PLUMAS NATIONAL FOREST
FEATHER RIVER RANGER DISTRICT

SUGARBERRRY PROJECT

Biological Evaluation
For
Threatened, Endangered, and Sensitive Vascular Plants, Bryophytes, and Fungi

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SUMMARY
No Federal or State listed Threatened, Endangered, or Proposed species are located in the Sugarberry Project area. However, five region 5 sensitive plant species were found within the analysis area (R5 Sensitive Species List 10/30/2006). These include: the Western Goblin (*Botrychium montanum*), Bug on a Stick Moss (*Buxbaumia viridis*), Clustered Lady's Slipper (*Cypripedium fasciculatum*), Veiny Aquatic Lichen (*Hydrothyria venosa*), and Quincy Lupine (*Lupinus dalesiae*). *L. dalesiae* is also Plumas National Forest Management Indicator species (see appendix D for MIS discussion). Also, there are approximately 670 acres of habitat for *Phaecollybia olivacea*, a R5 sensitive mushroom. Approximately 5% of the habitat will be impacted through project activities. Sensitive plant species will be protected by either avoidance (flagging and avoiding), imposing limited operating periods to allow sensitive species to finish their life cycle, or changes in prescription (from a spring to a fall underburn, for example). In some cases, depending on the species and the management prescription, no protection will be given for disturbance tolerant sensitive status species. Specific recommendations for each occurrence are found in Appendix B, of the Botany Protection Plan, and are based on the Plumas NF Interim Management Prescriptions 2007.

The effects determination in this document concludes that:
-there would be no effect to Threatened, Endangered, or Proposed plant species (all alternatives),
-the no action alternative would not effect sensitive plant species and,
-action alternatives may affect individuals but are not likely to cause a trend toward federal listing or loss of viability to sensitive plant species.

I. INTRODUCTION

PURPOSE

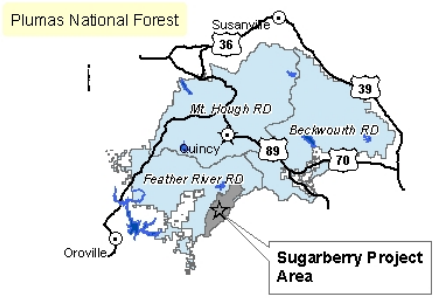
Forest Service Manual 2672.42 specifies that a biological evaluation (BE) be prepared to determine if a project may effect any Forest Service Sensitive species or U.S. Fish and Wildlife Service (USFWS) Threatened, Endangered, or Proposed species. The purpose of this BE is to describe the effects of the proposed project on all Threatened, Endangered and Sensitive (TES) plant species of record for the project area. The objectives of the BE are:

1. To ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant.
2. To ensure that Forest Service actions do not hasten the federal listing of any species.
3. To provide a process and standard through which TES species receive full consideration throughout the planning process, reducing negative impacts to species and enhancing opportunities for mitigation.

PROJECT NAME, TYPE AND LOCATION:

NAME: Sugarberry Project **TYPE**: DFPZ and Group selection

LOCATION



The Sugarberry Project area is located within the Feather River Ranger District of the Plumas National Forest in Yuba, Sierra, and Plumas Counties (see Figure 1-1, Sugarberry Project vicinity map). Encompassing approximately 48,000 acres, the project area is located south and east of Little Grass Valley Reservoir, from Gibsonville Ridge in the north to the North Yuba River in the south. Treatment units range in elevation from 2,400 to 6,500 feet above sea level.

Table 1 lists all Threatened, Endangered, Proposed or Sensitive (TEPS) plant species from the Plumas National Forest. No other (TEPS) plant species have known occurrences or potential habitat on the Plumas National Forest. Species which do not have potential habitat in the project area, based on the reasons given in Table 1, are not further analyzed in this document. Botanical surveys conducted for the proposed project area, focused on species with potential habitat. However, surveys were floristic in nature and an attempt was made to identify all plants encountered in the field. Many species have specific habitat preferences (such as serpentine outcrops or wetlands), and botanists searched for these habitats as well as their constituent species.

Table 1

SPECIES	Known occ.	potential habitat	No habitat	Habitat unsuitable based on the following:
Allium jepsonii			X	No serpentine outcrops in the project area.
Arabis constancei			X	No serpentine outcrops in the project area.
Astragalus lemmonii			X	Sierra Nevada Eastside
Astragalus lentiformis			X	Sierra Nevada Eastside
Astragalus pulsiferae var.*coronensis*			X	Sierra Nevada Eastside
Astragalus pulsiferae var. *pulsiferae*			X	Sierra Nevada Eastside
Astragalus pulsiferae var. *suksdorfii*			X	Sierra Nevada Eastside
Astragalus webberi			X	Sierra Nevada Eastside
Balsamorhiza macorlepis var. *macorlepis*			X	No serpentine soils or foothill woodlands habitat in project area.
Botrychium ascendens		X		
Botrychium crenulatum		X		
Botrychium lunaria		X		
Botrychium minganense		X		
Botrychium montanum	X			
Botrychium pinnatum		X		
Bruchia bolanderi		X		
Buxbaumia viridis	X			

