Biological Assessment/Evaluation

For
Sensitive, Threatened, and Endangered
Plant Species

Klamath National Forest

PROJECT NAME Mt. Ashland LSR Habitat Restoration
and Fuels Reduction Project

RANGER DISTRICT Oak Knoll

COMPARTMENTS Cottonwood, Long John, Cow, Sterling, Hungry

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I. Introduction

The purpose of this document is to evaluate the Mt. Ashland LSR Habitat Restoration and Fuels Reduction Project in sufficient detail to determine its effects on Endangered, Threatened, Proposed, or Sensitive plant species. This Biological Assessment/Evaluation (BA/BE) is prepared in accordance with the legal requirements set forth under Section 7 of the Endangered Species Act [19 U.S.C. 1536 (c)], and follows the standards established in the Forest Service Manual direction (FSM 2672.42).

A. Location Information

The Mt. Ashland LSR Habitat Restoration and Fuels Reduction Project encompasses all, or portions of the Cottonwood, Long John, Cow, Sterling, and Hungry compartments of the Oak Knoll Ranger District, Klamath National Forest. These compartments are located within the Beaver Analysis Watershed. The project area is north of the Klamath River, and just south of the Siskiyou Crest in the vicinity of Mt. Ashland. The project area lies in the watersheds of Grouse, Beaver, and Long John Creeks. This Biological Assessment/Evaluation analyzes the effects of the proposed project upon TEPS plants within the project area boundaries.

The legal description is:

> Willamette Meridian: T40S R1W S.25, 26, 34, 35, 36; T40S R1E Sec. 29, 30, 31, 32; T41S R1W Sec. 1, 2, 3, 10, 11, 12, 13, 14; T41S R1E Sec. 5,6,7,8,18; and T41S R2W S. 5, 6, 7, 8, 17, 18.
> Mt. Diablo Meridian: T48N R9W S. 13 and 24; and T48N R8W S. 15, 16, 17, 20, 21, 22, and 28.

For a map of the proposed project area, see the *Mt. Ashland LSR Habitat Restoration and Fuels Reduction Project DEIS* (USDA 2007).

B. Species Of Concern

<u>Endangered</u>
The Arcata Field Office, U.S. Fish and Wildlife Service (USFWS) provided the following list of species to the Klamath National Forest on August 15, 2006 (reference#118855772-95714). This BA addresses these species:

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

The Mt. Ashland LSR Habitat Restoration and Fuels Reduction Project is not within the range or habitat of *Arabis macdonaldiana*, *Astragalus applegatei*, or *Phlox hirsuta.* Surveys were conducted in 2005 for *Fritillaria gentneri* (USDA 2006g). No habitat and no populations of this species were located during project surveys. These species will not be addressed further in this

document. No federally listed threatened, endangered, or proposed, plant species will be affected by this project.

Sensitive

The Region 5 Regional Forester has listed plants for which there is a concern for species viability as Sensitive. Sensitive plants are those species which may occur in few to large numbers in a small localized area, or which may occur in a wide geographical area but in few numbers in restricted specialized habitats. Thirty-six Sensitive plant species are known, or thought likely to occur on Klamath National Forest (USDA. 2004b). In addition, the R5 list has recently been updated (USDA 2006a), and all species newly listed for the Klamath N.F. (19 species) are considered in this document (USDA 2006b). This BE addresses both species lists

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 areas include all activities discussed in the proposed action. The following preliminary botanical review was done to determine which the species of concern are.

C. Preliminary Botanical Review

An office prefield review and a preliminary field review were conducted to determine if this project is within the range of any Klamath listed Threatened, Endangered, or Sensitive species, and if suitable habitat is present within the proposed project area (USDA 2006e). All Sensitive, Threatened, and Endangered species listed for the Klamath National Forest were considered during this review (USDA 2004b, 2006b). The preliminary field review was intuitive controlled, searching for habitats that support these species. The objective of this survey was to determine if suitable habitats were present, and thus if further surveys would be required. Surveys are not required for species for which suitable habitat is not present, and for which the project area is outside of the currently known range of the species.

The proposed project area was determined to contain documented occurrences or suitable habitat for the following species:

SPECIES	CODE	STATUS	FIELD SURVEY RECOMMENDED
Cypripedium fasciculatum	CYFA	Sensitive - vascular	Yes
Cypripedium montanum	CYMO2	Sensitive - vascular	Yes
Fritillaria gentneri	FRGE	Endangered - vascular	Yes
Horkelia hendersonii	HOHE2	Sensitive - vascular	Yes
Lupinus lepidus ssp. ashlandensis	LULEA	Sensitive - vascular	Yes
Tauschia howellii	TAHO2	Sensitive - vascular	Yes
Ptilidium californicum	PTCA5	Sensitive - bryophyte	Yes
Boletus pulcherrimus	BOPU4	Sensitive – fungi	Fungi species, habitat evaluation only, no surveys required.
Cudonia monticola	CUMO2	Sensitive – fungi	
Dendrocollybia racemosa	DERA5	Sensitive - fungi	

Phaeocollybia olivacea *Sowerbyella rhenana* *Buxbaumia viridis*	PHOL SORH BUVI2	Sensitive – fungi Sensitive – fungi Sensitive - bryophyte	Habitat evaluation only

II. Current Management Direction

(FSM 2672.41):
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 U.S. Fish and Wildlife Service, and 2) species listed as Sensitive by the Region 5 Regional Forester, or to cause a trend to federal listing for species listed as Sensitive. (USDA. 1990)

Forest-wide Standards and Guidelines have been developed that direct the management of Sensitive plant species to ensure the maintenance of reproducing, self-sustaining populations, and to prevent the need for the species to become listed as T&E species (Klamath National Forest LRMP, 1994).

Consultation to Date

No consultation required

III. Description Of Proposed Action

A. Proposed Action

Alternative 2 was designed to meet the purpose and need for action. It will treat 4,706 acres in 256 stands as described below. Activity fuels will be treated in all stands. Road actions consist of maintenance, year-round closures, decommissioning, designating existing unauthorized roads as National Forest System roads, and the construction of temporary spur roads. Some landings will be constructed but existing landings will be used wherever possible. Refer to the Draft EIS for more complete descriptions of project activities and maps.

Restoration Silvicultural Treatments

- Variable density thinning of trees larger than nine inches in diameter at breast height (DBH) on 2589 acres in 158 stands.
- Small diameter thinning of trees 9 inches DBH and below on 408 acres in 16 stands.

Defensible Fuel Profile Zone

- Variable density thinning of trees larger than nine inches DBH on 1286 acres in 49 stands as part of a defensible fuels profile zone along upper slopes and ridges.

