
**EDDY GULCH LATE-SUCCESSIONAL RESERVE
FUELS / HABITAT PROTECTION PROJECT**

BOTANICAL RESOURCES REPORT

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Ranger District: Salmon River and Scott River Ranger Districts

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Supporting Documents in the Project Record

- Botanical Pre-field Review Analysis Flowchart
- Botanical Pre-field Review of Proposed Projects and Results of Preliminary Field Review

- Federally Listed (Section 7 Endangered Species Act, FSM 2670) and Forest Service Sensitive Plant Species
- Survey and Manage Known Sites Table
- Klamath National Forest Noxious Weed List
- Weed Risk Assessment by Factor
- Botanical Review of Other Species of Interest (former “Survey & Manage Species”)
- Sensitive /Survey and Manage Plant Population Site Reports
- Sensitive /Survey and Manage Plant Survey Reports
- General Rangeland Form
- Invasive Plant Form
- 1:24,000 Scale of Suitable Habitat Acres of All Species Likely to Occur in the Eddy Gulch LSR Project Proposed Treatment Units
- 1:24,000 Scale of Suitable Habitat Acres of the Four Species Most Likely to Occur in the Eddy Gulch LSR Project Proposed Treatment Units (*Cypripedium fasciculatum*, *Cypripedium montanum*, *Ptilidium californicum*, *Peltigera hydrothyria*)
- 1:24,000 Scale of Survey Areas (Most Likely Habitat of the Four Species Most Likely to Occur in the Eddy Gulch LSR Project Proposed Treatment Units)
- 1:24,000 Scale of Summary of Botanical Resources: Sensitive Plant Locations
- 1:24,000 Scale of Summary of Noxious Weed Survey Areas and Locations

Botanical Resources Report

1.1 Introduction

This Resource Report presents the existing and desired conditions of botanical resources and noxious weeds within the Eddy Gulch Late-Successional Reserve Project Fuels/Habitat Protection Project (Eddy Gulch LSR Project) Assessment Area. An environmental consequences section follows with an analysis of the effects on botanical resources and noxious weeds that would result from taking no action (Alternative A: No Action) or from implementation of Alternative B: Proposed Action or Alternative C: No New Temporary Roads Constructed.

Vegetation in the Assessment Area consists of true fir forests (*Abies* spp.) in the upper elevations and Douglas-fir and mixed-conifer stands in the mid- to lower elevations. Pacific madrone (*Arbutus menziesii*), canyon live oak (*Quercus wislizeni*), and other hardwoods (such as black oak [*Q. kelloggii*]) are commonly found in stands below 4,000 feet elevation. Additional conifer species in the lower and less exposed areas include ponderosa pine (*Pinus ponderosa*), sugar pine (*P. lambertiana*), and knobcone pine (*P. attenuata*). Extensive stands of Brewer's oak (*Q. breweri*) occur on exposed southern aspects at mid- to upper elevations. The mixed-conifer-pine forests occur on drier slopes below 5,000 feet. The Douglas-fir stands occur mostly on north-facing slopes below 5,000 feet. White fir (*A. concolor*) increases in dominance with increasing elevation, north-facing slopes, and moisture. Red fir (*A. magnifica*) stands are common on north-facing slopes above 5,500 feet. The forests in the Assessment Area are classified as associations in the following vegetative series: Red Fir, White Fir, Douglas-fir, Douglas-fir-Ponderosa Pine, and Mixed-conifer (Sawyer and Keeler-Wolf 1995).

1.1.1 Project Location

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

1.1.2 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 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.

1.2 Summary of the Alternatives

Chapter 2 in the environmental impact statement (EIS) for the Eddy Gulch LSR Project presents more information about the three alternatives, and Appendix A in the EIS contains project maps.

1.2.1 Alternative A: No Action

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.

1.2.2 Alternative B: Proposed Action

The Klamath National Forest proposes 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, which are described below.

- **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 would be 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 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 60 miles of emergency access routes identified in the Salmon River Community Wildfire Protection Plan (CWPP) (SRFSC 2007) 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 the route passes through) 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.

1.2.2.1 Proposed Temporary Roads and Landings

The construction of new temporary roads and the use of former logging access routes are proposed to access treatment units.

- Approximately 1.03 miles (5,433 feet) of new temporary roads would be used to access all or portions of seven M Units. All of these temporary roads would be closed (ripped and mulched, as needed) following thinning.
- Approximately 0.98 mile (5,177 feet) of former logging access routes would be re-opened (vegetation removed and bladed) to access all or portions of five M Units. These routes would be water-barred and closed immediately after thinning is completed.
- Five short spurs, each less than 100 feet long, would be bladed for tractor or cable yarding operations in two units.
- Existing landings would be used.

1.2.3 Alternative C: No New Temporary Roads Constructed

Alternative C responds to public concerns regarding the environmental and economic effects 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. This reduces 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; however, 99 acres in M Units would remain untreated. The total number of acres treated by tractor yarding would remain at 361 acres; however, the acres of cable yarding would be reduced from 570 acres under Alternative B to 471 acres under Alternative C. Reducing acres of M Units treated would also reduce the number of acres treated in two Rx Units because excessive fuels remaining in M Units would preclude safely burning portions of the two Rx Units. 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. There would be no changes in the miles of emergency access routes treated, transportation plan, or resource protection measures.

Chapter 2 in the EIS for the Eddy Gulch LSR Project presents more information about the three alternatives, and Appendix A in the EIS contains the project maps.

1.3 Significant Issues

Public and agency comments received during collaboration and scoping efforts did not identify any significant issues related to botanical resources. The only significant issue was in regard to construction of new temporary roads to access some of the treatment units. Alternative C was developed in response to public concerns regarding the environmental and economic impacts of constructing new temporary roads.

1.4 Regulatory Framework: Botanical Resources

This document is prepared in accordance with the legal requirements set forth under the following documents:

- Section 7 of the *Endangered Species Act* [19 United States Code 1536(c)].
- Klamath National Forest Land and Resource Management Plan (Klamath LRMP) (USFS 1995a).
- Forest Service Manual (FSM) 2080: Wildlife, Fish, and Sensitive Plant Management, Section 2670 (USFS 1995b).
- *Healthy Forest Restoration Act* and Healthy Forests Initiative (2003).
- Final Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines; Forest Service National Forests in Regions 5 and 6 and Bureau of Land Management District in Washington,

Oregon, and California Within the Range of the Northern Spotted Owl. January 2004. (USDA, USDI 2004).

1.4.1 Section 7 of the Endangered Species Act

Section 7 of the *Endangered Species Act of 1973*, 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 United States Fish and Wildlife Service (USFWS), and (2) species listed as Sensitive by the Region 5 Regional Forester, or to cause a trend towards federal listing for species listed as Sensitive (USFS 1990; USFS 1995a).

1.4.1.1 Consultation to Date

No Endangered Species Act Section 7 consultation is required.

1.4.2 Klamath National Forest Land and Resource Management Plan Direction

1.4.2.1 Forest Service Sensitive Species

The Klamath LRMP (USFS 1995a) contains forestwide and specific Management Area Standards and Guidelines for management of Forest Service 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. Based on guidance contained in the Klamath LRMP, numerous environmental measures, or indicators, were used for determining existing conditions. These same indicators were used to predict if desired conditions would be met following project implementation. Table 1 identifies measurement indicators for Forest Service Sensitive species.

1.5 Methodology: Botanical Resources

1.5.1 Analysis Methods and Assumptions

1.5.1.1 Species of Concern

Threatened, Endangered, and Proposed Plant Species. On November 18, 2008, the USFWS Arcata Field Office 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*)

Table 1. Klamath LRMP standards and guidelines for Forest Service Sensitive species.

Klamath LRMP Standards and Guidelines	Desired Condition	Measurement Indicator
7-1	Enhance Sensitive plant species populations and habitat to maintain reproducing, self-sustaining populations. Conduct an assessment to determine which Sensitive species are at a higher risk. Develop management strategies for higher risk Sensitive plant species first, with the intent of preventing the need for the species to become listed as threatened or endangered species.	The number and area of plants at each Sensitive species site within a proposed treatment unit (<i>Cypripedium fasciculatum</i> [CYFA], <i>Cypripedium montanum</i> [CYMO2], <i>Smilax jamesii</i> [SMJA], <i>Ptilidium californicum</i> [PTCA5]) remains stable (or increases) and does not decrease.
7-2	Coordinate species maintenance and enhancement goals with other management activities on the site.	The number and area of plants at each Sensitive species site within a proposed treatment unit (CYFA, CYMO2, SMJA, and PTCA5) remains stable (or increases) and does not decrease.
7-3	Management activities should imitate the natural ecological processes that created the Sensitive species habitat. Fire, timber management, or other activities may be used as tools for soil disturbance and removal of competing vegetation in managing the habitat.	The number and area of plants at each Sensitive species site within a proposed treatment unit (CYFA, CYMO2, SMJA, PTCA5) remains stable (or increases) and does not decrease. Individual habitat characteristics (such as canopy cover, moisture, vegetation cover, amount of duff, and coarse woody debris [CWD]) at each Sensitive species population within the proposed treatment units (CYFA, CYMO2, SMJA, PTCA5) remains stable and contributes to the stability of the sites.
7-4	Disturbances to plant populations and occupied habitat should be avoided during critical periods of plant growth. Individual projects shall develop project-level mitigations measures [resource protection measures] to avoid adverse impacts to Sensitive species.	The number and area of plants at each Sensitive species population within the project area (CYFA, CYMO2, SMJA, PTCA5) remains stable (or increases) and does not decrease.

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 2006b). 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 conducted to determine which species would have suitable habitat in the Assessment Area, which species are present, and the potential for species to be present.

1.5.1.2 Preliminary Botanical Review

An office pre-field review and a preliminary field review were conducted to determine if this project 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 and Forest Service Sensitive plant species listed for the Klamath National Forest were considered during this review (USFWS 2008; USDA 2006a). 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. Table 2 includes a list of the 23 Sensitive species (including vascular, bryophyte, and lichen plus six Sensitive fungi species that were previously listed as “Survey and Manage Category B, Pre-Disturbance Surveys Not Practical or Category E, Status Undetermined.” A Geographic Information System (GIS) query of the Assessment Area was conducted to identify potential suitable habitat for 23 species. Data layers included vegetation (vegetation type, density, and size class), riparian, soils, aspect, and elevation. The GIS analysis determined that for 5 of the 23 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 acres, and includes 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 of the acres identified in the GIS query is included in Appendix A (Map A-3).

Of the 23 Forest Service Sensitive species, 10 Sensitive species (identified with note “b” in Table 2) were determined to not have potential to occur in the proposed treatment units (Knight pers. comm 2008). The remaining 13 (of the 23) target Forest Service Sensitive species are identified with note “c” in Table 2. All 13 target Forest Service Sensitive species are considered to have potential to occur in the project Assessment Area. The 13 species include 11 vascular species, 1 bryophyte, and 1 lichen. Table 3 is a list of the 13 species and assessment methods.

The six Sensitive fungi species listed at the end of Table 2 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). Although no surveys were conducted, 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 to determine effects.

It was further determined that 4 (identified by ***bold italics*** in Table 2) of the 13 target Forest Service Sensitive species (*Cypripedium fasciculatum*, *Cypripedium montanum*, *Ptilidium californicum*, and *Hydrothyria venosa*) were most likely to occur in the Assessment. 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. To determine effects, the 9 species are assumed to be present in the project Assessment Area.

Table 2. Acres of suitable habitat identified by GIS Query for the 23 target Forest Service Sensitive plant species in the Eddy Gulch LSR Project Assessment Area.

Species	Species Code	Acres of Suitable Habitat ^a
Vascular Species		
<i>Botrychium pinnatum</i> ^b Northwest moonwort	BOPI	678
<i>Botrychium virginianum</i> ^{c, d} Rattlesnake fern	BOVI	0
<i>Campanula wilkinsiana</i> ^c Wilkin's harebell	CAWI8	43
<i>Chaenactis suffrutescens</i> ^c Shasta chaenactis	CHSU	41
<i>Cypripedium fasciculatum</i> ^c Clustered lady-slipper orchid	CYFA	4,313
<i>Cypripedium montanum</i> ^c Mountain lady-slipper orchid	CYMO2	4,313
<i>Epilobium oreganum</i> ^b Oregon fireweed	EPOR	4
<i>Eriogonum hirtellum</i> ^{c, d} Klamath Mountain buckwheat	ERHI7	0
<i>Eriogonum ursinum</i> var. <i>erubescens</i> ^c Blushing buckwheat	ERURE	0
<i>Erythronium citrinum</i> var. <i>roderickii</i> ^b Scott Mountains fawn lily	ERCIR	360
<i>Eucephalis vialis</i> ^c Wayside aster	EUVI8	0
<i>Frasera umpquaensis</i> ^b Umpqua green-gentian	FRUM	1,440
<i>Ivesia pickeringii</i> ^b Pickering's ivesia	IVPI	27
<i>Minuartia stolonifera</i> ^c Scott Mountain sandwort	MIST9	3
<i>Pedicularis howellii</i> ^{c, d} Howell's lousewort	PEHO	0
<i>Phacelia greenii</i> ^b Scott Valley phacelia	PHGR2	4
<i>Raillardella pringlei</i> ^b Showy raillardella	RAPR	752
<i>Smilax jamesii</i> ^c English Peak greenbriar	SMJA	3,080
<i>Thermopsis robusta</i> ^b Robust false lupine	THRO4	887
Bryophyte Species		
<i>Buxbaumia viridis</i> ^b Bug-on-a-stick moss	BUVI2	4,356
<i>Fissidens aphelotaxifolius</i> ^b Brook pocket moss	FIAP	341
<i>Ptilidium californicum</i> ^c Pacific fuzzwort (liverwort)	PTCA5	2,750
Lichen Species		
<i>Hydrothyria venosa</i> ^c (syn = <i>Peltigera hydrothyria</i>) Waterfan lichen	HYVE7	1,435

Table 2. Acres of suitable habitat identified by GIS Query for the 23 target Forest Service Sensitive plant species in the Eddy Gulch LSR Project Assessment Area (continued).

