GIS Query for the 23 Target Forest Sensitive Plant Species in the Eddy Gulch LSR Project Assessment Area.

Species	Species Code	Acres of Suitable Habitat[a]
Vascular Species		
Botrychium pinnatum[b] Northwest moonwort	BOPI	678
Botrychium virginianum[c, d] Rattlesnake fern	BOVI	0
Campanula wilkinsiana[c] Wilkin's harebell	CAWI8	43
Chaenactis suffrutescens[c] Shasta chaenactis	CHSU	41
Cypripedium fasciculatum[c] Clustered lady-slipper orchid	CYFA	4,313
Cypripedium montanum[c] Mountain lady-slipper orchid	CYMO2	4,313
Epilobium oreganum[b] Oregon fireweed	EPOR	4
Eriogonum hirtellum[c, d] Klamath Mountain buckwheat	ERHI7	0
Eriogonum ursinum var. *erubescens*[c] Blushing buckwheat	ERURE	0
Erythronium citrinum var. roderickii[b] Scott Mountains fawn lily	ERCIR	360
Eucephalis vialis[c] Wayside *aster*	EUVI8	0
Frasera umpquaensis[b] Umpqua green-gentian	FRUM	1,440
Ivesia pickeringii[b] Pickering's ivesia	IVPI	27
Minuartia stolonifera[c] Scott Mountain sandwort	MIST9	3
Pedicularis howellii[c, d] Howell's lousewort	PEHO	0
Phacelia greenei[b] Scott Valley phacelia	PHGR2	4
Raillardella pringlei[b] Showy raillardella	RAPR	752
Smilax jamesii[c] English Peak greenbriar	SMJA	3,080
Thermopsis robusta[b] Robust false lupine	THRO4	887
Bryophyte Species		
Buxbaumia viridis[b] Bug-on-a-stick moss	BUVI2	4,356
Fissidens aphelotaxifolius[b] Brook pocket moss	FIAP	341
Ptilidium californicum[c] Pacific fuzzwort (liverwort)	PTCA5	2,750
Lichen Species		
Hydrothyria venosa[c] (syn. *Peltigera hydrothyria)* Waterfan lichen	HYVE7	1,435
Fungi Species:		
Boletus pulcherrimus Red Pore bolete	BOPU4	Fungi species: habitat evaluation only.
Cudonia monticola Mains	CUMO2	
Dendrocollybia racemosa	DERA5	
Phaeocollybia olivacea	PHOL	
Sowerbyella rhenana	SORH	
Tricholomopsis fulvescens	TRFU3	
Total acres[e]	**24,827**	
Total individual acres[e]	**9,139**	

Notes for Table 1:

a. Acres of Suitable Habitat determined by review and GIS query conducted in April 2008.

b. There is no potential for this species to occur in the proposed treatment units.

c. One of the 13 target Forest Service Sensitive species considered to have potential to occur in the project Assessment Area.

d. The GIS analysis was a coarse-grained approach that could not determine if suitable habitat were present for this species. Data layers included vegetation (vegetation type, density, and size class), riparian, soils, aspect, and elevation. Therefore, the GIS analysis could not be used to determine if suitable habitat is present.

e. "Total acres" is the sum of all suitable habitat; "total individual acres" accounts for overlapping suitable habitat.

Table 2. Assessment Method.

SPECIES	CODE	Assessment Method
Vascular Species:		
Botrychium virginianum Rattlesnake fern	BOVI	Assume presence
Campanula wilkinsiana Wilkin's harebell	CAWI8	Assume presence
Chaenactis suffrutescens Shasta chaenactis	CHSU	Assume presence
Cypripedium fasciculatum Clustered lady-slipper orchid	CYFA	Field survey
Cypripedium montanum Mountain lady-slipper orchid	CYMO2	Field Survey
Eriogonum hirtellum Klamath Mountain buckwheat	ERHI7	Assume presence
Eriogonum ursinum var. *erubescens* Blushing buckwheat	ERURE	Assume presence
Eucephalis vialis Wayside *aster*	EUVI8	Assume presence
Minuartia stolonifera Scott Mountain sandwort	MIST9	Assume presence
Pedicularis howellii Howell's lousewort	PEHO	Assume presence
Smilax jamesii English Peak greenbriar	SMJA	Assume presence
Bryophyte Species		
Ptilidium californicum Pacific fuzzwort (liverwort)	PTCA5	Field Survey
Lichen Species		
Hydrothyria venosa (syn Peltigera hydrothyria) Waterfan lichen	HYVE7	Field Survey
Fungi Species		
Boletus pulcherrimus Red Pore bolete	BOPU4	Assume presence
Cudonia monticola Mains	CUMO2	
Dendrocollybia racemosa	DERA5	
Phaeocollybia olivacea	PHOL	
Sowerbyella rhenana	SORH	
Tricholomopsis fulvescens	TRFU3	

II. Current Management Direction

(FSM 2672.41):

Section 7 of the *Endangered Species Act of 1973* (ESA), as amended, and Forest Service Policy (FSM 2670) direct federal agencies to ensure that any action authorized, funded, or permitted by such agencies is not likely to jeopardize the continued existence of (1) species listed, or proposed to be listed, as Endangered or Threatened by the USFWS; and (2) species listed as Sensitive by the Region 5 Regional Forester, or to cause a trend to federal listing for species listed as Sensitive (USFS 1990).

The Klamath National Forest Land and Resource Management Plan (Klamath LRMP) (USFS 1995) contains forestwide Standards and Guidelines that direct the management of Sensitive plant species to ensure the maintenance of reproducing, self-sustaining populations and to prevent the need for species to become listed as Threatened or Endangered.

Consultation to Date: No ESA Section 7 consultation required.

III. Description of the Proposed Action

A. Alternative B: Proposed Action

The Proposed Action was designed to meet the purpose and need for the proposed Eddy Gulch LSR Project. It includes 25,969 acres of treatments to protect late-successional habitat and communities. Three primary treatment types were identified in the Assessment Area: Fuel Reduction Zones (FRZs), Prescribed Burn Units (Rx Units), and Roadside (RS) treatments along emergency access routes.

- **FRZs**—strategically located on ridgetops to increase resistance to the spread of wildfires. The FRZs would be wide enough to capture most short-range spot fires, and ground, ladder, and crown fuels are reduced so as to change crown fires to surface fires within the treated areas. The FRZs would provide safe locations for fire-suppression personnel to take fire-suppression actions during 90th percentile weather conditions, and they would serve as anchor points for additional landscape-level fuel treatments, such as underburning.
    - ***Proposed Action***. Construct 16 FRZs totaling 8,291 acres to increase resistance to wildfires. The 8,291 acres includes 931 acres in 42 M Units (thinning units) and 7,383 acres in fuel reduction areas (outside the M Units) to reduce ground and ladder fuels.

- **Rx Units**—a series of landscape-level treatments (ranging from 250 to 4,300 acres in size) designed to increase resilience to wildfires by reducing ground and ladder fuels. Most of these treatments would occur on south-facing aspects where fuels dry faster, and treatments would support the role of the FRZs.
    - ***Proposed Action***. ***Implement*** 17,524 acres of Rx Units to increase resiliency to wildfires.
- **RS treatments**—along emergency access routes identified in the Salmon River Community Wildfire Protection Plan (CWPP) and designed to facilitate emergency access for residents to evacuate and for suppression forces to safely enter the LSR in the event of a wildfire.
    - ***Proposed Action***. Treat 44 miles of emergency access routes in FRZs and Rx Units (treatments would be similar to the FRZ or Rx Unit) and 16 miles (with 154 acres of treatments) of RS treatments outside of FRZs and Rx Units—a total of 60 miles of RS treatments along emergency access routes.

B. Resource Protection Measures

Resource protection measures have been designed into the Proposed Action and are intended to protect individual plants and maintain habitat characteristics that are critical to the maintenance of long-term viable plant populations. The resource protection measures apply to the following Forest Service Sensitive plant sites that occur in proposed treatment units: 11 previously documented and 10 new *Cypripedium fasciculatum* (CYFA) sites, 6 previously documented and 6 new *Cypripedium montanum* (CYMO2) sites, one new site of *Smilax jamesii* (SMJA), and two new sites of *Ptilidium californicum* (PTCA5).

Factors considered in designing the measures for the *Cypripedium* species include

- the effects of ground disturbance (mastication, hand-thinning, mechanical harvest) on *Cypripedium* stems (rhizomes), root systems, and associated mycorrhizal fungi;
- the effects of overstory canopy cover (shade) on short-term and long-term viability of *Cypripedium* sites;
- the need to thin dense stands to prevent deterioration of the stand within any buffers;
- the inconclusive evidence of prescribed fire effects on *Cypripedium* sites, the need to protect sites from fire-related mortality, and the need to apply prescribed fire to prevent stand-replacing wildfire; and
- short-term versus long-term viability of individual plants, sites, and habitat characteristics.

Table 3 summarizes site-specific resource protection measures for individual CYFA, CYMO2, and PTCA5 plant occurrences (no measures are needed for the one occurrence of SMJA). The protection measures recommended for CYFA and CYMO2 include the following general recommendations:

- Avoid direct ground disturbance to plants: exclude mastication and hand-thinning in FRZs, RS treatments, and Riparian Reserves and exclude fireline construction (including handline and machine-constructed firelines) in Rx Units within 25 feet of population boundaries; exclude mechanical treatment and yarding within population boundaries;
- Maintain shade from overstory canopy cover: exclude mechanical harvest activities within one site tree distance on slopes to the south and southwest of populations and allow harvest activities to north and northeast of populations with trees felled away from populations;
- Avoid high-temperature burns from slash pile burning treatment: exclude all piling and burning of slash in FRZs within 25 feet of population boundary; and
- Allow prescriptive burning (in FRZs and Rx Units) within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 1), mitigate to exclude burning of plants with either (i) use of fire retardant foam applied outside of the population boundary, or (ii) construction of a fireline (handline) 25 feet outside of population boundary.

Table 3. Summary of Forest Service Sensitive plant sites and resource protection measures, Eddy Gulch LSR Project.

Sensitive Plant Species / Site	Location Within Treatment Unit and Legal Location	Number of Plants and Area	Habitat Description and Site-Specific Resource Protection Measures
***Cypripedium fasciculatum* (Clustered lady-slipper orchid)**			
CYFA-198V	FRZ 20: T41N-R10W-S.21,SW ¼ of SE ¼	2 plants; 5 feet x 10 feet	Site occurs on a northwest-facing convex slope, at 5,600 feet and approximately 300 feet above county road: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) avoid all treatment of slash (pile/burn) within 25 feet of site boundary.
CYFA-200V	FRZ 20 and RS treatment (along Sawyer's Bar Road); T41N0R10W-S29, NW ¼ of SE ¼	6 plants; 1.5 acres	Site occurs on a 40 percent west-facing slope, at 3,580 feet, in an intermittent drainage and approximately 100 feet from county road: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) allow hand thinning of small trees along roadside; (iii) exclude mastication within 25 feet of site boundary; (iv) avoid all slash treatment (piling/burning) within 25 feet of site boundary.
CYFA-201V	Rx Unit 8 (within Riparian Reserve); T40N-R10W-S.20,SE ¼ of SW ¼	14 plants; 2 acres	Site occurs on a northwest-facing slope at 3,300 feet in a Riparian Reserve and within 30 feet of a perennial stream (John's Meadow Creek): (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) avoid all treatment of slash (pile/burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) flag site boundary to ensure location accuracy relative to creek.
CYFA-202V	Rx Unit 8, within a Riparian Reserve; T40N-R10W-S.20,SW ¼ of SW ¼	2 plants; 3 feet x 3 feet	Site occurs on a west-facing slope at 3,200 feet, in a Riparian Reserve within 30 feet of Johns Meadow Creek, a perennial stream: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) avoid all treatment of slash (pile/burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) flag site boundary to ensure location accuracy relative to creek.

Table 3. Summary of Forest Service Sensitive plant sites and resource protection measures, Eddy Gulch LSR Project (continued).

Sensitive Plant Species / Site	Location Within Treatment Unit and Legal Location	Number of Plants and Area	Habitat Description and Site-Specific Resource Protection Measures
***Cypripedium fasciculatum* (Clustered lady-slipper orchid)**			
CYFA-203V	Rx Unit 12; (extends to Riparian Reserve) T40N-R10W-S.20,SE ¼ of SW ¼	68 plants; 4 acres	Site occurs on a 20 percent northeast-facing slope, between 3,640–4,000 feet at head of Eddy Gulch: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) avoid all treatment of slash (pile/burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) flag site boundary to ensure location accuracy relative to Riparian Reserve.
CYFA-RAW1	Rx Unit 9, within a Riparian Reserve; T40N-R10W-S. 9, NW ¼ of NW ¼	2 plants; 5 feet x 2 feet	Site occurs on a north-facing slope at 4,369 feet, within a Riparian Reserve, and within 12 feet of Cow Creek, a perennial stream: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) avoid all treatment of slash (pile/burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) flag site boundary to ensure location accuracy relative to Riparian Reserve.
CYFA-GSV2	Rx Unit 8; T40N-R10W-S.20, NE ¼ of SW ¼	7 plants; scattered in 1 acre	Site occurs on a northwest-facing 50–65 percent slope, at 3,080–3,160 feet: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) avoid all treatment of slash (pile/burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary.
CYFA-KM7	Rx Unit 8 and RS treatment (extends to Riparian Reserve); T40N-R10W-S.19,NE ¼ of SW ¼	73 plants; 600 feet x 150 feet	Site occurs in a Riparian Reserve on a north-facing 38 percent slope, at 2,980 feet, from roadside downslope to South Fork Russian Creek: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude

Table 3. Summary of Forest Service Sensitive plant sites and resource protection measures, Eddy Gulch LSR Project (continued).

Sensitive Plant Species / Site	Location Within Treatment Unit and Legal Location	Number of Plants and Area	Habitat Description and Site-Specific Resource Protection Measures
Cypripedium fasciculatum **(Clustered lady-slipper orchid)**			
			roadside mastication treatment within site boundary; (iii) exclude all treatment of slash (pile, burn) within 25 feet of site boundary; (iv) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary.
CYFA-RB2a	Rx Unit 2, within a Riparian Reserve; T39N-R10W-S.18,NE ¼ of SE ¼	15 plants; 5,000 square feet	Site occurs on a 60 percent northeast-facing slope at 3,450 feet, within a Riparian Reserve approximately 100 feet above Callahan Gulch, a perennial stream: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2) mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude all treatment of slash (pile, burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) exclude any mastication or hand thinning of small trees within 25 feet of site in Riparian Reserve.
CYFA-RB2b	Rx Unit 2, within a Riparian Reserve, on a northeast-facing toe slope above Callahan Gulch, at 3,450 feet (site is 450 feet west of CYFA-RB2A, and same location as CYMO2 T39N-R10W-S.18, NE ¼ of SE ¼	2 plants; 200 square feet	Site occurs on a 55 percent northeast-facing slope at 3,400 feet, and 100 feet south of Callahan Gulch: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude all treatment of slash (pile, burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) exclude any mastication or hand thinning of small trees within 25 feet of site in Riparian Reserve.
CYFA-5-6	FRZ 3 and RS treatment; T39N-R11W-S.7, NE ¼ of NE ¼	17 plants; 1 acre in 3 clumps	Site is a roadside site on a 35 percent west-facing slope at Black Bear Summit, and was burned during a May 2004 prescribed burn (effects include apparent increase in number of flowering stems): (i) exclude population from prescriptive burning as site is still recovering from the 2004 burn; (ii) exclude mastication within 25 feet of site boundary; (iii) exclude all treatment of slash (pile, burn) within 25 feet of site boundary; (iv) if slope is greater than 45 percent and hand-thinning proposed, exclude all hand-thinning of small trees and ground disturbance within 25 feet of plants (3 clumps). (Population is in 2004 prescribed burn and overlaps with CYMO2-5-58A.)
CYFA5-7A,B	Within Rx Unit 12 in a RS treatment (along 39N23 road) on a northeast-facing slope southeast of Black Bear Summit. 2008 Botanical Survey Unit	11 plants; 1 acre in two sub-populations	Site occurs on a northeast-facing upper slope position east of Black Bear Summit at 4,300 feet, area was salvage-logged and burned after a blowdown event in 1997, and prescribed burned in 2006 (current number of flowering stems reduced/recovering): (i) exclude population from prescriptive burning as site is still

Table 3. Summary of Forest Service Sensitive plant sites and resource protection measures, Eddy Gulch LSR Project (continued).

Sensitive Plant Species / Site	Location Within Treatment Unit and Legal Location	Number of Plants and Area	Habitat Description and Site-Specific Resource Protection Measures
***Cypripedium fasciculatum* (Clustered lady-slipper orchid)**			
	#16-North. Same site as CYMO2-5-58B. T39N-R11W-S8, NW ¼ of NW ¼		recovering from the 2006 burn; (ii) exclude all treatment of slash (pile, burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) exclude any mastication or hand thinning of small trees within 25 feet of any plants within RS treatment area.
CYFA-5-9	Rx Unit 4 within a Riparian Reserve T38N-R11W-S.5, SE ¼ of SE ¼	54 plants; 100 feet X 165 feet	Site occurs on a northeast-facing slope at 3,300 feet, within a Riparian Reserve (adjacent to Fourth of July Creek, a perennial stream: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude mastication treatment and hand thinning of small trees within 25 feet of plants in Riparian Reserve boundary; (iii) exclude all treatment of slash (pile, burn) within 25 feet of site boundary; (iv) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary. Treatments are not proposed for site area within 30 feet of the creek, and no resource protection measures are required or recommended.
CYFA-5-16A, B	Riparian Reserve within Rx Unit 4; T39N-R11W-S.34, SE ¼ of SW ¼ and T38N-R11W-S3, NE ¼ of NE ¼	2 plants in S.34, 1 plant in S.3	Both sub-populations occur along the Crawford Creek Trail at 3,300 feet and fully within the Riparian Reserve, one on a concave 45 percent southeast-facing slope, and a second (0.5 mile away) on a steep, east-facing slope: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2) mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude (Riparian Reserve) mastication treatment and/or hand thinning of small trees within 25 feet of plants; (iii) exclude all treatment of slash (pile, burn) within 25 feet of plants; (iv) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of plants.
CYFA-5-39-A,B	Rx Unit 4, within a Riparian Reserve); T39N-R11W-S34,NW ¼ of NE ¼, and T39N-R11W-S27, SW ¼ of SE ¼	72 total plants in two sub-populations	Plants occur on northwest-facing slopes in the Crawford Creek drainage within a Riparian Reserve, between 3,660 and 3,740 feet, on moderate to steep slopes: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude (Riparian Reserve) mastication treatment and/or hand thinning of small trees within 25 feet of plants; (iii)

Table 3. Summary of Forest Service Sensitive plant sites and resource protection measures, Eddy Gulch LSR Project (continued).

Sensitive Plant Species / Site	Location Within Treatment Unit and Legal Location	Number of Plants and Area	Habitat Description and Site-Specific Resource Protection Measures
Cypripedium fasciculatum **(Clustered lady-slipper orchid)**			
			exclude all treatment of slash (pile, burn) within 25 feet of plants; (iv) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of plants. Co-occurs with CYMO2-5-30A,B,C.
CYFA-5-69	M Unit 31; FRZ 20 on SW edge of M Unit 31; T41N-R10W-S.21,NE ¼ of SE ¼	1 plant	Site occurs on a northwest-facing slope at 5,600 feet within an intermittent draw on the far south end of M Unit31: The southern boundary of M Unit 31 (FRZ 20) has been moved one site tree distance to the north to exclude all mechanical treatments at population site and downslope (west, southwest, and due south) of this population, to maintain over story canopy cover shade to south, and to reduce ground disturbance from cable yarding to the east. The site occurs on a northwest-facing slope at 5,600 feet within an intermittent draw on the far south end of M Unit 31. No Resource Protection Measures needed.
CYFA-5-70	FRZ 20; T41N-R10W-S.21,SE ¼ of SE ¼	24 plants; 65 feet x 65 feet	Site occurs on steep northeast-facing slope at 5,300–5,400 feet, and approximately 300 feet upslope of county road: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude slash treatment (pile, burn) within 25 feet of site boundary.
CYFA-5-73	Rx Unit 8, within a Riparian Reserve; T40N-R10W-S.20, SE ¼ of SW ¼	65 plants located in 1991; 200 feet x 200 feet Site not relocated during 2008 surveys	Site occurs on a southwest-facing slope at 3,300 feet within a Riparian Reserve (above Johns Meadow Creek, a perennial stream) and appears to be more than 30 feet above the creek: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude slash treatment (pile, burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) exclude hand thinning of small trees within site boundary (in Riparian Reserve).
CYFA-5-78	FRZ 20 and RS treatment; T41N-R10W-S.28,NE ¼	No plants located in 2004. Site not relocated during 2008 surveys	Site occurs on a north-facing slope at 5,300 feet approximately 150 feet above the county road: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude slash treatment (pile, burn)

Table 3. Summary of Forest Service Sensitive plant sites and resource protection measures, Eddy Gulch LSR Project (continued).

Sensitive Plant Species / Site	Location Within Treatment Unit and Legal Location	Number of Plants and Area	Habitat Description and Site-Specific Resource Protection Measures
Cypripedium fasciculatum **(Clustered lady-slipper orchid)**			
			within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) exclude mastication and/or hand thinning of small trees.
CYFA-5-81	Rx Unit 1, within a Riparian Reserve; T39N-R12W-S.13, NW of SW ¼	10 plants in an unknown area	Site occurs near an intermittent side draw on a southeast-facing slope, at 3,440 feet, and within a Riparian Reserve (Argus Gulch). The site appears to be within 30 feet of the intermittent draw: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude slash treatment (pile, burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) exclude mastication and/or hand thinning of small trees within site boundary.
Cypripedium montanum **(Mountain lady-slipper orchid)**			
CYMO2-GSV1	FRZ 20 and RS treatment T41N-R10W-S29, SE ¼ of SW ¼	1 plant	Site occurs on a northwest-facing 65 percent slope approximately 200 feet uphill from the county road at 3,600 feet: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) for RS treatments, exclude mastication and/or hand thinning of small trees within 25 feet of site; (iii) exclude slash piling and burning within 25 feet of site.
CYMO2-KM1	Rx Unit 9; T41N-R10W-S.32, SE ¼ of NW ¼	12 plants; 100 feet x 3 feet	Site occurs on a flat roadside northeast-facing slope at 3,680 feet: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude slash treatment (pile, burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary.

Table 3. Summary of Forest Service Sensitive plant sites and resource protection measures, Eddy Gulch LSR Project (continued).

Sensitive Plant Species / Site	Location Within Treatment Unit and Legal Location	Number of Plants and Area	Habitat Description and Site-Specific Resource Protection Measures
***Cypripedium montanum* (Mountain lady-slipper orchid)**			
CYMO2-GSV3	Rx Unit 8, within a Riparian Reserve T40N-R10W-S.20, NE ¼ of SW ¼ continuing to SW ¼ of SW ¼	13 plants; scattered within 1 acre	Site occurs on a north-facing lower slope at 3,000 feet, within a Riparian Reserve 100 to 200 feet above South Fork Russian Creek, a perennial stream: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude slash treatment (pile, burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) exclude mastication and/or hand thinning of small trees within site boundary (in Riparian Reserve).
CYMO2-204V	Rx Unit 12; T39N-R11W-S8, NW of NW ¼	10 plants; 3 feet x 3 feet	Site occurs on a steep, northeast-facing convex slope due east of Black Bear Summit, (north of the 2004 prescribed burn treatment): (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude slash treatment (pile, burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary.
CYMO2-RB3	Rx Unit 2, within a Riparian Reserve; T39N-R10W, S.18, SW of NE ¼, and NW of SE ¼	125 plants; In 8 clumps along a linear polygon totaling 3.8 acres	Site occurs on a northeast-facing 60 percent slope, within a Riparian Reserve and within 100 feet of Callahan Gulch: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude slash treatment (pile, burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) exclude mastication and/or hand thinning of small trees within site boundary (in Riparian Reserve).
CYMO2-JS1	Rx Unit 2, within Riparian Reserve; T39N-R10W, S.18, SE ¼ of NE 1/4	25 plants; 20 feet x 10 feet	Site occurs on a northwest-facing 65 percent slope, within a Riparian Reserve and within 100 feet above Callahan Gulch: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction

Table 3. Summary of Forest Service Sensitive plant sites and resource protection measures, Eddy Gulch LSR Project (continued).