Associated Activities

- Weeding and cleaning of understory trees in a subset of the 3,875 acres and 207 stands identified for variable density thinning above (weeding and cleaning will occur as needed on a stand by stand basis).

Restoration Support Actions

- Helicopter systems to remove trees on 1071 acres in 65stands.
- Skyline systems to remove tress on 1602 acres in 75 stands.
- Ground-based equipment systems to remove trees on 1202 acres in 67 stands.
- An estimated 7 existing landings will be used and may be enlarged to accommodate processing of small trees for bio-mass utilization; landing size will not exceed 0.5 acre for each ground-based landing or 1 acre for each helicopter landing.
- An estimated 15 new ground-based system landings, 14 skyline system landings and 11 helicopter landings will be constructed. No new landings will be constructed within Riparian Reserves. Ground-based and skyline landings will be up to a 0.5 acre in size, helicopter landings will be up to 1 acre in size. The total acreage disturbed by landing construction will not exceed 25 acres.
- Landings will be hydrologically restored post-project. If it is determined by an earth scientist that special erosion control measures are needed, they will be implemented on a site by site basis.

Fuels Reduction Treatments

- Whole-tree Removal on slopes less than 45% on 1202 acres in 67 stands.
- Mastication to reduce activity and natural fuels on 809 acres in 51 stands; mastication combined with handpile/burn on 436 acres in 15 stands.
- Hand-pile and burn to reduce activity and natural fuels on 980 acres in 76 stands; handpile and burn followed by underburning on 979 acres in 42 stands.
- Underburning to reduce activity and natural fuels on 1502 acres in 72 stands. Additional underburning will occur outside of stand boundaries to riparian features .
- Underburning to reduce natural fuel build-up in two stands on 120 acres.
- Thinning out small trees and burning piled material to reduce ladder and surface fuels within riparian reserves on 303 acres in 31 stands.

Restoration Support Road Actions

- Change from open to year-round closure:

Road Segment:	**Miles:**
40S09	3.05
40S10 segment	0.82
40S13A	1.72
40S15A	2.20
40S16A	1.01
41S13	0.50
Total Miles:	*9.30*

- Decommission System roads:

Road Segment:	**Miles:**
40S20	.49

- Existing Unauthorized roads put on the System:

Road Segment:	**Miles:**
40S06.2	1.98
40S16.1 segment	0.23
40S16.6	0.12
41S15.1 segment	0.10
Total Miles:	*2.43*

- Existing Unauthorized roads used for the Project: opened, used, hydrologically stabilized and closed:

Road Segment:	**Miles:**
40S09.1A	0.77
40S09.1A1	0.11
40S09.2	0.18
40S12.1	0.15
40S13.1	0.42
40S13.2	0.08
40S14.1	0.12
40S14.2	1.14
40S16.1 segment	0.10
40S16.5 segment	0.04
40S16.5B	0.17
40S20.1	0.47
40S20.1A	0.76
41S07.3	0.80
41S09A.1	0.21
41S10.2	0.07
41S10.3	0.14
41S15.1 segment	0.19
41S15.3	0.73
41S15.3A	0.53
48N30A.1	0.18
48N37.1	0.64
Total Miles:	***8.00***

New Spur Road Construction: construct, use, decommission.

Road Segment:	**Miles:**
T206A	0.27
T206B	0.07
T207	0.43
T216	0.14
T228A	0.19
T228B	0.19
T232	0.06
T235	0.29
T254	0.73
T264	0.11
T266	0.14
T277A	0.16

T300	0.12
T317	0.82
T317	0.31
T320A	0.39
T320B	0.43
T320C	0.36
T374	0.14
T380	0.45
T383	0.2
T401	0.86
Total Miles:	***6.86***

B. Resource Protection Measures

Known Sites:
Mitigation for plant species of concern has been designed into the proposed action. One population of *Ptilidium californicum* (PTCA5) was previously known within the project area. It is located within a Thin & Handpile <9" unit (#465) which is surrounded by a larger Commercial Thin >9" unit (#300). One new population of *Ptilidium californicum* (PTCA5) was discovered during project surveys. It is located within a Commercial Thin >9" unit (#284). Based upon the recommendations of the botanist, site-specific habitat protection areas will be laid out on the ground around the Sensitive plant populations. The sites have been evaluated on the ground to determine the buffer widths. Factors considered include overstory trees available for shading, the need to thin dense stands to prevent deterioration of the stand within the buffer, protection from prescribed fire or the need to apply prescribed fire within the buffer to prevent catastrophic wildfire, and other habitat protection needs.

Population	Location	Treatment	Buffer
PTCA5-5-61	Unit #300	Thinning >9"; skyline. Handpile/burn.	No timber harvest, one site tree distance around population.
	Unit #465	Thinning <9"; handpile / burn.	No thin/handpile/burn 25 ft. around population.
PTCA5-5-92	Unit #284	Thinning >9"; skyline. underburn.	No timber harvest, one site tree distance around population. No underburn 25 ft. around population.

The buffer width for timber harvest is equivalent to one site tree height in distance. This buffer, a strip outside of the actual population area, is an area in which no timber harvest ground-disturbing activities will occur. Within this buffer, small diameter trees will be thinned/handpiled/burned (U#300) or underburned (U#284) to within 25 ft. of the population. There will be no ground disturbing activities of any kind within 25 ft. of the population.

Sensitive Fungi and Bryophytes:

An evaluation of effects to species listed for which surveys could not be conducted is being done as part of this document. Existing resource protection measures designed to protect fish and water resources are likely to provide benefits to the Sensitive plant species of concern also. The habitat for the sensitive fungi and bryophyte species occurs within the wetter environments of riparian areas and the timber stand within 25 ft. of the riparian vegetation. Riparian Reserves have been established 170 ft. on either side of non-fish bearing streams. The Riparian Reserve adjacent to fish bearing streams is 340 ft. Project activities will be limited within these areas. The objectives of these protection buffers are to maintain existing shade and moisture levels, litter, duff, and coarse woody debris components, and species composition. Retention of these components within the buffers will provide continued high quality habitat for the Sensitive fungi and bryophyte species of concern.

IV. Existing Environment

A. Field Survey

Project specific surveys have been conducted in October 2003, July, August and September 2004, May, June, July, and August 2005, and October, November, and December 2006. Surveys were timed to correspond with the time period that each species could be most readily identified. Surveys were conducted by botanists, or wildlife biologists and biological technicians trained in the identification of the target species. All areas within the project area boundary which are proposed for ground disturbing activities have been surveyed for the 7 target species for which surveys were recommended (CYFA, CYMO2, FRGE, HOHE2, LULEA, TAHO2, and PTCA5). Surveys were intuitive controlled, traversing harvest units, proposed roads and landings, and other activity areas searching for the specific habitats for the species of concern. Documentation included traverse routes marked on topographic maps. For all surveys, forms were completed which included the location of the unit, date of survey, seral stage and vegetation series, other habitat information, and a list of associated species. Project surveys and populations, if located, were documented on survey and site report forms.