SPECIES	Known occ.	potential habitat	No habitat	Habitat unsuitable based on the following:
Calystegia atriplicifolia ssp. *buttensis*			X	Proposed project is too high in elevation.
Calycadenia oppositifolia			X	Proposed project is too high in elevation.
Clarkia biloba ssp. *brandegeae*			X	Proposed project is too high in elevation.
Clarkia gracilis ssp. *albicaulis*			X	Proposed project is too high in elevation.
Clarkia mildrediae ssp. mildrediae			X	Proposed project is too high in elevation.
Clarkia mosquinii			X	Proposed project is too high in elevation.
Cypripedium fasciculatum	X			
Cypripedium montanum		X		
Dendrocollybia racemosa			X	No Potential habitat/ east side of Sierra Nevada.
Eleocharus torticulumis		X		
Eriogonum umbellatum var. ahartii			X	No serpentine outcrops in the project area.
Fissedens aphelotaxifolius		X		
Fissedens pauperculus		X		
Frittilaria eastwoodiae			X	Proposed project is too high in elevation.
Helodium blandowii			X	Rocky ridges on east side of Sierra Nevada
Hydrothyria venosa	X			
Ivesia aperta var. aperta			X	Sierra Nevada Eastside
Ivesia sericoleuca			X	Sierra Nevada Eastside
Ivesia webberi			X	Sierra Nevada Eastside
Lewisia cantelovii			X	Located in Feather River canyon
Lewisia kellogii ssp. hutchinsonii		X		
Lewisia kellogii ssp. kelloggii		X		
Lomatium roseanum		X	X	East side of forest, Modoc Plateau
Lupinus dalesiae	X			
Meesia longiseta		X		
Meesia triquetra		X		
Meesia uliginosa		X		
Mielichhoferia elongata		X		
Monardella follettii			X	No serpentine outcrops in the project area.
Monardella stebbinsii			X	No serpentine outcrops in the project area.
Oreostemma elatum		X		
Packer eurycephalus var. lewisrosei (Senecio eurycephalus var. lewisrosei)			X	No serpentine outcrops in the project area.
Packera layneae (Senecio layneae)			X	No serpentine in the project area. Project area is too high in elevation.
Penstemon personatus		X		
Penstemon sudans			X	Sierra Nevada Eastside
Phaeocollybia olivacea		X		
Pyrrocoma lucida			X	Sierra Nevada Eastside
Sedum albomarginatum			X	No serpentine outcrops in the project area.

FIELD RECONNAISSANCE

The project area was surveyed for TEPS and noxious weeds in 2004-2006 by USFS botanists. Non-vascular surveys were performed by Colin Dillingham, VMS, Forest Service Enterprise Team, and David Toren, USFS Botanist 2005.

There have been numerous botanical surveys within the Sugarberry Project area, these are listed in table 2. Botanical surveys were conducted in conjunction with these prior projects.

Field surveys identified the presence of the following Region 5 sensitive species:

1. *Botrychium montanum* (western goblin)
2. *Buxbaumia viridis* (bug on a stick)
3. *Cypripedium fasciculatum* (clustered lady's-slipper)
4. *Hydrothyria venosa* (Veiny aquatic lichen)
5. *Lupinus dalesiae* (Quincy lupine)

A potential habitat model (VMS 2006) identified 760 acres of potential habitat for *P. olivaceae* within the project area.

Project Name	Year
AMERICAN T.S.	1985
BUNKER HILL T.S.	1989
HARRISON BUYOUT SBA	1990
MOUNTAIN BOY	1990
PORTWINE	1990
STOWMAN	1990
LEXINGTON	1991
SCALES TIMBER SALE	1991
GIBSONVILLE	1992
PETERSON T.S.	1994
PC SNOW DAMAGE SSTS	1997
LOWER SLATE	2004
UPPER SLATE	2005
AMERICAN HOUSE SSTS	2007
LA PORTE PINES	2007

Table 2

The Botany Report for analysis of special interest plant species and other species of concern, and other botanical resources is attached as Appendix A. The Botany Protection Plan, describing how each occurrence of sensitive and special interest plant species and other botanical resources will be protected, is attached as Appendix B. The Noxious Weed Risk Assessment is attached as Appendix C. The Management Indicator Species Report is attached as Appendix D.

II. CONSULTATION TO DATE

The latest USFWS species list for the Plumas National Forest was accessed from the USFWS website on 1/16/2007. This list fulfills the requirements to provide a current species list pursuant to Section 7(c) of the Endangered Species Act, as amended.