Sensitive Plant Species / Site	Location Within Treatment Unit and Legal Location	Number of Plants and Area	Habitat Description and Site-Specific Resource Protection Measures
***Cypripedium montanum* (Mountain lady-slipper orchid)**			
			of a fireline (handline) 25 feet outside of population boundary; (ii) exclude slash treatment (pile, burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) exclude mastication and/or hand thinning of small trees within site boundary (in Riparian Reserve).
CYMO2-5-9	Rx Unit 8, within a Riparian Reserve; T40N-R10W-S.20, SW of SE¼ and SE of SW ¼	12 plants located during 1981 Site not relocated during 2008 surveys; 2 acres	Site occurs on both northwest- and southeast-facing slopes at 3,200–3,600 feet above an intermittent side draw of Johns Meadow Creek, site includes plants within 30 feet of intermittent creek: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude slash treatment (pile, burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) exclude mastication and/or hand thinning of small trees within site boundary (in Riparian Reserve).
CYMO2-5-30A,B,C	Rx Unit 4, within Riparian Reserve; T39N-R11W-S.34, NE ¼ of NE ¼, and S.27, SE ¼ of SE 1/4	7 plants; 1 foot x 2 feet	Site occurs on a northwest slope at 3,660 feet, within a Riparian Reserve (above an intermittent tributary of Crawford Creek): (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude slash treatment (pile, burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary. Co-occurs with CYFA-5-39 A,B.
CYMO2-5-32	FRZ 10 due north of M Unit 52; T39N-R11W-S.35, SW ¼ of SW ¼	50 plants; 650 feet x 500 feet	This large site occurs between 4,960 and 5,200 feet, on the west and northwest upper slopes of a south-facing ridgeline south of Grouse Point, within a notable shady oak understory. (i) the northern boundary of M Unit 52 has been moved one site tree distance to the south to exclude all mechanical treatments at site (to maintain overstory canopy cover shade to south, and to reduce ground disturbance from cable yarding to the east); (ii) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet

Table 3. Summary of Forest Service Sensitive plant sites and resource protection measures, Eddy Gulch LSR Project (continued).

Sensitive Plant Species / Site	Location Within Treatment Unit and Legal Location	Number of Plants and Area	Habitat Description and Site-Specific Resource Protection Measures
***Cypripedium montanum* (Mountain lady-slipper orchid)**			
			outside of population boundary; (iii) exclude mastication and/or hand thinning of small trees within the site boundary; (iv) exclude slash treatment (pile, burn) within 25 feet of site boundary; (v) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary.
CYMO2-49	M Unit 52 and FRZ 10; Rx4 T38N-R11W-S2, NW ¼ of NW ¼ and S.3, east ½ of NE ¼ + north ½ of SE ¼	1,000+ plants; 40 acres (approximately 0.75 mile x 650 feet)	This very large site occurs between 4,700 and 5,200 feet, within a notable shady oak understory, on the upper 1/3 of a west and northwest-facing 25% slope, and continuing to the ridgeline (beyond M Unit 52 to the east). The southern boundary of M Unit 52 (FRZ 10) has been moved north to completely avoid this population: (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude mastication and/or hand thinning of small trees within the site boundary; (iii) exclude slash treatment (pile, burn) within 25 feet of site boundary; (iv) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary.
CYMO2-5-58A	FRZ 3; T39N-R11W-S7, NE ¼ of NE ¼	25 plants located during 2006; 1 acre Area not surveyed in 2008	Site is a roadside site on a 35 percent northwest-facing slope, that was burned during a May 2004 prescribed burn (effects appear to have increased number of flowering stems): (i) exclude population from prescriptive burning as site is still recovering from the 2004 burn; (ii) exclude mastication within 25 feet of site boundary; (iii) exclude all treatment of slash (pile, burn) within 25 feet of site boundary; (iv) if slope is greater than 45 percent and hand-thinning proposed, exclude all hand-thinning of small trees and ground disturbance within 25 feet of plants; (v) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (vi) exclude mastication and/or hand thinning of small trees within site boundary.
CYMO2-5-58B	Within Rx Unit 12 on a northeast-facing slope south of Black Bear Summit. 2008 Botanical Survey Unit #16-North. Same site as CYFA-5-7A,B. T39N-R11W-S8, NW of NW ¼	2 plants located during 2006 Area not surveyed in 2008	(i) Allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude slash treatment (pile, burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) exclude mastication and/or hand thinning of small trees within site boundary.

Table 3. Summary of Forest Service Sensitive plant sites and resource protection measures, Eddy Gulch LSR Project (continued).

Sensitive Plant Species / Site	Location Within Treatment Unit and Legal Location	Number of Plants and Area	Habitat Description and Site-Specific Resource Protection Measures
***Cypripedium montanum* (Mountain lady-slipper orchid)**			
CYMO2-5-59	Rx Unit 4 and RS treatment, within a Riparian Reserve; T38S-R11W-S.5, NE ¼ of SE ¼	24 plants; 100 feet by 500 feet	Site occurs on the lower third of a steep, northwest-facing slope within a Riparian Reserve, and more than 30 feet above Fourth of July Creek; one clump also at roadside. Within primary site (above Fourth of July Creek): (i) allow prescriptive burning within population boundary outside of active growing season (September 2 to March 31); where conditions allow for burning during the active growing season (April 1 to September 2), mitigate to exclude burning of plants with either (a) use of fire retardant foam applied outside of the population boundary, or (b) construction of a fireline (handline) 25 feet outside of population boundary; (ii) exclude slash treatment (pile, burn) within 25 feet of site boundary; (iii) avoid all fireline construction, including handline and machine-constructed fireline, within 25 feet of site boundary; (iv) exclude mastication and/or hand thinning of small trees within site boundary (in Riparian Reserve). At roadside clump site: (i) exclude mastication from roadside area site boundary; (ii) allow hand thinning of small trees; (iii) exclude all slash treatment (piling, burning) from within 25 feet of roadside area site clump.
***Ptilidium californicum* (Pacific fuzzwort [liverwort])**			
PTCA5-TE1	RS treatment (39N23 road) in FRZ 5; T39N-R11W-S.28,SW ¼ of NW ¼	2-inch x 4-inch area of plants located in 2008 on one ABCO	Site occurs at the base of a 24-inch diameter at breast height (dbh) white fir, located on a northwest-facing 10 percent slope just above the road at 4,940 feet: (i) exclude mastication RS treatment within 25 feet of white fir PTCA5 site tree; (ii) allow proposed prescriptive fire treatment and protect the base of the white fir PTCA5 site tree from any direct prescriptive burning or indirect slash-related burn treatments. Avoid harvest of PTCA5 substrate trees in RS treatments. Avoid all direct disturbance to PTCA5 substrate trees: exclude mastication in RS treatments within 25 feet of substrate tree.
PTCA5-RB1	FRZ 14 (due west of M Unit 24) T39N-R10W-S17,SE ¼ of SW ¼	1-foot by 1-foot area; approximately 1,000 individual shoots on one ABCO; 2008 Botanical Survey Unit #2-East	Site occurs at the base of on a 36-inch dbh white fir, on a northwest-facing 55 percent slope at 5,460 feet, directly west of M Unit 24 and east of a 1-acre narrow wet meadow. The following measures are recommended for the western boundary of M Unit 24 when flagged on the ground. Allow all prescriptive fire in FRZ, but protect the lower bole of the PTCA5 substrate tree from all fire treatments, including treatment of slash: mitigate with either (i) the use of fire retardant foam applied in a buffer around the tree, or (ii) construction of a fireline (handline) in a buffer around the tree.

Table 3. Summary of Forest Service Sensitive plant sites and resource protection measures, Eddy Gulch LSR Project (continued).

Sensitive Plant Species / Site	Location Within Treatment Unit and Legal Location	Number of Plants and Area	Habitat Description and Site-Specific Resource Protection Measures
Ptilidium californicum **(Pacific fuzzwort [liverwort])**			
			Maintain shade from over story canopy cover in population: exclude mechanical harvest activities within one site tree distance on slopes to the south and east of populations, and allow harvest activities to north and northeast of populations with trees felled away from populations.
Smilax jamesii **(English Peak greenbriar)**			
SMJA-JS152	Rx Unit 8, within a Riparian Reserve; T41N-R10W-S.19,NE ¼ of SE ¼	7 plants	Site occurs along the South Fork Russian Creek, a perennial stream within a Riparian Reserve and within 30 feet of the creek. No resource protection measures are recommended.

The following are the resource protection measures recommended for the two PTCA5:

- Avoid all direct disturbance to PTCA5 substrate trees: exclude mastication in RS treatments within 25 feet of substrate tree;
- Avoid harvest of PTCA5 substrate trees in RS treatments;
- Allow all prescriptive fire in FRZs but protect the lower bole of the PTCA5 substrate tree from all fire treatments, including treatment of slash: mitigate with either (i) the use of fire retardant foam applied in a buffer around the tree, or (ii) construction of a fireline (handline) in a buffer around the tree; and
- Maintain shade from overstory canopy cover in population: exclude mechanical harvest activities within one site tree distance on slopes to the south and east of populations, and allow harvest activities to north and northeast of populations with trees felled away from populations.

No resource protection measures are recommended for the SMJA site.

Sensitive Fungi

This document presents an evaluation of effects on Sensitive fungi species for which presence was assumed. The habitat for the Sensitive fungi species occurs in the wetter environments of riparian areas and uplands within 25 feet of the riparian vegetation. This habitat is present in Riparian Reserves inside proposed FRZs and Rx Units, but the habitat does not occur in mechanical thinning units or RS treatments. The resource protection measures designed to protect fish and water resources are likely to also provide benefits to the Sensitive plant species of concern. The Klamath LRMP defines standard slope distance for Riparian Reserves as two site-potential tree heights or 300 feet for anadromous and resident fish-bearing streams (whichever is greater) and one site-potential tree height or 150 feet for nonfish-bearing streams (whichever is greater). This project defines one site-potential tree height as 170 feet on each side of a qualifying stream channel. Therefore, the Riparian Reserve width is 340 feet for fish-bearing streams and 170 feet on each side of an active stream channel for nonfish-bearing streams.

Proposed treatments within Riparian Reserves in FRZs and Rx Units include removal of small trees by hand thinning and pile burning and with low-intensity backing fires. Resource protection measures for Riparian Reserves are intended to maintain existing shade and moisture levels, litter, duff, and large woody debris components, and species composition. Retention of these components will provide continued high-quality habitat for the Sensitive fungi. Resource protection measures for Riparian Reserves are incorporated into the Proposed Action. The measures that will benefit Sensitive fungi and habitat include the following:

- Avoid construction of handlines within 25 feet of a watercourse;
- Ignite prescribed fires to minimize the potential for burning material to increase the potential for moderate- or high-intensity burns;
- When underburning in Riparian Reserves, at least 90 percent of the large woody debris will not be consumed, both standing and on the ground;
- Where more than 80 percent shade exists, at least 80 percent shade on the water will be retained after treatment;
- Larger conifers (greater than 20 inches dbh) felled within perennial stream channels or inner gorges will be left in place. However, slash will be minimized in the stream channel;
- Best Management Practices and Wet Weather Operations Standards will be implemented during all activities; and
- No new landings will be constructed in Riparian Reserves.

IV. Existing Environment

A. Field Survey

Botanical surveys were completed for the environmental impact statement based on recommendations in the Botanical Pre-field Review (USFS 2008a) and the Botanist's professional judgment. Field surveys were conducted in the Eddy Gulch LSR Project treatment units in August 2008 in accordance with current species protocols. Surveys were intuitive controlled, traversing units and other activity areas searching for the specific habitats for the species of concern. Surveys were timed to correspond with the time period that each species could be most readily identified.

Surveys were conducted by botanists trained in the identification of the target species. Documentation includes traverse routes marked on topographic maps. For all units, forms were completed (see project record), which include the location of the unit, date of survey, seral stage and vegetation series, other habitat information, and a list of associated species. Unit surveys and populations located were documented on survey and site report forms. Field surveys conducted within the general area, and specifically for this project, are adequate to determine the presence of Sensitive species.

Previous district surveys and the results of August 2008 field surveys include 36 sites of four Forest Service Sensitive species (three vascular and one bryophyte) in proposed treatment units:

- 10 new sites and 11 previously documented of *Cypripedium fasciculatum* (clustered lady-slipper orchid);
- 6 new sites and 6 previously documented of *Cypripedium montanum* (mountain lady-slipper orchid);
- 2 new sites of *Ptilidium californicum* (Pacific fuzzwort)
- 1 new site of *Smilax jamesii* (English Peak greenbriar)

A summary of the 36 sites containing Forest Service Sensitive plants is included in Table 4 below and depicted on Map B-1 (Appendix B of this document) in this BA/BE. Individual plant site maps are included with individual Sensitive Plant Population Site Report forms—all are available at the Salmon River and Scott River Ranger Districts office, in Fort Jones, California.

Sensitive Plant Survey Reports, dated

- June 1981 – June 2006 (previously documented sites) (USFS 2006a)
- August 15 – 21, 2008 (new sites) (USFS 2008b)

Sensitive Plant Population Reports, dated

- August 15 – 21, 2008 (USFS 2008a)

Field surveys were conducted for the 4 Forest Service Sensitive species (*Cypripedium fasciculatum*, *Cypripedium montanum*, *Ptilidium californicum*, and *Hydrothyria venosa)* determined as the most likely to occur in the proposed treatment units. Surveys for the 5 species were conducted in the highest potential habitat in proposed treatment units (a total of 1,887 acres). Habitat evaluations were conducted for the remaining 9 target species. The project Assessment Area is within the range of the remaining 9 target Forest Service Sensitive species, and potential suitable habitat appears to be present. All 13 target Forest Service Sensitive species are considered to have potential to occur in the project Assessment Area.

Presence was assumed for the six sensitive fungi species (BOPU4, CUMO2, DERA5, PHOL, SORH, and TRFU3) for which suitable habitat may occur within the project Assessment Area. These species were previously listed as Survey and Manage Category B, Pre-Disturbance Surveys Not Practical (BOPU4, CUMO2, DERA5, SORH and TRFU3) and Category E, Status Undetermined (PHOL). Pre-disturbance surveys were not required for these species under Survey and Manage guidelines either because surveys were determined not to be practical due to seasonal timing, difficulty in identification, or habitat non-specificity, or because there was not adequate information available to conduct targeted field surveys. In the 2004 Final Supplemental Environmental Impact Statement, the assumption was made that field surveys would not be necessary for these species in order to determine effects (USDA 2004c). For this BA/BE, an evaluation of species-habitat associations, presence of suitable or potential habitat, and a review of the literature on the effects to the species group of concern were used to determine effects.

B. Forest Service Sensitive Species Accounts

Vascular Plants

Cypripedium fasciculatum Kellogg ex. S. Wats. *(*Clustered Lady-Slipper Orchid)—CYFA

Clustered lady's-slipper orchid (CYFA) is a perennial forb in the orchid family. The simple stem bears a single pair of sessile, opposite leaves well above mid-length. The two to four greenish-purple flowers occur in a tight cluster, subtended by conspicuous greenish bracts. The species is widely scattered in many western states (Seevers and Lang 1998) in six major areas: (1) Sierra Nevada of California; (2) Coast Range and Cascade Range along the Oregon-California border (Siskiyou Mountains); (3) Santa Cruz Mountains on the central coast of California; (4) Cascade Range in Washington; (5) Rocky Mountains of northern Idaho (Darlene, Selkirk, and Clearwater mountains), northeastern Oregon (Blue Mountains), and western Montana (Mission and Swan ranges); and (6) Rocky Mountains of Utah (Wasatch and Uinta Mountains), Colorado (Park and Front Ranges), and Wyoming (Medicine Bow and Park Range mountains).The species is widespread within each of these centers. It is considered rare and threatened in all states where it occurs, except in California, where it is a Forest Service Sensitive species.

Table 4. Summary of 36 Forest Service Sensitive plant species sites within Eddy Gulch LSR Project proposed treatment units.

Site Number and Legal Description	Site Information[a]	UTM Location[b]	Location Within Proposed Treatment Unit
Cypripedium fasciculatum **(Clustered lady-slipper orchid)**			
CYFA-198V (new site, temporary number assigned) T41N-R10W, S.21, SW of SE ¼	2 plants located in 2008	500421, 4581337	Within FRZ 20. On a northwest-facing upland slope, at -5,600 feet, 1 mile south of Etna Summit. 2008 Botanical Survey Unit #23.
CYFA-200V (new site, temporary number assigned) T41N0R10W, S29, NW of SE ¼	6 new plants located during 2008 surveys	498462, 4580369	Within FRZ 20 in RS Treatment, in a shallow, northwest-facing draw above Sawyer's Bar Road, at 3,600 feet. 2008 Botanical Survey Unit #21.
CYFA-201V (new site, temporary number assigned) T40N-R10W-S.20, SE of SW ¼	14 new plants located during 2008 surveys	496993, 4573520	Within Rx Unit 8, on a northwest-facing slope along John's Meadow Creek (a tributary of South Russian Creek) at 3,300 feet. 2008 Botanical Survey Unit #18.
CYFA-202V (new site, temporary number assigned) T40N-R10W-S.20, SW of SW ¼	2 plants located during 2008 surveys	496717, 4573698	Within Rx Unit 8, on a west-facing slope along John's Meadow Creek (a tributary of South Russian Creek) at 3,200 feet. 2008 Botanical Survey Unit #18.
CYFA-203V (new site, temporary number assigned) T39N-R11W-S8, NW of NW ¼	68 plants located during 2008 surveys	488009, 4568030	Within Rx Unit 12 on a northeast-facing slope east of Black Bear Summit, from 3,640 – 4,000 feet. 2008 Botanical Survey Unit #16-North.
CYFA-RAW1 (new site, temporary number assigned) T40N-R10W, S. 9, NW of NW ¼	2 plants located during 2008 surveys	498399, 4578170	Within Rx Unit 9, on steep, northeast-facing draw above Cow Creek, at 4,300 feet. 2008 Botanical Survey Unit # 19-North.
CYFA-GSV2 (new site, temporary number assigned) T40N-R10W-S.20, NE of SW ¼	7 plants located during 2008 surveys	496775, 4573804	Within Rx Unit 8, on a northwest-facing convex slope above South Russian Creek, at 3,200 feet. Population overlaps with CYMO2-#GSV3. 2008 Botanical Survey Unit #18.
CYFA KM7 (new site, temporary number assigned) T40N-R10W-S.19, NE of SW ¼	73 new plants located during 2008 surveys	496290, 4573984	Within Rx Unit 8 in an RS treatment, on a north-facing convex slope above South Fork Music Creek, at 3,000 feet. 2008 Botanical Survey Unit #18.
CYFA-RB2A (new site, temporary number assigned) T39N-R11W, S.18, NE of SE ¼	15 plants located in 2008 surveys	487391, 4565613	Within Rx Unit 2, on a northeast-facing toe slope above Callahan Gulch, at 3,450 feet. 2008 Botanical Survey Unit #14.
CYFA-RB2B (new site, temporary number assigned) T39N-R10W, S.18, NE of SE ¼	2 plants located in 2008 surveys	487234, 4565613	Within Rx Unit 2, on a northeast-facing toe slope above Callahan Gulch, at 3,450 feet (site is 450 feet west of CYFA-RB2A, and same location as CYMO2 RB03). 2008 Botanical Survey Unit #14.

Table 4. Summary of 36 Forest Service Sensitive plant species sites within Eddy Gulch LSR Project proposed treatment units (continued).

Site Number and Legal Description	Site Information[a]	UTM Location[b]	Location Within Proposed Treatment Unit
CYFA-5-6 T39N-R11W, S.7, NE of NE ¼	17 plants located in 2006 Area not surveyed in 2008		Within FRZ 3 in a RS Treatment, on a northwest-facing slope southwest of Black Bear Summit. Outside 2008 Botanical Survey Units. (Population is in 2004 prescribed burn and overlaps with CYMO2-5-58A.)
CYFA-5-7A,B T39N-R11W-S8, NW of NW ¼	12 plants located in 2006 11 plants located during 2008 surveys	487750, 4567935	Within Rx Unit 12 in a RS Treatment on a northeast-facing slope southeast of Black Bear Summit. 2008 Botanical Survey Unit #16-North. Same site as CYMO2-5-58B.
CYFA-5-9 T38N-R11W-S.5, SE of SE ¼	54 plants located in 1991 Area not surveyed in 2008		Within Rx Unit 4, in riparian area of 4th of July Gulch. (Site overlaps with CYMO2-5-59). Outside 2008 Botanical Survey Units.
CYFA-5-16A T38S-R11W-S.34, SE of SW ¼	2 plants located in 1981 Area not surveyed in 2008		Within Rx Unit 4, along the riparian zone of upper Crawford Creek (along trail). Outside 2008 Botanical Survey Units.
CYFA-5-16B T38N-R11W-S.3, NE of NE ¼	1 plants located in 1981 Area not surveyed in 2008		Within Rx Unit 4, along the riparian zone of upper Crawford Creek (along trail, approx. 0.5 mile north of CYFA-16A). Outside 2008 Botanical Survey Units.
CYFA-5-39A,B T39N-R11W-S34, NW of NE ¼ and T39N-R11W-S27, SW of SE 1/4	72 plants located in 2002 Area not surveyed in 2008		Within Rx Unit 4, on a northwest-facing slope above Crawford Creek (southeast of trail), at 3,600 – 3,700 feet. Outside 2008 Botanical Survey Units.
CYFA-5-69 T41N-R10W, S.21, NE of SE ¼	11 plants located in 1991 1 plant relocated in 2008	500651, 4581662	Within FRZ 20 at southern boundary of M Unit 31. On a shady west-facing concave slope, (at the head of a small intermittent creek), at 5,600 feet, 1 mile south of Etna Summit. 2008 Botanical Survey Unit #23.
CYFA-5-70 T41N-R10W, S.21, SE of SE ¼	24 plants located in 1991 Site not surveyed during 2008 surveys		Within FRZ 20. On a northwest-facing slope at 5,200 feet, 1 mile south of Etna Summit. Outside 2008 Botanical Survey area.
CYFA-5-73 T40N-R10W-S.20, SE of SW¼	65 plants located during 1991 Site not relocated during 2008 surveys		Within Rx Unit 8, on a west-facing draw (John's Meadow Creek) above South Russian Creek. This site overlaps with CYMO2# 5-9. 2008 Botanical Survey Unit #18.

Table 4. Summary of 36 Forest Service Sensitive plant species sites within Eddy Gulch LSR Project proposed treatment units (continued).