Species	Species Code	Acres of Suitable Habitat ^a
Fungi Species:		
<i>Boletus pulcherrimus</i> Red Pore bolete	BOPU4	Fungi species: habitat evaluation only, no surveys required.
<i>Cudonia monticola</i> Mains	CUMO2	
<i>Dendrocollybia racemosa</i>	DERA5	
<i>Phaeocollybia olivacea</i>	PHOL	
<i>Sowerbyella rhenana</i>	SORH	
<i>Tricholomopsis fulvescens</i>	TRFU3	
Total acres^e	24,827	
Total individual acres^e	9,139	

Notes:

- 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 3. Assessment method.

Species	Code	Assessment Method
Vascular Species:		
<i>Botrychium virginianum</i> Rattlesnake fern	BOVI	Assume presence
<i>Campanula wilkinsiana</i> Wilkin's harebell	CAWI8	Assume presence
<i>Chaenactis suffrutescens</i> Shasta chaenactis	CHSU	Assume presence
<i>Cypripedium fasciculatum</i> Clustered lady-slipper orchid	CYFA	Field survey
<i>Cypripedium montanum</i> Mountain lady-slipper orchid	CYMO2	Field Survey
<i>Eriogonum hirtellum</i> Klamath Mountain buckwheat	ERHI7	Assume presence
<i>Eriogonum ursinum</i> var. <i>erubescens</i> Blushing buckwheat	ERURE	Assume presence
<i>Eucephalis vialis</i> Wayside aster	EUVI8	Assume presence
<i>Minuartia stolonifera</i> Scott Mountain sandwort	MIST9	Assume presence
<i>Pedicularis howellii</i> Howell's lousewort	PEHO	Assume presence
<i>Smilax jamesii</i> English Peak greenbriar	SMJA	Assume presence

Table 3. Assessment Method (continued).

SPECIES	CODE	Assessment Method
Vascular Species:		
Bryophyte Species		
<i>Ptilidium californicum</i> Pacific fuzzwort (liverwort)	PTCA5	Field Survey
Lichen Species		
<i>Hydrothyria venosa</i> (syn <i>Peltigera hydrothyria</i>) Waterfan lichen	HYVE7	Field Survey
Fungi Species		
<i>Boletus pulcherrimus</i> Red Pore bolete	BOPU4	Assume presence
<i>Cudonia monticola</i> Mains	CUMO2	
<i>Dendrocollybia racemosa</i>	DERA5	
<i>Phaeocollybia olivacea</i>	PHOL	
<i>Sowerbyella rhenana</i>	SORH	
<i>Tricholomopsis fulvescens</i>	TRFU3	

1.5.1.3 Field Surveys

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 4 species were conducted in the highest potential habitat in proposed treatment units (a total of 1,887 acres) (see Map A-1 in Appendix A of this report). 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 2004). 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.

Field surveys were conducted during August 2008 by botanists trained in the identification of the target Sensitive species. Surveys were intuitive controlled, traversing slopes, proposed roads and landings, and other activity areas searching for the specific habitats for the Sensitive species. Table 4 is a summary of the 31 survey units on the 1,887 acres. Map A-2 in Appendix A of this report shows the suitable habitat acres of the four species most likely to occur in the Assessment Area, and Map A-4 in Appendix A of this report shows the survey areas and Sensitive plant locations. The

survey units occurred in all proposed treatment unit categories, including FRZs, which include the M Units, RS Treatments, and fuel reduction areas; and in a number of Rx Units.

Table 4. List of botanical survey units, acres, and locations in the Eddy Gulch LSR Project Assessment Area.

Survey Unit ID*	Total Acres	Location (Proposed Treatment Unit)	Legal Location (Township, Range, Section)
1	91.1	Rx Unit 7	T39N-R10W, S. 16, 17, 20, 21
2 West	43.4	Rx Unit 6	T39N-R10W, S.19, 20
2 East	205.7	Rx Unit 6, FRZ 14, M Unit 23, M Unit 24, M Unit 63	T39N-R10W, S. 17, 20
3	28.7	FRZ 13, M Unit 25	T39N-R10W, S.7, 8, 17, 18
4	24.2	FRZ 15, Rx Unit 6	T39N-R10W, S. 30
5	20.1	FRZ 6, Rx Unit 6	T39N-R10W, S.19 and T39N-R11W, S. 24
6	83.3	FRZ 17	T39N-R11W, S. 10, 11, 15
7	47.2	Rx Unit 5	T39N-R11W, S. 23, 24, 25
8a	8.2	RS treatment	T39N-R11W, S. 11
8b	1.7	RS treatment	T39N-R11W, S. 11
8c	5.25	RS treatment	T39N-R11W, S. 11
8d	7.0	RS treatment	T39N-R11W, S. 13, 14
9 North	10.8	FRZ 15	T39N-R11W, S. 36
9 South	3.0	FRZ 15	T39N-R11W, S. 36
10	35.6	FRZ 10	T39N-R11W, S. 35
11 North	17.0	Rx Unit 4	T38N-R11W, S. 5
11 South	17.5	Rx Unit 4	T38N-R11W, S. 4, 5, 9
12 South	40.4	Rx Unit 3	T38N-R12W, S. 22, 23
12 North	71.9	Rx Unit 3	T38N-R12W, S. 10, 11, 14, 15
13	14.9	Rx Unit 11	T39N-R11W, S. 28, 29
14	91.5	Rx Unit 2	T39N-R11W, S. 17, 18, 21 and T39N-R12W, S. 24
15	120.2	FRZ 3, FRZ 12	T39N-R11W, S. 16
16 North	102.2	Rx Unit 12	T39N-R11W, S. 5, 6, 7, 8
16 South	104.2	Rx Unit 12, FRZ 3	T39N-R11W, S. 7, 8
17	30.7	FRZ 3, Rx Unit 1	T39N-R11W, S. 7, 8
18	182.7	Rx Unit 8	T40N-R10W, 19, 20, 29
19 South	12.8	Rx Unit 9	T40N-R10W, 8
19 North	57.1	Rx Unit 9	T41N-R10W, S. 31, 32, and T40N-R10W, S. 4, 9
20 West	31.5	Rx Unit 9	T41N-R10W, S. 29, 31, 32
20 East	26.2	Rx Unit 9	T41N-R10W, S. 32
21	143.9	FRZ 20	T41N-R10W, S. 28, 29, 31, 32
22 South	64.7	FRZ 20	T41N-R10W, S. 21, 28
22 North	26.3	FRZ 20	T41N-R10W, S. 20, 21
23	94.6	FRZ 20, M Unit 31	T41N-R10W, S. 21, 22, 28
Total acres	1,887.5		

Note: *The surveys were conducted in August 2008.

New occurrences were flagged on the ground with a double red/white candy stripe flag at the center of the site. Detailed site and habitat descriptions were included on “Sensitive/Survey and Manage Plant Population Site Reports,” and the location of the site was included on topographic maps at 1:12,000 scale. Documentation of survey units included travel routes marked on topographic maps, unit species lists of vascular and nonvascular species, and completed “Sensitive/Survey and Manage Plant Survey Reports.” Known sites of Forest Sensitive species (*Cypripedium fasciculatum* and *Cypripedium montanum*), located *within* the 1,887 acre survey area, were revisited concurrent with the 2008 botanical surveys and sites were documented on “Sensitive/Survey and Manage Plant-Population Site Reports.” Known sites of Forest Sensitive species, located *outside* of the 1,887-acre survey area, were not revisited and were considered current sites. Additional target Sensitive species listed in Table 2 above were also noted and documented as they were encountered.

All site report forms are part of the project record on file available at the Klamath National Forest Supervisor’s Office in Yreka, CA. Site forms include Sensitive/Survey and Manage Plant Population Site Reports of all new and re-visited occurrences of Forest Sensitive plant sites, and Sensitive/Survey and Manage Plant Survey Reports for each botanical survey unit.

Following the field surveys, the locations of new and previously documented Forest Sensitive plant sites were added to the GIS to analyze proximity of Sensitive plant sites to project treatment units to identify potential effects. Modifications were made to some of the treatment units due to plant presence. The changes are reflected in the final Proposed Action (refer to Chapter 2 of the environmental impact statement).

1.5.1.4 Analysis Assumptions

The effects analysis for Alternative A (no action) for individual species was based on (1) the continuation of current level of management (including fire suppression), and includes an assumption that levels of litter, woody debris, and understory shrub and tree cover would all continue to increase; and (2) the presumed occurrence of at least one wildfire occurring in the Assessment Area. Assumptions of wildfire characteristics under the no-action alternative include the following:

- The modeled wildfire in the no-action alternative would occur in the summer or early fall, between late July and early October.
- The presumed fire would include a mixture of surface fires, passive crown fires, and active crown fires.
- A surface fire would consume all litter and woody debris (less than 3 inches in diameter), all shrubs, and kill most small trees (diameter at breast height [dbh] is less than 6 inches), with some larger trees assumed to die later. A passive crown fire would have the same effects as the surface fire, plus individual and small groups (3–7) of mature trees would also die. An active crown fire would kill everything.
- The wildfire in the no-action alternative would occur within some or all of the Sensitive plant populations that occur in the project treatment units, (*Cypripedium fasciculatum*, *Cypripedium montanum*, *Ptilidium californicum*, *Smilax jamesii*), and within some or all of the known noxious weed species sites (Dyer’s Woad, yellow starthistle, spotted knapweed, Scotch broom) that occur in the Assessment Area.

The other considerations in this analysis of effects on Sensitive plant species include the rarity of the species, the range of the species relative to the Assessment Area, the occurrence and number of project area populations relative to the occurrences of the species within the region and range of the species.

1.5.2 Scope of the Analysis

1.5.2.1 Analysis Area for Botanical Resources

The analysis area for botanical resources includes the proposed treatment units within the project Assessment Area (refer to Table 4 above).

1.5.2.2 Analysis Period

“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.

1.5.3 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.

1.5.4 Measurement Indicators: Sensitive Plant Species

The environmental measure (or indicator) used to assess current conditions for species known to occur in the Assessment Area is the number of Forest Service Sensitive plant sites. For Forest Service Sensitive species not currently known to occur, but within the range of the Assessment Area, the measurement indicator used to assess current conditions is the presence of potential habitat.

To assess the effects on Forest Service Sensitive species known to occur in the Assessment Area, the measurement indicator is the number of sites that would remain stable (or increase) and would either be affected by taking no action or that would be affected within a treatment unit from implementation of Alternative B or C. For Forest Service Sensitive species not currently known to

occur, but with potential habitat in the Assessment Area, a qualitative analysis of effects is used as the measurement indicator to assess if plants would remain stable (or increase) and would either be affected by taking no action or that would be affected within a treatment unit from implementation of Alternative B or C.

1.6 Affected Environment (Existing Conditions): Botanical Resources

Previous district surveys and the results of August 2008 surveys include 36 sites of four Forest Sensitive vascular and bryophyte species in project treatment areas:

- 11 previously documented and 10 new sites of Clustered Lady-Slipper Orchid (*Cypripedium fasciculatum*);
- 6 previously documented and 6 new sites of Mountain Lady-Slipper Orchid (*Cypripedium montanum*);
- 1 new site of English Peak Greenbriar (*Smilax jamesii*); and
- 2 new sites of Pacific fuzzwort (*Ptilidium californicum*)

A summary of the 36 Forest Service Sensitive plant sites within the proposed treatment units is included in Table 5. A map (A-4) of the Sensitive plants sites is included in Appendix A of this report. Individual plant site maps are included with each Sensitive/S&M Plant Population Site Report form, and are available at the Salmon River and Scott River Ranger Districts office, in Ft. Jones, California.

The pre-field review identified nine target Forest Service Sensitive vascular and non-vascular plant species in addition to the four species that were surveyed. The Assessment Area contains potential suitable habitat and may contain occurrences of the nine species. Additional sites of the four surveyed target species may also occur outside of the botanical survey areas. No sites of the targeted Forest Sensitive lichen *Hydrothyria venosa* were located during project surveys.

1.6.1 Species Accounts—Vascular Plants

1.6.1.1 *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 Klamath National Forest Sensitive species.