The USFWS list of Threatened and Endangered species potentially occurring in the Plumas National Forest included one species, *Orcuttia tenuis*, (slender Orcutt grass). *Orcuttia tenuis* is limited to relatively deep vernal pools or vernal pool type habitat with clay soil. No suitable habitat for this species occurs in the project area. *Pachera* (*Senecio*) *layneae* (Layne's ragwort), is found on dry pine and oak woodland on serpentine soils (Jepson 1993). Habitat does not exist because serpentine/ ultramafic soils are not present in the project area. Consequently, threatened and endangered species will not be discussed in the effects section of this biological evaluation.

Ivesia webberi, Webber's Ivesia, is listed as a candidate species. *Ivesia webberi* is found in open areas in eastside pine and sagebrush communities. No suitable habitat for this species occurs in the project area, and therefore no candidate species are considered likely to occur in the project area. Consequently, candidate species will not be discussed in the effects section of this biological evaluation.

No formal or informal consultation with the USFWS has been conducted since there are no Threatened, Endangered, Candidate, or Proposed species in this area. The current USFWS list is on file and has been reviewed.

III. CURRENT MANAGEMENT DIRECTION

The Plumas National Forest Land and Resource Management Plan (LRMP, 1988) states as a forest-wide general direction to "maintain viable populations of sensitive plant species." The Plumas National Forest LRMP forest-wide standards and guidelines state to "Protect sensitive and special interest plant species as needed to maintain viability. Inventory and monitor sensitive plant populations on a project-by-project basis. Develop species management guides to identify population goals and compatible management activities and/or prescriptions that will maintain viability."

Noxious Weed Management (see also Appendix C, the Noxious Weed Risk Assessment):
The ROD's for the HFQLG FEIS and the SNFPA amend the management direction in the LRMP for the Plumas NF to address management of noxious weed and invasive exotic weeds (page 2-9 of the HFQLGFEIS and pages 30-31 of Appendix A of the ROD for SNFPA). The noxious weed management standards and guidelines in Appendix A state that a noxious weed risk assessment needs to be conducted to determine the risks for weed spread associated with different types of proposed management activities. A risk assessment was conducted for the HFQLGFEIS and resulted in the following amended direction. Table 2.4 of the HFQLG FEIS states:

Manage National Forest system lands so that management activities do not introduce or spread noxious or invasive exotic weeds using the following guidelines during site-specific planning and implementation:

Inventory: As part of site-specific planning, inventory project areas and adjacent areas (particularly access roads) for noxious and invasive exotic weeds.

Control: If noxious weeds are found in or adjacent to a site-specific project area, evaluate treatment options relative to the risk of weed spread without treatment. Evaluate control methods at the site-specific planning level.

Prevention/Cleaning: Require off-road equipment and vehicles (both Forest Service owned and contracted) used for project implementation to be weed-free. Clean equipment and vehicles of all attached mud, dirt and plant parts. Use standard timber sale contract clause C6.343-Cleaning of Equipment in timber sale contracts.

Prevention/Road Construction: Require all earth-moving equipment, gravel, fill or other materials to be weed-free. Use onsite sand, gravel, rock or organic matter, where possible. Evaluate road locations for weed risk factors.

Prevention/Revegetation: Use weed-free equipment, mulches, and seed sources. Avoid seeding in areas where revegetation will occur naturally, unless noxious weeds are a concern. Save topsoil from disturbance and put it back to use in onsite revegetation, unless contaminated with noxious weeds.

Prevention/Staging Areas: Do not stage equipment, materials, or crews in noxious weed infested areas where there is risk of spread to areas of low infestation. (See Appendix C, Noxious Weed Risk Assessment):

IV. DESCRIPTION OF PROJECT:

See Chapter 2 of Sugarberry FEIS

V. EXISTING ENVIRONMENT

The project area is generally situated east and south east of Little Grass Valley Reservoir and encompasses many of the surrounding historic gold mining communities. These include Gibsonville in the north east corner on the project, St. Louis, La Porte, American House, Poverty Hill, and Union Hill in the southern end of the project area. Many of the historic disturbances are still evident. The project area is bisected by Slate Creek, bounded on the south and east

by Canyon Creek, and to the north by Valley Creek. There are numerous tributaries that feed into these larger streams. Elevations in the project area range from a low of 2300 feet at the southern end near Wambo Bar to a high of 6200 feet near Sawmill Ridge at the north end of the project. Terrain varies from nearly level areas on ridges and alluvial terraces to relatively steep sites located below ridgelines and on slopes along drainages. Geologic parent materials include: volcanic andesite, granodiorite, greenstone, peridotite, shists, and shale. The dominant upland plant communities include: sierran mixed conifer associations, ponderosa pine associations, white fire associations, red fir associations, black and canyon live oak associations. Cis-montane and montane chaparral communities are dominated by *Ceanothus* and *Arctostaphylos* species.