Two populations of *Horkelia hendersonii*, one population of *Lupinus lepidus var. ashlandensis*, four populations of *Tauschia howellii* and one population of *Ptilidium californicum* were previously known from the project area. One new population of *Cypripedium montanum* and one new population of *Ptilidium californicum* was located within the project area.

SPECIES FOUND	POPULATION NUMBER(S)	LEGAL LOCATION
Horkelia hendersonii	HOHE2-5-1 HOHE2-5-3	T40S R1E Sec. 17,18,20,21 T40S R1E Sec. 19,30
Cypripedium montanum	CYMO2-5-83	T48N R8W Sec. 15
Lupinus lepidus var. ashlandensis	LULEA	T40S R1E Sec. 17,18,20,21

Ptilidium californicum	PTCA5-5-61 PTCA5-5-92	T48N R8W Sec. 21 T41S R1W Sec. 11
Tauschia howellii	TAHO2-5-4 TAHO2-5-7 TAHO2-5-8 TAHO2-5-9	T40S R1W Sec. 25 T40S R1E Sec. 19 T40S R1E Sec. 30 T40S R1E Sec. 19

No populations of *Cypripedium fasciculatum*, or *Fritillaria gentneri* were located during project surveys, and these species will not be discussed further in this document.

Sensitive Plant Survey Reports, dated: 2003, 2004, 2005 2006 (USDA 2006g)

Sensitive Plant Population Reports, dated: 6-19-02, 7-22-04 10-27-06 (USDA 2005)

Field surveys have not been conducted for the five sensitive fungi species and one bryophyte (BOPU4, CUMO2, DERA5, PHOL, SORH, and BUVI2) for which suitable habitat may occur within the project area. These species were previously listed as Survey and Manage Category B, Pre-Disturbance Surveys Not Practical (BOPU4, CUMO2, DERA5, and SORH) and Category E, Status Undetermined (PHOL and BUVI2). 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 (FSEIS), the assumption was made that field surveys would not be necessary for these species in order to determine effects (USDA 2004c). In this 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 is used to determine effects.

B. Species Accounts – Vascular plants

- *Cypripedium montanum* - mountain lady-slipper orchid – CYMO2:

One population of this species was discovered within the lower Grouse Creek drainage. This population is not within or adjacent to any area proposed for ground disturbing activities. It is approximately ¼ mile from the closest project activity area.

- *Horkelia hendersonii* – Henderson's horkelia – HOHE2; *Lupinus lepidus var. ashlandensis* – Mt. Ashland lupine – LULEA; *Tauschia howellii* – Howell's tauschia– TAHO2:

Several populations of these species were previously known within the project area. These populations are found at the highest elevations of the project area along the Siskiyou Crest. The plants are found within open dry meadows along ridge tops. These populations are within the project area boundary, but well outside any area that will be impacted by project related activities. The closest population (TAHO2-5-4) is more than ¼ mile from the closest project activity area.

C. Species Accounts – Fungi

There is very little specific information 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* (USDA 2003), *Handbook to Strategy 1 Fungal Species in the Northwest Forest Plan* (USDA 1999), and *Management Recommendations for Survey and Manage Fungi* (USDA 1997). In addition, this analysis is based upon an Interagency Species Management System (ISMS) query of the results of the pre-project surveys, strategic surveys, and purposive surveys that have been completed within Oregon, Washington, and California, and on the species range listed in the scientific literature.

Mycorrhizal fungi species:

Many fungi taxa are ectomycorrhizae (ECM) 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. Mycelia 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 upon mycorrhizal fungi for adequate uptake of nutrients and survival in nature. Likewise mycorrhizal fungi depend upon 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 species. Overstory tree cover is important to maintain high moisture levels within the forest litter and large woody debris.

- *Boletus pulcherrimus* – BOPU4:

This mycorrhizal species is endemic to the Pacific Northwest in Washington, Oregon, and Northern California. The ISMS database lists known sites on the Ashland District of the Rogue River N.F. and the Ashland Resource Area of the Medford BLM, which are north of the project area. There are no known sites on the Klamath N.F., 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. Only *Pseudotsuga menziesii* is present in the project area, at the lower elevations. It is unknown if these are the only trees species that this fungus forms an association with. BOPU4 is a large epigeous mushroom that presumably needs moisture to fruit during late summer or early autumn (USDA 1997). There are currently no known locations of this species at elevations above 5,200 ft. Because the majority of the known sites of this species are located in more humid or coastal locations and in older forests, the project area may be too dry and too young to support the species, and there is a **low** probability

of the species being present. If present, populations are most likely to occur in wet, north facing riparian areas within 25 ft. of a perennial stream, at the lower elevations.

- *Phaeocollybia olivacea* – PHOL:

This species is endemic to the western United States from the central Oregon coast south to Santa Cruz County. Within the range of the northern spotted owl, populations are known from the western portions of Washington, Oregon, and California as far south as Mendocino National Forest. The ISMS database lists known sites on the Rogue River National Forest, adjacent to the Klamath. No sites were found during strategic surveys conducted on the Klamath N.F. Two populations of this species are known adjacent to the Klamath, in the Red Buttes Wilderness and near Haypress Meadows. 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 ft. There is a **low** potential that the species may be present within the project area. If present, populations are most likely to occur in wet, north facing riparian areas within 25 ft. of a perennial stream, at the lower elevations.

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 coverage 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 N.F. where climatic conditions provide higher levels of rainfall than that which is found in the central and eastern portions of the Klamath.

- *Dendrocollybia racemosa* – DERA5:

This saprophytic species is widespread in the Northern Hemisphere but always locally rare. Within the range of the northern spotted owl, populations are known from the western portions of Washington, Oregon, and northern California. The ISMS database lists known sites on the Rogue River N.F. and the Shasta-Trinity N.F. No sites were discovered during strategic surveys conducted on the Forest. One previously known population of this species is located on the Klamath NF, near the Duck Lake trailhead on Scott River district. This species is found on rotting or mummified remnants of agarics, or occasionally in nutrient-rich leaf mulch in forests. The species has been found in older forests of coast 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 ft. There is a **low** potential for the species to occur within the project area. If present, populations are most likely to occur in wet, north facing riparian areas within 25 ft. of a perennial stream, at the lower elevations.