Table 5. Summary of 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
<i>Cypripedium fasciculatum</i> (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. <u>2008 Botanical Survey Unit #23.</u>
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. <u>2008 Botanical Survey Unit #21.</u>
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. <u>2008 Botanical Survey Unit #18.</u>
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. <u>2008 Botanical Survey Unit #18.</u>
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. <u>2008 Botanical Survey Unit #16-North.</u>
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. <u>2008 Botanical Survey Unit # 19-North.</u>
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. <u>2008 Botanical Survey Unit #18.</u>
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. <u>2008 Botanical Survey Unit #18.</u>
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. <u>2008 Botanical Survey Unit #14.</u>
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). <u>2008 Botanical Survey Unit #14.</u>
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. <u>Outside 2008 Botanical Survey Units. (Population is in 2004 prescribed burn and overlaps with CYMO2-5-58A.)</u>
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. <u>2008 Botanical Survey Unit #16-North. Same site as CYMO2-5-58B.</u>
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). <u>Outside 2008 Botanical Survey Units.</u>

Table 5. Summary of 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
<i>Cypripedium fasciculatum</i> (Clustered lady-slipper orchid)			
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). <u>Outside 2008 Botanical Survey Units.</u>
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). <u>Outside 2008 Botanical Survey Units.</u>
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. <u>Outside 2008 Botanical Survey Units.</u>
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. <u>2008 Botanical Survey Unit #23.</u>
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. <u>Outside 2008 Botanical Survey area.</u>
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. <u>2008 Botanical Survey Unit #18.</u>
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. <u>2008 Botanical Survey Unit #22.</u>
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. <u>Outside 2008 Botanical Survey Units.</u>
<i>Cypripedium montanum</i> (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. <u>2008 Botanical Survey Unit #21.</u>
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. <u>Near 2008 Botanical Survey Unit #20-East.</u>

Table 5. Summary of 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
<i>Cypripedium montanum</i> (Mountain lady-slipper orchid)			
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]. <u>2008 Botanical Survey Unit #18.</u>
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]; <u>2008 Botanical Survey Unit# 16-North.</u>
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). <u>2008 Botanical Survey Unit #14.</u>
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. <u>2008 Botanical Survey Unit #14.</u>
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). <u>2008 Botanical Survey Unit #18.</u>
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. <u>Outside 2008 Botanical Survey Units.</u>
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. <u>Outside 2008 Botanical Survey Units.</u>
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. <u>Outside 2008 Botanical Survey Units.</u>
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. <u>2008 Botanical Survey Unit #16-North.</u>
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. <u>2008 Botanical Survey Unit #16-North.</u> Same site as CYFA-5-7A,B.

Table 5. Summary of 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
<i>Cypripedium montanum</i> (Mountain lady-slipper orchid)			
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. <u>Outside 2008 Botanical Survey Units.</u>
<i>Ptilidum californicum</i> (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. <u>2008 Botanical Survey Unit #13.</u> 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	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 <u>2008 Botanical Survey Unit #2-East.</u>
<i>Smilax jamesii</i> (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. <u>2008 Botanical Survey Unit #18.</u>

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 (USDI BLM 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 (USDI BLM 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.

1.6.1.2 *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 (Seevers 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 (USDI BLM 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). Local monitoring of *Cypripedium* sites within prescribed fire treatments inside the Eddy Gulch LSR appears to be inconclusive (Knight pers. comm 2008), and the findings of other research demonstrate that the role of fire in *Cypripedium* 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.

1.6.1.3 *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.

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.

1.6.2 Species Accounts—Fungi Species

Very little specific information is available about the 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 1997a).

1.6.2.1 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. Both *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.

1.6.2.2 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 central and eastern portions of the Forest.

***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.

1.6.3 Species Accounts—Bryophyte Species

1.6.3.1 *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 1997b) and from the Conservation Assessment for *Ptilidium californicum* (USFS 2006c).

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 Unit. 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, west of M Unit 24.

1.6.4 Species Accounts—Lichen Species

1.6.4.1 *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.

1.7 Desired Conditions: Botanical Resources

The desired conditions for botanical resources in the Assessment Area are based on the Standards and Guidelines set forth in the Klamath LRMP (USFS 1995a). The Standards and Guidelines are the rules and limits governing actions and the principles specifying the environmental conditions or levels to be achieved and maintained. The following desired conditions apply to botanical resources and are derived from the LRMP Standards and Guidelines:

- 7-1 Enhance Sensitive plant species sites and habitat to maintain reproducing, self-sustaining sites. Conduct an assessment to determine which Sensitive species are at a higher risk. Develop management strategies for higher risk Sensitive plant species first, with the intent of preventing the need for the species to become listed as threatened and endangered species.
- 7-2 Coordinate species maintenance and enhancement goals with other management activities on the site.
- 7-3 Management activities should imitate the natural ecological processes that created the Sensitive species habitat. Fire, timber management, grazing [grazing is not applicable to the Eddy Gulch LSR Project], or other activities may be used as tools for soil disturbance and removal of competing vegetation in managing the habitat.
- 7-4 Disturbances to plant sites and occupied habitat should be avoided during critical periods of plant growth. Individual projects shall develop project-level mitigations measures to avoid adverse impacts to Sensitive species.

1.8 Environmental Consequences: Botanical Resources

1.8.1 General Effects

The general direct, indirect, and cumulative effects of project-related activities on Sensitive plants are described below.

1.8.1.1 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.

1.8.1.2 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.

1.8.1.3 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 Fork 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.

1.8.1.4 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.

1.8.1.5 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 one to ten years (or less).

Long-term. Effects would be present or apparent for more than ten years.

1.8.2 Effects of Alternative A: No Action

1.8.2.1 Sensitive Vascular Plant Species

Indicator: The number of Forest Service Sensitive plant sites that would remain stable (or increase) and would be affected by taking no action.

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

Direct and Indirect Effects. There are 21 populations of CYFA, 12 populations of CYMO2, and 1 population of SMJA that 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; USDI BLM 1998; Knight pers. comm 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 (USDI BLM 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.

1.8.2.2 Additional Sensitive Target Species

Indicator: For Forest Service Sensitive species not currently known to occur, but with potential habitat in the Assessment Area, a qualitative analysis of effects is used as the measurement indicator to assess if plants would remain stable (or increase) and would be affected by taking no action.

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 4 species most likely to occur in the proposed treatment units. The remaining 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 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 for the four species most likely to occur. No sites of the remaining eight additional sensitive species were located during the 2008 surveys.

1.8.2.3 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.

1.8.2.4 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 sabiteana* 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, yellow starthistle, and meadow knapweed 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 (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. 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.

1.8.2.5 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 Scrophulariaceae (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.

1.8.2.6 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.

1.8.2.7 Sensitive Fungi Species

Indicator: For Forest Service Sensitive fungi species not currently known to occur, but with potential habitat in the Assessment Area, a qualitative analysis of effects is used as the measurement indicator to assess if plants would remain stable (or increase) and would be affected by taking no action.

- *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 within 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, and 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 fungi in general. While not eliminating potential effects to 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 within the project Assessment Area, there is also a low potential for an effect to 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 direct short-term minor adverse 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 an indirect minor long-term adverse 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 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 road sides 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 direct short-term minor adverse 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 an indirect minor long-term adverse 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. Any mining activities would result in direct short-term negligible adverse effects as individual BOPU4 and PHOV may be destroyed but any populations would be maintained. No cumulative effects to 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 within the proposed project activity areas, there is also a low potential for an effect to 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 direct short-term minor adverse 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 an indirect minor long-term adverse 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 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 road sides 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 two 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 direct short-term minor adverse 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 an indirect minor long-term adverse 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 direct short-term negligible adverse 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.

1.8.2.8 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 and hazard tree removal, 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.

1.8.2.9 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 an increase (1) in noxious weeds and stream flows and (2) 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.

1.8.3 Effects of Alternative B: Proposed Action

1.8.3.1 Sensitive Vascular Species

Indicator: The number of sites that would remain stable (or increase) and would be affected within a treatment unit from implementation of Alternative B.

- *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 CYMO2. 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 RPMs for CYFA and CYMO2 have been designed into the Proposed Action (refer to Table 3 above). The RPMs 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 1995a). 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 RPMs, 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 RPMs, 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 CYMO2. 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 Fork 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: CYFA and CYMO2. The Proposed Action, with the implementation of RPMs, 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: SMJA. 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.

1.8.3.2 Additional Sensitive Target Species

Indicator: For Forest Service Sensitive species not currently known to occur, but with potential habitat, in the Assessment Area, a qualitative analysis of effects is used as the measurement indicator to assess if plants would remain stable (or increase) and would be affected within a treatment unit from implementation of Alternative B.

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 is an indirect long-term minor adverse 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) an indirect long-term minor adverse 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 portions (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.

1.8.3.3 Sensitive Fungi Species

Indicator: For Forest Service Sensitive fungi species not currently known to occur, but with potential habitat in the Assessment Area, a qualitative analysis of effects is used as the measurement indicator to assess if plants would remain stable (or increase) and would be affected within a treatment unit from implementation of Alternative B.

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

The Proposed Action includes mechanical and fuels treatments to reduce fuels. Suitable habitat in the project Assessment Area for the six Sensitive fungi species occurs along wet, north facing riparian areas within 25 feet of perennial streams, at the lower to mid-elevations, and within mature timber stands. This habitat occurs within the Riparian Reserves of Rx and FRZ Units, and does not occur within the proposed mechanical treatment units (M Units), located on ridges and upper slope positions. RPMs for Riparian Reserves are incorporated into the Proposed Action and are designed to protect fish and water resources. These RPMs are likely to provide benefits to the six Sensitive fungi. RPMs for Riparian Reserves 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 (BMPs) and Wet Weather Operating Standards will be implemented during all activities.

Several studies that have examined the effects of prescribed fire have found that the effects to 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 the proposed project activity areas, there is also a low potential for an effect to individual fungi populations.

Mechanical Treatments. The implementation of proposed mechanical treatments will have no effect on the six Sensitive fungi species as these species do not occur in the M Units.

Prescribed Fire Treatments. Suitable habitat for the 6 fungi is restricted to Riparian Reserves within the project Assessment Area. Prescribed burn activities in FRZ and Rx Units will be modified in these areas to reduce effects, i.e., 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 that will ensure the preservation of shade and a diverse mix of tree species to support underground ectomycorrhizal 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. BMPs 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 populations 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 is 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 FRZ and Rx Units would result in (1) a direct short-term

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

Mastication Treatments. Mastication treatments are proposed to occur, within 875 acres of Riparian Reserves within FRZ Units on slopes less than 45 percent and within 0.25 miles 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 impact on fungi individuals. The increased woody debris is expected to increase forest floor moisture that 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 direct adverse 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 indirect beneficial 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. RS 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 is maintained. RS 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 indirect beneficial 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 Fork road maintenance project. Each of these district projects involves ground disturbance near road sides 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 fuels treatments would result in a direct short-term negligible adverse effect to individual fungi as underburning destroys some number of individuals (but entire populations are not impacted), and an indirect long-term moderate beneficial effect as suitable fungi habitat is maintained and the risk of stand replacing wildfires are reduced; (3) mastication fuels treatments would result in (i) a direct short-term minor adverse effect as individual fungi would be destroyed or damaged but any populations would persist and recover in the short term, and (ii) an indirect short-term minor beneficial 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 fuels treatments would result in direct short-term minor adverse 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.

1.8.3.4 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). RPMs for the two PTCA5 populations have been designed into the Proposed Action (refer to Table 3 above). The RPMs 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 RPMs, therefore, allow the broadcast burning within the two PTCA5 stands but exclude burning of the substrate trees. The RPMs also exclude the harvesting of the substrate trees. With the implementation of the RPMs, the Proposed Action would result in an indirect long-term beneficial 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 benefit to 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 road sides, 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 (i.e., 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, cumulative effects included in the proposed action would result in (1) an indirect long-term moderate beneficial effect as the species' habitat is maintained as the risk of wildfire is reduced and a noxious weed infestation is avoided, and (2) cumulative effects from ongoing and future district projects along roadsides would result in direct and indirect moderate long-term adverse effects if the PTCA5-#TE1 tree is removed or damaged and/or surrounding habitat is altered.

Conclusion. The Proposed Action would result in an indirect long-term beneficial effect as PTCA5 habitat and plants are protected from mortality in 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 a direct and indirect long-term moderate adverse effect 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.

1.8.3.5 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. RPMs 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.

1.8.4 Alternative C: No New Temporary Roads Constructed

Indicator: the number of sites that would remain stable (or increase) and would be affected within a treatment unit from implementation of Alternative C.

1.8.4.1 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 RPMs.

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

Conclusion. Alternative C, with implementation of RPMs, 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.

1.8.4.2 Additional Sensitive Vascular Species (With Potential to Occur)

Indicator: For Forest Service Sensitive species not currently known to occur, but with potential habitat in the Assessment Area, a qualitative analysis of effects is used as the measurement indicator to assess if plants would remain stable (or increase) and would be affected within a treatment unit from implementation of Alternative C.

- *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.

1.8.4.3 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 6 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.

1.8.4.4 Bryophyte Species

- *Ptilidium californicum* (Pacific Fuzzwort)—PTCA5

Direct and Indirect Effects. Alternative C proposes no new 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 1.8.3.7 above.

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 1.8.3.7 above.

Cumulative Effects. Cumulative effects for the PTCA5-#TE1 site would not change from Alternative B, as described above in Section 1.8.3.7 above. Cumulative effects for the PTCA5-#RB1 site would not change from Alternative A, as described above in Section 1.8.3.7 above.

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 an indirect long-term moderate adverse effect to 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.