Site Number and Legal Description	Site Information[a]	UTM Location[b]	Location Within Proposed Treatment Unit
CYFA-5-78 T41N-R10W, S.28, NE of NW ¼	No plants located in 2004 Site not relocated during 2008 surveys		Within FRZ 20 in a RS Treatment, on a northwest-facing slope at 5,600 feet, south of Etna Summit. 2008 Botanical Survey Unit #22.
CYFA-5-81 T39N-R12W-S.13, NW of SW ¼	10 plants located in 1995 Area not surveyed in 2008		Within Rx Unit 1, along a north-facing side draw of Argus Creek. Outside 2008 Botanical Survey Units.
***Cypripedium montanum* (Mountain lady-slipper orchid)**			
CYMO2-GSV1 (new site, temporary number) T41N-R10W-S.29, SE of SW ¼	1 plant located during 2008 surveys	498115, 4579930	Within FRZ 20 and RS Treatment, on a NW-facing convex slope above Sawyer's Bar Road, at 3,600 feet. 2008 Botanical Survey Unit #21.
CYMO2-KM1 (new site, temporary number) T41N-R10W-S.32, S/E of NW ¼	12 plants located during 2008 surveys	497977, 4579145	Within Rx Unit 9 on a north-facing slope above Taylor Creek road, 3,640 feet. Near 2008 Botanical Survey Unit #20-East.
CYMO2-GSV3 (new site, temporary number assigned) T40N-R10W-S.20, NE of SW ¼ continuing to SW of SW ¼	13 plants located during 2008 surveys	496719, 4573933	Within Rx Unit 8, on a north-facing slope above South Russian Creek, at 3,200 feet. [Site overlaps with CYFA-GSV2]. 2008 Botanical Survey Unit #18.
CYMO2-204V (new site, temporary number assigned) T39N-R11W-S8, NW of NW ¼,	10 plants located during 2008 surveys	488007, 4568047	Within Rx Unit 12 on an upland northeast-facing slope southeast of Black Bear Summit, and north of CYFA-7A. [Population has been monitored after previous 2004 prescribed underburn]; 2008 Botanical Survey Unit# 16-North.
CYMO2-RB3 (new site, temporary number assigned) T39N-R10W, S.18, SW of NE ¼, and NW of SE ¼	125 plants located in 2008 surveys	487347, 4565613	Within Rx Unit 2, on a northeast-facing toe slope above Callahan Gulch, at 3,350–3,650 feet (at same location as CYFA- RB2B). 2008 Botanical Survey Unit #14.
CYMO2-JS1 (new site, temporary number assigned) T39N-R12W-S.24, SE of NE ¼	25 plants located in 2008 surveys	486577, 4565602	Within Rx Unit 2 on a northwest-facing slope above Callahan Creek. 2008 Botanical Survey Unit #14.
CYMO2-5-9 T40N-R10W-S.20, SW of SE¼ and SE of SW ¼	12 plants located during 1981 Site not relocated during 2008 surveys		Within Rx Unit 8, on southwest-facing draw and slopes above John Meadows Creek. (Site overlaps with CYFA-5-73). 2008 Botanical Survey Unit #18.
CYMO2-5-30A,B,C T39N-R11W-S.34, NE of NE ¼, and S.27, SE of SE 1/4	7 plants located in 2002 Area not surveyed in 2008		Within Rx Unit 4, on a northwest-facing slope above Crawford Creek (southeast of trail), at 3,700 feet. Outside 2008 Botanical Survey Units.

Table 4. Summary of 36 Forest Service Sensitive plant species sites within Eddy Gulch LSR Project proposed treatment units (continued).

Site Number and Legal Description	Site Information[a]	UTM Location[b]	Location Within Proposed Treatment Unit
CYMO2-5-32 T39N-R11W-S.35, SW of SW ¼	50 plants located in 1985 Area not surveyed in 2008		Within FRZ 10 and northern edge of M Unit 52, on ridgeline, south of Grouse Point, in unique habitat of conifer-oak woodland. Outside 2008 Botanical Survey Units.
CYMO2-5-49 T38N-R11W-S2, NW of NW ¼ and S.3, NE, SE and SW of NE ¼, and NE and NW of SE ¼	1,000+ plants located in 1991 Area not surveyed in 2008		Within FRZ 10, Rx Unit 4 at southern boundary of M#52, on ridgeline and western slopes below Grouse Point, in unique habitat of conifer overstory/oak understory. Outside 2008 Botanical Survey Units.
CYMO2-5-58A T39N-R11W-S7, NE of NE ¼	25 plants located during 2006 Area not surveyed in 2008		Within FRZ 3 on an upper west-facing slope south of Black Bear Summit. (Site within 2004 prescribed burned area.) Site overlaps with CYFA-5-6. 2008 Botanical Survey Unit #16-North.
CYMO2-5-58B T39N-R11W-S8, NW of NW ¼	2 plants located during 2006 Area not surveyed in 2008		Within Rx Unit 12 on a northeast-facing slope south of Black Bear Summit. 2008 Botanical Survey Unit #16-North. Same site as CYFA-5-7A,B.
CYMO2-5-59 T38S-R11W-S.5, NE of SE ¼	24 plants located in 1995 Area not surveyed in 2008		Within Rx Unit 4 and RS Treatment, on north-facing slope above 4th of July Gulch, Site overlaps with CYFA 5-9. Outside 2008 Botanical Survey Units.
***Ptilidum californicum* (Pacific fuzzwort)**			
PTCA5-TE1 (new site, temporary number assigned) T39N-R11W-S.28, SW of NW ¼	2-inch x 4-inch area of plants located in 2008 on one ABCO	487991, 4562459	Within FRZ 5 and RS Treatment, on a northwest-facing flat slope, at 4,940 feet. 2008 Botanical Survey Unit #13. Lafayette Point.
PTCA5-RB1 (new site, temporary number assigned) T39N-R10W, S17, SE of SW ¼	1-foot by 1-foot area; approximately 1,000 individual shoots on one ABCO; 2008 Botanical Survey Unit #2-East	496747, 4564884	Within Rx Unit 6, at western boundary of M 24, on a northwest-facing slope north of Grasshopper Ridge at 5,460 feet
***Smilax jamesii* (English Peak greenbriar)**			
SMJA-JS152 (new site, temporary number assigned) T41N-R10W, S.19, NE of SE ¼	7 new plants located in 2008 surveys	496040, 4574052	Within Rx Unit 8, along South Russian Creek, at 2,800 feet. 2008 Botanical Survey Unit #18.

Notes:

a. The surveys were conducted in August 2008.

b. UTM coordinates available only for sites located (or re-located) during 2008 project botanical surveys.

CYFA has an intricate life cycle that is not fully understood. As with most orchids, this species' development from seed to a reproductive individual is very slow. *Cypripedium* species are dependent on mycorrhizal associations for several months or years before above-the-ground growth even begins. Specific fungi are required for germination and establishment of new CYFA seedlings; presence of these fungi may be more ecologically important than specific site characteristics (such as elevation, moisture, and shade). Small nonflowering plants have been found to be at least 12 years old (USDA, USDI 1998). The nearly microscopic seeds of this species are produced in large numbers. They are usually waterproof at the time of dispersion and are carried by air or water. The seeds are also dependent on mycorrhizal fungi for germination and establishment.

CYFA likely shares the same growth patterns as other native orchids, which are regularly saprophytic (living on decay) when immature, spending several years in a dependent, subterranean condition before sufficient growth occurs, and stored food accrues for the production of leaves. It is only after this that the plant first appears above ground. Growth is then rapid, and within a season or two, flowering commences. Mature plants appear to also require mycorrhizae (a beneficial association between a fungus and roots of a plant) for proper water uptake and some nutrients. Estimates on the length of time necessary for development of native species from seed to flowering vary considerably from between 8 and 16 years.

Spring growth of CYFA arises from overwintering buds that were produced the previous growing season. Unlike most other plants, however, if new spring growth is destroyed by late frost, foraging animals, or forest management activities, an orchid cannot replace the lost tissues until the following year. Although dormant buds may be present, they will not initiate growth. The root system will remain, and a new bud may form, or a dormant bud will enlarge, but at best the plant will suffer a major setback and may die. Plants that lose their growth before midsummer will commonly appear the next year but will not bloom. Depending on how severely depleted their energy reserves were, they may require two or more subsequent vegetative seasons before blooming (USDA, USDI 1998).

Specific Populations in the Assessment Area. Twenty-one CYFA sites occur in proposed treatment units (refer to Tables 3 and 4 above). Eleven of the sites were documented prior to the August 2008 botanical surveys, and 10 new sites were located during the 2008 botanical surveys.

Six CYFA sites occur in FRZs, of which 4 are inside RS treatment areas in FRZs, and 15 sites occur in Rx Units, of which 2 are within RS treatments.

Cypripedium montanum Douglas ex. Lindley (Mountain Lady-Slipper Orchid)—CYMO2

Mountain lady-slipper orchid (CYMO2) is a tall perennial forb in the orchid family. It has a single, erect leafy stem from 8 to 24 inches in height. The leaves are widely elliptic or ovate-elliptic, from 2 to 6 inches long and up to 3 inches wide, slightly glandular-pubescent sessile and sheathing, with parallel venation. The one to three flowers are large and showy, ranked one above the other. Each flower is opposite a large green, leaf-like bract. The sepals are light to deeply brownish-purple, narrowly to broadly lanceolate, twisted or wavy, with the upper sepal from 1.5 to 2 inches long and the two drooping sepals shorter in length. The pair of upper petals is similarly colored, while the lower, drooping petal forms a pouch-like lip from 0.75 inch to 1.25 inches in length. The lower lip is pure white with purple venation.

CYMO2 ranges from southern Alaska, British Columbia, and western Alberta south to Montana, Idaho, Wyoming, and northern California. In California it is known to occur in Del Norte, Humboldt, Mendocino, Modoc, Mariposa, Plumas, San Francisco, San Mateo, Sierra, Siskiyou, Tehama, Trinity, and Tuolumne counties (Severs and Lang 1998). CYMO2 occurs in both moist and dry conditions within lower and upper montane coniferous forests, typically with 60 to 80 percent canopy cover.

Spring growth of CYMO2 arises from overwintering buds that were produced the preceding growing season. Unlike most other plants, however, if new spring growth is destroyed by late frost, foraging animals, or forest management activities, an orchid cannot replace the lost tissues until the following year. Although dormant buds may be present, they will not initiate growth. The root system will remain, and a new bud may form or a dormant bud will enlarge, but at best, the plant will suffer a major setback and may die. Plants that lose their growth before midsummer will commonly appear the next year but will not bloom. Depending on how severely depleted their energy reserves are, they may require two or more subsequent vegetative seasons before blooming (USDA, USDI 1998).

The historical ecosystem processes that are thought to have provided habitat for this species have been altered. Fire suppression is, perhaps, an important factor in the decline of CYMO2. This is based on site information that indicates the species appears to be doing better in eastern Oregon, and this may be attributable to fire; that is, the greater fire frequency east of the Cascade Range may correlate to the greater number of known sites in the area. Additionally, CYMO2 seems to persist in areas that have been burned. Research on *Cypripedium fasciculatum*, however, appears to contradict the belief that *Cypripediums* are fire dependent and suggests that *Cypripedium fasciculatum* is a fire-intolerant species, and management of this species probably should not include prescribed fire. CYMO2 and CYFA often grow sympatrically (species that occupy the same area without interbreeding), which would indicate that their habitat requirements may be very similar (USDA, USDI 1998). The findings of other research demonstrate that the role of fire in C*ypripedium* habitat needs to be further investigated.

Specific Populations in the Assessment Area. Twelve CYMO2 sites occur in proposed treatment units (refer to Table 4 above). Six of the sites were documented prior to the 2008 botanical surveys, and six new sites were located during the 2008 botanical surveys. Four of the CYMO2 sites occur in FRZ units—one of the four is in an RS treatment. Eight CYMO2 sites occur in Rx Units, one of the eight occurs in an RS treatment.

Smilax jamesii G. Wallace (English Peak Greenbriar)—SMJA

SMJA is a rhizomatous perennial forb in the lily family and a California and Klamath Mountains endemic species. It has a trailing “zigzag” rhizome and an above-ground annual vine with smooth shiny unarmed stems. Leaves are large (2–3 inches), alternate, and triangular to ovate, with long climbing tendrils. The small (0.09 inch) pale-green male and female flowers occur as umbels in the leaf axils. Fruits are small (0.25–0.3 inch) dark-blue berries, drying to maroon. SMJA occurs in moist habitats, lakesides, stream banks, and alder thickets in montane coniferous forests (Hickman 1993). Its range is limited to northern California, including Del Norte, Siskiyou, Shasta, and Trinity counties in the Klamath Mountains.

Specific Populations in the Assessment Area One new site of *Smilax jamesii* was located during 2008 surveys. The site includes seven plants and is located in the Riparian Reserve of Rx Unit 8.

Additional habitat for SMJA appears to occur in the project Assessment Area outside of the 2008 survey areas.

Fungi Species

Very little specific information is available about the six Sensitive fungi species. The following species accounts are based on the best available information. The majority of the information has come from the *Handbook to Additional Fungal Species of Special Concern in the Northwest Forest Plan* (USFS 2003), *Handbook to Strategy 1 Fungal Species in the Northwest Forest Plan* (USFS 1999), and *Management Recommendations for Survey and Manage Fungi* (USFS 1997b).

Mycorrhizal Fungi Species

Many fungi taxa are ectomycorrhizae formers. Mycorrhizae are the symbiotic, mutually beneficial association between a fungus and plant root. This highly interdependent relationship is based on the translocation of mineral nutrients and water by the fungus to the host plant while the fungus obtains photosynthetic carbon from the host plant. Nutrients are transported through an underground network called mycelia, which can extend over several acres. Some mycorrhizal associations are highly specific, and some fungi are dependent upon specific vascular plant species as hosts. Many plants depend on mycorrhizal fungi for adequate uptake of nutrients and survival in nature. Likewise, mycorrhizal fungi depend on their host plant for carbohydrate. No specific ecological information is available for any of these taxa at this time.

These fungi species are dependent upon the habitat elements that support the species and their vascular plant hosts throughout their life cycles. Adequate overstory, understory, and shrub layers of diverse species are required to support these fungi species. Overstory tree cover is important to maintain high moisture levels within the forest litter and large woody debris.

Boletus pulcherrimus (Thiers and Halling)—BOPU4

This mycorrhizal species is endemic to the Pacific Northwest in Washington, Oregon, and northern California. There are known sites on the Ashland District of the Rogue River National Forest and the Ashland Resource Area of the Medford Bureau of Land Management (BLM), which are north of the Eddy Gulch LSR Assessment Area. There are no known sites on the Klamath National Forest, and no sites were discovered during strategic surveys conducted on the Forest. This species is found in humus in association with the roots of mixed-conifers and hardwoods (primarily *Abies grandis*, *Pseudotsuga menziesii*, and *Lithocarpus densiflorus*) in older coastal forests. *Pseudotsuga menziesii* and *Abies concolor* are present in the Assessment Area at the lower and upper elevations, respectively. It is unknown if these are the only tree species with which this fungus forms an association. BOPU4 is a large epigenous (growing on an organism) mushroom that presumably needs moisture to fruit during late summer or early autumn (USFS 1997b). There are currently no known locations of this species at elevations above 5,200 feet. Because the majority of the known sites of this species are located in more humid or coastal locations (and in older forests), the Assessment Area may be too dry to support the species, and there is a **low** probability of the species being present. Populations, if present, would most likely occur in wet north-facing riparian areas within 25 feet of a perennial stream, below 5,200 feet.

Phaeocollybia olivacea **(A.H. Smith)—PHOL**

This species is endemic to the western United States from the central Oregon coast south to Santa Cruz County in California. Within the range of the northern spotted owl, sites are known to occur in the western portions of Washington, Oregon, and California as far south as the Mendocino National Forest. Known sites occur on the Rogue River National Forest, adjacent to the Klamath National Forest. No sites were found during strategic surveys conducted on the Klamath National Forest; however, in recent years, four populations have been documented on the Klamath National Forest in the Happy Camp and Ukonom Ranger Districts. Additionally, there is one population in the Red Buttes Wilderness. PHOL has been found scattered in older mixed forests containing oak, pine, true fir, tanbark oak, or sequoia in western mountain ranges. There are currently no known locations of this species at elevations above 5,000 feet. There is a **low** potential that the species may be present in proposed treatment units. Sites, if present, would most likely occur in wet north-facing riparian areas within 25 feet of a perennial stream, below 5,000 feet.

Saprophytic Fungi Species

Saprophytic species obtain nutrients by the decomposition of dead organic matter. These fungi species are dependent upon adequate amounts of leaves, needles, limbs, large woody debris, other decomposing forest litter, or even dead animal carcasses to provide a substrate and to supply a continuous source of nutrients. These species are not dependent upon specific vascular plant hosts but may require adequate canopy cover to retain the moisture levels sufficient to support them. Most of the known sites of these species are located on the west side of the Klamath National Forest, where climatic conditions provide higher levels of rainfall than what occurs in the project Assessment Area in the central Klamath.

Dendrocollybia racemosa **(pers.: Fr.) Peterson & Redhead—DERA5**

This saprophytic species is widespread in the Northern Hemisphere but always locally rare. Within the range of the northern spotted owl, sites are known to occur from the western portions of Washington, Oregon, and northern California. Known sites occur on the Rogue River National Forest and the Shasta-Trinity National Forest. No sites were discovered during strategic surveys conducted on the Klamath National Forest. One previously known site of this species is located on the Klamath National Forest near the Duck Lake trailhead on the Salmon River and Scott River Ranger Districts. This species is found on rotting or mummified remnants of agarics (a large-capped fungus) or, occasionally, in nutrient-rich leaf mulch in forests. The species has been found in older forests of coastal live oak, Douglas-fir, and tanbark oak, along riparian areas, and in other types of conifer forests. There are currently no known locations of this species at elevations above 5,000 feet. There is a **low** potential for the species to occur in proposed treatment units. If present, sites would most likely occur in wet north-facing riparian areas within 25 feet of a perennial stream, below 5,000 feet.

Cudonia monticola **Mains—CUMO2**

This very rare saprophytic species is endemic to western North America. Within the range of the northern spotted owl, sites are known from the western portions of Washington, Oregon, and northern California. There are no known sites on any adjacent National Forests or BLM Districts. Two sites of this species were previously known on the Klamath National Forest on the Ukonom Ranger District, in the vicinity of Haypress Meadows. This species is found on coniferous needles and debris within older forests. This species is known to occur on *Picea* (spruce) needles and coniferous debris. It has also been found with white fir, Douglas-fir, and pine. Spruce is not present in the Assessment Area. There are

currently no known locations of this species at elevations above 5,000 feet, and there is a **low** potential for the species to occur in the Assessment Area. If present, sites are most likely to occur in wet north-facing riparian areas within 25 feet of a perennial stream, below 5,000 feet.

***Sowerbyella rhenana* (Fuckel) J.Moravec—SORH**

This saprophytic species is known to occur from Europe, Japan, and the western United States. Within the range of the northern spotted owl, sites are known from the western portions of Washington, Oregon, and California as far south as the Mendocino National Forest. The Interagency Species Management System (ISMS) database lists known sites on the Six Rivers National Forest and Shasta-Trinity National Forest and on the Medford BLM District. No sites were discovered during strategic surveys conducted on the Klamath National Forest. Five sites of this species are present in the Klamath National Forest, on the Salmon River and Scott River Ranger Districts, at elevations of 2,500 to 3,500 feet. SORH fruits in scattered to gregarious or caespitose (growing in tufts or clumps) groups in duff of moist, relatively undisturbed older conifer forests. The specific habitat is unknown but could include duff, litter, mineral soil, woody debris, or roots. There are currently no known locations of this species at elevations above 5,000 feet. There is a **low** potential that the species may be present in proposed treatment units. If present, sites would most likely occur in wet north-facing riparian areas within 25 feet of a perennial stream, below 3,500 feet.

***Tricholomopsis fulvescens* (A.H. Smith)—TRHU3**

This saprophytic species is known to occur from the Western Cascades of Washington State and the Klamath and Coastal ranges of California. It is found as a solitary mushroom on decayed conifer wood above 3,000 feet elevation. Fewer than 10 known sites occur within the range of the northern spotted owl. Data on its distribution outside the range of the northern spotted owl is not readily available. There are two known locations of this species: one site (from 1948 and 1952) occurs in Mount Rainier National Park in Washington. The habitat is low elevation, very moist old-growth conifer forest; and a second, more current site (1982), occurs in the Marble Mountain Wilderness in Siskiyou County, and detailed habitat data are not available. The specific habitat of this species includes decayed conifer wood, logs, and stumps. There is a low potential that the species may be present in proposed treatment units. If present, sites would most likely occur in wet north-facing riparian areas within 25 feet of a perennial stream, above 3,000 feet.

Bryophyte Species

***Ptilidium californicum* (Aust.) Underw. (Pacific fuzzwort)—PTCA5**

One bryophyte species, *Ptilidium californicum* (PTCA5), was located in the proposed treatment units. General species information comes from the *Management Recommendations for Bryophytes* (USFS 1997a) and from the Conservation Assessment for *Ptilidium californicum* (USDA 2006b).

PTCA5 is a bryophyte (nonvascular plant) classed within the liverwort group. In the past this species has been reported to occur in Russia and Japan, but recent literature calls it an endemic of the west coast of North America, ranging from southeastern Alaska to northern California—the southern extent of the range. Within the range of the northern spotted owl, sites are known from almost every National Forest and BLM District in Oregon and Washington. Known sites in California occur on the Rogue River, Six Rivers, Siskiyou, and Shasta-Trinity National Forests adjacent to the Klamath and south to the Lassen and Mendocino National Forests. One hundred and one sites of PTCA5 are known to occur on the Klamath

National Forest, distributed across every Ranger District, including the two new sites located during the August 2008 field surveys.

PTCA5 has a narrow environmental specificity: it is found in (and can serve as an indicator species of) old-growth forest. It is typically epiphytic (a plant that grows on another plant) on bark at the base of standing mature to old-growth trees (*Abies concolor*, *A. magnifica*, and *Pseudotsuga menziesii*) or recently fallen logs and rarely on other organic substrates such as decaying logs and stumps or humus covering boulders. At the southern end of its range (Oregon and California), this species is distinctly restricted to mid-elevation forests. In northern California sites, the preferred habitat appears to be moist, mature, mixed-conifer forests with dominant elements of Douglas-fir and true firs, including white fir. Approximately 98 percent of the sites occur at elevations above 3,500 feet, and sites are almost always found on the shaded aspects of host trees, with numerous species of mosses. The host tree species is most often Douglas-fir or white fir with a dbh larger than 30 inches, but PTCA5 has also been found on other species of trees, including hardwoods and down logs at much smaller diameters where the moisture at the site is high.

Specific Populations in the Assessment Area. During the 2008 surveys, two new PTCA5 sites were located in proposed treatment units. One site (PTCA5-TE1) was located at the base of a white fir tree, at 5,100 feet, on a northwest-facing ridgeline within FRZ 5 and within an overlapping RS treatment area. A second site (PTCA5-RB1) was located on a white fir tree on a northwest-facing slope below Grasshopper Ridge at 5,460 feet and within Rx Unit 6 and west of M Unit 24.

Lichen Species

***Hydrothyria venosa* (syn. *Peltigera hydrothyria*) J.L. Russell (Waterleaf Lichen) – HYVE7**

One sensitive lichen species, *Hydrothyria venosa* (HYVE7), was determined to have potential to occur in the Assessment Area. This lichen was recently studied and grouped in with the genus *Peltigera*, with a proposal to change the name from *Hydrothyria venosa* to *Peltigera hydrothyria*. The name change has not yet been accepted by the Integrated Taxonomic Information System (ITIS), a USDA database with reliable information on species names and their hierarchical classification. This taxonomy change does not affect the rarity or distribution of the species.

This aquatic lichen is found in cold, unpolluted streams in mixed-conifer forests from the western slope of the Sierra Nevada and north to Oregon, Washington, and British Columbia. This species occurs in shaded perennial streams with light sediment loads and consistent flows, and in its northern range, occurs at upper elevations. One site of HYVE7 occurs on private land in the Klamath National Forest boundary, but it is outside the Assessment Area boundary and north of Etna Summit.

Specific Populations in the Assessment Area. No HYVE7 sites are known to occur in the Assessment Area, and none were located during the 2008 surveys.