- *Cudonia monticola* – CUMO2:

This very rare saprophytic species is endemic to western North America. Within the range of the northern spotted owl, populations are known from the western portions of Washington and Oregon, and in Northern California. The ISMS database does not list known sites on any adjacent National Forests or BLM Districts. No sites were discovered during strategic surveys

conducted on the Forest. Two populations of this species were previously known on the Klamath, on the Ukonom District, in the vicinity of Haypress Meadows. This species is found on coniferous needles and debris within older forests. The Handbook lists this species as occurring on *Picea* (spruce) needles and coniferous debris, but it is not known if this is the only forest type in which *Cudonia* is found. Spruce is not present within the project area. It has also been found with white fir, Douglas-fir and pine. There are currently no known locations of this species at elevations above 5,000 ft. There is a **low** potential for the species to occur within the project area. If present, populations are most likely to occur in wet, north facing riparian areas within 25 ft. of a perennial stream, at the lower elevations.

- *Sowerbyella rhenana* - SORH:

This saprophytic species is known from Europe, Japan, and the western United States. Within the range of the northern spotted owl, populations are known from the western portions of Washington, Oregon, and California as far south as Mendocino National Forest. The ISMS database lists known sites on the Six Rivers N.F. and Shasta-Trinity N.F. and on the Medford District BLM. No sites were discovered during strategic surveys conducted on the Forest. Five populations of this species are known from the Klamath, on Salmon River District, at elevations of 2,500 to 3,500 ft. SORH fruits in scattered to gregarious or caespitose 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 ft. There is a **low** potential that the species may be present within the project area. If present, populations are most likely to occur in wet, north facing riparian areas within 25 ft. of a perennial stream, at the lowest elevations. The stands present within the project area may be too young to support SORH.

<u>Specific Habitat Areas Within Project Area</u>

There is very little suitable habitat for these species within the project area boundary. The habitat is distributed along the main stem and major tributaries of Grouse Creek and Long John Creek, where the late-seral timber stands occur. Because these species require high moisture levels, the habitat is further restricted to north facing slopes within 25 feet of the perennial creeks. These areas are within the Riparian Reserve buffers that have been established 340 ft. from perennial water courses.

D. Species Accounts – Bryophytes

There is very little specific information available about the Sensitive bryophyte species. The following species accounts are based on the best available information. The majority of information has come from the *Draft Management Recommendations - Bryophytes* (USDA 1997a) and from the *Conservation Assessment for Buxbaumia viridis* (USDA 2006c) and *Conservation Assessment for Ptilidium californicum* (USDA 2006d). In addition, this analysis is based upon an Interagency Species Management System (ISMS) query of the results of the pre-project surveys, strategic surveys, and purposive surveys that have been completed within Oregon, Washington, and California, and on the species range listed in the scientific literature.

- *Buxbaumia viridis* – BUVI2:

This species ranges from northern California to British Columbia, and is known from Idaho and Montana. It is also known from Asia, Australia, Europe, and New Zealand. It is widespread but uncommon at middle elevations throughout the region. Within the range of the northern spotted owl, populations are known from almost every National Forest and BLM District. The ISMS database lists known sites on the Rogue River, Six Rivers, Siskiyou, and Shasta-Trinity National Forests adjacent to the Klamath. No sites were found during strategic surveys conducted on the Klamath N.F. No populations of this species are known to occur on the Klamath N.F. *Buxbaumia viridis* occurs on decay class 4 and 5 stumps and logs with high water content and occasionally on mineral or organic soil, in cool, shaded humid locations at 3,500 to 5,000 feet. Floodplains and stream terraces are favorable habitats because of the large amount of decayed wood available in old growth, but the species can be found on almost any landform as long as microclimatic conditions are favorable. A number of specimens have been found growing on shaded cutbanks of trails and roads where climatic or microsite conditions produce high moisture levels. Associated conifers include mountain hemlock (*Tsuga mertensiana)* western redcedar (*Thuja plicata*) silver fir (*Abies amabilis)* and Douglas-fir (*Psuedotsuga menziesii).* Based on the distribution of the known sites of this species, which are located in areas that are very moist or closer to the coast, the project area may be too dry to support the species. There is a **very low** potential that the species may be present within the project area. If present, populations are most likely to occur in wet, north facing riparian areas within the actual creek beds, at the lowest elevations of the project area.

<u>Specific Habitat Areas Within Project Area</u>
There is very little suitable habitat for this species within the project area boundary. The habitat is distributed along the main stem and major tributaries of Grouse Creek and Long John Creek, where the late-seral timber stands occur, and where large diameter decay class logs are found. Because this species requires high moisture levels, the habitat is further restricted to logs that are actually inserted into the perennial creeks. These areas are within the Riparian Reserve buffers that have been established 340 ft. from perennial water courses.

- *Ptilidium californicum* Pacific fuzzwort – PTCA5:

Ptilidium californicum is a bryophyte classed within the liverwort group. It is distributed throughout the North Pacific, ranging from Japan, the Russian far East, into Alaska, western British Columbia, and then south through Washington, Oregon, Idaho, Montana, and northern California, the southern extent of the range. Within the range of the northern spotted owl, populations are known from almost every National Forest and BLM District in Oregon and Washington. In California, the ISMS database lists known sites 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. Ninety three populations of this species are known to occur on the Klamath N.F., distributed across every Ranger District.

Throughout its range in northern California, PTCA5 tends to occur in old stands, specifically those classified as old-growth or second-growth with legacy components. Currently, the preferred habitat appears to be moist, mature, mixed conifer forests with dominant elements of Douglas-fir and/or white fir. Approximately 98% of the sites occur at elevations above 3500’ in elevation. Populations of *Ptilidium* are almost always found on the shaded aspects of host trees, amongst numerous species of mosses at the base of the tree. 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. Very little habitat for PTCA5 was located within the project area during surveys. All areas of suitable habitat have been surveyed.

Specific Populations Within Project Area

One population, PTCA5-5-61 was previously known from within the project area. This population is located 10 ft. out of a dry draw, within Unit #465, which is a small unit within the larger Commercial Thin Unit #300.

One population, PTCA5-5-92, was located during project surveys. This population is located midslope, within Commercial Thin Unit #284.

V. Effects Of The Alternatives

A. Interactions Important to Analysis - General

Ground disturbance and alterations of the light, moisture, and nutrient regimes within forest and associated plant environments can affect sensitive plants and their habitats. These effects can take two forms; either the actual destruction of individuals in a population or the adverse modification of suitable habitat considered critical to maintenance of viable populations (direct effect), or the modification of habitat to the extent that it prevents future colonization of the site by a species (indirect effect).