1.8.4.5 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 an increase (1) in noxious weeds and (2) 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.

1.9 Introduction: Noxious Weeds

The Klamath National Forest has placed a high priority on management of noxious weeds, which includes reducing management-related introduction and spread of noxious weeds on the Forest (USFS 2001a, 1995b).

Noxious weeds and invasive exotic plants are an increasing threat to native ecosystems and the function of plant communities. Weed species out-compete native plants for water, nutrients, sunlight, and space, which in turn alters the composition, structure, and function of the entire ecological community. Many weed species contain chemical compounds that prevent any other plant seeds from germinating at the same site. Weed infestations can impact wildlife by reducing important food plants and modifying habitat characteristics. Invasive plants can decrease the quantity and quality of desired forage species and rangeland production. Many weed species contain compounds that are toxic to livestock when eaten in abundance. The financial impacts of noxious weeds are increasing dramatically for public land management agencies. Often, local rural economies are dependent upon healthy native plant and animal communities. The cost of current treatment and prevention should be weighed against the future cost of treating a much larger infestation and future land degradation if prevention measures are not used or control of isolated weed introductions are not implemented or effective.

1.10 Regulatory Framework: Noxious Weeds

Forest Service Manual1 (FSM) 2080 Noxious Weed Management (USFS 1995b) provides direction for managing noxious weeds on Forest Service lands and includes a policy statement calling for a risk assessment for noxious weeds to be completed for every project. Specifically, the manual states:

- **2081.03 – Policy.** When any ground disturbing action or activity is proposed, determine the risk of introducing or spreading noxious weeds associated with the proposed action.
 1. For projects having moderate to high risk of introducing or spreading noxious weeds, the project decision document must identify noxious weed control measures that must be undertaken during project implementation.
 2. Use contract and permit clauses to prevent the introduction or spread of noxious weeds by contractors and permittees. For example, where determined to be appropriate, use clauses requiring contractors or permittees to clean their equipment prior to entering National Forest System lands.
- **2081.2 – Prevention and Control Measures**
 - Determine the factors that favor the establishment and spread of noxious weeds and design management practices or prescriptions to reduce the risk of infestation or spread of noxious weeds.
 - Where funds and other resources do not permit undertaking all desired measures, address and schedule noxious weed prevention and control in the following order:
 1. *First Priority:* Prevent the introduction of new invaders,
 2. *Second Priority:* Conduct early treatment of new infestations, and
 3. *Third Priority:* Contain and control established infestations.

The Klamath LRMP also provides direction for managing noxious weeds in LSRs:

- MA5-3—Nonnative Species

In general nonnative species (plant and animal) should not be introduced into LSRs. If an introduction of nonnative species is proposed, complete an assessment of effects and avoid any introduction that would retard or prevent achievement of LSR objectives. Evaluate effects of nonnative species (plant and animal) currently existing within reserves and develop plans and recommendations for eliminating or controlling nonnative species that are inconsistent with LSR objectives. These will include an analysis of the effects of implementing such programs to other species or habitats within LSRs.

1.11 Methodology: Noxious Weeds

1.11.1 Analysis Methods and Assumptions

1.11.1.1 Noxious Weed List

The California Department of Food and Agriculture (CDFA 2008), and the Siskiyou County Department of Agriculture manage weeds using the same list and risk rating criteria. There are approximately 30 known species of state and county listed noxious and invasive weeds in the Klamath National Forest. The state and county listing process was developed primarily to address agricultural concerns. The California Invasive Plant Council (Cal-IPC) identifies species that may threaten forest and rangeland ecosystems in their California Invasive Plant Inventory (Cal-IPC 2006).

The Klamath National Forest Noxious Weed List includes high-priority plants from the state and county lists that are known or expected to occur on the Klamath National Forest. Based on inventories and current understanding of species' ranges, a total of 24 high-priority weeds are on the Klamath National Forest Noxious Weed List. This list is used for resource management and decision making and is subject to change to reflect new information.

1.11.1.2 Weed Risk Assessment

FSM 2080 Noxious Weed Management (USFS 1995b) includes a policy statement calling for a risk assessment for noxious weeds to be completed for every project. The risk assessment process has been standardized to determine the risk of introducing or spreading noxious weeds within a project and includes a Weed Risk Assessment document. For projects having moderate to high risk of introducing or spreading noxious weeds, the project decision document must identify noxious weed control measures that must be undertaken during project implementation. The Weed Risk Assessment identified this project as having high risks associated with all factors (known species, habitat vulnerability, non-project-dependent vectors, habitat alteration, and increased vectors as result of project implementation). Control measures are included as RPMs in Section 1.14.2, and a Weed Risk Assessment by Factor Table is included in the project record, as is the full Weed Risk Assessment document.

1.11.1.3 Prevention Emphasis

Through the experiences of treating large infestations of noxious weeds, government agency managers have realized that it is much cheaper to prevent an infestation from becoming established than to try to eliminate it once it has begun to spread, or to deal with the effects of a degraded plant community. Prevention includes both reducing the human-assisted spread of seeds and other reproductive parts into a weed-free area and prompt eradication of the first plants that show up. Once a priority noxious weed is identified in an area, eradication should be undertaken as soon as possible. Hand-pulling the first plant or few plants of a noxious weed that show up in an area is frequently the most efficient and effective mechanism we have for reducing weed spread. Inventory and initial attack on small sites can and should occur simultaneously. The Guide to Noxious Weed Prevention Practices (USFS 2001b) provides a tool box of ideas that may be used in mitigating weed risks. Currently, for forested vegetation management operations, equipment cleaning contract provision BT 6.35 is required.

1.11.1.4 Pre-Field Review

The Forest Service has adopted the International Data Standards for the Inventory, Monitoring, and Mapping of Invasive Plants (NAWMA 2002), and incorporated those standards into a Field Guide: *Invasive Plant Inventory, Monitoring, and Mapping Protocol* (USFS 2002). The National Resource Information System (NRIS) is the database of record for noxious weed sites, and the Klamath National Forest is implementing the protocol along with the maintenance of the Forest GIS noxious weed layer.

A pre-field review of noxious weed sites included a review of the Klamath National Forest Noxious Weed GIS Database, and weed site data from atlases and maps located at the office of the Salmon River and Scott Ranger Districts, in Ft. Jones, California.

1.11.1.5 Field Surveys

The project Assessment Area is considered to have a low infestation of noxious weed sites (Knight pers. comm 2008) and all known noxious weed sites at the time of 2008 field surveys were located on roadsides. Field surveys for noxious weeds were conducted where weed sites were most likely to occur, along the 44 miles of proposed emergency access routes in FRZs and Rx units, and the 16 miles of proposed RS treatment Units outside of FRZs and Rx units. The 60 miles of surveyed roads represent the primary routes of traffic in the Assessment Area. Approximately 15 additional miles of secondary routes were surveyed during 2005 and 2007 district surveys, or were included as foot surveys to access 2008 survey botany units. Field surveys for noxious weeds were also conducted concurrent with the 2008 botanical surveys in the 1,887 acres of botany survey units within FRZs and Rx units as described above in Section 1.5.1.3, and along three of the six proposed new temporary roads (within M Unit 10, M Unit 15, and between M Units 43 and 8) during the preliminary field review survey. All secondary roads in proposed treatment units were not surveyed due to the nature of the project's implementation timeline (see Section 2.6.5 of EIS), and because noxious weed surveys in the Salmon River and Scott Ranger Districts are generally considered valid for two to five years (Knight pers. comm 2008), depending upon the weed species, condition of infestation, and project treatments and funding.

Field surveys were conducted during August 2008 by botanists trained in the identification of the target noxious weed species. Surveys were timed to correspond with the season in which the species could be most readily identified. Field surveys within the 1,887 acres of botany units were intuitive controlled, traversing slopes, current and proposed roads and landings, and other activity areas searching for the specific habitats for the target noxious weed species. Surveys along roads were conducted primarily by vehicle with two surveyors slowly driving the roads, or walking where roads were not drivable. All species on the Klamath National Forest Noxious Weeds List (included as part of the project record) were considered during field surveys. Four miles of secondary roads (outside of roadside and emergency routes) were surveyed by foot to access botany survey units.

When a target weed species was located, a Global Positioning System (GPS) point was recorded, and a Noxious Weed flag was hung at the center of the weed site. Information was then documented on two Klamath National Forest forms: (i) General Rangeland Form, and (ii) Invasive Plant Form. Information collected for each noxious weed site included location, size (acres) of infestation, phenology of plants, canopy cover of the infestation, and general habitat information.

1.11.2 Measurement Indicators: Weeds

The measurement indicator used to assess current conditions for weeds is the number of weed sites in the Assessment Area. The measurement indicator used to assess effects of the alternatives on weed sites (that is, sites that would either be affected by taking no action or that would be affected within a treatment unit from implementation of Alternative B or C) is the number of weed sites that would increase or spread infestations to damaging levels.

1.12 Affected Environment (Existing Conditions): Noxious Weeds

The Forest Noxious Weed Database was used for information on noxious weed sites that are currently mapped within or adjacent to the Assessment Area. Additional hard copy data was accessed from unpublished site forms and plant atlas data on file at the Scott-Salmon Ranger District Office of the Klamath National Forest Service (USFS 2008a). Following the field surveys, the locations of new and previously documented target noxious weed sites were added to the GIS database to analyze proximity of noxious weed plant sites to project treatment units to identify potential effects. Existing data was combined with the 2008 field survey results. Additional noxious weed sites may occur in treatment units outside of the 2008 surveyed areas. Table 6 is a summary of noxious weed sites in the proposed treatment units, and Map A-5 shows the survey areas and weed locations. The noxious weed sites in the Assessment Area include

- 4 previously documented sites and 8 new sites of Dyer's woad (*Isatis tinctoria*),
- 1 previously documented site and 4 new sites of yellow starthistle (*Centaurea solstitialis*),
- 3 previously documented site of Scotch broom (*Cytisus scoparius*), and
- 13 previously documented sites of spotted knapweed (*Centaurea maculosa*).

1.12.1 Species Accounts

1.12.1.1 Dyer's woad – *Isatis tinctoria*—ISTI (CDFA Pest Rating “B”)

Dyer's woad is an aggressive member of the Brassicaceae family, with small bright-yellow flowers and black flat fruits. This species is native to southeastern Russia and was first discovered in California in Siskiyou County, in Scott Valley as a contaminant in alfalfa seed from Ireland. It may behave as an annual, a biennial, or a monocarpic (flowers only once before dying) perennial.

Flowering is induced by cold stratification of rosettes, so late-spring-emerging plants will not generally flower until the second or third year. Dyer's woad flowers from April to June, reproduces mainly by seed but may resprout from buds located at the crown. Seed production is prolific and typically occurs from late May through July in California. Seed remain within the fruits and are mainly dispersed by animals, human-related activities and water, and reproduces by seed, often with hundreds of seeds per plant. Most fruits fall near the parent plants, although some disperse short distances with water, soil movement, human activities, as a seed and hay contaminant, and possibly by clinging to the fur or feathers of animals. Seeds mature about eight weeks after flower stem initiation. Seeds removed from fruits lack a dormancy period. Fruit coats contain water-soluble inhibitors that prevent many seeds from germinating until leaching occurs and reduce seedling growth

Table 6. Summary of noxious weed sites in the Eddy Gulch LSR Project, August 2008.