V. Effects of the Alternatives

Alternative A: No Action

The no-action alternative complies with Council on Environmental Quality (CEQ) regulations for implementing *National Environmental Policy Act* (NEPA) (40 CFR 1502.14(d)). It is not a baseline condition but rather a description of future circumstances without implementation of the Eddy Gulch LSR Project. In this EIS, the no-action alternative is described as continuation of the current level of management and public use—this includes road maintenance, dispersed recreation (hunting, fishing, camping, and hiking), mining, watershed restoration projects, and the modeled wildfire. The time frame for analysis is considered to be 20 years. Given the fuel hazard in the Eddy Gulch LSR and current predictions of climate change, it is assumed at least one wildfire will escape initial attack during the 20-year period and burn under 90th percentile weather conditions (defined as 10 percent of the days in the historical weather database that had lower fuel moisture and higher wind speeds compared to the rest of the days). An analysis of a wildfire for three days that escaped initial attack in the Eddy Gulch LSR Project Assessment Area indicates that fire would burn 7,200 acres. Of those 7,200 acres, 1,355 acres (19 percent) would be surface fire; 5,065 acres (70 percent) would be a passive crown fire; and 780 acres (11 percent) would be an active crown fire.

Alternative B: Proposed Action

The Proposed Action was described above in Section III-A.

Alternative C: No New Temporary Roads Constructed

Alternative C responds to public concerns regarding the environmental and economic impacts of constructing new temporary roads. Alternative C is similar to the Proposed Action but approximately 1.03 miles (5,443 feet) of new temporary roads identified in the Proposed Action would not be constructed. As a result, no fuels treatments would occur in portions of seven M Units, thereby reducing the total acres of treatments in M Units from 931 acres under Alternative B to 832 acres in Alternative C. Fuels treatments could not be carried out in those M Units because of excessive treatment costs, high existing dead crown fuel loadings, and potential heat damage to the overstory if these untreated units were prescribed burned.

Under Alternative C, the FRZs would continue to total 8,291 acres, and the total number of acres treated by tractor yarding would remain at 356 acres; however, the acres of cable yarding would be reduced from 570 acres under Alternative B to 471 acres under Alternative C (a reduction of 99 acres). Reducing acres of M Units treated would also reduce the number of acres treated in Rx Units 5 and 6 because excessive fuels remaining in those units would preclude safely burning portions of those Rx Units. Rx Unit 5 would be reduced by 26 percent (418 acres) because no treatment would occur in a portion of M Unit 17, and Rx Unit 6 would be reduced by 28 percent (404 acres) because no treatment would occur in a portion of M Unit 24 (see Maps A-4a and A-4b). Six-foot-wide control lines would be constructed around the perimeter of those untreated areas to keep prescribed burns out of those portions of Rx Units 5 and 6. There would be no changes in the miles of emergency access routes treated, transportation plan, or resource protection measures.

A. Interactions Important to the Analysis—General

Direct Effects. Sensitive plants can be directly affected when they are driven over, covered, have trees fall on them, or are burned. These actions can physically break, crush, or uproot the plants, and the

effects on individual plants can reduce their growth and development, population size, and potentially, the viability of the species across the landscape. The plants may also experience reduced or eliminated seed-set and reproduction. If the disturbance is severe, plants can be killed. For annual plant species, the timing of effects is critical. Management actions that take place after annuals have set seed have much less effect than management actions performed prior to seed-set. For perennial species, the timing of effects can be equally critical. Management actions that take place after the active growing season have less effect than management activities performed during the active growing season.

Indirect Effects. Indirect effects (both beneficial and adverse) on Sensitive plants may be caused by alteration to habitat and typically include changes in vegetation composition, solar exposure, hydrologic patterns, fire regime, or soil characteristics. Indirect effects can also occur from noxious weed invasion or from effects on pollinators or mycorrhizae associated with the various species.

Cumulative Effects. The Klamath National Forest Schedule of Proposed Actions was reviewed to identify current and reasonably foreseeable future projects on the Salmon River and Scott River Ranger Districts that should be included in the cumulative effects analysis for the Eddy Gulch LSR Project. Ongoing projects include annual road maintenance, improvements to existing mining claims, hiking, and appropriate responses for fire suppression. Additional future projects include the following:

- Installing telephone and fiber-optic lines through the Ranger District (this involves digging a trench adjacent to roads to bury the lines and installing access points for future maintenance activities).
- North Forks road maintenance (this involves storm proofing 76 miles of road requiring blading, improving road drainage, and protecting riparian and stream systems; decommissioning 36 miles of roads to reduce sediment delivery to streams; and adding 2.4 miles of existing road).
- Construction of a fuelbreak system west of Black Bear Ranch (approximately 700 acres of ridgetop fuel reduction).
- A small amount of projects on private lands have been funded under the Salmon River CWPP. This includes funding to treat 75 acres of fuels on private properties in and around the Eddy Gulch LSR Project Assessment Area in the next 18 months. There may be additional funding for at least 50 acres in the following 18 months.

A cumulative effect results from the incremental effect of the action when added to the effects of other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the other actions and regardless of land ownership on which the other actions occur. An individual action when considered alone may not have a significant effect, but when its effects are considered in sum with the effects of other past, present, and reasonably foreseeable future actions, the effects may be significant (40 Code of Federal Regulations [CFR] 1508.7 and 1508.8 and Forest Service Handbook [FSH] 1909.15 Section 15.1). Cumulative, direct, and indirect effects can be minimized by following Forest Service standards and guidelines and by implementing the resource protection measures to monitor or offset effects on Sensitive plant species. With those measures in place, cumulative effects are less likely to be adverse. Current management direction is designed to eliminate or reduce possible negative cumulative effects by protecting Sensitive plant species from direct and indirect effects.

Types of Effects

- **Beneficial effects** are those that result in a positive change in the condition or nature of the resource, usually with respect to a standard or objective. A change that moves a resource toward its desired condition.
- **Adverse effects** are those that result in a significant negative change in the condition or nature of the resource, usually with respect to a standard or objective. A change that moves a resource away from its desired condition.

Intensity of Effects

"Intensity" refers to the severity of effects or the degree to which the action may adversely or beneficially affect a resource. The intensity definitions used throughout this analysis are described below.

Negligible. Effects would be at the lowest levels of detection and would have no appreciable effect on resources, values, or processes.

Minor. Effects would be perceptible but slight and localized.

Moderate. Effects would be readily apparent and widespread, and would result in a noticeable change to resources, values, or processes.

Major. Effects would be readily apparent and widespread, and would result in a substantial alteration or loss of resources, values, or processes and would likely be permanent.

Duration of Effects

"Duration" of effects refers to the time period that the effects would impact plants or habitat, whether beneficial or adverse. The time period of effects has been classified into "short-term" or "long-term," as a precise number of years is not always appropriate or known.

Short-term. Effects would be present or apparent for approximately 1 to 10 years (or less).

Long-Term. Effects would be present or apparent for more than 10 years.

B. Effects of Alternative A: No Action

Sensitive Vascular Plant Species

- *Cypripedium fasciculatum* (Clustered Lady-slipper Orchid)—CYFA
- *Cypripedium montanum* (Mountain Lady-slipper Orchid)—CYMO2
- *Smilax jamesii* (English Peak Greenbriar)—SMJA

Direct and Indirect Effects

Twenty-one populations of CYFA, 12 populations of CYMO2, and 1 population of SMJA occur in the Assessment Area. The effects of a wildfire on these species are dependent on the intensity and type of fire, as well as the timing of the fire. A low or moderate surface fire (19 percent of the fire) that occurs after the growing season would result in some damage to an unknown number of CYFA and CYMO2 plants at each of the population sites (Harrod et al. 1996; USDA, USDI 1998; Knight 2008). An unknown number of damaged plants would recover, and populations in these areas would recover in the short term. A hot surface fire, or a fire that occurs during the CYFA and CYMO2 growing season, would damage or

destroy an unknown number of CYFA and CYMO2 plants at each population site. Damaged and any unaffected plants would eventually recover and recolonize the affected populations in the long term. Recovery and recolonization is more likely to occur in populations with large numbers of individual plants. A moderate to hot surface fire could also indirectly affect CYFA and CYMO2 populations by reducing or eliminating critical mycorrhizal associations. Like other orchids, CYFA and CYMO2 seeds germinate in association with certain fungi that aid the developing embryo by providing nutrients necessary for development. (Orchid seeds, unlike those of other flowering plants, lack a seed coat, differentiated embryo, and endosperm.) Young orchid plants are also dependent upon mycorrhizal associations for several months or years before above-ground growth begins (USDA, USDI 1998). A surface fire that is hot enough to sterilize the soil would destroy associated mycorrhizae and seeds, indirectly affecting CYFA and CYMO2 viability and recovery after a wildfire.

A surface fire would damage above-ground portions of some or individual SMJA plants, while underground portions would be unaffected, and plants would recover in the short term. SMJA is a vine-like perennial that grows along the forest floor in riparian habitat. A surface fire within SMJA habitat would benefit SMJA populations indirectly by reducing riparian vegetation cover and competition for understory resources (moisture, substrate, soil minerals, understory light), resulting in increased viability of the SMJA population, until riparian vegetation recovers.

A passive crown fire (70 percent of the fire) would result in effects similar to a surface fire, except the overstory could also be removed in scattered locations. The opening of canopy cover in CYFA and CYMO2 habitat would alter important habitat factors and decrease population viability. These two species require shade and the associated higher soil and duff moisture and humidity. The loss of canopy cover would result in the long-term loss of CYFA and CYMO2 plants until there is restoration of the canopy cover and important habitat characteristics. The scattered removal of overstory trees in SMJA habitat and the resulting increased sunlight would increase understory vegetation and competition. This would result in the long-term decline of SMJA plants until canopy cover is restored and understory vegetation is reduced.

An active crown fire (11 percent of the fire) would burn with greater intensity and remove all canopy cover in the area affected. This would result in the direct loss of CYFA, CYMO2, and SMJA populations. Recovery of these CYFA and CYMO2 populations will not occur until a mature closed-canopied forest is re-established. Recovery of SMJA should be sooner, as riparian areas typically recover faster than mature conifer forests.

As local populations are a minor fraction of occurrences throughout the region (northwestern California and southwestern Oregon), the loss of CYFA and CYMO2 plants or populations in the Assessment Area would have a negligible effect on the viability of the two species and would be less than significant at a regional level and across the range of the two species.

While SMJA is limited to the four far-northwest counties of California, and the SMJA population in the Assessment Area represents 1 of only 17 sites in the Siskiyou County area, SMJA is currently secure in number of populations. The loss of the individual project populations would not affect viability of the species.

Cumulative Effects

The previous history of fire suppression has resulted in a build up of ground and ladder fuels in the Assessment Area. The ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area create potential for fire ignitions; these combined factors would increase the risk of stand-replacing wildfire. A frequent result of stand-replacing wildfires, and the corresponding suppression activities, is the formation of conditions favorable to noxious weed invasion. Noxious weed infestations can compete directly with Sensitive plant populations and can permanently alter natural plant communities. Dyer's woad is the most likely noxious weed species to invade CYFA, CYMO2, and SMJA habitat. This species is frequently found on roadsides and in open, disturbed dry sites, although at least one site in the Assessment Area continues down into a riparian area. An established infestation of Dyer's woad (or other noxious weed species) in a CYFA, CYMO2, or SMJA project population would lead to a long-term decline of the Sensitive plant population over the long term. Noxious weed infestation is also a likely result of disturbance from annual road maintenance, fire suppression activities, and other future district projects, including the digging of a roadside trench for telephone and fiber-optic line installation, and the North Forks road maintenance project. Each of these projects involves ground disturbance, which creates conditions for noxious weed infestations along roadsides and can permanently alter natural plant communities. Once noxious weed species are established, it can be costly to manage and remove them.

Conclusion. A surface fire and portions of a passive crown fire that remain on the surface would result in minor adverse short-term direct effects on CYFA, CYMO2, and SMJA as plants are initially damaged and then recover. A surface fire hot enough to sterilize the soil would result in long-term moderate adverse indirect effects on CYFA and CYMO2 as mycorrhizae are eliminated and recolonization, seed germination, and juvenile plant development are reduced. Where the overstory is removed as a result of a passive or active crown fire, the indirect loss of CYFA, CYMO2, and SMJA plants from habitat alteration would result in a moderate long-term adverse indirect effect until mature forest canopy cover recovers. The cumulative effects of previous fire suppression management, associated high fuel loads, and increased fire ignitions from ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area would increase risk of stand-replacing fire and create conditions for the spread and introduction of noxious weeds into the Assessment Area and CYFA, CYMO2, and SMJA populations—the result would be a long-term moderate, adverse indirect effect as weed infestations out-compete CYFA, CYMO2, and SMJA plants and other native vegetation over time. The distribution and abundance of the three species would result in a negligible change from the current distribution and abundance.

Additional Sensitive Target Species

The pre-field review determined that potential suitable habitat occurs in the proposed treatment units for 13 Forest Service Sensitive vascular and nonvascular species. Surveys were conducted for the four species most likely to occur in the proposed treatment units. The other nine Forest Service Sensitive species include:

- 3 species of moist environments: *Botrychium virginianum* (Rattlesnake Fern) (BOVI), *Campanula wilkinsiana* (Wilkin's harebell) (CAWI8), and *Smilax jamesii* (English Peak Greenbriar) (SMJA);

- 3 species serpentine environments: *Chaenactis suffrutescens* (Shasta chaenactis) (CHSU), *Eriogonum hirtellum* (Klamath Mountain Buckwheat) (ERHI7), and *Minuartia stolonifera* (Scott Mountain sandwort) (MIST9);

- 2 species of canopy gaps and forest edge environments: *Eucephalis vialis* (Wayside Aster) (EUVI8) and *Pedicularis howellii* (Howell's lousewort) (PEHO); and

- 1 species of montane chaparral and mixed-conifer forest environments: *Eriogonum ursinum* var. *erubescens* (Blushing Buckwheat) (ERURE).

This effects analysis assumes some number of sites of the above nine additional sensitive species may occur in the proposed treatment units outside of the 2008 botanical survey areas. One site of the sensitive species *Smilax jamesii* was located in a treatment unit during 2008 surveys, and no sites of the remaining eight additional sensitive species were located during the 2008 surveys.

Species of Moist (and Riparian) Environments

- *Botrychium virginianum* (Rattlesnake Fern)—BOVI
- *Campanula wilkinsiana* (Wilkin's harebell)—CAWI8
- *Smilax jamesii* (English Peak Greenbriar)—SMJA

BOVI is a small fern with seasonal leaves appearing in spring and dying back in late summer. BOVI occurs in moist environments, including bogs, fens, seeps and riparian forests within lower montane coniferous forests, While the coarse-grained GIS analysis identified no acres of suitable BOVI habitat in the project treatment units, potential BOVI habitat is expected to occur in moist environments that the GIS query could not identify, including bogs, fens, seeps, and riparian habitat throughout the Assessment Area.

CAWI8 is a rhizomatous herb that occurs in meadows and seeps in upper montane coniferous forests. The GIS query identified 43 acres of suitable CAWI8 habitat in proposed treatment units. Additional potential CAWI8 habitat is expected to occur in moist environments that the GIS query could not identify, including bogs, fens, seeps, and riparian habitat throughout the Assessment Area.

SMJA is perennial trailing vine that occurs along streambanks in lower and upper montane coniferous forests. An expanded SMJA effects analysis is described here, as additional sites may occur in proposed treatment units outside of the 2008 botanical survey areas. The GIS query identified 3,080 acres of suitable SMJA habitat in the proposed treatment units. The effects of fire on BOVI, CAWI8, and SMJA have not been reported.

Direct and Indirect Effects

A surface fire would damage above-ground portions of some BOVI, CAWI8, and SMJA plants, while underground portions would be unaffected. BOVI, CAWI8, and SMJA sites would recover in the short term. A surface fire within BOVI, CAWI8, and SMJA habitat would benefit plants indirectly by reducing riparian vegetation cover and competition for understory resources (moisture, substrate, soil minerals, understory light), resulting in increased viability of any BOVI, CAWI8, and SMJA sites until riparian vegetation recovers.

A passive crown fire (70 percent of the fire) would result in effects similar to a surface fire, except the overstory would also be removed in scattered locations. The scattered removal of overstory trees in BOVI, CAWI8, and SMJA habitat would increase sunlight and competition from understory vegetation. This would result in an indirect long-term decline of BOVI, CAWI8, and SMJA plants until canopy cover is restored and understory vegetation is reduced.

An active crown fire (11 percent of the fire) would burn with greater intensity and remove all canopy cover in the affected area. This would result in the long-term direct loss of any BOVI, CAWI8, and SMJA sites until riparian overstory recovers.

Cumulative Effects

The previous history of fire suppression has resulted in a build up of ground and ladder fuels in the treatment units. The ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area create potential for fire ignitions; these combined factors would increase the risk of stand-replacing wildfire in the treatment units. A frequent result of stand-replacing wildfires, and the corresponding suppression activities, is the formation of conditions favorable to noxious weed invasion. Noxious weed infestations can compete directly with Sensitive plant sites and can permanently alter natural plant communities. Dyer's woad is the most likely noxious weed species to invade BOVI, CAWI8, and SMJA habitat. While this weed species is frequently found on roadsides and in open, disturbed dry sites, at least one site in the Assessment Area continues down into a riparian area. An established infestation of Dyer's woad (or other noxious weed species) in a BOVI, CAWI8, or SMJA project site would lead to a long-term decline of the Sensitive plant site over the long term. Noxious weed infestation is also a likely result of disturbance from annual road maintenance, fire suppression activities, and other future district projects, including the digging of a roadside trench for telephone and fiber-optic line installation, and the North Forks road maintenance project. Each of these projects involves ground disturbance that creates the conditions for noxious weed infestations along roadsides that can permanently alter natural plant communities. Once noxious weed species are established, management and removal can be costly.

Conclusion. A surface fire and portions of a passive crown fire that remain on the surface would result in short-term minor adverse direct effects on BOVI, CAWI8, and SMJA as plants are initially damaged and then recover. If the overstory is removed as a result of a passive or active crown fire, the loss of BOVI, CAWI8, and SMJA plants from habitat alteration would result in a long-term moderate adverse indirect effect until mature forest canopy cover recovers. The cumulative effects of previous fire suppression management, associated high fuel loads, and increased fire ignitions from ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area would increase risk of stand-replacing fire and create conditions for the spread and introduction of noxious weeds into the Assessment Area and BOVI, CAWI8, and SMJA sites. The result would be a long-term moderate adverse indirect effect as weed infestations out-compete BOVI, CAWI8, and SMJA plants and other native vegetation over time. The distribution and abundance of the three species would result in a negligible change from the current distribution and abundance.

Species of Serpentine Environments

- *Chaenactis suffrutescens* (Shasta chaenactis)—CHSU
- *Eriogonum hirtellum* (Klamath Mountain buckwheat)—ERHI7
- *Minuartia stolonifera* (Scott Mountain sandwort)—MIST9

CHSU is a perennial to a subshrub plant of sandy rocky serpentine soils in open canopy lower and upper montane coniferous forests. CHSU blooms between May and early September. The pre-field review GIS query identified 41 acres of potential suitable CHSU habitat in the treatment units. Additional potential CHSU habitat is expected to occur in the project Assessment Area in serpentine habitat that the GIS query could not identify.

ERHI7 is a perennial herb limited to scattered locations in Siskiyou County, on serpentine soils in chaparral and open lower to upper montane coniferous forests above 4,500 feet. The GIS query identified no acres of potential suitable ERHI7 habitat in the treatment units. Potential ERHI7 habitat is expected to occur in the project Assessment Area in serpentine habitat that the GIS query could not identify.

MIST9 is a perennial mat-forming species of serpentine soils in Jeffrey pine woodlands below 5,300 feet. The GIS query identified only 3 acres of potential suitable MIST9 habitat in the treatment units. Additional MIST9 habitat is expected to occur in serpentine habitat in the project Assessment Area that the GIS query could not identify.

The effects of fire on CHSU, ERHI7, and MIST9 have not been reported in the literature. Although the ecology of serpentine ecosystems in California has been the subject of many dozens of scientific studies, the fire ecology of serpentine habitats has remained largely unexplored, and the role of fire in serpentine ecosystems is poorly understood. Wildfire frequency and intensity in serpentine habitats is generally considered to be lower than in surrounding non-serpentine habitats due to lower availability and continuity of woody fuels (Safford and Harrison 2008).

Direct and Indirect Effects

A surface fire would burn above-ground portions (leaves, flowers/fruits, or stems) but not damage below-ground (caudex, roots) portions of CHSU, ERHI7, and MIST9. Surface fires, however, would also cause an increase in competing early seral vegetation cover (such as grass species), with a resulting decrease in plants at any CHSU, ERHI7, or MIST9 sites. The result of a surface fire on CHSU, ERHI7, and MIST9 in serpentine habitat include (1) a short-term minor adverse direct effect as burned plants would recover in the short term, and (2) a long-term moderate adverse indirect effect because the increase in competing early seral vegetation (that is, grass species) would out-compete some CHSU, ERHI7, and MIST9 plants for resources.

Passive and active crown fires would remove some or all canopy cover in CHSU, ERHI7, and MIST9 habitat. The physical removal of canopy would result in minimal effects because all three species occur in open overstory habitats. However, crown fires in serotinous cone species in the overstory (that is, *Pinus sabineana* or *P. contorta*) would increase seed supply and germination, resulting in an increase in seedlings of these species that would compete with CHSU, ERHI7, and MIST9. Passive and active crown fires would result in (1) a long-term negligible adverse direct effect as canopy cover is reduced;

and (2) a long-term moderate adverse indirect effect where an increase in serotinous pine seedlings would out-compete some CHSU, ERHI7, and MIST9 plants for resources.

Cumulative Effects

The previous history of fire suppression has resulted in a build up of surface and ladder fuels in the treatment units. The ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area create potential for fire ignitions; these combined factors would increase the risk of stand-replacing wildfire in the treatment units. A frequent result of stand-replacing wildfires, and the corresponding suppression activities, is the formation of conditions favorable to noxious weed invasion. Noxious weed infestations can compete directly with Sensitive plant sites and can permanently alter natural plant communities. Dyer's woad and yellow starthistle are the most likely noxious weed species to invade serpentine habitat. An established infestation of noxious weeds in any CHSU, ERHI7, and MIST9 sites would lead to a long-term decline of these three serpentine species. Noxious weed infestation is also a likely result of disturbance from annual road maintenance, fire suppression activities, and other future district projects, including the digging of a roadside trench for telephone and fiber-optic line installation, and the North Forks road maintenance project. Each of these projects involves ground disturbance that creates the conditions for noxious weed infestations along roadsides. Once noxious weed species are established, management and removal can be costly.

In addition to the indirect effects of noxious weed infestations, the increase in fuels in serpentine habitats above historic levels would result in an increase in fire intensity. The increased fire intensity would create hotter surface fires, resulting in damage and possible destruction of the three serpentine plants, as high soil temperatures destroy underground portions of plants. The result would be a long-term moderate adverse direct effect.

Conclusion. A surface fire would result in a short-term minor adverse direct effect as burned plants would recover in the short term, and a long-term moderate adverse indirect effect because the increase in competing early seral vegetation (such as grass species) would out-compete some CHSU, ERHI7, and MIST9 plants for resources. Passive and active crown fires would result in a long-term negligible adverse direct effect as canopy cover is reduced; and (2) a long-term moderate adverse indirect effect where an increase in serotinous pine seedlings would out-compete some CHSU, ERHI7, and MIST9 plants for resources. The cumulative effects of previous fire suppression management, associated high fuel loads, and increased fire ignitions would (1) increase the risk of stand-replacing fire and create conditions for the spread and introduction of noxious weeds—the result would be a long-term moderate adverse indirect effect as weed infestations out-compete CHSU, ERHI7, and MIST9 plants and other native vegetation for resources; and (2) create hotter surface fires, with damage and possible destruction of CHSU, ERHI7, and MIST9 plants, resulting in a long-term moderate adverse direct effect.