Management activities differ in their intensity of impact on sensitive plants within a project area. Removal of conifer overstory through thinning can impact the habitat of species dependent upon high levels of shading. Conversely, thinning overstocked stands may have a short-term adverse impact, but a long-term beneficial effect if the thinning serves to reduce the risk of stand loss through wildfires, insect infestation, or excessive mortality due to suppressed conifers.

Management activities and their effects on sensitive plants can be both long-term and short-term. Activities that occur once on a specific population may not affect a population or its habitat if the species possesses the biological mechanisms to recover, while repeated activities may have the potential to significantly impact a population. Activities prescribed by a project may have cumulative effects on the species viability if individually insignificant effects occur over a wide geographic range or on large numbers of sensitive plant populations.

Fuels treatment can destroy individuals in a population and reduce nutrient levels and shading. Fuels treatment can be beneficial in the case of sensitive plant species that are adapted to fire, or by reducing competition from non-sensitive species. Prescribed fire that reduces fuel loading within a site can benefit a species if it reduces the risk of wildfire.

The significance of management activities upon sensitive plant species viability depends upon many factors, including the size of known populations, the wider geographic range of known

sensitive plant populations outside of the project area, and the degree of species sensitivity to short-term and long-term habitat modification. The alternatives are evaluated in terms of how they would affect sensitive plant species viability in the context of the above factors.

B. Interactions Important to Analysis - Species Specific

1) Vascular plants

- *Cypripedium montanum, Horkelia hendersonii, Lupinus lepidus var. ashlandensis,* and *Tauschia howellii*:

Each of these species is located at least ¼ mile from the closest project activity area. There are no habitat elements that these species depend upon that can be affected by such a large distance from the areas in which project activities will occur.

2) Fungi

There is no species-specific information available for the 5 fungi species that may be present within the project area. General information is available, however, for the 2 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 logging 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).

Mycorrhizal fungi species

The following effects analysis is based primarily upon references provided in a literature review conducted by Lisa Hoover, Forest Botanist, Six Rivers National Forest (Hoover 2004). There is little information available about species-specific effects, but information has been gathered about the effect of management actions upon ectomycorrhizal (ECM) fungi in general. While not eliminating potential effects 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.

- *Boletus pulcherrimus, Phaeocollybia olivacea*:

Timber harvest effects: Studies that have collected data on the effects of logging on ECM fungi have determined that the effects are closely related to the number of trees that are removed, and the size of canopy gaps that are created. ECM fungi decreased exponentially as gap size increased (Hagerman, et al. 1999). In some studies, effects were seen in openings as small as 45 feet in diameter (Durall et al. 1999) and in other studies, significant effects were not seen until

openings reached 30-tree cluster sizes (260 sqm) (Parsons et al. 1994). Thinning harvest prescriptions that retained living trees and shrubs and reduced the size of gap openings showed reduced effects by providing adequate underground linkages for ECM fungi (Amaranthus et al. 1994). Harvest prescriptions that retained hardwoods may in the short-term provide hosts for mycorrhizal species until conifers become reestablished. In one study, the presence of "refuge" trees – old growth legacy conifers – within clear-cuts reduced adverse effects to fungi by maintaining localized sources of ECM fungi species within a large disturbed area (Kranabetter 1999).

Fuel treatment effects: Several studies that have examined the effects of natural and prescribed fire have found that the effects to 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 layer have reduced effects on fungi (Stendell et al. 1999, Miller et al. 1994, Miller et al. 1998, Jonsson et al. 1999). Fuel treatment prescriptions that retain adequate live overstory, understory, and shrub species would retain sufficient host species to form mycorrhizal connections, and would serve to retain moisture at the site.

Saprophytic fungi species

No specific studies have been found that have examined the effects of logging and fuel treatment activities 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 the habitat. This effects analysis is based on the assumption that the relationships will be similar to that seen in the studies cited above.

- *Dendrocollybia racemosa, Cudonia monticola, Sowerbyella rhenana*:

Timber harvest effects:

Fungi species that are saprophytic do not depend upon mycorrhizal connections with live vascular plants, and thus are not directly affected by logging or fuel treatments that remove or kill vascular plants. Saprophytes can be affected by canopy removal, however, if it reduces the amount of cover needed to retain moisture within the litter layer. This effect is likely to be greatest in clear-cuts, less in small patch cuts, and the least in thinning prescriptions which retain a stand density and canopy cover that provides shading for moisture retention and that will foster the increased growth of the remaining trees. Canopy removal can affect fungi species if there is not an adequate recruitment source for large woody material, needles, leaves, and other organic material.

Fuel treatment effects:

Fire may be a threat to species that depend upon organic matter for survival if adequate down woody material is not retained. The effects are likely to be similar to that seen in mycorrhizal species – fuel treatments that do not fully consume the large woody debris, litter, and organic layer will have reduced effects on fungi.

Both species groups

Fuel treatment effects: The Mt. Ashland LSR Habitat Restoration and Fuels Reduction Project is located within an area of historically low intensity and high frequency fire regimes (Taylor & Skinner 1998). The conifer forests present within the Klamath region burned at a frequency that

maintained more open forests than that which is currently present. These forests within the project area have developed for thousands of years in the presence of low intensity fire. If any of the 5 fungi species of concern are present within the project area, they have likely adapted to the presence of fire along with the forest within which they are found. High-intensity, stand replacing fires can extirpate potential fungi populations by killing all live canopy and consuming all woody debris. Commercial thinning of the overstocked younger stands followed by fuel treatment of excessive fuels can be benefical to the fungi species of concern by reducing the risk of stand replacing wildfires.

Associated activities effects: The restoration activities proposed that are associated with timber harvest and fuels treatments can have effects upon the fungi species of concern. Thinning of small diameter trees and shrubs is not likely to have an effect upon fungi populations where larger diameter mature trees are left present in the timber stand. Reforestation activities such as pre-commercial thinning are likely to benefit fungi by increasing the rate of tree growth in young conifer stands. Road and landing construction activities can have adverse effects upon fungi populations because the entire soil surface, vegetation, duff and woody material would be removed. Mastication of activity fuels and non-commercial trees and brush can reduce the amount of available live trees and coarse and fine woody debris needed for fungi substrates if adequate remaining live conifers, hardwoods, and shrubs are not retained. Conversely, reduction of the amount of fuels can benefit fungi by reducing the risk of stand replacing fires.

3) Bryophytes

- *Buxbaumia viridis*:

There is no specific information available on the effects of logging and fuel treatment upon *Buxbaumia viridis.* The majority of the information here is summarized from the *Conservation Assessment for Buxbaumia viridis* (USDA 2006c). Assumptions can be made, however, about how the habitat of the species would respond to the activities proposed in this project.