Floristic botanical surveys were conducted in the analysis area in 2004, 2005, and 2006 for rare plants, management indicator species, unique habitats and noxious weeds by USDA Forest Service Botanists and TEAMS Enterprise Team (Teams UI6382 2005). All plant surveys were floristic, as such an attempt was made to identify all species encountered. Non-vascular plant surveys were conducted by Colin Dillingham, VMS, Forest Service Enterprise Team, and David Toren, USFS Botanist 2005.

What USFS sensitive vascular plants are located within the project area?

There are approximately 73 acres of R5 sensitive plant species within the project area. Of these, approximately 47 acres of sensitive plants are located within treatment units. Table two lists all sensitive species found within the project area.

Species	Acres (ac) in project area	ac in Group selection	ac in ITS*/ Group selection	% area protected	Protected through
Botrychium montanum	1.9	1.2	0.6	100%	CA**
Buxbaumia viridis	NA	0	0	100%	RHCA
Cypripedium fasciculatum	29.1	9.9	0.5	100%	CA**
Hydrothyria venosa	40.8	39.5	0.0	100%	RHCA
Lupinus dalesiae	0.7	0.2	0.0	0%	No protection

Table 4

CA**- Controlled Area ITS*- Individual Tree Selection

Project effects to *Phaeocollybia olivacea*, an R5 sensitive fungal species with potential habitat in the project area was assessed using a potential habitat model. This model was developed by Vegetation Management Solutions (O'Hanlin VMS 2006), to aid in the identification of potential habitat for selected R5 sensitive fungi. The model is based on the professional experience of Dr. Dennis E. Desjardin (Professor of Mycology San Francisco State University) and his understanding of fungal biology. The two main variables that were shown to correspond with know population locations are tree canopy cover and tree species. The model delineates habitat quality into low, medium, medium-high, and high quality habitat.

Surveys were not conducted for *P. olivacea*, because this is a fall fruiting species and access to these mountainous areas after rain and snow present safety concerns. Consequently, areas of potential habitat that rank as medium to medium-high are assumed to be occupied for the purposes of this analysis. Therefore, for the purposes of this discussion low quality habitat will not be addressed in the analysis.

There is no high quality habitat present in the project area for *Phaeocollybia olivacea* in the project area. However there are approximately 670 acres of medium to medium-high quality habitat. For the purposes of the discussion the two habitat rankings will be lumped together. There are total of 48.3 acres of potential habitat within the project area (See table 5).

Phaecollybia olivacea potential habitat within the project area.

Total acres (ac) of potential habitat	Total ac. potential habitat in treatment units	Acres in Groups	Acres in Hand Cut and Tractor Pile	Acres in ITS, groups	Acres in Mastication	Acres in Mastication, UB, groups	Acres in Oak enhancement
670.0	48.3	11	1.0	7.6	2.3	16.7	9.7

Table 5

VI. EFFECTS OF THE PROPOSED PROJECT

An effects analysis is a part of the biological assessment and evaluation process, and is required in cases where rare plants have been found within or near proposed project areas or where potential habitat exists. Elements of the effects analysis are presented below. The direct, indirect, and cumulative effects of all alternatives are disclosed.

A "NO EFFECT" determination has been made for: *Botrychium ascendens, Botrychium crenulatum, Botrychium lunaria, Botrychium minganense, Botrychium pinnatum, Bruchia bolanderi, Eleocharus torticulumis, Fissedens aphelotaxifolius, Fissedens pauperculus, Lewisia cantelovii, Meesia longiseta, Meesia triquetra, Meesia uliginosa, Mielichhoferia elongate,* and *Oreostemma elatum.*
These species have potential habitat but no known occurrences. These species were not analyzed due to their specialized habitat and the extensive botanical surveys done in the project area. These specialized habitats include: wet meadows, seeps, and springs.
These special habitats will be protected either as special botanical habitats or under existing riparian standards and guidelines. For these reasons, no direct or indirect impacts are expected under the range of the alternatives. If any of these species are found during project implementation they will be protected by applying the standard management requirements such as flagging and avoidance or a limited operating period (LOP). They will not be further analyzed in this document.

A "MAY IMACT INDIVIDUALS BUT NOT LIKELY TO CAUSE A TREND TOWARD FEDERAL LISTING OR A LOSS OF VIABILITY" has been made for the following species: *Bruchia bolanderi, Cypripedium montanum, Lewisia cantelovii, Lewisia kellogii ssp. hutchinsonii, Lewisia kellogii ssp. kelloggii,* and *Penstemon personatus.* No know occurrences exist in the project area, however it is possible that isolated undiscovered populations may be impacted. If any of these species are found during project implementation they will be protected by applying the standard management requirements, such as flagging and avoidance or a limited operating period (LOP). They will not be further analyzed in this document.