Species of Canopy Gap and Forest Edge Environments

- *Eucephalis vialis* (Wayside Aster)—EUVI8
- *Pedicularis howellii* (Howell's lousewort)—PEHO

EUVI8 is a perennial herb with a thickened woody stem (caudex) and rhizomes. EUVI8 sites occur in canopy gaps, clearcuts, forest edges, and on roadsides. The species' preferred habitat is thought to have been historically sustained by frequent fire return intervals that created open forest conditions with widely

spaced conifers. EUVI8 flowers in late summer to early fall and occurs from eastern Del Norte to southern Humboldt counties and north to Oregon. The coarse-grained GIS query identified no potential suitable EUVI8 acres in the treatment units, but potential suitable EUVI8 habitat is expected to occur along roads (including roads outside of and within RS treatments), and in forest edge / canopy gap habitat within FRZs and Rx Units.

PEHO is an herbaceous perennial green root parasite in the Scophulariaceae (figwort) plant family. This species is found in partial shade or along the edges of forest openings in a variety of conifer/shrub plant associations. PEHO is most abundant where the mixed-conifer canopy is less than 40 percent, created by either natural forest processes (fire, windthrow, disease) or manmade forest edges such as trails, roads, or other openings. This species flowers in June and July and is found only in the Siskiyou Mountains of southwestern Oregon and northwestern California. The coarse-grained GIS query identified no potential suitable PEHO habitat in the treatment units, but potential suitable PEHO habitat is expected to occur in forest edge / canopy gap habitat within FRZs and Rx Units.

Direct and Indirect Effects

A surface fire would burn above-ground portions (leaves, flowers/fruits or stems) but would not damage below-ground (caudex [stem], roots) portions of any EUVI8 and PEHO plants. Both species are associated with canopy gap habitat and are likely tolerant of surface fires. The results would be a very short-term minor adverse direct effect (as plants resprout and recover) and a long-term minor beneficial indirect effect as competing vegetation decreases and EUVI8 or PEHO site vigor increases.

A passive crown fire would result in effects similar to a surface fire, except the overstory could also be removed in scattered locations. The removal of some canopy overstory would improve any EUVI8 and PEHO site conditions by creating more edge-canopy gap habitat, resulting in a long-term minor beneficial indirect effect as EUVI8 and PEHO site vigor increases.

An active crown fire would burn with greater intensity and remove all canopy cover in the affected area. This would result in the direct loss of some EUVI8 or PEHO sites—the preferred habitat for both species includes some canopy overstory. The result would be a long-term moderate adverse indirect effect until some canopy overstory is re-established.

Cumulative Effects

The previous history of fire suppression has resulted in a buildup of ground and ladder fuels in the treatment units. The ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area create potential for fire ignitions; these combined factors would increase the risk of stand-replacing wildfire in the treatment units. A frequent result of stand-replacing wildfires, and the corresponding suppression activities, is the formation of conditions favorable to noxious weed invasion. Noxious weed infestations can compete directly with Sensitive plant sites and can permanently alter natural plant communities. Dyer’s woad, yellow starthistle, and meadow knapweed are the most likely noxious weed species to invade EUVI8 and PEHO habitat. An established infestation of noxious weeds in these species’ sites would lead to a long-term decline of the sites. Noxious weed infestation would also be a likely result of disturbance from annual road maintenance, fire suppression activities, and other future district projects, including the digging of a roadside trench for telephone and fiber-optic line installation and the North Forks road maintenance project. Each of these projects involves ground disturbance, which

creates conditions for noxious weed infestations along roadsides and can permanently alter natural plant communities. Once noxious weed species are established, management and removal can be costly.

Conclusion. A surface fire and portions of a passive crown fire that remain on the surface would result in a very short-term minor adverse direct effect (as plants resprout and recover) and a long-term minor beneficial indirect effect as competing vegetation is reduced and EUVI8 or PEHO site vigor increases. A passive crown fire would result in a long-term minor beneficial indirect effect as EUVI8 and PEHO site vigor increases from overstory canopy opening. An active crown fire would result in a long-term moderate adverse indirect effect until some canopy overstory is re-established. The cumulative effects of previous fire suppression management, associated high fuel loads, and increased fire ignitions would result in a long-term moderate adverse indirect effect as conditions are created for the spread and introduction of noxious weeds that would outcompete EUVI8 and PEHO plants and other native vegetation.

Montane Chaparral and Mixed-Conifer Environments

- *Eriogonum ursinum* var. *erubescens* (Blushing Buckwheat)—ERURE

ERURE is a spreading, matted perennial herb that occurs in gravelly metavolcanic soils in montane chaparral and conifer/mountain mahogany plant communities. ERURE flowers from June through September and is localized and rare, and known only to occur in Siskiyou County west of Yreka and the Shasta County / Trinity County line. The coarse-grained GIS query identified no potential suitable ERURE acres in the treatment units, but potential suitable ERURE habitat is expected to occur in the project Assessment Area in chaparral habitat that the GIS query could not identify.

Direct and Indirect Effects

A surface fire would burn above-ground portions (leaves, flowers/fruits, or stems) but not damage below-ground portions (roots) of ERURE. The result would be a short-term minor adverse direct effect on any ERURE sites as plants would recover in the short term.

A passive or active crown fire would have the same effects as a surface fire, with additional effects resulting from canopy removal. ERURE occurs in open chaparral and conifer/mountain mahogany habitat. Passive and active crown fires would remove some or all chaparral, hardwood, and conifer canopy cover. The result would be a long-term minor adverse indirect effect because any shade provided by the canopy would be lost, and surface temperatures would increase, resulting in some minor damage to any ERURE sites until chaparral or conifer canopy cover recovers.

Cumulative Effects

The previous history of fire suppression has resulted in a build up of ground and ladder fuels in the Assessment Area. The ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area create potential for fire ignitions; these combined factors would increase the risk of stand-replacing wildfire in the treatment units. A frequent result of stand-replacing wildfires, and the corresponding suppression activities, is the formation of conditions favorable to noxious weed invasion. Noxious weed infestations can compete directly with Sensitive plant sites and can permanently alter natural plant communities. Dyer’s woad, yellow starthistle, and meadow knapweed are the most likely noxious weed species to invade ERURE chaparral habitat. An established infestation of noxious weeds in any ERURE sites would lead to a long-term decline of the site as plants are outcompeted by invasive

weeds. Noxious weed infestation is also a likely result of disturbance from annual road maintenance, fire suppression activities, and other future district projects, including the digging of a roadside trench for telephone and fiber-optic line installation, and the North Forks road maintenance project. Each of these projects involves ground disturbance, which creates the conditions for noxious weed infestations along roadsides that can permanently alter natural plant communities. Once noxious weed species are established, management and removal can be costly.

In addition to the indirect effects of noxious weed infestations, the increase in fuels in ERURE chaparral habitat above historic levels would result in an increase in fire intensity. The increased fire intensity would create hotter surface and canopy fires, resulting in damage and possible destruction of any ERURE plants because high soil temperatures can destroy underground portions of plants. The result would be a long-term moderate adverse direct effect.

Conclusion. A surface fire and portions of a passive crown fire that remain on the surface would result in a short-term minor adverse direct effect on any ERURE sites because plants would recover in the short term. Passive and active crown fires would result in a long-term minor adverse indirect effect until destroyed canopy cover recovers. The cumulative effects of previous fire suppression management, associated high fuel loads, and increased fire ignitions would (1) increase risk of stand-replacing fire and create conditions for the spread and introduction of noxious weeds—the result would be a long-term moderate adverse indirect effect because weed infestations would out-compete any ERURE plants and other native vegetation over time; and (2) create hotter surface fires, resulting in damage and possible destruction to ERURE plants and resulting in a long-term moderate adverse direct effect.

Sensitive Fungi Species

- *Boletus pulcherrimus, Cudonia monticola, Dendrocollybia racemosa, Phaeocollybia olivacea, Sowerbyella rhenana, Tricholomopsis fulvescens*

There is no species-specific information available for the above six Sensitive fungi species that may be present in the project Assessment Area. General information is available, however, for the two major groups of fungi (mycorrhizal and saprophytic). Fungi differ from vascular plants (flowering plants) in several important ways that affect their response to management activities. Fungi do not have roots but, rather, depend upon an extensive network of fungal mycelium to support the plants. Mycelia are fine, net-like structures that penetrate the soil, rotting wood, duff, or other substrates. Mycelia that penetrate the roots of vascular plants form mycorrhizae. The fruiting structure of a fungus can form anywhere along the network of mycelia. When the substrate within which the mycelial network occurs is disturbed, the fungus is not necessarily killed; rather, the network will be broken into many fragmented parts that will continue to live and fruit as long as a nutrient source—vascular plants for mycorrhizal species or rotten wood for saprophytic species—and a moisture source persists. Specifically, this means that ground disturbance from thinning and fuel treatments, and changes in moisture levels from canopy removal (direct effect), will not necessarily kill fungi populations unless critical habitat elements are removed to an extent that the habitat can no longer support the fungi species (indirect effect) (USFS 2007).

The following effects analyses are based primarily upon references provided in a literature review conducted by Lisa Hoover, Forest Botanist, Six Rivers National Forest (USFS 2007). There is little information available about species-specific effects, but information has been gathered about the effect of

management actions upon ectomycorrhizal (ECM) fungi in general. While not eliminating potential effects on target fungal taxa, it is assumed that by managing for habitat elements, adverse effects on communities supporting any one of the target fungi will be reduced.

Mycorrhizal Fungi Species (*Boletus pulcherrimus, Phaeocollybia olivacea*)

Direct and Indirect Effects

Because there is an overall low probability that *Boletus pulcherrimus* (BOPU4) and *Phaeocollybia olivacea* (PHOL) are present in the project Assessment Area, there is also a low potential for an effect on individual fungi populations. The suitable habitat for these species is located along wet, north-facing riparian areas within 25 feet of perennial streams, at the lower to mid-elevations, and within mature timber stands. A surface fire in these areas would generally be of low intensity due to the higher moisture levels present. There is potential that a population could be affected if a portion is burned, but it is unlikely that a surface fire would burn at high intensity throughout the entire population. Because these species are not killed when a portion of a population is affected, this would not affect the entire population or habitat. Additionally, a surface fire would still retain important habitat elements, including adequate mature live overstory and understory trees, substrate recruitment trees, and coarse and fine woody debris. The retention of these habitat elements would ensure that potential populations of these species would be maintained. A surface fire would result in a short-term minor adverse direct effect as individuals are destroyed, but any entire population would be unaffected and/or recover in the short term.

A passive or active crown fire would indirectly affect these two fungi species if suitable habitat elements are impacted. Because these two fungi are mycorrhizal with mixed-conifers and hardwood tree roots, if a passive or active crown fire destroys or damages mature overstory substrate trees (or substrate recruitment trees), and/or if canopy removal is extensive enough to significantly reduce adequate moisture levels, and/or if coarse woody debris is consumed, individuals would be indirectly affected. Individuals might be burned, but as with a surface fire, because these species are not killed when a portion of a population is affected, this would not affect the entire population or habitat. The overstory within the fungi's riparian habitat, however, would burn with lower intensities than in upland stands, and elements of suitable fungi habitat would be retained. The retention of these habitat elements would ensure that any populations of these species would be maintained. A passive or active crown fire would result in a long-term minor adverse indirect effect as some suitable fungi habitat would be damaged or destroyed, and individual BPOU4 and PHOV would be impacted, but any populations would remain or recover in the long term, and any impacted habitat elements would recover in the long term.

Cumulative Effects

The previous history of fire suppression has resulted in a buildup of ground and ladder fuels in the treatment units. The ongoing recreational (mining, hiking, hunting) and rural community activities in the project Assessment Area could create potential for fire ignitions; these combined factors would increase the risk of stand-replacing wildfire in the treatment units. The direct and indirect effects of wildfire are discussed above. Future district projects expected to occur in the short and long term include annual road maintenance, fire suppression activities, the installation of telephone and fiber-optic lines (and associated disturbance from roadside trenches), and the North Forks road maintenance project. Each of these district projects involves ground disturbance near roadsides or other upland site locations, outside of BOPU4 and PHOV riparian habitat. Mining activities, however, do occur near streams and may occur within the

riparian habitat of these two species. Ground disturbance from mining would damage or destroy individual BOPU4 or PHOV but any populations would be maintained. No cumulative effects are expected from effects from wildfire and mining.

Conclusion. A surface fire would result in a short-term minor adverse direct effect as individuals are destroyed, but any entire population would be unaffected and/or recover in the short term. A passive or active crown fire would result in a long-term minor adverse indirect effect as some suitable fungi habitat would be damaged or destroyed, and individual BPOU4 and PHOV would be impacted, but any populations would remain or recover in the long term, and any impacted habitat elements would recover in the long term. And mining activities would result in short-term negligible adverse direct effects as individual BOPU4 and PHOV may be destroyed, but any populations would be maintained. No cumulative effects on these two fungi species are expected from wildfire and mining activities.

Saprophytic Fungi Species (*Cudonia monticola, Dendrocollybia racemosa, Sowerbyella rhenana, Tricholomopsis fulvescens*)

Direct and Indirect Effects

Because there is an overall low probability that *Cudonia monticola* (CUMO2), *Dendrocollybia racemesas* (DERA5), *Sowerbyella rhenana* (SORH),and *Tricholomopsis fulvescens* (TRFU3) are present in the proposed treatment units, there is also a low potential for an effect on individual fungi populations. The suitable habitat for these species is located along wet, north-facing riparian areas within 25 feet of perennial streams, at the lower to mid-elevations, and within mature timber stands. A surface fire in these areas would generally be of low intensity due to the higher moisture levels present. There is potential that a population could be affected if a portion is burned, but it is unlikely that a surface fire would burn at high intensity throughout the entire population. Because these species are not killed when a portion of a population is affected, this would not affect the entire population or habitat. Additionally, a surface fire would still retain important habitat elements, including adequate coarse and fine woody debris as fungi substrate and stand and surface moisture levels. The retention of these habitat elements would ensure that potential populations of these species would be maintained. A surface fire would result in a short-term minor adverse direct effect as individuals are destroyed, but any entire population would be unaffected and/or recover in the short term.

A passive or active crown fire would indirectly affect these four fungi species if suitable habitat elements are impacted. The four saprophytic fungi obtain nutrients from the decomposition of dead organic matter and are dependent upon adequate amounts of leaves, needles, limbs, large woody debris, other decomposing forest litter, or even dead animal carcasses to provide a substrate and to supply a continuous source of nutrients. Soil moisture is also important. The removal of canopy cover itself from a passive or active crown fire would not affect these species directly. If canopy cover is extensive enough to significantly reduce adequate soil moisture levels, and/or if coarse woody debris is also consumed, individuals would be indirectly destroyed or damaged, but because these species are not killed when a portion of a population is affected, this would not affect the entire population or habitat. The overstory within the fungi's riparian habitat, however, would burn with lower intensities than in upland stands, and elements of suitable fungi habitat would be retained. The retention of these habitat elements would ensure that any populations of these species would be maintained. A passive or active crown fire would result in a long-term minor adverse indirect effect as some suitable fungi habitat would be damaged or destroyed,

individual CUMO2, DERA5, SORH, and TRFU3 would be impacted but any populations would remain or recover in the long term, and impacted habitat elements (soil moisture) would recover in the long term.

Cumulative Effects

The previous history of fire suppression has resulted in a buildup of ground and ladder fuels in the treatment units. The ongoing recreational (mining, hiking, hunting) and rural community activities in the project Assessment Area create potential for fire ignitions; these combined factors would increase the risk of stand-replacing wildfire in the Assessment Area. The direct and indirect effects of wildfire are discussed above. Future district projects expected to occur in the short and long term include annual road maintenance, fire suppression activities, the installation of telephone and fiber-optic lines (and associated disturbance from roadside trenches), and the North Forks road maintenance project. Each of these district projects involves ground disturbance near roadsides or other upland site locations, outside of CUMO2, DERA5, SORH, and TRFU3 riparian habitat. Mining activities, however, do occur near streams and may occur within the riparian habitat of these four species. Ground disturbance from mining would damage or destroy individual fungi but any populations would be maintained. No cumulative effects are expected from effects from wildfire and mining.

Conclusion. A surface fire would result in a short-term minor adverse direct effect as individuals are destroyed but any entire population would be unaffected and/or recover in the short term. A passive or active crown fire would result in a long-term minor adverse indirect effect as some suitable fungi habitat would be damaged or destroyed, individual CUMO2, DERA5, SORH and TRFU3 would be impacted but any populations would remain or recover in the long term, and impacted habitat elements (soil moisture) would recover in the long term. Any mining activities would result in short-term negligible adverse direct effects as individual fungi would be destroyed but any populations would be maintained. No cumulative effects on these four fungi species are expected from wildfire and mining activities.

Bryophyte Species

- *Ptilidium californicum* (Pacific Fuzzwort)—PTCA5

Direct and Indirect Effects

Two populations of PTCA5 occur in the Assessment Area on northwest aspects, at the base of large-diameter white fir trees in upper elevation forests. The effect of a wildfire on this species is dependent on the intensity of the fire. A surface fire (19 percent of the fire) would result in damage to or loss of some or all PTCA5 plants. Where all plants are destroyed, recolonization is not likely to occur because PTCA5 does not recolonize over long distances and does not occur on burned substrates. Where a portion of a PTCA5 population remains, recolonization would occur slowly, with a short- to long-term recovery. A surface fire that also consumes PTCA5 microhabitat components (duff layers and coarse woody debris, logs, associated bryophyte populations) would have an adverse indirect effect on PTCA5; the loss of microhabitat components that regulate humidity, temperature, and shade would lessen or slow the recovery and recolonization of PTCA5.

A passive crown fire (70 percent of fire) would have the same effects as a surface fire with the additional loss of canopy trees in scattered locations. The loss of scattered canopy cover would alter critical PTCA5 habitat components (increased solar radiation, increased temperature, decreased soil moisture, decreased humidity, and a decrease in potential substrate tree bases), and unburned PTCA5

populations would decline because recovery and recolonization of burned plants would be significantly reduced.

An active crown fire (11 percent of the fire) would include the same effects as a surface fire and burn with greater intensity and remove all canopy cover. The active crown fire would result in the loss of all PTCA5 plants. PTCA5 recolonization would be unlikely or negligible and would not occur until a mature, closed-canopy forest is re-established.

PTCA5 ranges from southeast Alaska, south to northern California. The loss of Assessment Area PTCA5 plants would result in a negligible adverse effect on the viability of this species. However, because the northern California PTCA5 populations represent the southern extent of the species and may be a fragment of a relict population, these populations should be managed to maintain the genetic diversity of this species (USFS 1997a, 2006b).

Cumulative Effects

The previous history of fire suppression has resulted in a build up of ground and ladder fuels in the treatment units. The ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area create potential for fire ignitions; these combined factors would increase the risk of stand-replacing wildfire in the treatment units. A frequent result of stand-replacing wildfires, and the corresponding suppression activities, is the formation of conditions favorable to noxious weed invasion. Competition from invasive noxious weeds would affect other vegetation (herbaceous and shrub layers) in PTCA5 stands, but would have a minor effect on the recovery or recolonization of PTCA5. District projects that include roadside disturbance (such as annual road maintenance, the digging of a roadside trench for telephone and fiber-optic line installation, and fire suppression activities) could damage PTCA5 plants or alter habitat as roadside trees are removed or disturbed. Disturbances would affect the roadside PTCA5 population (PTCA5-#TE1) located on the northwest side of a roadside tree, approximately one mile south of Bacon Rind. If the substrate tree is removed, and no other disturbance occurs, the PTCA5 population would have no immediate adverse effects. As the stump dies and bark sloughs off, the PTCA5 population would slowly decline and eventually die as the plant's substrate deteriorates. If project activities along roads disturb the substrate tree or the PTCA5 plants directly, the population is likely to decline or be destroyed, and recolonization would be slow if at all. Where project activities along roads alter overstory habitat or other critical PTCA5 habitat features (humidity, soil moisture, shade, and associated bryophyte cover), individual PTCA5 plants and the population viability would decline over time.

Conclusion. A surface fire and portions of a passive crown fire that remain on the surface would damage or destroy PTCA5 plants and result in short- and long-term minor to major adverse direct effects. A surface fire and portions of a passive crown fire would also alter important PTCA5 habitat microhabitat features that would damage PTCA5 plants or slow the recovery/recolonization of PTCA5—the result would be short- and long-term minor to major adverse indirect effects on PTCA5. Where the overstory is removed as a result of a passive or active crown fire, PTCA5 habitat would be altered and PTCA5 plants would decline or die—the result would be a long-term moderate adverse indirect effect on PTCA5. The cumulative effects of increased fire ignitions and increased fuel loads from previous fire suppression management would increase the risk of stand-replacing fire and conditions for noxious weeds infestation into PTCA5 populations; the result would be a long-term minor adverse indirect effect on PTCA5.

Cumulative effects from other district projects that disturb roadsides would result in a long-term moderate adverse direct effect from removing or damaging the PTCA5 substrate tree, and a long-term moderate adverse indirect effect from habitat alteration leading to the decline or loss of PTCA5 plants.

Lichen Species

- *Hydrothyria venosa* (syn. *Peltigera hydrothyria*) (Waterleaf Lichen) – HYVE7

Direct and Indirect Effects

No sites of *Hydrothyria venosa* (HYVE7) are known to occur in the Assessment Area. Surveys in 2008 included a number of streams with low to moderate potential HYVE7 habitat. Additional potential habitat may occur outside of the 2008 survey areas.

A surface fire (19 percent of a wildfire) would have no direct effect on this species because it occurs on rocks in perennial streams. Surface fires would, however, burn small understory trees and ground fuels along riparian areas, which would improve HYVE7 riparian habitat by (1) removing fuels and avoiding the potential for a destructive wildfire, and (2) increasing resources for riparian overstory trees that contribute shade and moderate stream temperatures important to HYVE7 viability. The improved riparian habitat would result in a moderate short-term beneficial indirect effect until understory vegetation recovers and ground fuels are replaced.

A passive or active crown fire (70 and 11 percent, respectively) would also not affect HYVE7 directly, but would indirectly affect HYVE7 habitat. Passive and active crown fires would destroy some or all overstory trees along HYVE7 riparian habitat, which would result in a loss of important overstory shade and an increase in stream temperatures as solar radiation increases. The increased solar radiation would result in a moderate indirect adverse long-term effect until overstory canopy is restored.

Cumulative Effects

The previous history of fire suppression has resulted in a build up of ground and ladder fuels in the Assessment Area. The ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area create potential for fire ignitions; these combined factors would increase the risk of stand-replacing wildfire in the treatment units. A frequent result of stand-replacing wildfires, and the corresponding suppression activities, is the formation of conditions favorable to noxious weed invasion. Noxious weed infestations are unlikely to directly affect any HYVE7 sites. Stand-replacing fires often result in post-fire increases in stream flows and siltation when large amounts of upland vegetation are consumed. The increase in stream flows and siltation would directly destroy HYVE7 plants and HYVE7 habitat, resulting in long-term moderate adverse indirect effects on HYVE7 until stream flows and siltation levels recover. Mining activities along streams with any HYVE7 sites are also likely to affect this aquatic lichen by disturbing HYVE7 substrate habitat (rocks) and destroying plants and indirectly increasing stream siltation. Mining activities in HYVE7 sites would result in (1) a long-term moderate adverse direct effect if HYVE7 substrate or plants are destroyed or disturbed, and (2) a long-term moderate adverse indirect effect if siltation levels increase and destroy plants.