Species Site Number*	Number of Plants/Area	Location (TRS)	Location (UTM)	Location in Proposed Treatment Unit
<i>Isatis tinctoria</i> L. – Dyer's Woad – ISTI				
ISTI-TE1	15 plants in 6 ft x 50 ft	T38N-R11W, S.32 NW of SE ¼	487446, 4560425	RS Treatment in FRZ 6, along National Forest System (NFS) Road #39N23, due south of Windy Gap.
ISTI-#55	0.1 acre or less, most likely eradicated or one or two plants present.	T40N-R10W, S.19, West ½ of NW ¼	Shape files available	A linear roadside population, along the 40N54 road, that occurs in a RS Treatment area outside of FRZ or Rx Unit.
ISTI-RAW2 (re-visit to previous site, no #)	3.8 acre area	T40N-R10W, S.19, SE of NW ¼	495304, 4574562	A linear roadside population, along the 40N54 road, that occurs in a RS treatment area outside of FRZ or Rx Unit. Located south of ISTI#55.
ISTI-RAW3	2,000 plants in 5 acres	T41N-R10W, S.22, SW of SW ¼	501097, 4581354	RS Treatment in Rx Unit 9 (northern), between NFS Road #41N18 and spur road heading south (1 mile southeast of Etna Summit)
ISTI-GSV1	50 plants in 15 ft x 5 ft	T41N-R10W, S.28, NE of NW ¼	499785, 4581205	RS Treatment in FRZ 20, on old roadbed in 2008 Botanical Survey Unit #22 South.
ISTI-KM2	200 plants in 2 acres	T41N-R10W, S.32,31	497729, 4579764	RS Treatment in Rx Unit 9, scattered in riparian area in 2008 Botanical Survey Unit #20-West
ISTI-KM5	200 plants in 1 acre	T41N-R10W, S. 32	498502, 4579045	RX#9, scattered in riparian area in 2008 Botanical Survey Unit #20-East
ISTI-RB4	1 plant in 1 ft x 1 ft	T39N-R11W, S.6, SE of SW ¼	487541, 4568107	RS treatment in FRZ 2, along NFS road #1E001, due west of Black Bear Summit and M Unit 51.
ISTI-no site #	0.1 acre or less, most likely eradicated or one or two plants present.	T40N-R11W-S.5	unavailable data	Multiple sites in a RS Treatment in Rx Unit 12, along NFS Road 39N60, northeast of Black Bear Summit.
ISTI-no site #	0.1 acre or more, rock pit, at saddle; many plants, pre-treatment being attempted.	T39N-R12W, S.12, SE of NW ¼	Shape files available	On roadside, within FRZ 2 and adjacent to M Unit 32, at saddle of 39N24 X 39N41, one mile east of Blue Ridge Lookout. Site continues north on roads outside project treatment areas,
ISTI-141	0.1 acre or less, most likely eradicated or one or two plants present.	T40N-R10W-S16, SW ¼ and center	Unavailable data	Multiple sites in FRZ 12, along the 39 road near Klamath Basin; plants within RS treatments and M Unit 13.
ISTI-GC1	45 plants in 20 ft x 25 ft	T39N-R11W, S.16,	490298, 4565625	RS treatment area in FRZ 12, along NFS Road #39 due north of Klamath Basin. This site could be combined with ISTI-141 above.
<i>Centaurea solstitialis</i> L. – Yellow starthistle – CESO3				
CESO3- no site #	1.24 acre area	T39N-R11W, S.26, NE of SW ¼	Shape files available	In FRZ 11, on a saddle at junction of NFS roads 39N74 and 39N51, and due south of M Unit 19.
CESO3-JV1	100 plants in 10 ft x 100 ft	T39N-R11W, S29, NW of SE ¼	497217, 4562358	In RS treatment area outside of and due east of FRZ 15, linear population along Siskiyou County Cecilville Road east of Grasshopper Ridge.
CESO3-JV2	1,500 plants in 10 ft x 1,000 ft	T39N-R10W, S30, SE of SW ¼ to S. 31, NE of NW ¼	494780, 4561723	RS treatment area in FRZ 15, linear population along a 0.25 mile area of Siskiyou County Cecilville Road, south of Grasshopper Ridge.
CESO3-GC1	600 plants in 0.2 acre	T38N-R12W-S16, NW ¼ of NE ¼	482259, 4557065	In RS treatment within Rx Unit 3, on the Cecilville Road approximately 1 mile south of Matthews Creek.

Table 6. Summary of noxious weed sites in the Eddy Gulch LSR Project, August 2008 (continued).

Species Site Number*	Number of Plants/Area	Location (TRS)	Location (UTM)	Location in Proposed Treatment Unit
<i>Centaurea solstitialis</i> L. – Yellow starthistle – CESO3				
CESO3-JDS10	50 plants in 40 ft x 20 ft	T38N-R12W, S.22, SE of NW ¼	482549, 4556296	Just outside of RS treatment area in Rx Unit 3 along County Cecilville Road due west of Butcher Creek.
<i>Cytisus scoparius</i> (L.) Link. Scotch Broom – CYSC4				
CYSC4-no site #	0.10 acre area	T40N-R10W, S.19, NW of NW ¼	Shape files available	Within a RS treatment area (outside of FRZs or Rx Units) west of the 40N54 road 0.10 mile south of Idlewild Campground.
CYSC4- no site #	0.10 acre area	T40N-R10W-S19, SE of NW ¼	Shape files available	Within a RS treatment area and outside of any FRZ or RX Units, along the 40N54 road, above South Fork Russian Creek, approximately 0.50 mile south of Idlewild Campground, due south of ISTI#RAW2.
CYSC4-no site #	0.10 acres	T40N-R10W-S19,	Shape files available	Within a RS Treatment area just outside of Rx Unit 8, along the 40N54 road above South Fork Russian Creek.
<i>Centaurea maculosa</i> Lam. Spotted Knapweed – CEMA4				
CEMA4-#22.6	0.10 acre	T40N-R10W-S6, NW ¼ of SW ¼	Shape files available	Along county road, outside of, but on the far SW edge of Rx Unit 9.
CEMA4-#RN28	0.10 acre	T41N-R10W, S.28, NE of NW ¼	Shape files available	Along county road in FRZ 20 and RS Treatment area.
CEMA4-#RN145	0.10 acre	T41N-R10W, S.29, SW of NE ¼.	Shape files available	Along county road in FRZ 20 and RS Treatment area.
CEMA4-#RN88	0.10 acre	T41N-R10W, S.29, NE of SW ¼.	Shape files available	Along county road in FRZ 20 and RS Treatment area.
CEMA4-#RN87	0.10 acre	T41N-R10W, S.31	Shape files available	Along county road in Rx Unit 9 and RS treatment area.
CEMA4-#RN24.5	0.10 acre	T41N-R10W, S.32	Shape files available	Along county road in Rx Unit 9 and RS Treatment area.
CEMA4-#RN24.4	0.10 acre	T41N-R10W, S.32	Shape files available	Along county road in Rx Unit 9 and RS Treatment area.
CEMA4-#118	0.10 acre	T39N-R10W-S.4, SE ¼ of SW ¼	Shape files available	RS treatment area in FRZ 15, along Siskiyou County Cecilville Road, south of Grasshopper Ridge.
CEMA4-#122	0.10 acre	T40N-R10W-S18, SE of NE ¼	Shape files available	Along county road in Rx Unit 8 and RS treatment area.
CEMA4-#123	0.10 acre	T40N-R10W-S18, NE of SE ¼	Shape files available	Along county road in Rx Unit 8 and RS Treatment area.
CEMA4-#125	0.10 acre	T40N-R10W-S18, SW of SE ¼	Shape files available	Along county road in Rx Unit 8 and RS Treatment area.
CEMA4-#127.1	Approximately 5 acres	T40N-R10W-S18, NE of NW ¼	Shape files available	Outside of any proposed treatment units or areas, but in the LRS boundary and adjacent to private ownership 1 mile south of Idlewild Campground
CEMA4-#138	0.10 acre	T39N-R10W-S5, Ne of NW ¼	Shape files available	Within Rx Unit 5, along the 39N73 road (outside of a RS Treatment area).

Note: *Site numbers were temporarily assigned during 2008 field surveys.

of dyer's woad and other species. Some seeds germinate in the presence of the inhibitor. Rupture of fruit coats increases germination. Seeds germinate in fall and early spring. At maturity, fall-germinating plants typically produce more seeds than spring-germinating plants. Taproots of rosette and mature plants penetrate the soil to an average depth of about 3 feet. Most lateral root growth occurs in the top 12 inches of soil during the second year.

Dyer's woad invades both disturbed and undisturbed areas, but it is most common on dry rocky soils that typically exhibit reduced herbaceous plant cover. However, dyers woad will also invade dense stands of medusahead, bulbous bluegrass, and cheatgrass, in a manner similar to yellow starthistle. On rangelands, it reduces forage availability by suppressing annual grasses and is low in palatability to grazers. Burning has not been successful in eradication, and only slows down the spread of dyers woad but doesn't usually kill the roots. Mowing is not considered an effective treatment due to resprouting from the crown. However, hand pulling may be very effective in reducing infestations. It is critical to remove the crown to prevent resprouting. Hand pulling is easiest after the plants have bolted but should be done before seed set. Most hand-pulling programs have indicated it is necessary to follow up for several years to prevent reinfestation. The longevity of the seed in the soil seedbank is currently unclear. However, anecdotal evidence has suggested the seedbank may persist for several years (CDFA 2008).

Eleven of the 12 Dyer's woad sites occur along paved or primary gravel roads or decommissioned roadbeds within a range of proposed treatment units, and one new site occurs in a riparian area within Rx Unit 9. The 11 roadside sites are distributed in the following treatment unit types: six occur in RS treatment areas of FRZ Units (two of the six also occur within or adjacent to mechanical units), three sites occur in RS treatments within Rx Units, and two occur in RS treatments outside of any FRZ or Rx Unit.

1.12.1.2 Yellow starthistle – *Centaurea solstitialis*—CESO3 (CDFA Pest Rating “C”)

Yellow starthistle is an annual species in the Aster family that was introduced from Europe. It produces numerous seed heads that produce seed in the fall, and new plants germinate in the spring and flower in the summer. It requires moderately warm exposed or disturbed areas where there is little competition from other species. It does not readily invade shady, forested, or wet areas. Human activities are the primary mechanisms for the long-distance movement of Yellow starthistle seed. Seed is primarily transported by vehicles and road construction/maintenance equipment and by contaminated hay and straw. Seed is transported in lesser amounts over short to medium distances by animals and humans by seed that clings to fur and clothing. Seed is not readily dispersed by wind (USFS 2008b).

Management techniques, such as mowing, burning, and cultivation, can prevent seed production and control infestations when employed over a period of 2 to 3 years or more, depending on the degree of infestation and other factors. These methods must be properly timed to be effective. Mowing is most effective when plants are cut below the height of the lowest branches and 2 to 5 percent of the total population of seed heads is in bloom. Mowing too early can result in high seed production. Prescribed burns can provide control if implemented after annual plants have dried but before yellow starthistle seed is produced. Burning at other times may enhance yellow starthistle survival. To prevent re-infestation, vigilant monitoring and spot eradication may be required indefinitely (CDFA 2008).

Four of the five Yellow starthistle sites occur along the paved county Cecilville Road on the project's southern and southwest boundaries; three of the four sites occur within proposed RS treatment areas (one of which is also in an FRZ) and the fourth site occurs just outside and south of an RS treatment and Rx Unit. The fifth site occurs in an FRZ and due south of an M Unit at a saddle at the junction of two National Forest System roads.

1.12.1.3 Scotch Broom – *Cytisus scoparius*—CYSC4 (CDFA Pest Rating “C”)

Scotch broom is a tall shrub (to about 10 feet tall) in the Fabaceae family with green stems, yellow pea-like flowers, and pea-pod-like fruits. It is native to the British Isles and to central and southern Europe and was originally introduced in the early 1900s as a landscape ornamental and planted along highways in some areas to prevent soil erosion. Scotch broom has deep, branched taproots, associated with nitrogen-fixing bacteria. Nitrogen-fixation occurs year-round where winters are mild. Roots do not produce new shoots, but plants cut above the crown can grow new shoots, especially during the rainy season. Plants flower April to June and pods mature June to July. Pods typically burst apart into spiral halves, ejecting seeds a short distance from the parent plant. Seeds disperse to greater distances with water, soil movement, vehicle tires, human activities, and animals. Seeds are hard-coated and long-lived under field conditions. Scotch broom can also re-sprout from the crown when cut above.

Established infestations are difficult to eliminate because large, long-lived seedbanks typically accumulate. Minimizing soil disturbances, monitoring, and manually pulling young plants when discovered can help prevent new infestations. Machines and tools used to remove stands may inadvertently transport seed to uninfested sites. Cutting Scotch broom shrubs to ground level at the end of the dry season can help reduce re-sprouting from the crown. Planting native shrubs and trees within and around broom stands can eventually help to minimize infestations by shading. Prescribed burns can eliminate above-ground growth but do not prevent re-sprouting from the crown and may stimulate a flush of seed germination. There are two approved insects for Scotch broom: a stem miner (*Leucoptera spartifoliella*) and a seed beetle (*Apion fusciostre*). However, both insects have had limited success in California (CDFA 2008).

Two of the three Scotch broom sites occur within RS Treatment areas, which are not part of an FRZ or Rx Unit, and one site is right on the edge of Rx Unit 8. This last site is also adjacent to private ownership.

1.12.1.4 *Centaurea maculosa* Lam. Spotted Knapweed CEMA4 (CDFA Pest Rating “A”)

Spotted knapweed is a bushy biennial to short-lived perennial introduced from Europe. It grows to about 3 feet tall, with spiny or comb-like phyllaries and white, pink, or purple flowers. Plants exist as basal rosettes until erect, highly branched flowering stems with are produced late spring/summer (June through October). *Centaurea* species produce allelopathic effects (when one plants releases a substance into the soil that inhibits growth of other plants) and are highly competitive with other plants, often displacing desired vegetation. This species typically reproduces by seeds, and most seeds or seed heads fall near the parent plant, although some can disperse to greater distances with human activities, vehicles, heavy machinery, water, soil movement, and by clinging to shoes, clothing, tires, and feet, fur, or feathers of animals. Germination can occur over a broad range of environmental conditions. Seedling emergence is typically highest after the first fall rains. Mortality of seedlings that emerge in spring can be high when conditions become dry after emergence. Most seedlings emerge from seeds at or near the soil surface. Plants produce fewer viable seeds in dry years.

Infestation density correlates with the age of the population and degree of disturbance. Spotted knapweed can also reproduce vegetatively from lateral roots just below the soil surface. New rosettes may develop at approximately 1-inch intervals along lateral roots, expanding populations

peripherally. About two to three weeks after maturity, drying phyllaries pop seed heads open, ejecting seeds a short distance. Stems typically do not break off and tumble with wind. Some seedlings can emerge from soil depths to 2 inches. Plants may produce up to 40,000 seeds per plant. Spotted knapweed is an excellent pioneer species and rapidly establishes in disturbed roadside, rangeland, wildland, or recreation areas. Control measures include mechanical treatments (mowing, and hand pulling), fire (with varying results), biological (two insects are established in California as biocontrol agents), and chemical (herbicides are used to control existing stands and to reduce seed production). Management strategies must be continuous or re-infestation is inevitable (CDFA 2008) because plants can produce thousands of seeds, as well as re-sprout from crowns, and seeds are viable in the soil for up to seven years.