General Description of Direct/ Indirect Effects

Direct Effects: Direct impacts can physically break, crush or uproot rare plants by driving over them, covering them, by falling trees on them, or by burning them. When too much of an individual plant is damaged, that plant may experience altered growth and development, and reduced or eliminated seed-set and reproduction. If the disturbance is severe, it can kill rare plants. These impacts to individual plants can reduce the growth and development, population size, and potentially the viability of the species across the landscape. For annual plant species, the timing of impacts is critical. Management actions which take place after annuals have set seed have much less impact than management actions performed prior to seed-set. Conversely, some rare early seral species respond favorably to such actions. Consequently, a negative impact to one species and be beneficial to another.

Indirect Effects: Indirect effects to rare plants may be caused by changes in: vegetation composition, solar exposure, hydrologic patterns, fire regime, or soil characteristics of the habitat. These changes can have positive or negative effects. Indirect effects can also occur from noxious weed invasion (See Appendix C Noxious Weed Risk Assessment) or from impacts to pollinators or mycorrhizae associated the various species.

Cumulative Effects: **<u>Definition:</u>** (reference 40 CFR 1508.7 and 1508.8, and FSH 1909.15 Section 15.1)
A cumulative effect is the effect on the environment that results from the incremental effect of the action when added to the effects of other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the other actions and regardless of land ownership on which the other actions occur. An individual action when considered alone may not have a significant effect, but when its effects are considered in sum with the effects of other past, present, and reasonably foreseeable future actions, the effects may be significant.

MacDonald reports that a critical step in cumulative effects analysis is to compare the current condition of the resource (in this case sensitive plants) and the projected changes due to management activities (in this case fuels management, mechanical or hand treatment and group selection) with the natural variability in the resources and processes of concern. This is difficult for sensitive plants since long-term data are often lacking, and many sensitive plant habitats have a long history of disturbance, i.e. an undisturbed reference is often lacking. For some species, particularly those which do not tolerate disturbance or are found under dense canopy conditions, minimizing on-site changes to sensitive plants is an effective way of reducing cumulative impacts. "If the largest effect of a given action is local and immediate, then these are the spatial and temporal scales at which the effect would be easiest to detect. If one can minimize the adverse effects at this local scale, it follows that there would be a greatly reduced potential for larger-scale effects" (MacDonald, 2000). For other species, particularly those which are disturbance tolerators or fire-followers, minimizing on-site changes could be detrimental. These species tolerate or benefit from on-site changes which result in opening the stand, reducing the potential for catastrophic fire, and increasing light reception in the understory. Thus, the response of sensitive plant species to the management activities is species-dependent.

Cumulative, direct/ indirect effects can be minimized by following Forest Service standards and guidelines and by implementing mitigation measures to monitor or offset impacts to rare plants species. With these protective measures in place, cumulative effects are less likely to be adverse. Current management direction is designed to eliminate or reduce possible negative cumulative impacts by protecting rare plant species from direct and indirect impacts. The following discussion provides an explanation of why this type of management is effective in reducing cumulative impacts.

ANALYSIS OF EFFECTS FOR VASCULAR PLANTS AND BRYOPHYTES

1. Western Goblin (*Botrychium montanum*),
2. Bug on a Stick Moss (*Buxbaumia viridis*)
3. Clustered Lady's Slipper (*Cypripedium fasciculatum*),
4. Veiny Aquatic Lichen (*Hydrothyria venosa*),
5. Quincy Lupine (*Lupinus dalesiae*),

Table 4 and 5 list the total acres sensitive species found within the project area. The total numbers of acres that are located within treatment units are also listed. Direct/ indirect effects are discussed below. Also, the cumulative effects are summarized for each species, a discussion of analysis parameters follows.

Existing Conditions and Analysis of Effects for Western Goblin (*Botrychium montanum*)
Abundance: Western goblin is a member of the adder's-tongue family. It is a primitive fern that is found in open marshes and wet meadows. It is widely distributed globally but uncommon in California. *Botrychium montanum* is one of the rarest of the Botrychium species within California. At this time, there are only nine confirmed occurrences of *Botrychium montanum* in California. The Lassen National Forest has 11 occurrences but only seven of these have been located since 1985, and the Modoc and Tahoe National Forests each a have only one known occurrence. In addition, there are a few historic occurrences, which have not been confirmed in recent years within Butte County. Known occurrences often consist of only a few plants, so overall plant numbers in California are low. There are three occurrences on the Plumas NF.
Range/Distribution: *B. montanum* is limited to scattered locations from British Columbia, to California, Montana, Oregon, and Washington. In California, this species has been found in only Butte, Modoc, Nevada, Plumas, Shasta and Tehama Counties.
Within Project Area: 1.9 acres
Trend: Actual trends in the populations are unknown, since plants do not appear above ground every year, and all known occurrences have very few individuals recorded.
Fragility/habitat specificity: *Botrychium montanum* grows in varied wet habitats from marshes/meadows to coniferous forest/montane streamside areas. In California, it has primarily been found along shady streams in mixed coniferous forests. These habitats are not highly unusual, so what specific factors limit the plants' abundance and distribution are not known. All *Botrychium spp*. have strong mycorrhizal requirements, though, which may be a

factor. Riparian habitats are subject to grazing and hydrologic alterations, and conifer stands are subject to timber harvesting.