Conclusion. A surface fire would result in no direct effect on HYVE7 and a moderate indirect beneficial short-term effect until understory vegetation recovers and ground fuels are replaced. A passive or crown fire would increase solar radiation along HYVE7 riparian habitat and result in a moderate

indirect adverse long-term effect until overstory canopy is restored. Cumulative effects of Alternative A include the likelihood of a stand-replacing fire with (1) an increase in noxious weeds and stream flows and stream siltation levels following the stand-replacing wildfire. The results include (1) no short-term or long-term direct effect on HYVE7 plants from weed infestations, and (2) a long-term moderate adverse indirect effect until stream flows and siltation levels recover. Mining activities would also have a cumulative effect by disturbing or destroying HYVE7 plants or habitat, resulting in (1) a long-term moderate adverse direct effect if HYVE7 substrate or plants are destroyed or disturbed, and (2) a long-term minor to moderate adverse indirect effect if siltation levels increase and indirectly destroy plants.

C. Effects of Alternative B: Proposed Action

Sensitive Vascular Species

- *Cypripedium fasciculatum* (Clustered Lady-slipper Orchid)—CYFA
- *Cypripedium montanum* (Mountain Lady-slipper Orchid)—CYMO2
- *Smilax jamesii* (English Peak greenbriar)—SMJA

Direct and Indirect Effects: CYFA and CYM02

Twenty-one CYFA and 12 CYMO2 sites occur in the Assessment Area, within all treatment types (FRZs and Rx Units, RS treatments in FRZs, and within Riparian Reserves in both FRZs and Rx Units). The resource protection measures for CYFA and CYM02 have been designed into the Proposed Action (refer to Table 3 above). The Resource Protection Measures are intended to protect individual plants and maintain habitat characteristics that are critical to the maintenance of long-term viable plant populations, in accordance with the desired conditions of the Standards and Guidelines contained in the Klamath LRMP (USFS 1995). While it is assumed that CYFA and CYMO2 have evolved with wildfire in the landscape, the levels of ground and ladder fuels in these sites is considered outside the historic range due to fire suppression. The resource protection measures, therefore, allow fuel reduction treatments to occur in stands containing CYFA and CYMO2 sites when it is outside the active growing period, or if within the growing period, those sites will be protected from treatments with a 25-foot buffer. With the implementation of the resource protection measures, Alternative B would enhance CYFA and CYMO2 habitat and protect plants from potential mortality from a stand-replacing fire and likely lead to long-term viability of the CYFA and CYMO2 populations in the Assessment Area.

Cumulative Effects: CYFA and CYM02

Ongoing district projects and projects scheduled for the foreseeable future include annual road maintenance, improvements to existing mining claims, hiking, and appropriate responses for fire suppression, installation of utility lines with associated roadside trenching, the North Forks road maintenance project, and the construction of a fuelbreak system west of Black Bear Ranch. The Proposed Action would prevent the risk of stand-replacing fire from the cumulative effects of a previous history of fire suppression, a build up of ground and ladder fuels in the treatment units, and the potential for fire ignitions from the ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area. The prevention of stand-replacing fire would benefit these two species by preventing the direct loss or damage of CYFA and CYMO2 plants and habitat from fire.

A secondary benefit of the prevention of stand-replacing fire is the prevention of a potential weed infestation—a frequent result of stand-replacing wildfires and the corresponding suppression activities.

The prevention of a weed infestation would directly benefit CYFA and CYMO2 by avoiding competition that could lead to a decline in native vegetation and CYFA and CYMO2 populations. Other district projects, however, may increase the potential for noxious weed invasion through ground disturbance (that is, disturbance from annual road maintenance, fire suppression activities, the digging of a roadside trench for telephone and fiber-optic line installation, and the North Forks road maintenance project). A weed infestation would compete with native vegetation and CYFA and CYMO2 populations and lead to a decline in population viability. Dyer's woad is the most likely local noxious weed species to invade CYFA and CYMO2 habitat. While this weed is frequently found on roadsides and in open, disturbed dry sites, at least one site in the Assessment Area continues down into a riparian area.

Conclusion. The Proposed Action, with the implementation of resource protection measures, would result in long-term moderate beneficial direct and indirect effects on CYFA and CYMO2 populations as long-term population viability is enhanced, and plants and habitat are protected from a stand-replacing wildfire and secondary weed infestation. The cumulative effects of district projects that create ground disturbance may increase weed infestations in CYFA and CYMO2 habitat that would out-compete native vegetation and CYFA and CYMO2 plants and contribute to the decline of CYFA and CYMO2 populations; the result would be a long-term moderate adverse indirect effect on CYFA and CYMO2 populations.

Direct and Indirect Effects: SMJA

One SMJA site occurs in a Riparian Reserve within an Rx Unit. The prescribed fire treatments in Riparian Reserves have been modified to protect riparian resources and include the following: (i) the building of handlines will stop within 25 feet of the wetted edge of channels; (ii) prescribed fires will be ignited to minimize potential for moderate- or high-intensity burns; and (iii) when underburning, at least 90 percent of the large woody debris will not be consumed, both standing and on the ground. The low-intensity fires proposed for the SMJA habitat in the Riparian Reserve would directly burn above-ground portions (leaves, flowers/fruits, or stems) but not damage below-ground portions (caudex, roots) of SMJA. SMJA plants would recover in the short term. The low-intensity fires would enhance SMJA habitat by removing low to moderate amounts of competing vegetation and ground fuels and small-diameter trees. The removal of competing vegetation and understory fuels would reduce competition for resources until vegetation recovers and fuel loads eventually increase.

Cumulative Effects: SMJA

The Proposed Action would reduce the risk of stand-replacing fire that would result from the cumulative effects of a previous history of fire suppression, a build up of ground and ladder fuels in the treatment units, and the potential for fire ignitions from the ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area. The prevention of stand-replacing fire would benefit this species by avoiding the direct loss or damage of SMJA plants and habitat from fire. A secondary benefit of the prevention of stand-replacing fire is the prevention of a potential noxious weed infestation—a frequent result of stand-replacing wildfires and the corresponding suppression activities. The prevention of a weed infestation would directly benefit SMJA by avoiding competition that could lead to a decline in native vegetation and the SMJA population. Other district projects, however, that create disturbance along riparian areas (that is, improvements to mining claims) could destroy or damage SMJA plants directly or indirectly through alteration of riparian habitat.

Conclusion. The proposed fuel reduction treatments under the Proposed Action would result in (1) a short-term negligible adverse direct effect if plants burn and then recover, and (2) a long-term moderate beneficial indirect effect as SMJA riparian habitat is enhanced and competition for resources is reduced, and plants and habitat are protected from a stand-replacing fire and secondary weed infestation. Cumulative effects from mining claim improvement activities in riparian areas may result in long-term minor to moderate adverse direct and indirect effects on SMJA as plants and/or habitat are destroyed or damaged.

Additional SMJA sites may occur in proposed treatment units outside of the 2008 survey areas. Any new SMJA sites would occur in riparian habitat within FRZs or Rx Units. This species is unlikely to occur in RS treatments or in mechanical thinning units in FRZs, which are located on uplands and ridgetops. Any SMJA sites in riparian zones of FRZs or Rx Units would have the same effects as the known SMJA site described above.

Species of Moist (and Riparian) Environments

- *Botrychium virginianum* (Rattlesnake Fern)—BOVI
- *Campanula wilkinsiana* (Wilkin's harebell)—CAWI8

Direct and Indirect Effects

No BOVI or CAWI8 sites are known to occur in the proposed treatment units. This effects analysis assumes that some number of BOVI and CAWI8 sites may occur in proposed FRZs or Rx Units outside the 2008 botany survey areas. BOVI and CAWI8 occur in moist habitats including meadows, seeps, bogs, and streamsides. This habitat is common in both FRZs and Rx Units within Riparian Reserves. BOVI and CAWI8 habitat is less likely to occur in mechanical thinning units located along upland and ridgeline areas and is unlikely in proposed RS treatments. The proposed treatments in Riparian Reserves in FRZs include mastication (on slopes less than 45 percent) or hand thinning and piling (on slopes greater than 45 percent) to remove small trees in FRZs. Within Riparian Reserves in Rx Units, low-intensity backing fires are proposed.

The implementation of mastication or hand-thinning and piling of small trees in FRZs would damage or destroy BOVI and CAWI8 plants and result in a long-term minor to moderate adverse direct effect as few plants would recover or recolonize. The use of low-intensity backing fires in Rx Units would damage some above-ground portions of any BOVI or CAWI8 plants and would result in a short-term minor adverse direct effect as plants would recover and recolonize. The post-treatment reduction in ground and small ladder fuels in stands where these two species might occur would result in long-term moderate beneficial indirect effects because the likelihood of stand-replacing wildfires would be reduced, and BOVI and CAWI8 site stability and vigor would be maintained in the long term.

Cumulative Effects

The Proposed Action would reduce the risk of stand-replacing fire resulting from the cumulative effects of a previous history of fire suppression, a build up of ground and ladder fuels in the treatment units, and the potential for fire ignitions from the ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area. A secondary benefit is the avoidance of potential noxious weed infestations—a frequent result of stand-replacing wildfires and the corresponding suppression activities. The prevention of a weed infestation would directly benefit BOVI and CAWI8 sites by

avoiding competition that could lead to a decline in native vegetation and the BOVI and CAWI8 plants. Other activities (such as improvements to mining claims), however, that create disturbance along riparian areas could destroy and/or damage BOVI or CAWI8 plants.

Conclusion. The implementation of proposed fuels reduction treatments would result in long-term minor to moderate adverse direct effects as mastication destroys BOVI and CAWI8 plants and short-term minor adverse direct effects from low-intensity backing fires. The reduction in fuels and the avoidance of stand-replacing fire and weed infestation would result in long-term moderate beneficial indirect effects as BOVI and CAWI8 site stability and vigor in increased or maintained. Cumulative effects from mining claim improvement activities within riparian areas may result in long-term minor to moderate adverse effects if BOVI and CAWI8 plants and riparian habitat are destroyed or damaged.

Species of Serpentine Environments

- *Chaenactis suffrutescens* (Shasta chaenactis)—CHSU
- *Eriogonum hirtellum* (Klamath Mountain Buckwheat)—ERHI7
- *Minuartia stolonifera* (Scott Mountain sandwort)—MIST9

No CHSU, ERHI7, or MIST9 sites are known to occur in the proposed treatment units. This effects analysis assumes that some number of CHSU, ERHI7, or MIST9 sites may occur in proposed FRZs or Rx Units outside the 2008 botany survey areas. These three species occur in serpentine or ultramafic soils. These soil types are known to occur in FRZs and Rx Units in the Matthews Creek area, in the far southwestern region, and on FRZs on two ridgelines located west and east of East Crawford Creek.

Direct and Indirect Effects

Implementation of prescribed fire to reduce fuels in FRZs and Rx Units would burn above-ground portions (leaves, flowers/fruits, or stems) but not damage below-ground portions (caudex, roots) of CHSU, ERHI7, and MIST9 plants. The result would be a short-term minor adverse direct effect on any CHSU, ERHI7, and MIST9 sites as plants would recover in the short-term. The implementation of prescribed fire would have a secondary indirect effect on the habitat of these species. Prescribed fire would cause (to a lesser degree than a wildfire) an increase in competing early seral vegetation cover (such as grass species), with a resulting decrease in plants at any CHSU, ERHI7, or MIST9 sites. The result would be a long-term minor adverse indirect effect as the increase in competing early seral vegetation would out-compete some CHSU, ERHI7, and MIST9 plants for resources. Mastication treatments (on slopes less than 45 percent) would damage or destroy to CHSU, ERHI7, and MIST9 plants from mechanical disturbance and result in long-term minor to moderate adverse direct effects as some plants would slowly recover and others would be lost. The reduction in ground and small ladder fuels in stands where these three species might occur would result in long-term moderate beneficial indirect effects because the likelihood of stand-replacing wildfires would be reduced, and CHSU, ERHI7, or MIST9 site stability and vigor would be maintained in the long term.

Cumulative Effects

The Proposed Action would reduce the risk of stand-replacing fire resulting from the cumulative effects of a previous history of fire suppression, a build up of ground and ladder fuels in the treatment units, and the potential for fire ignitions from the ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area. The avoidance of stand-replacing fire would benefit CHSU,

ERHI7, and MIST9 sites by avoiding the direct loss or damage of plants and habitat. A secondary beneficial effect would be the avoidance of potential noxious weed infestations—a frequent result of stand-replacing wildfires and the corresponding suppression activities. The prevention of a weed infestation would directly benefit sites by avoiding competition that could lead to a decline in native vegetation and CHSU, ERHI7, and MIST9 plants.

Conclusion. The implementation of prescribed burning in proposed FRZs and Rx Units would result in (1) short-term minor adverse direct effects if CHSU, ERHI7, or MIST9 plants are damaged and recover in the short term, and (2) a long-term minor adverse indirect effect as the increase in competing early seral vegetation would out-compete some CHSU, ERHI7, and MIST9 plants for resources. Mastication treatments (on slopes less than 45 percent) would damage or destroy to CHSU, ERHI7, and MIST9 and would result in long-term minor to moderate adverse direct effects if plants are damaged or destroyed but result in some level of recovery. Post-treatment reductions of fuel loads and avoidance of stand-replacing fire and weed infestations would result in long-term moderate beneficial indirect effects on CHSU, ERHI7, and MIST9 site vigor and stability.

Species of Canopy Gap and Forest Edge Environments

- *Eucephalis vialis* (Wayside Aster)—EUVI8
- *Pedicularis howellii* (Howell's lousewort)—PEHO

No sites of EUVI8 or PEHO are known to occur in the proposed treatment units. This effects analysis assumes that some number of EUVI8 and PEHO sites may occur in treatment units outside the 2008 botany survey areas. These two species occur in canopy gaps and forest edge habitat, including habitat maintained by fire. EUVI8 also occurs in manmade openings along roads. Canopy gap and forest edge habitat occurs in proposed FRZs and Rx Units and RS treatments along emergency access routes.

Direct and Indirect Effects

Implementation of prescribed fire to reduce fuels in FRZs and Rx Units would burn plants above-ground potions (leaves, flowers/fruits, or stems) and leave below-ground portions (caudex, roots) undamaged. Both species occur in habitat maintained by fire; plants burned in a prescribed fire would re-sprout, and EUVI8 or PEHO plant vigor and long-term site stability would be increased or maintained. Prescribed fire would, therefore, result in a long-term moderate beneficial direct effect. Mastication (on slopes less than 45 percent) and mechanical thinning treatments in FRZs would damage or destroy EUVI8 and PEHO plants and result in long-term minor to moderate adverse direct effects as some plants would slowly recover and others would be lost. Mechanical thinning would also increase suitable EUVI8 and PEHO habitat by opening overstory canopy cover, resulting in a long-term moderate beneficial indirect effect on any EUVI8 or PEHO site not destroyed by the mechanical disturbance of the thinning treatment.

Cumulative Effects

The cumulative effects of district projects with mechanical disturbance to roadsides have the potential to create long-term minor to moderate adverse direct effects if roadside EUVI8 or PEHO plants are disturbed or destroyed. The Proposed Action would reduce the risk of stand-replacing fire resulting from the cumulative effects of a previous history of fire suppression, a build up of ground and ladder fuels in the treatment units, and the potential for fire ignitions from the ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area. The avoidance of stand-replacing fire

would benefit EUVI8 and PEHO sites by avoiding the direct loss or damage of plants and habitat. A secondary beneficial effect would be the avoidance of potential noxious weed infestations—a frequent result of stand-replacing wildfires—and the corresponding suppression activities. The prevention of a weed infestation would directly benefit sites by avoiding competition that could lead to a decline in native vegetation and EUVI8 and PEHO plants.

Conclusion. The implementation of proposed FRZs and Rx Units would result in long-term minor to moderate beneficial direct effects, and mastication and mechanical thinning treatments would result in both long-term minor to moderate adverse direct effects and minor to moderate beneficial long-term indirect effects. The post-treatment reduction in fuels and the avoidance of stand-replacing fire and weed infestation would result in long-term moderate beneficial indirect effects as EUVI8 and PEHO site vigor is increased or maintained over the long term.

Species of Montane Chaparral and Mixed-Conifer Forest Environments

- *Eriogonum ursinum* var. *erubescens* (Blushing Buckwheat)—ERURE

No ERURE sites are known to occur in the proposed treatment units. This effects analysis does assume that some number of ERURE sites occur in proposed treatments units outside the 2008 botanical survey areas. ERURE occurs in chaparral and open conifer/mountain mahogany habitat. This habitat type is most likely to occur in FRZs where prescribed burn and mastication treatments are proposed.

Direct and Indirect Effects

The implementation of prescribed fire treatments to reduce fuels in FRZ and Rx Units would burn above-ground portions (leaves, flowers/fruits, or stems) of plants and leave below-ground portions (caudex, roots) undamaged. The result would be a short-term minor adverse direct effect as burned ERURE plants would re-sprout in the short term. Mastication (on slopes less than 45 percent) or mechanical thinning in FRZs would damage or destroy EUVI8 and PEHO plants and result in long-term minor to moderate adverse direct effects as some plants would slowly recover and others would be lost.

Cumulative Effects

The Proposed Action would reduce the risk of stand-replacing fire resulting from the cumulative effects of a previous history of fire suppression, a build up of ground and ladder fuels in the treatment units, and the potential for fire ignitions from the ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area. The avoidance of stand-replacing fire would benefit ERURE sites by avoiding the direct loss or damage of plants and habitat. A secondary beneficial effect would be the avoidance of potential noxious weed infestations—a frequent result of stand-replacing wildfires—and the corresponding suppression activities. The prevention of a weed infestation would directly benefit sites by avoiding competition that could lead to a decline in native vegetation and ERURE plants.

Conclusion. The implementation of proposed FRZs and Rx Units would result in short-term minor adverse direct effects, and mastication and mechanical thinning treatments would result in long-term minor to moderate adverse direct effects on ERURE sites. The post-treatment reduction in fuels and the avoidance of stand-replacing fire and weed infestation would result in long-term moderate beneficial indirect effects as ERURE site vigor is increased or maintained over the long term.

Sensitive Fungi Species

- *Boletus pulcherrimus, Cudonia monticola, Dendrocollybia racemosa, Phaeocollybia olivacea, Sowerbyella rhenana, Tricholomopsis fulvescens*

Several studies that have examined the effects of prescribed fire have found that the effects on mycorrhizal fungal species are related to the intensity of the fire within the species' habitat. Fires that do not fully consume the large woody debris, litter, and organic layers and also retain moisture have reduced effects on fungi (USFS 2007). Fuel treatment prescriptions that retain adequate live overstory, understory, and shrub species would retain sufficient host species to form mycorrhizal connections. No specific studies have been found that have examined the effects of fuel treatments specifically upon *saprophytic* species. The effects are likely to be similar to those seen upon mycorrhizal species, which require canopy cover and large woody material to retain moisture levels within their habitat. This effects analysis is based on the assumption that the relationships will be similar to that seen in the studies cited above. Because there is an overall low probability that the six Sensitive fungi species are present within proposed treatment units, there is also a low potential for an effect on individual fungi populations.

The Proposed Action includes mechanical and fuels treatments to reduce fuels. Suitable habitat in the project Assessment Area for the six Sensitive fungi species is located along wet, north-facing riparian areas within 25 feet of perennial streams, at the lower to mid-elevations, and within mature timber stands. Suitable habitat for the six Sensitive fungi does not occur within the proposed mechanical treatment units (M Units) located on ridges and upper slope positions.

Direct and Indirect Effects

Mechanical Treatments: The implementation of proposed mechanical treatments would have no effect on the six Sensitive fungi species as there is no habitat for these species in the M Units.

Prescribed Fire Treatments: Suitable habitat for the six fungi is restricted to Riparian Reserves within the project Assessment Area. Prescribed burn activities in FRZs and Rx Units will be modified in these areas to reduce effects; that is, underburning will be allowed to back into the Riparian Reserves down to the riparian area (see "Section III.B. Resource Protection Measures" for details). The prescription will retain an adequate percentage of the live tree overstory, which will ensure the preservation of shade and a diverse mix of tree species to support underground ECM linkages, and will maintain mycorrhizal species. Understory trees, shrubs, and coarse woody debris will be reduced but maintained at adequate levels to support the fungi that depend upon these vascular plant species. Saprophytic fungi species will be maintained by underburn prescriptions that ensure a low-intensity burn that will retain adequate woody debris. Best Management Practices are being applied to provide adequate soil cover to prevent erosion, which will retain additional coarse woody debris and duff as a substrate for saprophytic fungi. There would be a long-term beneficial effect to the fungi species habitat through the maintenance of suitable habitat and by reducing the risk of stand-replacing wildfires.

Underburning would burn some number of individual fungi populations. Because mycorrhizal and saprophytic fungi have large underground systems, any entire population of the fungi would not be affected. Fungi species readily regenerate after impacts to a portion of the population as long as adequate vegetative cover, species diversity, soil cover, and coarse woody debris are maintained. The habitat would not be affected to the extent that it would no longer be suitable for the fungi. In summary, prescribed burn activities in FRZs and Rx Units would result in (1) a short-term negligible adverse direct effect on

individual fungi as underburning destroys some number of individuals (but entire populations are not impacted), and(2) a long-term moderate beneficial indirect effect as suitable fungi habitat is maintained and the risk of stand-replacing wildfires is reduced.

Mastication Treatments: Mastication treatments are proposed to occur within 875 acres of Riparian Reserves in FRZs on slopes less than 45 percent and within 0.25 mile of roads. No specific studies have been found that have examined the effects of mastication activities, specifically upon fungi species. While mastication activities would likely destroy or damage some individuals and/or the substrate of some saprophytic fungi, the fungi populations would not be killed. When the substrate within which the mycelial network occurs is disturbed, the fungus is not necessarily killed; rather, the network will be broken into many fragmented parts that will continue to live and fruit as long as a nutrient source—vascular plants for mycorrhizal species or rotten wood for saprophytic species—and a moisture source persists. Mastication treatments also include leaving mulched coarse and fine woody debris on site. The increase in fine and coarse woody debris is expected to have a negligible to beneficial effect on fungi individuals. The increased woody debris is expected to increase forest floor moisture, which would benefit both saprophytic and mycorrhizal fungi and would increase substrate source for the saprophytic species. In summary, proposed mastication treatments would result in (1) a short-term minor adverse direct effect as individual fungi would be destroyed or damaged but any populations would persist and recover in the short term, and (2) a short-term minor beneficial indirect effect as increased fine and coarse woody debris cover would increase forest floor moisture and provide increased substrate for saprophytic fungi species.

Roadside Fuels Treatments: Roadside treatments are proposed for 69.5 acres of Riparian Reserves. A masticator would be used on slopes less than 45 percent to remove trees less than 10 inches dbh, and hand thinning and pile burning would be used to remove trees up to 6 inches dbh on slopes greater than 45 percent. Hand thinning and pile burning would likely destroy or damage some fungi individuals and/or the substrate of some saprophytic fungi, the fungi populations would readily regenerate as long as adequate vegetative cover, species diversity, soil cover and coarse woody debris are maintained. Roadside fuels treatments would result in short-term minor adverse direct effects as individual fungi and/or substrate for saprophytic fungi species would be destroyed or damaged but any populations would persist and recover in the short term.

Cumulative Effects

The Proposed Action would reduce the risk of stand-replacing fire resulting from the cumulative effects of a previous history of fire suppression, a build up of ground and ladder fuels in the treatment units, and the potential for fire ignitions from the ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area. The avoidance of stand-replacing wildfire would result in a long-term moderate beneficial indirect effect by avoiding the direct loss or damage of fungi populations and habitat.

Future district projects expected to occur in the short and long term include annual road maintenance, fire suppression activities, the installation of telephone and fiber-optic lines (and associated disturbance from roadside trenches), and the North Forks road maintenance project. Each of these district projects involves ground disturbance near roadsides or other upland site locations, outside of the six Sensitive fungi species' riparian habitat. Mining activities, however, do occur near streams and may occur within

riparian habitat of these species. Ground disturbance from mining would damage or destroy some fungi individuals, but any populations would be maintained. No cumulative effects are expected from effects from wildfire and mining.