Timber harvest effects: Factors associated with timber harvest that can cause declines in bryophytes include the temperature extremes and the drying effect of increased wind, the lowering of surface water, drying of logs, reduction in amount of coarse woody debris substrate, and increased dispersal distance between fragments of old growth forests (Laaka 1990). Intensive logging that clears an area of mature trees eliminates the substrata recruitment potential (USDA 2006c). These effects are likely to be greatest in clear-cuts, and less in partial cuts that retain live overstory trees for shading.

Fuel treatment effects: *Buxbaumia viridis*, because of its substratum requirements, would not benefit from the effects of fire (USDA 2006c). The loss of rotten logs and or humus would eliminate occupied sites and limit the availability of future suitable substratum for colonization. Fuel treatment activities that do not consume these logs would show reduced effects. The availability of suitable substrate is important to the persistence of this species in a forest. Timber harvest and fuel treatments that provide for the recruitment of additional large downed logs and increased growth of remaining larger size class trees would provide a continued source of substrate for the species.

Fire, as an integral component of forest dynamics in western forests, has shaped the distribution and abundance of large, coarse woody debris across the landscape. Historic fire return intervals in the Klamath Mountains averaged less than 20 years (Taylor and Skinner 1998). Areas that are outside of this historic range are at risk of potentially stand-replacing wildfires. Project activities that reduce the density of younger 2nd growth conifers and the amount of ground fuels may reduce the risk of wildfires that pose a threat to *Buxbaumia viridis* habitat.

Associated activities effects: Thinning of small diameter trees within timber stands is not likely to have an effect upon BUVI habitat since larger diameter trees would be retained to provide shade and recruitment trees for BUVI substrate. Thinning of pre-commercial stands can benefit the species through the increased growth and development of young trees, which would speed the development of suitable habitat. Road and landing construction activities can have adverse effects upon potential *Buxbaumia viridis* populations because the entire soil surface, vegetation, duff and woody material would be removed. Mastication of activity fuels and non-commercial trees and brush could have an effect upon BUVI habitat if large diameter logs are not retained for potential future substrate. Conversely, reduction of the amount of fuels can benefit the species by reducing the risk of stand replacing fires.

- *Ptilidium californicum:*

There is no specific information available on the effects of logging and fuel treatment upon *Ptilidium californicum*. The majority of the information here is summarized from the *Conservation Assessment for Ptilidium californicum* (USDA 2006d). Based upon the microclimatic conditions and habitat specificity at the base of mature conifers, the important considerations are likely those activities and conditions that physically damage an occurrence, increase light intensity and wind velocity around the base of the tree, and significantly reduce or isolate occupied trees and potential substrate trees. The most significant factors that drive habitat capability appear to be water availability and evaporation (USDA 2006d).

Timber harvest and fuel treatment effects: Project activities such as timber harvest and fuel treatment activities that reduce required shading levels or damage the boles of occupied trees may damage or kill *Ptilidium* plants. Clear-cut harvest prescriptions would have greater effects than partial cut or thinning prescriptions that retain a live conifer overstory. In some cases, PTCA5 plants have persisted within partial cut thinning units on the Klamath National Forest where adequate shade was retained, and where the local rainfall levels are high enough to maintain moisture at the site (USDA 2006f). Underburn prescriptions can kill PTCA5 plants where the base of an occupied tree is scorched. Underburns that are patchy and do not affect all portions of a timber stand can have reduced effects if some occupied trees are not scorched. Handpile and burn fuel treatments can affect PTCA5 populations if a pile is placed too close to an occupied mature tree.

Conversely, fire is also recognized as being an important disturbance agent throughout the range of this species in California, and is important to reducing the threat of wildfire (USDA 2006d). With the relatively frequent fire return intervals throughout the range of PTCA5 in California (Taylor & Skinner 1998) and the risk posed by wildfire to bryophytes it is conceivable that this species has persisted in fire-free niches, and may be expanding in range and abundance due to fire suppression in the last century. Thinning prescriptions may have beneficial effects if dense

2nd growth stands are thinned to levels that reduce the risk of wildfire and that promote the development of the later-seral stands in which PTCA5 is found.

Associated activities effects: Thinning of small diameter trees within timber stands is not likely to have an effect upon PTCA5 plants or habitat since larger diameter trees would be retained to provide shade and recruitment trees for substrate and PTCA5 does not occupy young, small diameter trees. Thinning of pre-commercial stands can benefit the species through the increased growth and development of young trees, which would speed the development of suitable habitat. Road and landing construction activities can have adverse effects upon *Ptilidium californicum* populations because the entire soil surface, vegetation, duff and woody material would be removed. Mastication of activity fuels and non-commercial trees and brush can benefit the species by reducing the risk of stand replacing fires.

C. Effects of the No Action Alternative (Alternative 1)

In this alternative, current management plans would continue to guide management of the project area. No commercial thinning, fuels reduction activities, pre-commercial thinning or roadwork would be implemented to accomplish project objectives. Stand development and fuel dynamics currently occurring in the project area will continue. The effects to the plant species present or for which suitable habitat occurs in this alternative are related to the increased risk of wildfire that would result from the No Action alternative. Excess fuel levels would not be reduced in this alternative.

1) Vascular plants

- *Cypripedium montanum*:

In this alternative, the known site of this species is located within a timber stand that is currently not overstocked or exhibiting excess fuel levels. This population would not be affected by an increased risk of wildfire. There would be no direct, indirect or cumulative effects to this species.

- *Horkelia hendersonii*, *Lupinus lepidus* var. *ashlandensis*, and *Tauschia howellii*:

In this alternative, the known sites of these species are located within open, high elevation meadows, with no increased risk for wildfire. These populations would not be affected by an increased risk of wildfire. There would be no direct, indirect or cumulative effects to these species.

2) Fungi

- *Boletus pulcherrimus, Phaeocollybia olivacea, Dendrocollybia racemosa, Cudonia monticola*, and *Sowerbyella rhenana*:

Because there is an overall low probability that these fungi species of concern 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 the main stems of Grouse and Long John Creeks where wet, north facing riparian areas within 25 ft. of a perennial stream occur, at the lower to mid-elevations, and within mature timber stands. Wildfire in these areas

would be generally of low-intensity due to the high moisture levels present. There is potential that a population could be affected if a portion is burned in a wildfire, but it is unlikely that a wildfire would burn at high intensity throughout the entire population. This would be a direct effect to individuals. Because these species are not killed when a portion of a population is affected, this would not affect the entire population or habitat. A low-intensity wildfire would retain adequate mature live overstory and understory trees, adequate 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. There is a low risk that these areas would be impacted by a high intensity stand replacing wildfire. There would be no indirect effects to these species from the elimination of suitable habitat. There is not likely to be a cumulative effect, and no change to the species' viability within the project area, on the Klamath National Forest, or throughout the species' ranges. High quality habitat for these species that will remain relatively fire-resistant will persist within the moister areas adjacent to riparian areas.