Effects of Alternative A on Western Goblin

Direct Effects- No direct effects.

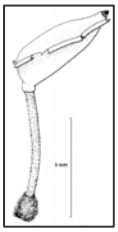
Indirect Effects- Habitat will become more susceptible to high intensity wildfire.

Cumulative Effects- Habitat may be prone to noxious weed invasion as a result of high intensity wildfire.

Effects of Alternatives B, C, and G on Western Goblin

Direct/ Indirect Effects- No direct/ indirect effects because all of the 1.9 acres will be protected through Controlled Areas (See table 4).

Cumulative Effects Analysis Summary- There are no cumulative effects to western goblin because there are no direct/ indirect effects as a result of the project and there are no past projects that overlap western goblin populations. Consequently, there are no known lingering negative effects of past projects. Also, there are no future projects planned for areas with Western Goblin.



Existing Conditions and Analysis of Effects for Bug on a Stick Moss (*Buxbaumia viridis*)

Abundance: Prior to the identification of this occurrence in the Strawberry Project area, the Sierra Nevada Mountains were considered too dry for this species. This is the first recorded occurrence in the Sierra Nevada!

Range/ Distribution: It grows as scattered individuals and occurs sparsely throughout most of Europe. It also occurs in south-west Asia, China and North America. In the UK, since 1950 it has been recorded from two sites in Scotland, but has only been recorded in one site recently.

Within Project Area: Located on one log, 13 sporophytes.

Fragility/habitat specificity: This species occurs as a single sporophyte or in small patches, consequently, it is extremely sensitive to changes in the environment. *B. viridis* needs the presence of well-rotted logs in perineal moist areas; the loss of this substratum through disturbance (i.e., fire, desiccation of the log etc.) would limit the distribution of the species within the region.

Effects of Alternative A on Bug on a Stick Moss

Direct Effects- No direct effects.

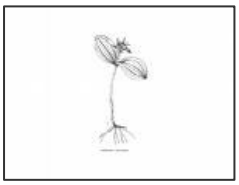
Indirect Effects- Habitat will become more susceptible to high intensity wild fire.

Cumulative Effect- No cumulative effects.

Effects of Alternatives B, C, and G on Bug on a Stick Moss

Direct/ Indirect Effects- No direct effects because the occurrence is not located within a treatment unit.

Cumulative Effect- No cumulative effects because there will be no direct/ indirect effects. Also, there are no known lingering negative effects of past projects. The site were the bug on a stick moss was found is in an old growth conifer stand adjacent to a perineal stream on 90-100% slope.



Existing Conditions and Analysis of Effects for Clusterd Lady's Slipper Orchid (*Cypripedium fasciculatum*)

Abundance: Clusterd Lady's Slipper is in the orchid family. This orchid is found from British Columbia south to California. However wide ranging, population numbers are typically small. The 2005 Conservation Assessment for *C. fasciculatum* and *C. montanum* (Kaye 2004). Six Rivers NF-16 documented occurrences, population size ranges from 2 to 60 plants, only three of the occurrences have been verified, the rest are historic or have not been relocated. Shasta-Trinity NF-29 occurrences, population size ranges from 1 to 50 (average 10 plants), only half of the occurrences have been verified. Klamath NF- 97 occurrences, population size ranges from 1 to 141 plants (from KNF population records). Mendocino NF - 50 occurrences totaling <1400 stems. Lassen NF-1 occurrence, population size is about 50 plants. Plumas NF-101 occurrences, population size ranges from 2 plants to over 3,000. Tahoe NF-8 occurrences, population sizes 1, 13, and <200. Range/Distribution: Known from 8 states; in California from Del Norte County to Sierra County. Also Colorado, Idaho, Montana, Utah, Oregon, Washington, and Wyoming. The Tahoe NF supports the southern-most occurrences.