Conclusion. Effects from the Proposed Action include the following: (1) no effects would result from mechanical treatments as the six Sensitive fungi species do not occur in M Unit habitat; (2) prescribed fire treatments would result in a short-term negligible adverse direct effect on individual fungi as underburning destroys some number of individuals (but entire populations are not impacted), and a long-term moderate beneficial indirect effect as suitable fungi habitat is maintained, and the risk of stand-replacing wildfires are reduced; (3) mastication treatments would result in (*i*) a short-term minor adverse direct effect as individual fungi would be destroyed or damaged, but any populations would persist and recover in the short term; and (*ii*) a short-term minor beneficial indirect effect as increased fine and coarse woody debris cover would increase forest floor moisture and provide increased substrate for saprophytic fungi species; and (4) roadside treatments would result in short-term minor adverse direct effects as individual fungi and/or substrate for saprophytic fungi species would be destroyed or damaged, but any populations would persist and recover in the short term.

Bryophyte Species

- *Ptilidium californicum* (Pacific Fuzzwort)—PTCA5

Direct and Indirect Effects

Two sites of the Sensitive liverwort PTCA5 occur in Rx Units, one of the two is also located in an RS treatment (PTCA5-#TE1). Resource protection measures for the two PTCA5 populations have been designed into the Proposed Action (refer to Table 3 above). The resource protection measures are intended to protect individual plants and to maintain habitat characteristics that are critical to the maintenance of long-term viable plant populations, in accordance with the desired conditions of the Standards and Guidelines from the Klamath LRMP (USFS 1995a). Fuel reduction treatments proposed in both sites include broadcast burning to remove ground and small ladder fuels (less than 4 inches dbh).

PTCA5 is a liverwort that occurs in patches on the base of Douglas-fir and true fir trees in upper-elevation conifer forests. It is assumed that populations in northern California have evolved in spite of fire in the landscape; that is, individual plants or populations, once destroyed by fire, recover or recolonize slowly, if at all, at the same location, depending upon the severity of fire. In addition the levels of ground and ladder fuels in these sites are considered outside the historic range due to past fire suppression. The resource protection measures, therefore, allow the broadcast burning within the two PTCA5 stands but exclude burning of the substrate trees. The resource protection measures also exclude the harvesting of the substrate trees. With the implementation of the resource protection measures, the Proposed Action would result in a long-term beneficial indirect effect as PTCA5 habitat and plants are protected from mortality in a stand-replacing fire and would lead to long-term viability of the PTCA5 populations in the Assessment Area.

Cumulative Effects

The Proposed Action would reduce the risk of stand-replacing fire that may occur given the cumulative effects of a previous history of fire suppression, a build up of ground and ladder fuels in the treatment units, and the potential for fire ignitions from the ongoing recreational (mining, hiking, hunting)

and rural community activities in the Assessment Area. The avoidance of stand-replacing fire would benefit this species by preventing the direct loss or damage of PTCA5 plants and habitat. The Proposed Action's reduction of the potential for stand-replacing fire would also prevent the secondary effects from a weed infestation—a frequent result of stand-replacing wildfires and the corresponding suppression activities. The direct benefit to PTCA5 would be minor. PTCA5 is a small liverwort that grows in patches on the base of large trees and is not in direct competition with herbaceous or shrubby weeds. The avoidance of weed competition for herbaceous and shrub vegetation in PTCA5 habitat, however, would be an indirect beneficial effect on this species' habitat.

Future district projects expected to occur in the short and long term include annual road maintenance, fire suppression activities, the installation of telephone and fiber-optic lines (and associated disturbance from roadside trenches), and the North Forks road maintenance project. Each of these district projects involves ground disturbance near roadsides, and cumulative adverse effects are expected with the multiple roadside disturbances from the district projects. If the PTCA5-#TE1 tree is damaged or removed, PTCA5-#TE1 would be damaged or destroyed. If habitat is altered (that is, canopy cover and stand humidity is reduced, and/or if suitable substrate mature overstory tree species are removed), PTCA5-#TE1 plants would decline or be killed. In summary, (1) the Proposed Action would result in (1) a long-term moderate beneficial cumulative effect because the species' habitat would be maintained as the risk of wildfire is reduced and a noxious weed infestation is avoided; and (2) ongoing and future district projects along roadsides would result in moderate long-term adverse cumulative effects if the PTCA5-#TE1 tree is removed or damaged and/or surrounding habitat is altered.

Conclusion. The Proposed Action would result in a long-term beneficial indirect effect because PTCA5 habitat and plants would be protected from mortality during a stand-replacing fire (and avoiding a secondary noxious weed infestation) and would lead to long-term viability of the PTCA5 populations in the Assessment Area. Cumulative effects from ongoing and future district roadside-disturbing projects would result in long-term moderate adverse direct and indirect effects if the PTCA5-#TE1 substrate tree is removed or damaged, and/or surrounding habitat is altered, leading to the decline or loss of PTCA5-#TE1 plants.

Lichen Species

- *Hydrothyria venosa* (syn. *Peltigera hydrothyria*) (Waterleaf Lichen) – HYVE7

No sites of HYVE7 are known to occur in the Assessment Area. Surveys in 2008 included a number of streams with low to moderate potential HYVE7 habitat. Additional potential habitat may occur outside of the 2008 survey areas. Potential HYVE7 sites of this aquatic lichen would occur in Riparian Reserves of Rx Units.

Proposed treatments in Riparian Reserves include removal of small trees by hand thinning and pile burning and with low-intensity backing fires. Resource protection measures for Riparian Reserves are intended to maintain existing shade and moisture levels, litter, duff, and large woody debris components, and species composition. The protection measures include the following: (i) avoid construction of handlines within 25 feet of a watercourse; (ii) ignite prescribed fires to minimize the potential for burning material to increase the potential for moderate- or high-intensity burns; (iii) when underburning in Riparian Reserves, at least 90 percent of the large woody debris will not be consumed, both standing and

on the ground; (iv) where more than 80 percent shade exists, at least 80 percent shade on the water will be retained after treatment; (v) larger conifers (greater than 20 inches dbh) felled within perennial stream channels or inner gorges will be left in place; however, slash will be minimized in the stream channel.

Direct and Indirect Effects

Proposed treatments in Riparian Reserves that maintain overstory shade, reduce understory fuels, and avoid disturbance to streams would result in short-term moderate indirect beneficial effects to any HYVE7 sites until riparian habitat fuels recover. Proposed treatments would result in no direct effects on any HYVE7 plants.

Cumulative Effects

The Proposed Action would reduce the risk of stand-replacing fires that may occur given the cumulative effects of a previous history of fire suppression, a build up of ground and ladder fuels in the treatment units, and the potential for fire ignitions from the ongoing recreational (mining, hiking, hunting) and rural community activities in the Assessment Area. A stand-replacing fire would affect HYVE7 habitat by reducing upland vegetation and increasing stream flows and silt loads. The result would be an indirect long-term moderate adverse effect until upland vegetation recovers and stream flows and silt loads stabilize. Cumulative effects of mining activities would be similar to Alternative A described above.

Conclusion. The Proposed Action would result in a long-term moderate beneficial indirect effect, as HYVE7 habitat components (shade, stream temperature) are maintained. By reducing or avoiding the cumulative effects of a stand-replacing fire, the Proposed Action also would result in a long-term moderate beneficial indirect effect until upland vegetation recovers and stream flows and silt loads stabilize. The cumulative effects of mining activities along streams with any HYVE7 sites would result in (1) a long-term moderate adverse direct effect as HYVE7 substrate or plants are destroyed or disturbed; and (2) a long-term moderate adverse indirect effect as siltation levels increase and destroy plants.

D. Alternative C: No New Temporary Roads Constructed

Sensitive Vascular Species

- *Cypripedium fasciculatum* (Clustered Lady-slipper Orchid) [CYFA]
- *Cypripedium montanum* (Mountain Lady-slipper Orchid) [CYMO2]
- *Smilax jamesii* (English Peak Greenbriar) [SMJA]

Direct and Indirect Effects

Direct and indirect effects for the three Sensitive vascular species would not change from Alternative B, described above. The shift in treatment locations in Alternative C (as mechanical units are dropped) would be accounted for with the resource protection measures.

Cumulative Effects

Cumulative effects for the three Sensitive vascular species would not change from Alternative B.

Conclusion. Alternative C, with implementation of resource protection measures, would result in long-term moderate beneficial direct and indirect effects on CYFA and CYMO2 populations as long-term population viability is enhanced, and plants and habitat are protected from stand-replacing wildfire and secondary weed infestation. The cumulative effects of projects that create ground disturbance may

increase weed infestations in CYFA and CYMO2 habitat, causing an adverse indirect effect as invasive weeds out-compete native vegetation and CYFA and CYMO2 plants, contributing to the decline of CYFA and CYMO2 populations; the result would be a long-term moderate adverse indirect effect on CYFA and CYMO2 populations.

Alternative C, with the proposed fuel reduction treatments, would enhance SMJA riparian habitat; the result would be a long-term moderate beneficial indirect effect on the SMJA population in the Assessment Area as SMJA riparian habitat is enhanced, and plants and habitat are protected from a stand-replacing fire and secondary weed infestation. Cumulative effects from mining claim improvement activities within riparian areas may result in long-term minor to moderate adverse effects on SMJA as plants and habitat are destroyed or damaged.

Additional Sensitive Vascular Species (With Potential to Occur)

- *Botrychium virginianum* (Rattlesnake Fern) [BOVI]
- *Campanula wilkinsiana* (Wilkin's harebell) [CAWI8]
- *Chaenactis suffrutescens* (Shasta chaenactis) [CHSU]
- *Eriogonum hirtellum* (Klamath Mountain buckwheat) [ERHI7]
- *Minuartia stolonifera* (Scott Mountain sandwort) [MIST9]
- *Eucephalis vialis* (Wayside Aster) (EUVI[]
- *Pedicularis howellii* (Howell's lousewort) [PEHO]
- *Eriogonum ursinum* var. *erubescens* (Blushing buckwheat) [ERURE]

The eight additional Sensitive vascular species listed above are not known to occur in any proposed treatment unit. This effects analysis, however, does assume that some number of sites of these eight species may occur in proposed treatment units outside of the 2008 botanical survey areas.

Direct and Indirect Effects

Direct and indirect effects to the eight Sensitive vascular species would not change from those discussed for Alternative B. See discussions of effects on individual species within the Alternative B section above.

Cumulative Effects

Cumulative effects to the eight Sensitive vascular species would not change from those discussed for Alternative B. See discussions of effects on individual species in the Alternative B section above.

Conclusion. See discussions of effects on individual species in the Alternative B section above.

Sensitive Fungi Species

- *Boletus pulcherrimus, Cudonia monticola, Dendrocollybia racemosa, Phaeocollybia olivacea, Sowerbyella rhenana, Tricholomopsis fulvescens*

Direct and Indirect Effects

Direct and indirect effects for the six Sensitive fungi species would not change from Alternative B, described above.

Cumulative Effects

Cumulative effects for the six Sensitive fungi species would not change from Alternative B described above.

Conclusion. See Conclusion summary in Alternative B section above.

Bryophyte Species

- *Ptilidium californicum* (Pacific Fuzzwort)—PTCA5

Direct and Indirect Effects

Alternative C proposes no construction of the 1.03 miles of new temporary roads and no underburning treatments in portions of Rx Units 5 and 6. One known PTCA5 site (PTCA5-#TE1) occurs in an RS treatment within FRZ 5. The direct and indirect effects for this site would not change from Alternative B, as described above in Section V.C.

A second PTCA5 site (PTCA5-#RB1) occurs within the portion of untreated Rx Unit 6. The effects of no underburning in Rx Unit 6 would not change from Alternative A, the no-action alternative, as described above in Section V.B.

Cumulative Effects

Cumulative effects for the PTCA5-#TE1 site would not change from Alternative B, as described above in Section V.C. Cumulative effects for the PTCA5-#RB1 site would not change from Alternative A, as described above in Section V.B.

Conclusion for PTCA5-#RB1: Alternative C proposes no underburning to Rx Unit 6 where PTCA5-#RB1 is located. Given the fuel hazard in the Eddy Gulch LSR, it is assumed at least one wildfire will escape initial attack and would burn with surface fires, passive crown and/or active crown fires. A surface fire and portions of a passive crown fire that remain on the surface would damage or destroy plants at PTCA5- #RB1 and result in short- and long-term minor to major adverse direct effects. A surface fire and portions of a passive crown fire would also alter important PTCA5 habitat microhabitat features that would damage plants or slow the recovery/recolonization of PTCA5 plants—the result would be short- and long-term minor to major adverse indirect effects to PTCA5-#RB1 site. Where the overstory is removed as a result of a passive or active crown fire, habitat would be altered and PTCA5 plants would decline or die—the result would be a long-term moderate adverse indirect effect on PTCA5-#RB1.

Conclusion for PTCA5-#TE1: Alternative C would enhance PTCA5 habitat, increase population viability, and protect plants from destruction in a stand-replacing fire; the result would be a moderate beneficial long-term indirect effect on PTCA5 populations. Cumulative effects from district roadside-disturbing projects could result in a long-term moderate adverse direct effect from removing or damaging the PTCA5-#TE1 substrate tree, and a long-term moderate adverse indirect effect from habitat alteration, leading to the decline or loss of PTCA5-#TE1 plants.

Lichen Species

- *Hydrothyria venosa* (syn. *Peltigera hydrothyria*) (Waterleaf Lichen) – HYVE7

Direct and Indirect Effects

Direct and indirect effects for HYVE7 would not change from Alternative B, described above. HYVE7 is an aquatic lichen limited to perennial streams, and the lack of new temporary road construction would not change the direct or indirect effects on this species.

Cumulative Effects

Cumulative effects for HYVE7 would not change from Alternative B, described above. HYVE7 is an aquatic lichen limited to perennial streams, and the lack of new temporary road construction would not change the cumulative effects on this species.

Conclusion. A surface fire would result in no direct effect on HYVE7 and a short-term moderate beneficial indirect effect until understory vegetation recovers and ground fuels are replaced. A passive or crown fire would increase solar radiation along HYVE7 riparian habitat and result in a long-term moderate adverse indirect effect until overstory canopy is restored. Cumulative effects of Alternative C include the likelihood of a stand-replacing fire with (1) an increase in noxious weeds and stream flows and stream siltation levels following the stand-replacing wildfire. The results include (1) no short-term or long-term direct effects on HYVE7 plants from weed infestations, (2) long-term moderate indirect adverse effects until stream flows and siltation levels recover. Mining activities also have a cumulative effect by disturbing or destroying HYVE7 plants or habitat, resulting in (1) long-term moderate adverse direct effects as HYVE7 substrate or plants are destroyed or disturbed and (2) long-term minor to moderate indirect adverse effects as siltation levels increase and indirectly destroy plants.

VI. ESA Effects Determination

The Eddy Gulch LSR Project Assessment Area is not within the range of, nor does it include habitat for, the four federally Endangered plant species (McDonald's rock-cress [*Arabis macdonaldiana*], Applegate's milk-vetch [*Astragalus applegatei*], Gentner mission-bells [*Fritillaria gentneri*], and Yreka phlox [*Phlox hirsuta*]. It is my determination that these four Endangered plant species in the Eddy Gulch LSR Project will not be affected by the Proposed Action. No federally listed Threatened or Proposed plant species will be affected by this project.

VII. Sensitive Species Effects Determination

Alternative A: No Action

For the Forest Service Sensitive plant species (*Botrychium virginianum, Campanula wilkinsiana, Chaenactis suffrutescens, Cypripedium fasciculatum, Cypripedium montanum, Eriogonum hirtellum, Eriogonum ursinum* var. *erubescens, Minuartia stolonifera, Eucephalis vialis, Pedicularis howellii, Smilax jamesii, Boletus pulcherrimus, Phaeocollybia olivacea, Dendrocollybia racemosa, Cudonia monticola, Sowerbyella rhenana, Ptilidium californicum, Hydrothyria venosa,* and *Tricholomopsis fulvescens*), it is my determination that the no-action alternative **may impact individuals but is not likely to cause a trend toward federal listing or a loss of viability**.

Alternative B: Proposed Action

For the sensitive plant species (*Botrychium virginianum, Campanula wilkinsiana, Chaenactis suffrutescens, Cypripedium fasciculatum, Cypripedium montanum, Eriogonum hirtellum, Eriogonum ursinum* var. *erubescens, Minuartia stolonifera, Eucephalis vialis, Pedicularis howellii, Smilax jamesii, Boletus pulcherrimus, Phaeocollybia olivacea, Dendrocollybia racemosa, Cudonia monticola, Sowerbyella rhenana, Ptilidium californicum Hydrothyria venosa,* and *Tricholomopsis fulvescens*), it is my determination that the Proposed Action **may impact individuals but is not likely to cause a trend toward federal listing or a loss of viability**.

Alternative C: No New Temporary Roads Constructed

For the sensitive plant species (*Botrychium virginianum, Campanula wilkinsiana, Chaenactis suffrutescens, Cypripedium fasciculatum, Cypripedium montanum, Eriogonum hirtellum, Eriogonum ursinum* var. *erubescens, Minuartia stolonifera, Eucephalis vialis, Pedicularis howellii, Smilax jamesii, Boletus pulcherrimus, Phaeocollybia olivacea, Dendrocollybia racemosa, Cudonia monticola, Sowerbyella rhenana, Ptilidium californicum Hydrothyria venosa,* and *Tricholomopsis fulvescens*), it is my determination that the Proposed Action **may impact individuals but is not likely to cause a trend toward federal listing or a loss of viability**.

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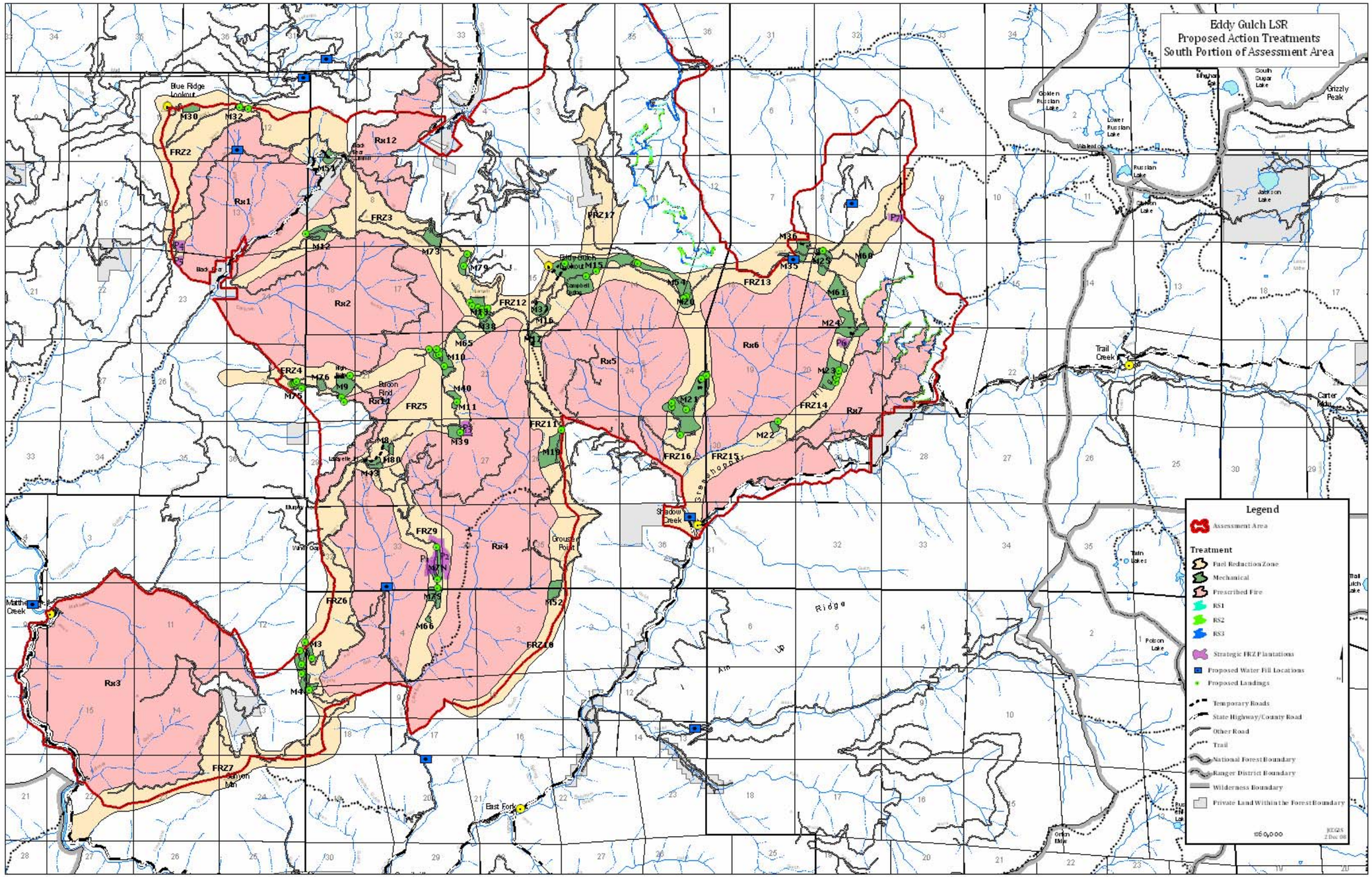
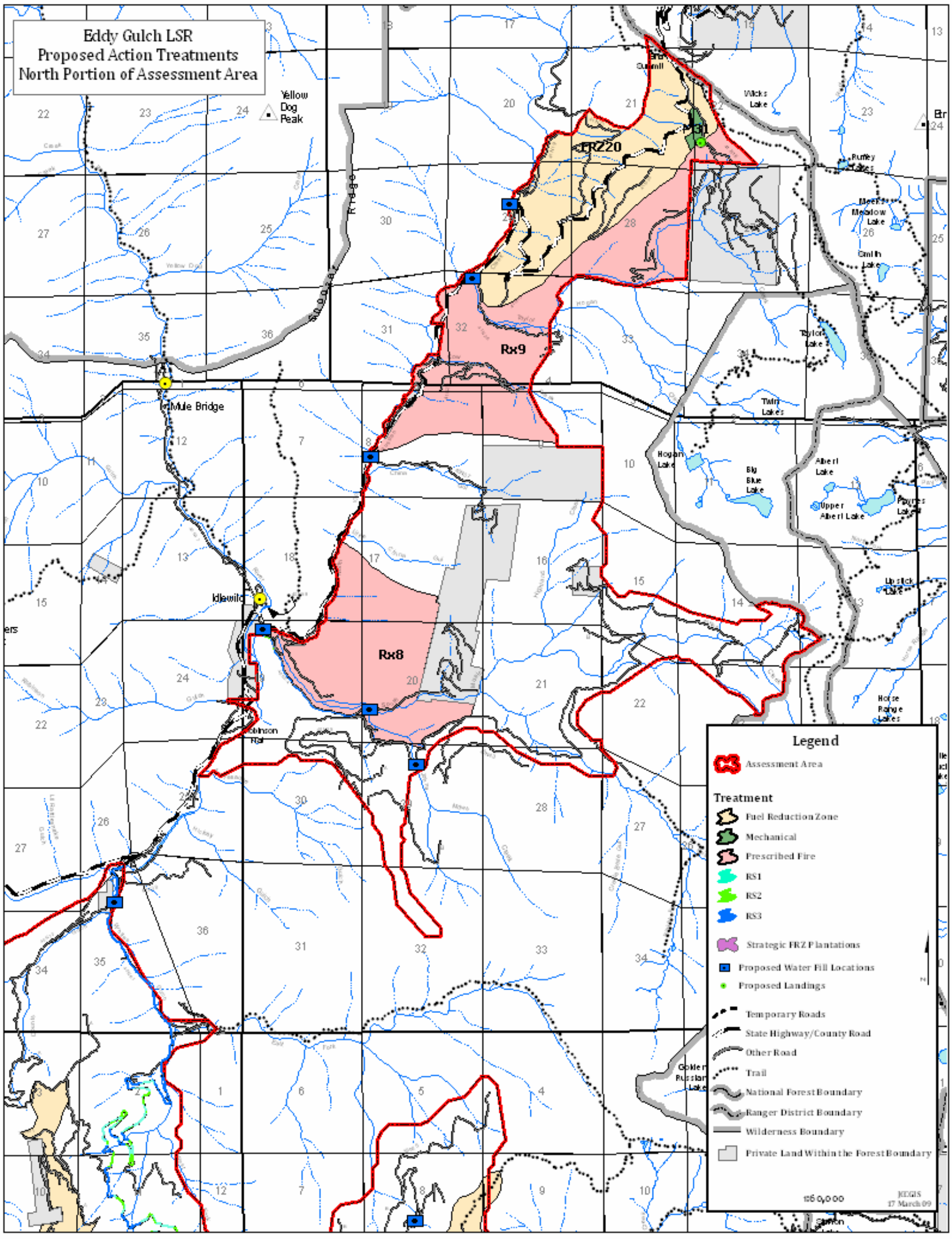
Appendix A
Maps