Seven of the 13 spotted knapweed sites occur in RS treatments within Rx Units, four occur in RS treatments within FRZs, and two sites occur in RS treatments outside of any FRZ or Rx unit.

1.13 Environmental Consequences: Noxious Weeds

1.13.1 Effects of Alternative A: No Action (Noxious Weeds)

A description of Alternative A (no action) is included in Section 1.2.1 above.

Indicator: The number of weed sites that would increase or spread infestations to damaging levels.

1.13.1.1 Direct and Indirect Effects

Weed infestations are likely to follow stand-replacing wildfires and the corresponding suppression activities. Factors like an ideal seed bed, reduced competition from native plants and increased nutrients released by the fire, all combine to make conditions ideal for weed seed to germinate and flourish following fire. Noxious weed infestation can have long-term negative effects on native vegetation, and can create permanent change in natural plant communities. Weed infestations following wildfire follow a typical pattern: modest weed infestation rates typically follow the first year, and dramatic increases in infestation rates occur after the second year, due to weed seed banks and plants re-sprouting (Asher et al. 2001).

The four noxious weed species in the Assessment Area (Dyer's woad, yellow starthistle, Scotch broom and spotted knapweed) all prefer open, disturbed habitat. Following a surface fire, (depending upon the fire severity), infestations of the four species would increase most dramatically in burned open habitats, (roadsides, young silviculture stands, shrub communities and other natural openings), near and adjacent to the known sites in the Assessment Area. Weed infestations would increase dramatically within two years following a surface fire, and beyond the first few years could quickly and permanently alter the native vegetation in these areas, if no control measures are taken. Open habitat, however, represents a relatively small area of the Assessment Area. Weed infestations would be minimal in shady habitat (mid-seral to mature forests with closed canopies) and would increase modestly within two years following a surface fire. Beyond the first two years, the infestation would continue to spread, although the increase would be modest and, even without control measures, is unlikely to permanently alter the vegetation in shady habitats. Shady habitat (mid-seral and older closed canopy forests) is a common habitat type in the Assessment Area.

A passive crown fire would have the same effects as a surface fire, with the additional loss of overstory trees in scattered locations. The canopy cover loss would increase the area of open habitat and level of weed infestation in the Assessment Area with the rates of infestation occurring similarly, as described above for surface fires. An active crown fire would create large areas of open disturbed ground and potential for dramatic weed infestations in the Assessment Area. Weed infestations following an active crown fire would increase dramatically within two years following the fire in large areas of the Assessment Area, and without control measures has the potential to quickly and permanently alter natural plant communities over large areas of the Assessment Area.

1.13.1.2 Cumulative Effects

Ongoing district projects and projects scheduled for the foreseeable future include annual road maintenance, hazard tree removal, improvements to existing mining claims, hiking, appropriate responses for fire suppression, installation of utility lines with associated roadside trenching, the North Fork road maintenance project and the construction of ridgetop fuelbreaks west of Black Bear Ranch. District projects that disturb known weed sites are expected to spread noxious weeds in the Assessment Area. All Assessment Area weed sites (except one Dyer's woad population) are located along existing or decommissioned roads. The following projects have the potential to spread current infestations: annual road maintenance, fire suppression, hazard tree removal, roadside utility line trenching and improvements to existing mining claims (that occur along and adjacent to roads). Projects that alter habitat and create more open, disturbed areas (along roads or elsewhere in the Assessment Area) would create additional habitat for the spread of weeds. Fire suppression activities, the roadside utility line trenching and the ridgetop fuelbreak projects would all create additional disturbed habitat that is susceptible to weed infestation.

1.13.1.3 Conclusion

By creating more disturbed open habitat susceptible to infestations, the surface and crown fires modeled under the no-action alternative would increase the abundance of the four noxious weed species (Dyer's woad, yellow starthistle, Scotch broom, and spotted knapweed) in the Assessment Area; the result would be a long-term minor to moderate adverse direct effect on native vegetation. Post-fire monitoring and control measures would reduce these direct effects.

By directly disturbing known noxious weed sites along roads, the cumulative effects of district projects, which include roadside disturbance, have the potential to spread infestation of the 32 current roadside noxious weed sites in the Assessment Area; the result would be a long-term moderate adverse direct effect on native vegetation in the Assessment Area. These effects would be reduced by noxious weed control measures, required by the *FSM 2080 Noxious Weed Management* (USFS 1995b).

1.13.2 Effects of Alternative B: Proposed Action (Noxious Weeds)

A description of the Proposed Action is included in Section 1.2 above. A Weed Risk Assessment document was completed for the Proposed Action, in accordance with the *FSM 2080 Noxious Weed Management* (USFS 1995b), and is included in the project record. The Weed Risk Assessment identified this project as having moderate to high risk of introducing or spreading noxious weeds. For projects having moderate to high risk of introducing or spreading noxious weeds, the project decision

document must identify noxious weed control measures that must be undertaken during project implementation. Control measures include post-treatment surveys and site evaluation for treatment.

Indicator: The number of weed sites that would increase or spread infestations to damaging levels.

1.13.2.1 Direct and Indirect Effects

Mechanical thinning (M Unit) treatments—are planned in 42 units (931 acres) within FRZ Units. One site of Dyer's woad occurs on a roadside in M Unit 13 near the Klamath Basin area; a second site occurs on a roadside adjacent to M Unit 32 east of Blue Ridge Lookout. The ground disturbance from mechanical treatments has the potential to create ideal conditions for the infestation or spread of Dyer's woad. The risk for increased weed infestations at these two sites would be reduced by the noxious weed RPMs. These RPMs include the buffering of ground disturbance within known noxious weed sites (all weed sites will be flagged on the ground), the cleaning of all equipment before entering project areas, and the monitoring of weed sites for as long as it takes vegetation to recover from disturbance,. The RPMs also require post-treatment surveys of each M Unit and site evaluations for treatment of any weed sites located. With the implementation of the RPMs, there would be a negligible increase in weed infestation at the two known weed sites and any new future sites in the project Assessment Area from mechanical treatments, resulting in negligible adverse direct or indirect effects on noxious weed sites or native vegetation in the Assessment Area.

Mastication treatments—are planned within the 16 FRZ Units (in 3,207 acres) on slopes with less than 45 percent slope. Mastication treatments would reduce ground and ladder fuels only. Information is lacking on the effects of mastication on noxious weed infestations. While mastication creates high disturbance to the soil (and therefore creates the conditions for weed infestation), this risk would be offset by the final treatment result of deep fuelbed loads that suppress germination of noxious weeds. In addition, the RPMs require that mastication activities be excluded from weed population sites (all weed sites will be flagged on the ground). In addition, all equipment will be cleaned prior to entering project areas, all weed sites will be monitored following mastication treatments for as long as it takes vegetation to recover from disturbance, post-treatment surveys will be conducted in mastication units, and site-specific evaluations will be used to determine treatment of any weed sites located. With the implementation of the RPMs, there would be a negligible increase in weed infestation sites in the project Assessment Area from mastication treatments, resulting in a negligible adverse direct or indirect effect on noxious weed sites or native vegetation in the Assessment Area.

Roadside treatments—are proposed within FRZs and Rx Units, and include a mix of mastication and prescribed burn treatments (depending upon steepness of slope) in FRZs, and broadcast burn treatments in Rx Units. The majority of weed sites in the Assessment Area occur within RS treatment units (eleven of the twelve Dyer's Woad sites, three of the five Yellow Starthistle sites, two of the three Scotch Broom sites, and all thirteen of the Spotted Knapweed sites) or along roads within the project area outside of treatment areas. The occurrence of these weed sites within RS treatment units poses a high risk of spreading noxious weeds to other sites within the project area. The risk would be offset by RPMs incorporated into the Proposed Action. The RPMs require the cleaning of equipment before entering project areas, that RS treatments be excluded from weed population sites (all weed sites will be flagged on the ground), all known weed sites be monitored for

as long as it takes vegetation to recover from disturbance, post-treatment surveys be conducted in RS treatments, and site-specific evaluations be used to determine treatment of any weed sites located. With the implementation of the RPMs, there would be a negligible increase in weed infestation sites in the Assessment Area from RS treatments, resulting in a negligible adverse direct or indirect effect on native vegetation in the Assessment Area.

Prescribed burn treatments—are planned in FRZs with slopes above 45 percent (5,107 acres), and in all Rx Units (17,524 acres); treatments include broadcast burning of ground and small ladder fuels, and fireline construction (both hand line and machine-constructed). One Dyer's woad site (ISTI-KM5) occurs within a riparian area of Rx Unit 9, and one yellow starthistle site begins roadside (outside of an RS treatment) and continues north on a saddle at the junction of National Forest System Roads 39N51 and 39N74, within FRZ 11. Both weed sites occur where broadcast burning and fireline construction activities are expected to occur. While information on fire effects is often conflicting for many noxious weed species, prescribed fire has the potential to create the conditions for new infestations of weed species due to reduced competition from vegetation and litter, increased sunlight and nutrients, and soil disturbance. Possible effects of the broadcast burn treatments include the spread of the existing weeds and the introduction of new weeds into treatment areas. Fire can have different effects on the introduction and establishment of different noxious weed species (USFS 2008b; BLM 2008). Where Dyer's woad sites already occurs near burned areas, infestations commonly explode in burned areas (Asher 2001). And while fire has been used to control existing infestations of yellow starthistle, fire may also create ideal conditions for the establishment of infestations by reducing competition and litter, exposing soils, releasing nutrients and possibly even stimulating germination (USFS 2008b). Prescribed fire has been used to control Scotch Broom when used repeatedly to deplete the seed bank (CAL-IPC 2006) and does not appear to increase infestation rates. Low-severity fire is not likely to kill Spotted Knapweed plants or seeds: fire may top-kill plants, plants can re-sprout from roots, and seeds are persistent to all but severe fire. And based on the species regeneration strategies, fire could actually promote the establishment and spread of Spotted Knapweed by creating areas of bare soil and increasing access to sunlight (USFS 2008b).

Both weed species can quickly establish and spread in the disturbed bare ground that would result from prescribed burning and fireline construction. The broadcast burn treatments and fireline activities would therefore increase the risk of invasion by these weeds in the Assessment Area. Any increased risk of infestation from the current Dyer's Woad and yellow starthistle sites, or introduction of additional noxious weed species in the Assessment Area, however, would be reduced by the project weed RPMs. The RPMs require the exclusion of prescribed burn treatments and fireline construction within weed populations, the cleaning of all equipment before entering project areas, the monitoring of weed sites for as long as it takes vegetation to recover from disturbance, post-treatment surveys be conducted in Rx Units and FRZs, and site-specific evaluations be used to determine treatment of any weed sites located. With the implementation of the RPMs, the prescribed burn treatments (including fireline construction) would result in a negligible risk of weed infestation and a long-term negligible adverse indirect effect to native vegetation in the Assessment Area.

Road construction—the Proposed Action includes the construction and closure of 1.03 miles (7 segments totaling 5,443 feet) of new temporary roads to access all or portions of seven M Units, and the re-opening and closing of 0.98 mile (5 segments totaling 5,177 feet) of former logging access routes. No documented noxious weed sites occur along proposed temporary roads, or existing roads

proposed for re-opening, but all four weed species can quickly establish in disturbed ground. The disturbance and habitat alteration from new road construction commonly increases weed infestations. This effect would be reduced by the weed RPMs that require avoidance of ground-disturbance project treatments within noxious weed populations, the cleaning of all equipment before entering the project area, and monitoring any new weed sites for as long as it takes vegetation to recover from disturbance, following project completion, and post-treatment surveys be conducted where temporary road construction activities occurred, and site specific evaluations used to determine treatment of any weed sites located.

1.13.2.2 Cumulative Effects

Ongoing district projects, and projects scheduled for the foreseeable future include annual road maintenance, hazard tree removal, improvements to existing mining claims, hiking, appropriate responses for fire suppression, installation of utility lines with associated roadside trenching, the North Fork road maintenance project and the construction of ridgetop fuelbreaks west of Black Bear Ranch. 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 surface and ladder fuels in the Treatment Areas, and the potential for fire ignitions from the ongoing recreational (mining, hiking, hunting) and rural community activities in the project area. The avoidance of stand-replacing fire would prevent an increase in weed infestations that is likely to follow stand-replacing wildfires and the corresponding suppression activities. Noxious weed infestation can have long-term negative effects on native vegetation, and can create permanent change in natural plant communities. The avoidance of increased weed infestations would benefit the native vegetation and contribute to the viability of the natural plant communities in the Assessment Area. Other future district projects that include disturbance to roadside habitat have the potential to increase the spread of known weed sites that occur along roads and to introduce new weeds to the Assessment Area. These effects would be reduced by noxious weed control measures, required by the *FSM 2080 Noxious Weed Management* (USFS 1995b).