Range/Distribution: Known from 8 states; in California from Del Norte County to Sierra County. Also Colorado, Idaho, Montana, Utah, Oregon, Washington, and Wyoming. The Tahoe NF supports the southern-most occurrences of CYFA's range.
Within Project Area: 29.1 acres
Trend: Declining. Federal Register (9/30/93) lists that the habitat for this plant as declining. Details of population trends across its range are unknown. It can be assumed that given the complicated life history of this species including the establishment of mycorrhizal relationships, limited establishment factors, apparent intolerance to intense disturbance and occurrence of this species on lands available for timber harvest that the trend is downward. Under the President's Northwest Forest Plan (1993), 55% of CYFA's habitat could be extirpated by implementing Option 9 of the President's Plan. In Barker's Management Recommendations for Cypripedium species (1983) concern for the viability of the species was also identified due to many of the reasons mentioned above. The document states "an overwhelming majority of the populations have been located on commercial ground where timber harvest units or roads are being planned in the immediate vicinity" (Barker 1983). The population on the Tahoe NF is declining due to habitat disturbance. The Lassen population was 60 plants in 1998, 50 plants in 2001. On the Plumas NF many of the occurrences have been revisited and most relocated year after year. Two occurrences on the Plumas are large, having more than 2,000 stems and the other over 3,000 stems. Small population sizes with risk of local extirpation coupled with monitoring inconsistency and the fact that some of the populations have not been visited in over a decade, contributes to concerns for this species.
Fragility/habitat specificity: *C. fasciculatum* habitat is very broad, occurring on various parent materials from ultramafic, schist, and limestone derived soils. In Oregon and California, CYFA is associated with Douglas-fir-dominated and mixed conifer forests in the mid-late seral stands whose structure allows some light to reach the forest floor. Occurrences have also been documented in riparian areas. Exceptions to this general habitat description do exist, which demonstrates the difficulty in identifying leading habitat characteristics. Mycorrhizal fungi play a pivotal role in the biology of orchids. Several stages in the orchid's life-cycle, especially early stages of seedling development, depend on associations with fungi. Given this essential dependence, the habitat needs of the fungi must also be met.

Effects of Alternative A on Clustered Lady's Slipper Orchid

Direct Effects- No direct effects.

Indirect Effects- Habitat will become more susceptible to high intensity wild fire.

Cumulative Effects- Habitat may be prone to noxious weed invasion as a result of high intensity wildfire and occurrences may be lost when overstory canopy is removed and areas burned it high intensity.

Effects of Alternatives B, C, and G on Clustered Lady's Slipper Orchid

Direct/ Indirect Effects- No direct effects as a result of this project because all known occurrences will be protected (see table 3).

Cumulative Effects- There are no negative cumulative effects as a result of this project because there will be no negative direct/ indirect effects, all occurrences will be protected from project activities with a 150 foot buffer. Also, there are no known past lingering past effects from projects. There was one known project adjacent to two large orchid occurrences (CYFA 81&101). The project was the 1990 Mountain Boy Timber Sale. No other past projects within the analysis area are known from areas with clustered lad's slipper.

There is one known future project that may impact the orchid. The Port Wine Clustered Lady's Slipper Prescribed Fire Study will apply a fall prescribed fire to approximately 6 acres containing clustered lady's slipper. This project will help determine the effects (positive or negative) of prescribed fire to the orchid. This action may contribute to the loss of some orchids within the study area. However, it is unlikely that a loss of these six acres would have any measurable effect to the overall fitness of the orchid populations in this area for the following reasons.

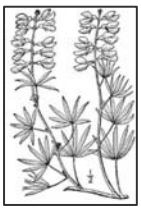
1. There are numerous occurrences both large and small in the general vicinity these include CYFA_21,65,66,81,82,85,86,101,102,103,124,125,129,&130. These occurrences total approximately 29 acres. Consequently, the spatial distribution will be maintained and this will allow for recolonization of the study area.
2. The study will not destroy the major structural habitat components including, tree canopy, under-story vegetation composition, and hydrology will be preserved, allowing for recolonization and use.

Existing Conditions and Analysis of Effects for the Veiny Aquatic Lichen (*Hydrothyria venosa*)