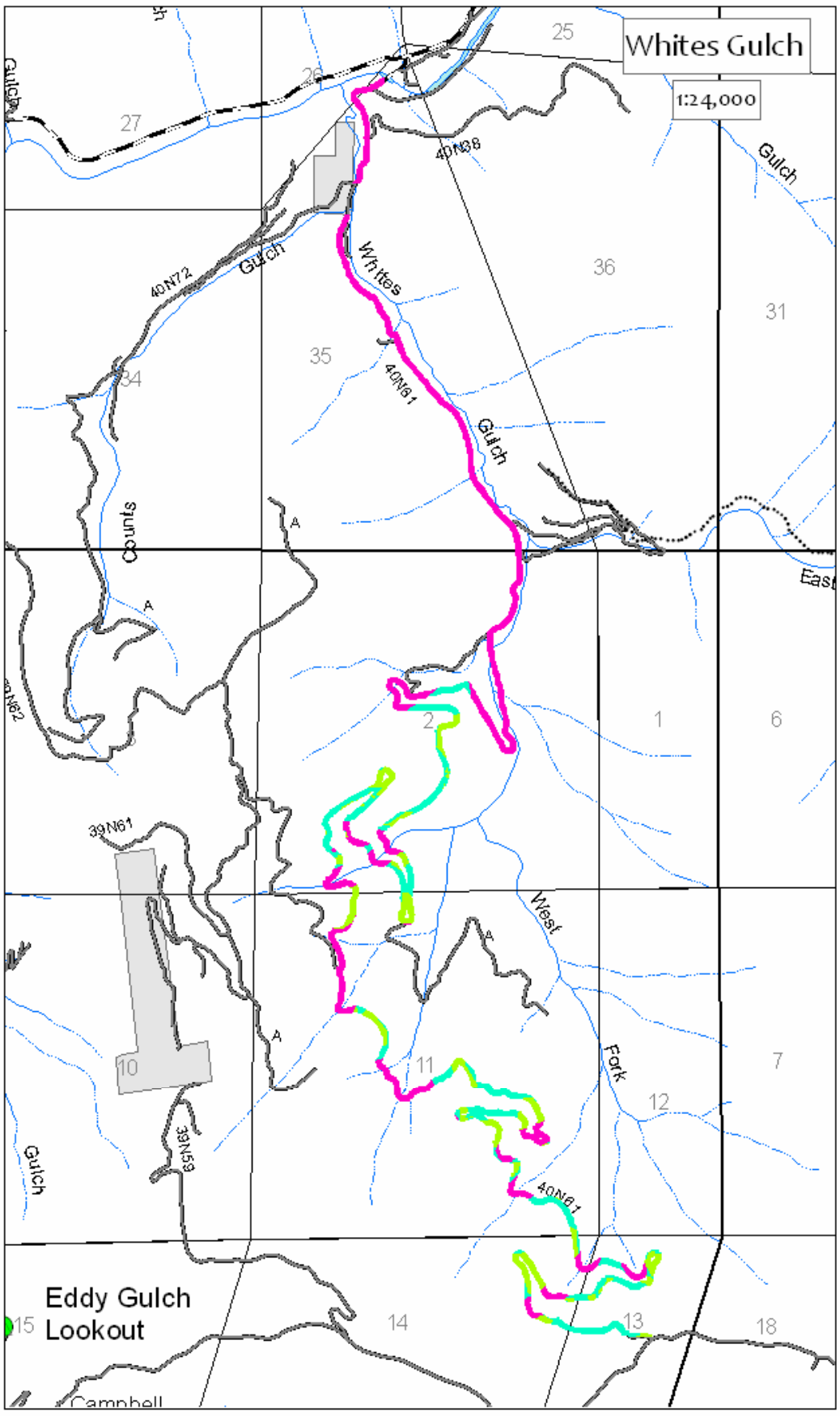
Map A-1 Proposed treatment units in the south portion of the Eddy Gulch LSR Project Assessment Area.

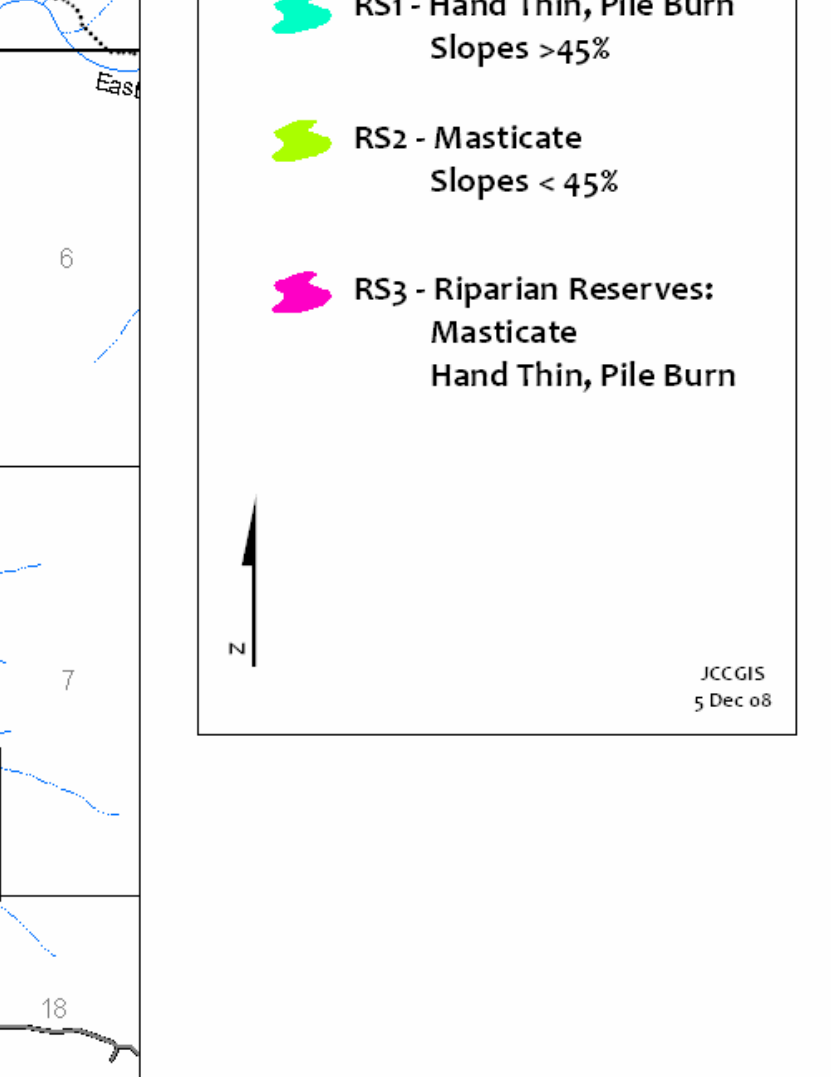


Map A-2. Proposed treatment units in the north portion of the Eddy Gulch LSR Project Assessment Area.



Map A-3. Roadside treatments along emergency access routes that do not pass through an FRZ or Rx Unit.





Eddy Gulch LSR Roadside Treatment

Legend

Treatment Category

- RS1 - Hand Thin, Pile Burn
  Slopes >45%
- RS2 - Masticate
  Slopes < 45%
- RS3 - Riparian Reserves:
  Masticate
  Hand Thin, Pile Burn

N

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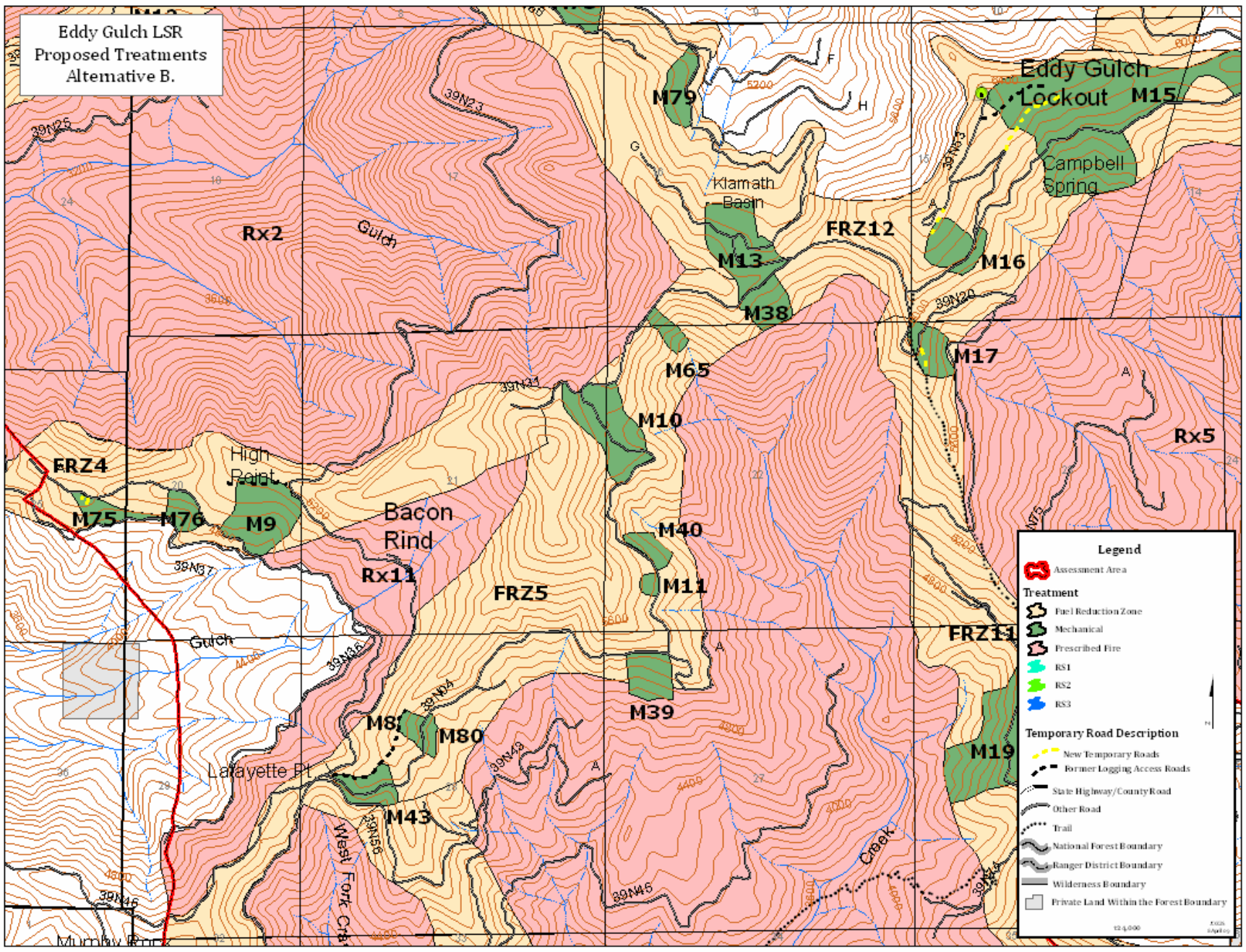
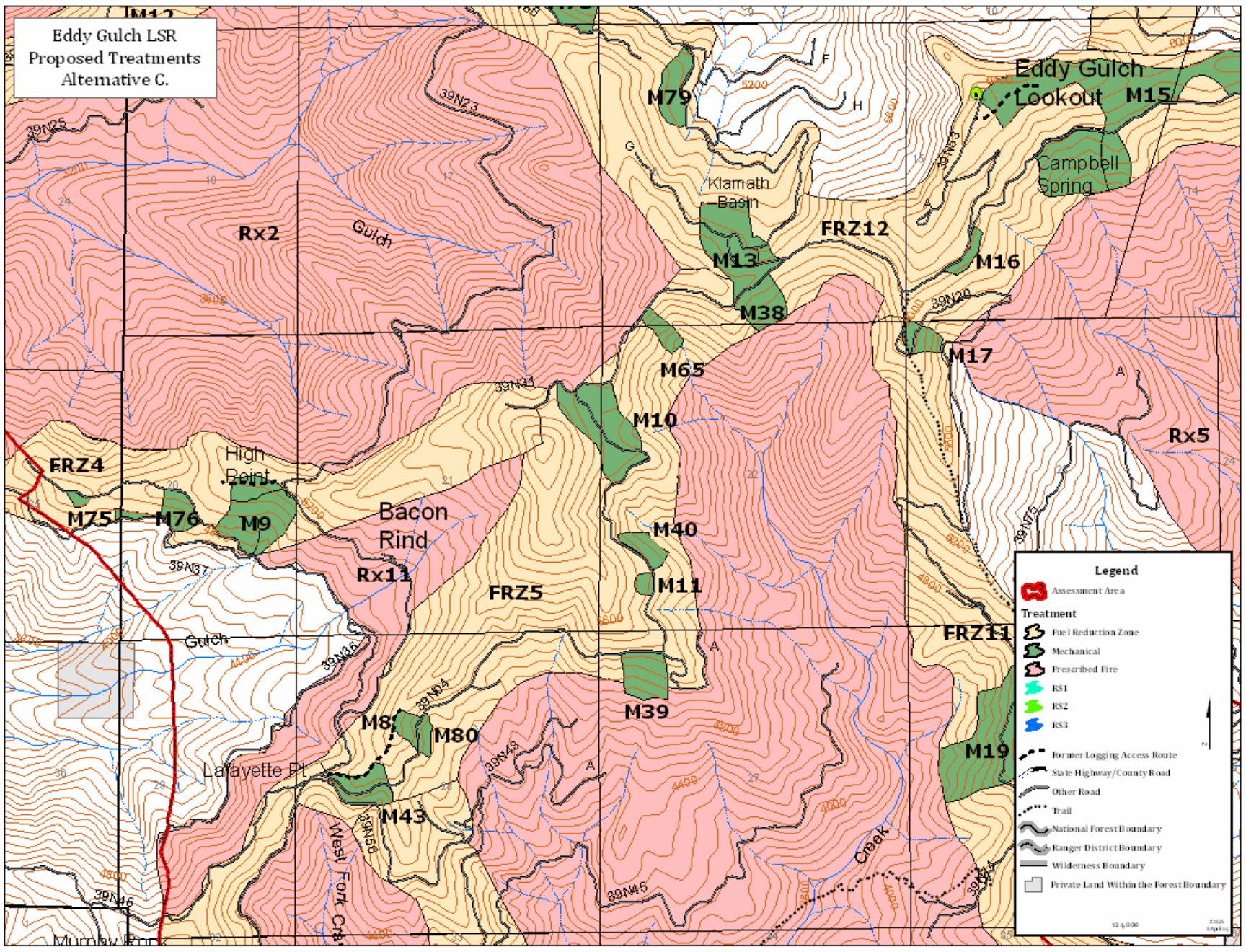
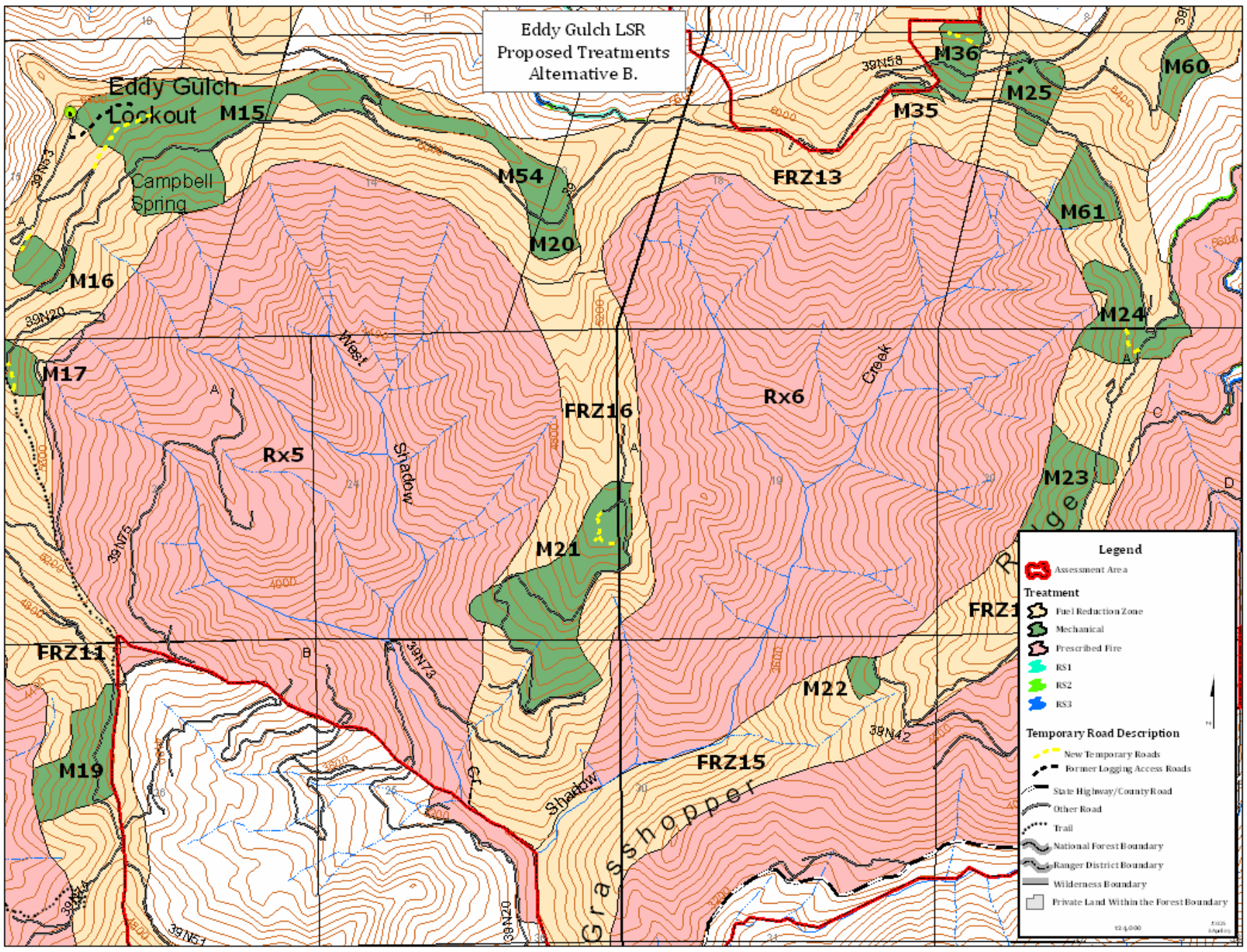
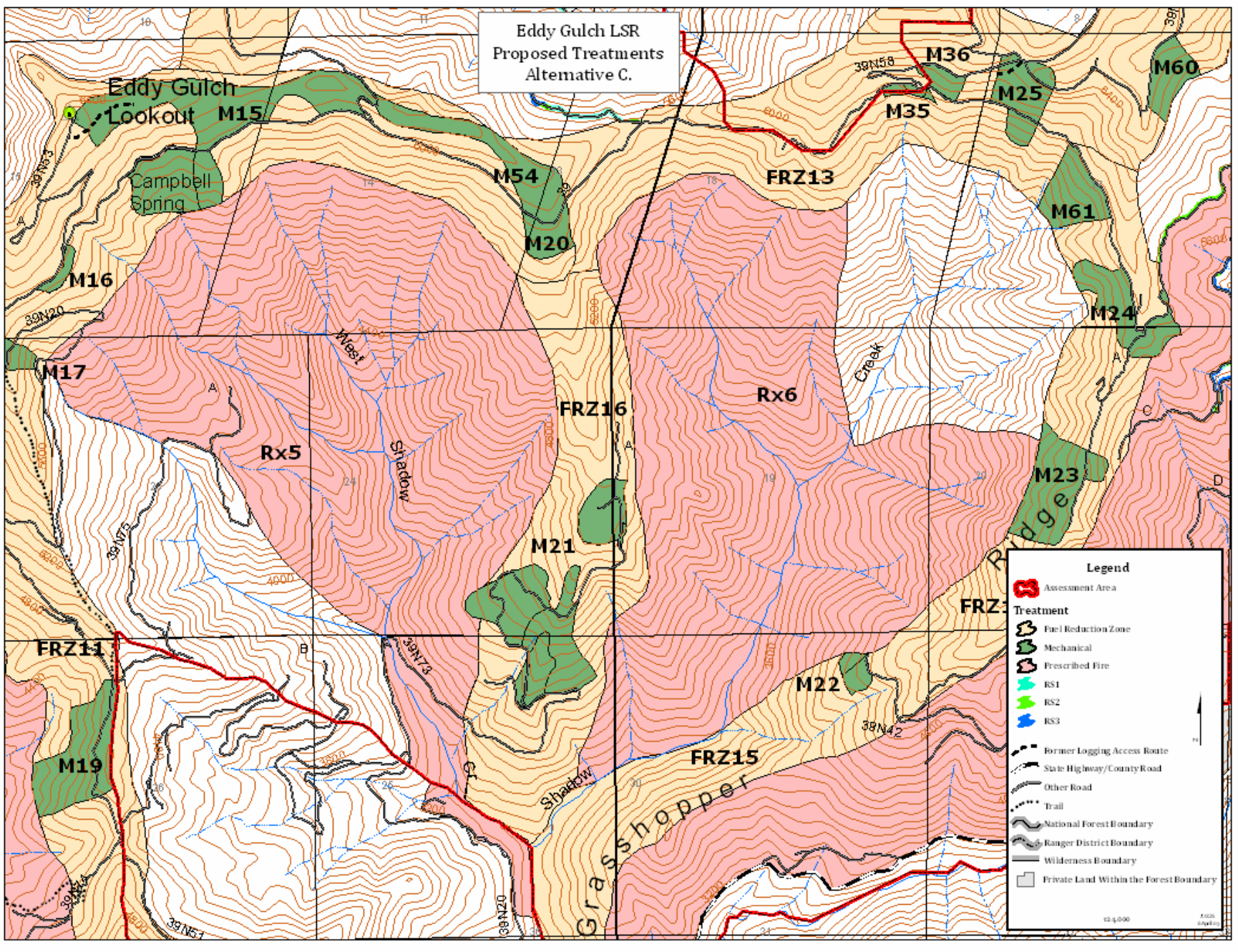
Map A-4a. View 1: Alternative B–configuration of treatment units *with construction* of 1.03 miles of new temporary roads and Alternative C–configuration of treatment units *without construction* of 1.03 miles of new temporary roads.





Map A-4b. View 2: Alternative B–configuration of treatment units *with construction* of 1.03 miles of new temporary roads and Alternative C–configuration of treatment units *without construction* of 1.03 miles of new temporary roads.





Appendix B
Summary of Botanical Resources: Sensitive Plant Locations

Map B-1 Summary of Botanical Resources: Sensitive Plant Locations.