Conclusion. With the implementation of the weed RPMs, direct and indirect effects from Proposed Action treatments include a negligible increase in weed infestations; the result would be a negligible adverse direct or indirect short-term effect to native vegetation in the Assessment Area. The Proposed Action would reduce risk of a wildfire resulting from the cumulative effects of fire suppression, the build up of surface and ladder fuels, and the potential for fire ignitions from the ongoing recreational (mining, hiking, hunting) and rural community activities; the avoidance of wildfire would prevent an increase in weed infestations; the result would be a moderate beneficial long-term indirect effect to native vegetation in the Assessment Area. With the implementation of control measures required by the *FSM 2080 Noxious Weed Management* (USFS 1995b), the cumulative effects from other district projects would be reduced and no effects would be expected.

1.13.3 Alternative C: No New Temporary Roads Constructed

Indicator: The number of weed sites that would increase or spread infestations to damaging levels.

Alternative C is similar to the Proposed Action without the construction of the 1.03 miles of new temporary roads. The lack of new temporary roads result in the following changes from the Proposed

Action: the total acres of mechanical thinning treatments would be reduced by 99 acres within portions of seven M Units; the total acres of fuels treatments in Rx Unit 5 would be decreased by 26 percent (418 acres); the total acres of fuels treatments in Rx Unit 6 would be decreased by 28 percent (404 acres); and the acres of cable yarding would be reduced from 570 to 471 acres (tractor yarding would remain the same).

1.13.3.1 Direct and Indirect Effects

The direct and indirect effects to noxious weeds would remain the same as described above in Alternative B, Proposed Action, for mastication treatments, RS treatments, and prescribed burn treatments. Minor differences in effects would occur for mechanical thinning treatments. The reduced acres of mechanical treatments, would result in a minor reduced risk of new weed infestations resulting from fewer acres of ground disturbance. With the implementation of the RPMs, however, there would still be a negligible increase in weed infestation sites in the project Assessment Area from mechanical treatments, and negligible adverse direct or indirect effects to noxious weed sites or to native vegetation in the Assessment Area.

Direct and indirect effects to noxious weeds would be reduced in areas without the new temporary road construction. The temporary roads represent approximately fifty percent of all road construction in the Proposed Action. The reduction in road construction would result in a reduced risk of new weed infestations from disturbance and habitat alteration. The (reduced) risk of weed infestation would still be reduced by the weed RPMs that require avoidance of ground-disturbance project treatments within noxious weed populations, the cleaning of all equipment before entering the project area, and monitoring any new weed sites for as long as it takes vegetation to recover from disturbance, following project completion.

1.13.3.2 Cumulative Effects

The cumulative effects from Alternative C would not differ from Alternative B. See the discussion of cumulative effects under Alternative B in Section 1.13.2 above.

Conclusion. With the implementation of the weed RPMs, direct and indirect effects from Alternative C treatments include a negligible increase in weed infestations for mastication treatments, RS treatments, and prescribed burn treatments; the result would be a negligible adverse direct or indirect short-term effect to native vegetation in the Assessment Area. The Proposed Action would prevent risk of a wildfire resulting from the cumulative effects of fire suppression, the build up of surface and ladder fuels, and the potential for fire ignitions from the ongoing recreational (mining, hiking, hunting) and rural community activities; the prevention of wildfire would prevent an increase in weed infestations; the result would be a moderate beneficial long-term indirect effect to native vegetation in the Assessment Area. With the implementation of control measures required by the *FSM 2080 Noxious Weed Management* (USFS 1995b), the cumulative effects from other district projects would be reduced and no effects would be expected.

1.14 Resource Protection Measures: Botanical Resources and Noxious Weeds

1.14.1 Sensitive Vascular and Bryophyte Species

RPMs have been designed into the Proposed Action and are intended to protect individual plants and/or to maintain habitat characteristics that are critical to the maintenance of long-term viable plant populations. The RPMs 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 7 summarizes site-specific RPMs for individual CYFA, CYMO2, and PTCA5 plant occurrences (no measures are needed for the one occurrence of SMJA). The protection measures required for CYFA and CYMO2 include the following general requirements:

- 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

Table 7. 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 Description	Number of Plants and Area	Habitat Description and Site-specific RPMs
<i>Cypripedium fasciculatum</i> (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 7. 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 Description	Number of Plants and Area	Habitat Description and Site-specific RPMs
<i>Cypripedium fasciculatum</i> (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 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.

Table 7. 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 Description	Number of Plants and Area	Habitat Description and Site-specific RPMs
<i>Cypripedium fasciculatum</i> (Clustered lady-slipper orchid)			
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. <u>2008 Botanical Survey Unit</u> <u>#16-North. Same site as CYMO2-5-58B.</u> T39N-R11W-S8, NW ¼ of NW ¼	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 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.

Table 7. 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 Description	Number of Plants and Area	Habitat Description and Site-specific RPMs
<i>Cypripedium fasciculatum</i> (Clustered lady-slipper orchid)			
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 RPMs are required.
CYFA-5-16A, B	Riparian Reserve within Rx Unit 4; T39N-R11W-S.34, SE ¼ of SW ¼ and T38N-R11W-S.3, 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-S.34,NW ¼ of NE ¼, and T39N-R11W-S.27, 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) 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 Unit 31: 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 RPMs needed.

Table 7. 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 Description	Number of Plants and Area	Habitat Description and Site-specific RPMs
<i>Cypripedium fasciculatum</i> (Clustered lady-slipper orchid)			
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) 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.

Table 7. 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 Description	Number of Plants and Area	Habitat Description and Site-specific RPMs
<i>Cypripedium montanum</i> (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.
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.

Table 7. 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 Description	Number of Plants and Area	Habitat Description and Site-specific RPMs
<i>Cypripedium montanum</i> (Mountain lady-slipper orchid)			
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 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.

Table 7. 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 Description	Number of Plants and Area	Habitat Description and Site-specific RPMs
<i>Cypripedium montanum</i> (Mountain lady-slipper orchid)			
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 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.

Table 7. 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 Description	Number of Plants and Area	Habitat Description and Site-specific RPMs
<i>Cypripedium montanum</i> (Mountain lady-slipper orchid)			
CYMO2-5-58B	Within Rx Unit 12 on a northeast-facing slope south of Black Bear Summit. <u>2008 Botanical Survey Unit #16-North</u> . 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.
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. <u>Within primary site (above Fourth of July Creek):</u> (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). <u>At roadside clump site:</u> (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.
<i>Ptilidium californicum</i> (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 tree: exclude mastication in RS treatments within 25 feet of substrate tree.

Table 7. 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 Description	Number of Plants and Area	Habitat Description and Site-specific RPMs
<i>Ptilidium californicum</i> (Pacific fuzzwort [liverwort])			
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 required 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. 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.
<i>Smilax jamesii</i> (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 additional RPMs are required.

- 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.

The RPMs required for PTCA5 include:

- 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 RPMs are required for the single SMJA site.

1.14.2 Noxious Weeds

1.14.2.1 Prevention

- Require all contractors and permittees to clean equipment prior to entering the National Forest System lands and when moving within a treatment unit from known noxious weed sites; follow Provision B6.35 Equipment Cleaning (summarized below):
 - Vehicles used off roads shall not be used in the Assessment Area that was last operated in an area infested with one of more invasive species of concern area without having cleaned such equipment of seeds, soil, vegetative matter, and other debris that could contain or hold seeds. Equipment shall be considered clean when a visual inspection does not disclose seeds, soil, vegetative matter, and other debris that could contain or hold seeds.
 - Flag noxious weed populations on the ground prior to project implementation to avoid all proposed project ground-disturbing activities.
 - Avoid proposed ground-disturbing project treatments in units known to contain noxious weeds; these treatments include road construction, mastication, prescribed burning, and fireline construction (both hand and machine firelines and piling and burning of slash). See Table 6 for weed sites and proposed treatment unit locations.
 - Require the use of certified weed-free seed and straw to restore areas of ground disturbance.

1.14.2.2 Control

- Conduct post-treatment surveys in proposed treatment units and use site-specific evaluations to determine appropriate treatment to control any weed sites located.

1.14.2.3 Monitoring

- Monitor mechanical treatment units and RS treatments for noxious weeds, as part of the Klamath National Forest noxious weed program, after the proposed project treatments are completed or as long as it takes vegetation to recover from disturbance (as measured by ground duff cover and forb and shrub layer cover).

1.14.2.4 Site-specific RPMs for M Units 13 and 32

RPMs for M Unit 13

Prevention:

- Require all contractors and permittees to clean equipment prior to entering the National Forest System lands and when moving within a treatment unit from known noxious weed sites; follow Provision B6.35 Equipment Cleaning (summarized below):
 - Vehicles used off roads shall not be used in the Assessment Area that was last operated in an area infested with one of more invasive species of concern area without having cleaned such equipment of seeds, soil, vegetative matter, and other debris that could contain or hold seeds. Equipment shall be considered clean when a visual inspection does not disclose seeds, soil, vegetative matter, and other debris that could contain or hold seeds.

- Avoid proposed ground-disturbing project treatments in units known to contain noxious weeds; these treatments include road construction, mastication, and fireline construction (both hand and machine firelines and piling and burning of slash).
- Require the use of certified weed-free seed and straw to restore areas of ground disturbance.

Control:

- Flag noxious weed populations on the ground prior to project implementation.

Monitoring:

- Monitor mechanical treatment units and Roadside treatments for noxious weeds, as part of the KNF noxious weed program, after the proposed project treatments are completed or as long as it takes vegetation to recover from disturbance (as measured by ground duff cover and forb and shrub layer).

RPMs for M Unit 32:**Prevention:**

- Require all contractors and permittees to clean equipment prior to entering the National Forest System lands and when moving within a treatment unit from known noxious weed sites; follow Provision B6.35 Equipment Cleaning (summarized below):
- Purchaser shall not move any off- road equipment that last operated in an area infested with one of more invasive species of concern onto Sale Area without having cleaned such equipment of seeds, soil, vegetative matter, and other debris that could contain or hold seeds. Equipment shall be considered clean when a visual inspection does not disclose seeds, soil, vegetative matter, and other debris that could contain or hold seeds.
- Avoid proposed ground-disturbing project treatments in units known to contain noxious weeds; these treatments include road construction, mastication, and fireline construction (both hand and machine firelines and piling and burning of slash).
- Require the use of certified weed-free seed and straw to restore areas of ground disturbance.

Control:

- Flag noxious weed populations on the ground prior to project implementation.

Monitoring:

- Monitor mechanical treatment units and Roadside treatments for noxious weeds, as part of the Klamath National Forest noxious weed program, after the proposed project treatments are completed or as long as it takes vegetation to recover from disturbance (as measured by ground duff cover and forb and shrub layer).