3) Bryophytes

- *Buxbaumia viridis:*

Because there is an overall low probability that this species is present within the proposed project activity areas, there is also a low potential for an effect to individual BUVI2 populations. In this alternative, there is likely to be no effect to this species from an increased risk of wildfires. The habitat occurs within the riparian reserves, and on large diameter rotten logs that are directly inserted within the perennial creeks. This substrate is not likely to burn in a wildfire. The timber stand adjacent to these north facing areas along perennial streams would be likely to burn with a low-intensity. This is not likely to kill the overstory and understory trees, reduce shading levels significantly, or reduce the amount or coarse woody debris. Retaining these habitat elements would ensure the continuation of high quality habitat for the species within riparian areas. There would be no direct, indirect or cumulative effects to this species and no change to the species' viability within the project area, on the Klamath National Forest, or throughout the species' range.

- *Ptilidium californicum*:

In this alternative, the two known sites of PTCA5 may be affected by an increased risk of wildfire. In this alternative, no small diameter trees will be thinned, piled, and burned, and no intermediate diameter trees will be commercially thinned. The timber stands in which these populations are located are overstocked with small and intermediate diameter conifers, and are at risk for a moderate to high intensity wildfire. There is potential for effects to the population sfrom a wildfire which could scorch the base of the trees on which the PTCA5 occurs, killing the plants. This would be a direct effect to the populations. There may be an indirect effect to the populations if there is a crown fire that kills overstory trees that provide the existing shade. There is not likely to be a cumulative effect to the species from this and other projects because only two populations are known within the project area boundary. An adverse effect to these populations from an increased risk of wildfire may affect the species viability within the project area boundary, but is not likely to affect viability on the Klamath National Forest or within the species range. Ninety three populations are known on the Klamath National Forest, well distributed across all districts, and the species is common in Oregon and Washington.

D. Effects of the Proposed Action Alternative (Alternative 2)

1) Vascular plants

- *Cypripedium montanum, Horkelia hendersonii, Lupinus lepidus* var. *ashlandensis* and *Tauschia howellii*:

In this alternative, all four species are located more than ¼ mile from the closest proposed project activity area. There will be no direct effect to individuals or populations and existing habitat conditions would be maintained at each population site. The distance from the closest activity area is great enough that there would be no indirect effects from any of the project activities. There will be no direct, indirect, or cumulative effects to these species and no change to the species' viability within the project area, on the Klamath National Forest or throughout the species' range.

2) Fungi

- *Boletus pulcherrimus, Phaeocollybia olivacea, Dendrocollybia racemosa, Cudonia monticola,* and *Sowerbyella rhenana*:

Timber harvest effects: In this alternative, there will be no effects to fungi from timber harvest due to the location of the fungi habitat, which is outside of the timber harvest units and within the Riparian Reserves. The wetter environments and shadier stands adjacent to riparian areas along perennial streams provide habitat for the fungi species of concern. These areas are protected from timber harvest activities with a buffer of 340 ft. Within this buffer, commercial thinning activities will occur only within the outer 170 ft. distance from the perennial streams. There will be no commercial thinning within the 170 ft. buffer adjacent to the perennial streams. This distance is adequate to prevent edge effects to the habitat adjacent to the streams. There would be no direct effect to the species from mechanical damage to potential fungi populations. The 170 ft. buffer adjacent to the streams would retain all habitat elements necessary to support mycorrhizal and saprophytic species. Adequate live trees would be retained and would provide shade to the site to retain moisture, and there would not be an indirect effect through the long-term loss of habitat. A diversity of conifer, hardwood and shrub species would be retained within the stands and would provide host trees for mycorrhizal fungi species. Coarse woody debris and duff would be maintained which would provide substrate for saprophytic species. There would not be a cumulative effect from this action and others occurring within the project area because populations and their habitat would be maintained.

Fuel treatment effects: Because there is an overall low probability that these fungi species of concern are present within the proposed project activity areas, there is also a low potential for an effect to individual fungi populations from fuel treatment effects. The suitable habitat for these species is located along the main stems of Grouse and Long John Creeks where wet, north facing riparian areas within 25 ft. of a perennial stream occur, at the lower to mid-elevations, and within mature timber stands. The only activity that will occur within these areas is underburning. The fire intensities will be very low within the wet areas of fungi habitat. The prescribed fire will be allowed to back into the Riparian Reserve down to the riparian area. The fuel treatments will be designed to reduce smaller diameter ground fuels and a portion of the ladder fuels and will affect mainly the understory vegetation. Prescribed fires of this type burn in a patchy mosaic that does

not consume all of the understory trees and shrubs. A diverse mix of species in these layers will be maintained within the fungi habitat. This 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 ECM linkages, and will maintain mycorrhizal species. Understory trees, shrubs, and coarse woody debris will be reduced, but maintained at adequate levels to support the fungi that depend upon these vascular plant species. Saprophytic fungi species will be maintained by underburn prescriptions that ensure a low-intensity burn that will retain adequate woody debris. Best Management Practices (BMP) 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 may be a direct effect to a portion of individual fungi populations. Because mycorrhizal and saprophytic fungi have large underground systems, this is not likely to affect a population in its entirety. 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. There will be no indirect or cumulative effects to the species. The habitat would not be affected to the extent that it would no longer be suitable for the species of concern (indirect effect). Because potential populations would be maintained, there would not be a cumulative effect from this and other project activities occurring in the project area boundary. There may be a long-term beneficial effect to the fungi species habitat through the reduction of the risk of stand replacing wildfire due to fuel reduction activities.

Associated activities effects: Small diameter thinning of trees, weeding and cleaning of understory trees, pre-commercial thinning, other fuel treatment activities, restoration support road actions and all other proposed actions in this alternative would have no effects on the fungi species of concern. These activities are proposed in areas that are not suitable habitat for the fungi species. Areas of riparian vegetation and the timber stand within 25 ft. of perennial streams will be protected from these project activities.

Summary – fungi species: In this alternative, there may be direct effects to individuals, but there will not be indirect or cumulative effects to populations or their habitat. There will be no change to the species' viability within the project area, on the Klamath National Forest or throughout the species' range.