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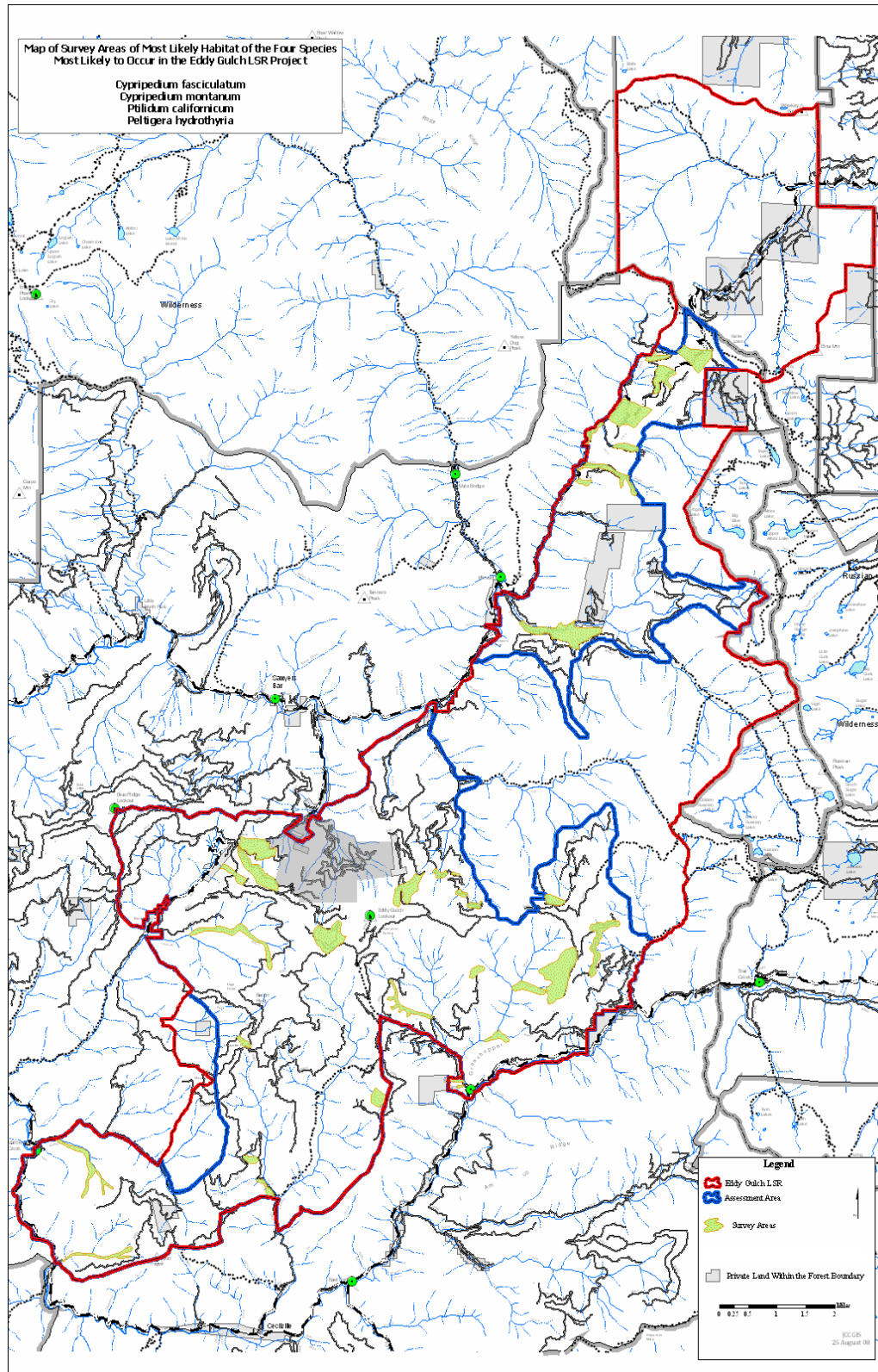
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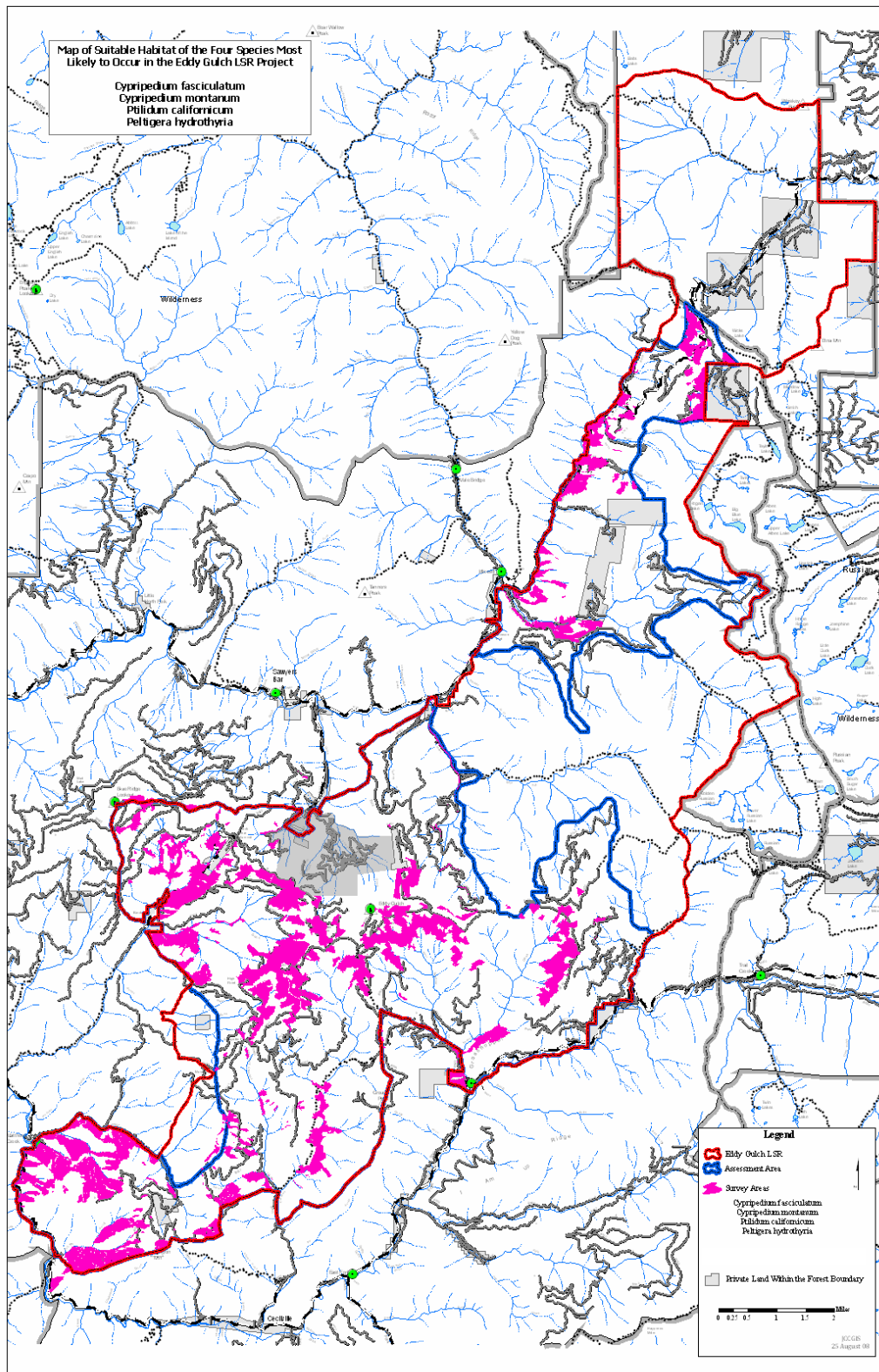
Appendix A

Maps

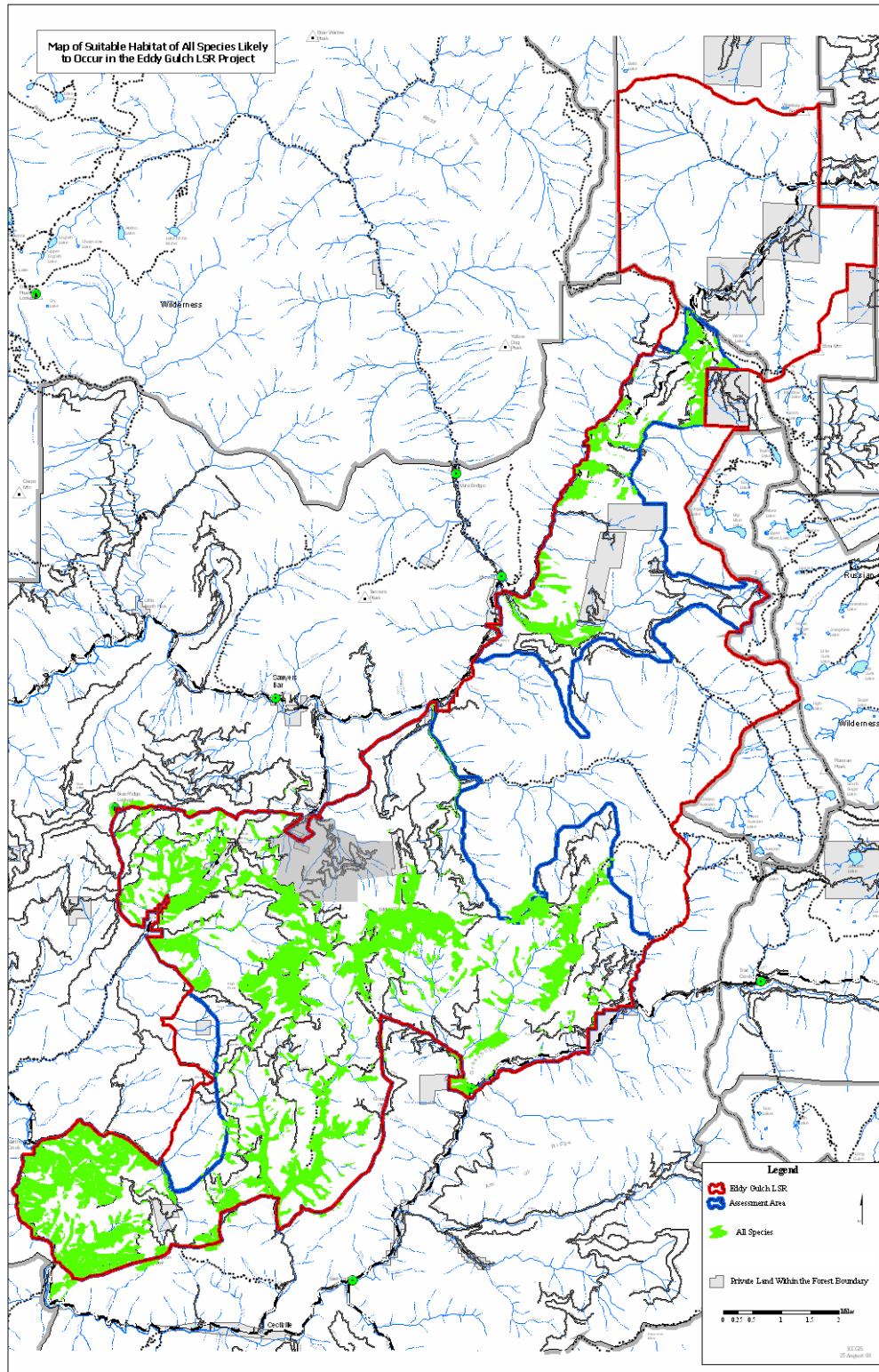
Map A-1. Survey areas (most likely habitat of the four Sensitive species most likely to occur in the Eddy Gulch LSR Project Assessment Area).

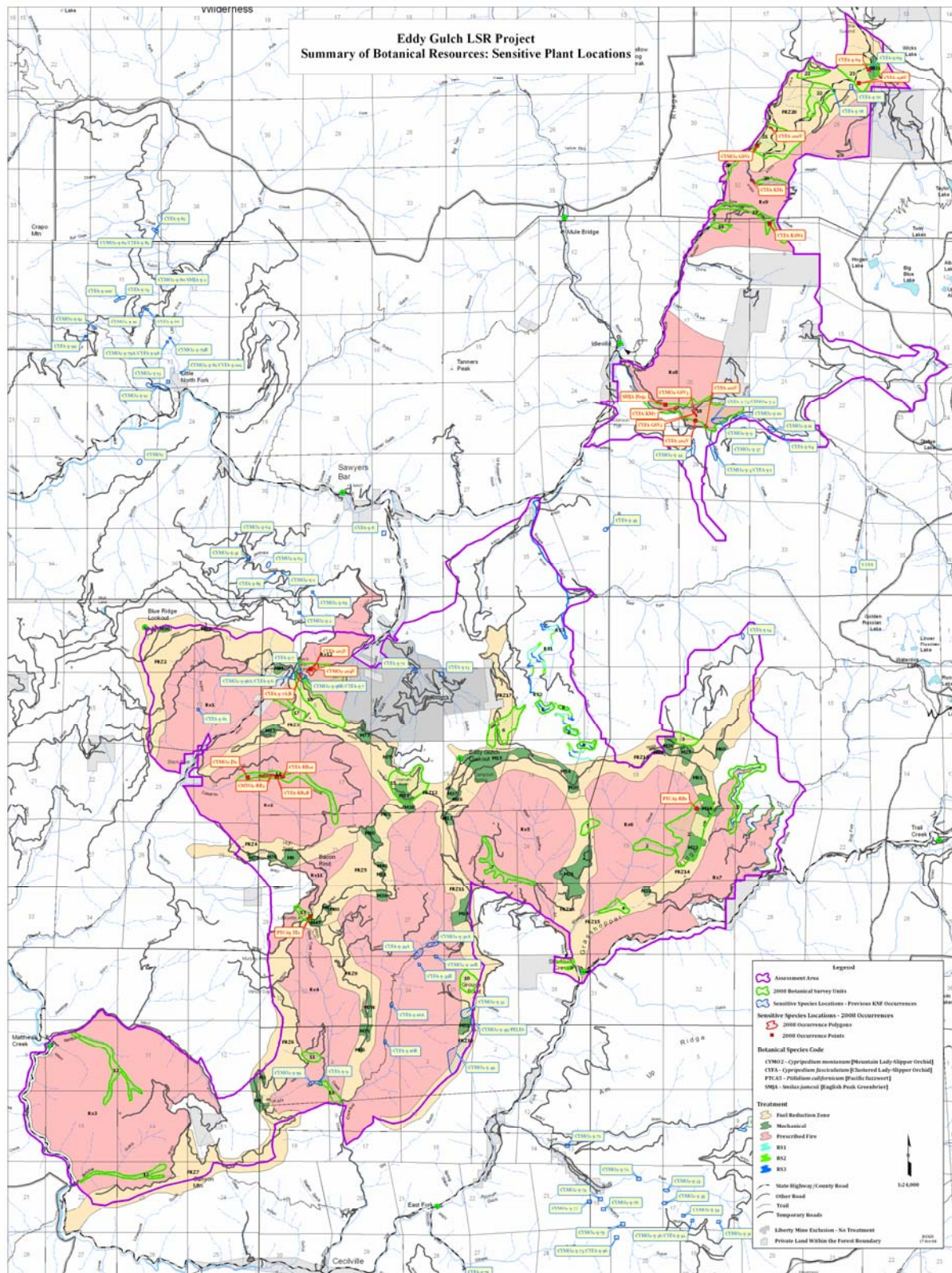


Map A-2. Suitable habitat acres of the four species most likely to occur in the Eddy Gulch LSR Project Assessment Area (*Cypripedium fasciculatum*, *Cypripedium montanum*, *Ptilidium californicum*, *Peltigera hydrothyria*).



Map A-3. Suitable habitat acres of all species likely to occur in the Eddy Gulch LSR Project Assessment Area.



Map A-4. Summary of botanical resources: Sensitive plant locations.

Map A-5. Summary of noxious weed survey areas and weed locations.