3) Bryophytes

- *Buxbaumia viridis*:

Timber harvest effects: In this alternative, there will be no effects to the species from timber harvest due to the location of the habitat, which is outside of the timber harvest units and within the Riparian Reserves. The wetter environments and shadier stands within riparian areas along perennial streams are the most likely locations for potential populations of the species. These areas are protected from timber harvest activities with a buffer of 340 ft. Within this buffer, commercial thinning activities will occur only within the outer 170 ft. distance from the perennial streams. There will be no commercial thinning within the 170 ft. buffer adjacent to the perennial streams. There would be no direct effect to the species from mechanical damage to potential populations. The 170 ft. buffer adjacent to the streams would retain all habitat elements

necessary to the species. Adequate live trees would be retained and would provide shade to the site to retain moisture, and there would not be an indirect effect through the long-term loss of habitat. Coarse woody debris within and immediately adjacent to the perennial streams would be retained. Large diameter standing trees will remain to provide a future source of substrate for the species. There would not be a cumulative effect to the species from this action and others occurring within the project area because potential populations and their habitat would be maintained.

Fuel treatment effects: Because there is an overall low probability for this species to occur within the proposed project activity areas, there is also a low potential for an effect to individual populations from fuel treatment effects. The suitable habitat for this species is located along the main stems of Grouse and Long John Creeks where wet, north facing riparian areas along a perennial stream occur, at the lower to mid-elevations, and within mature timber stands. The only activity that will occur within these areas is underburning. Underburns within these areas will be allowed to back down into the creeks, which will ensure a low-intensity underburn. Substrate for the species, which is large diameter logs within the actual creek bed, are not likely to be consumed in a low-intensity underburn of this type. There may be some loss of shading from shrub and understory trees that are killed as the fire backs down the slope into the riparian areas. This is not likely to significantly affect the overall shading to the potential sites. Large diameter standing trees will be retained to provide recruitment trees for BUVI2 substrate. There will be no direct, indirect, or cumulative effects to this species.

Associated activities effects: Small diameter thinning of trees, weeding and cleaning of understory trees, pre-commercial thinning, other fuel treatment activities, restoration support road actions and all other proposed actions in this alternative would have no effects *Buxbaumia viridis*. These activities are proposed in areas that are not suitable habitat for this species. Areas of riparian vegetation and the timber stand within and immediately adjacent to perennial streams will be protected from these project activities.

Summary – BUVI2: In this alternative, there will be no, direct, indirect or cumulative effects to populations or their habitat. There will be no change to the species' viability within the project area, on the Klamath National Forest or throughout the species' range.

- *Ptilidium californicum*:

Timber harvest effects: In this alternative, there will be no timber harvest related ground disturbing activities within or adjacent to the *Ptilidium californicum* populations present. A protection buffer of one site tree (approximately 150 ft.) will be designated on the ground. Within this buffer, no timber harvest will occur, and no trees >9 inches will be removed. This will retain all existing shade and cover provided by the moderate to large sized trees. A buffer of this size will preserve existing moisture levels at the PTCA5 sites, and will provide for additional large diameter recruitment trees to serve as substrate for the species. There will be no heavy equipment operated within the buffer, and this will protect the PTCA5 plants from mechanical damage. There will be no direct effect to individuals and no indirect effect to the species habitat quality because all habitat elements will be retained. Because these populations will be maintained, there will be no cumulative effect from this and other project activities occurring within the project area boundary.

Fuel treatment effects: In this alternative, fuels within the units will be treated by thinning small diameter trees <9 inches, hand piling, and burning piles, or underburning. The PTCA5 populations will be protected from these activities with a fuel treatment buffer of 25 ft. Retention of all existing small diameter trees within this buffer will provide additional shading and moisture retention adjacent to the population. No handpiles will be constructed or burned, and no underburning will be conducted within this buffer. This buffer will protect the populations from direct mechanical damage from thinning and the heat and radiation effects of pile burning.

Small diameter trees outside this buffer do not provide additional shading and contribute to increased fuel loading and wildfire risk levels. These small diameter trees outside the 25 ft. buffer will be thinned and burned. This is likely to provide a beneficial effect to the population and habitat through the reduction of fuel loading and wildfire risk.

Associated activities effects: Pre-commercial thinning, other fuel treatment activities, restoration support road actions and all other proposed actions in this alternative would have no effects the *Ptilidium californicum* populations. These activities are proposed in areas that are not within or adjacent to the populations or their buffer area.

Summary – PTCA5: Because these population will be protected, there will be no direct, indirect, or cumulative effects to the *Ptilidium californicum* populations. There will be no change to the species' viability within the project area, on the Klamath National Forest or throughout the species' range.

E. Effects of Alternative 4

In this alternative, effects to all species of concern will be the same as the effects in Alternative 2.

F. Effects of Alternative 5

In this alternative, effects to all species of concern will be the same as the effects in Alternative 2.

VI. Determination Of Effects

Adequate botanical assessment has been completed for this Biological Assessment/Evaluation. This was based on recommendations in the Botanical Review for this project, and this botanist's professional judgment.

No Action Alternative:

No federally listed threatened, endangered, or proposed, plant species will be affected by this project.

For the sensitive plant species *Cypripedium montanum, Horkelia hendersonii, Lupinus lepidus* var. *ashlandensis, Tauschia howellii,* and *Buxbaumia viridis* it is my determination that the Mt. Ashland LSR Habitat Restoration and Fuels Reduction Project will cause **no impacts.**

For the sensitive plant species *Boletus pulcherrimus, Phaeocollybia olivacea, Dendrocollybia racemosa, Cudonia monticola,* and *Sowerbyella rhenana,* and *Ptilidium californicum,* it is my determination that the Mt. Ashland LSR Habitat Restoration and Fuels Reduction Project **may impact individuals but is not likely to cause a trend to federal listing or a loss of viability.**

Alternative 2, 4, and 5:
No federally listed threatened, endangered, or proposed, plant species will be affected by this project.

For the sensitive plant species *Cypripedium montanum, Horkelia hendersonii, Lupinus lepidus* var. *ashlandensis, Tauschia howellii, Buxbaumia viridis* and *Ptilidium californicum,* it is my determination that the Mt. Ashland LSR Habitat Restoration and Fuels Reduction Project will cause **no impacts.**

For the sensitive plant species *Boletus pulcherrimus, Phaeocollybia olivacea, Dendrocollybia racemosa, Cudonia monticola,* and *Sowerbyella rhenana,* it is my determination that the Mt. Ashland LSR Habitat Restoration and Fuels Reduction Project **may impact individuals but is not likely to cause a trend to federal listing or a loss of viability.**

VII. Mitigation Measures

No additional mitigation required beyond measures discussed in Section III above.

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