Abundance: This aquatic lichen is infrequently reported. Where populations occur, numbers of individuals are generally few in number. No other similar appearing species is totally aquatic. Since being added to the R5 Sensitive list in 1998, surveys supporting projects have been conducted for this species. Twenty-one occurrences are known on the Plumas NF, two on the Sequoia, one on the Shasta-Trinity, eleven on the Sierra, and eight on the Stanislaus. There are also two occurrences known from Calaveras Big Trees State Park which is encircled by the Stanislaus NF and one occurrence on private land within the Mendocino NF.
Range/Distribution: This species is found in cold unpolluted streams in mixed conifer forests along the western slope of the Sierra Nevada on the Plumas, Sequoia, Sierra, and Stanislaus NFs. It is also found in the northern coast range in the Mendocino NF, and northwestern California in the Shasta-Trinity NF. Based on its currently known distribution, its range in California also includes the Eldorado, Tahoe, LTBMU, Lassen, Klamath, Six Rivers, and possibly Inyo National Forests. Occurrences have not yet been found in these Forests. While the Modoc NF seems to be within the range of *Hydrothyria venosa*, it is believed that there is no suitable habitat there. The CA occurrences are disjunct from other U.S. populations which occur in the eastern states of Massachusetts, New Hampshire, Vermont, Tennessee and Georgia. *Hydrothyria venosa* also occurs in Oregon, Washington and British Columbia. Many of the eastern occurrences are historic sightings and some have apparently become extirpated (J. Shevock, e-mail, 10/14/99).
Within Project Area: 40.8 acres
Trend: This distinctive species has been in decline throughout its historic range. Currently known Sierran populations appear to be stable at this time, but actual extent of local extirpations in CA are not possible to determine.
Fragility/habitat specificity: From the occurrences in California documented to date, this species occurs in streams that are fed by cold water springs. The water is very clear, and peak flows are not of the intensity that would lead to scouring. The streamlets have a rich aquatic bryophyte flora. The streams rarely are more than 8 inches in depth. Increased sedimentation would significantly impact occurrences. This lichen is a foliose species with a rather delicate thallus. Reproductive structures have been observed, but how the lichen actually colonizes new habitats is unknown.

Effects of Alternative A on the Veiny Aquatic Lichen
Direct Effects- No direct effects.
Indirect Effects- Habitat will become more susceptible to high intensity wild fire.
Cumulative Effects- Habitat may be prone to sediment deposition and increased scouring following high intensity wildfires.

Effects of Alternatives B, C, and G on the Veiny Aquatic Lichen
Direct/ Indirect Effects- No direct effects as a result of this project because all of the known occurrences will be protected (See table 4).
Cumulative Effects- There will be no known negative cumulative effects as a result of project implementation because there will be no negative direct/ indirect effects because the streams will be protected with no treatment buffers. Also, there are no known lingering negative effects of past projects within the analysis area. Surveys have been conducted for this species since 1998. Stream Side Management Zones have been in place on the Plumas National Forest since the 1988 LRMP. As a result habitat for this species has been protected since 1988.



Existing Conditions and Analysis of Effects for the Quincy Lupine (*Lupinus dalesiae*)
Abundance: Quincy lupine is a member of the pea family. It has a limited range but is abundant within its specific habitat. Quincy Lupine occurs in Chaparral, cismontane woodland, lower montane coniferous forest, and upper montane coniferous forest.
Range/Distribution: It is known from the Plumas and Lassen National Forests with 130 and 19 occurrences, respectively; as well as scattered occurrences on adjacent private lands. There are 2 occurrences on the Tahoe National Forest with approximately 200 and 300 individual plants at each. The range is limited to Plumas, Sierra, and Yuba Counties with nearly all occurrences in Plumas.
Within Project Area: There are approximately 0.7 acres within the project area.
Trend: The California Native Plant Society recently changed the status of the Quincy Lupine from List 1B to List 4 based on the number of mapped occurrences in the California Fish and Game's California Native Diversity Data Base (CNDDB). Also this list change is based on the large number of occurrences considered "good" to "excellent"
Fragility/habitat specificity: It occupies sites of open canopy in mixed conifer forests on metasedimentary or metavolcanic soils mainly in the Highway 70/89 corridor in Plumas County. It is tolerant of moderate to high

disturbance.

Effects of Alternative A on the Quincy Lupine
Direct Effects- No direct effects.

Indirect Effects- Habitat will become more susceptible to high intensity wild fire however this would likely benefit Quincy lupine. This plant is known to be tolerant of moderate to high disturbance and likely needs clearings in the forest to successfully reproduce. This is based on where the Quincy lupine occurs across the landscape.

Cumulative Effects- Habitat will likely decline as the forest becomes denser. Overstory trees and shrubs will out-compete the Quincy Lupine for sunlight and water.

Effects of Alternatives B, C, and G on the Quincy lupine

Direct/ Indirect Effects- Mature plants may be uprooted, buried, or physically damaged in other ways by harvest activities.

Cumulative effects- This project in unlikely to have any negative effects to the Quincy lupine because it is tolerant of moderate to high disturbance and requires openings in the forest canopy. Approximately 30% of the plants in the analysis area are located in a group selection unit and they will likely benefit from alternatives B, C, and D. Also, there are four occurrence outside of treatment units, within one mile of Quincy lupine that will be treated. In the unlikely event that plants within the treatment unit are killed, the geographic distribution of plants will be maintained.

DESCRIPTION OF CUMULATIVE EFFECTS ANALYSIS PARAMETERS FOR VASCULAR PLANTS

A description a cumulative effects analysis parameters and the logic behind the analysis is described below.

What is the analysis area?
The cumulative effects analysis area for *B. montanum, B. viridis, C. fasciculatum, H. venosa*, and *L. dalesiae*, is the Sugarberry project area. The area of cumulative effects analysis was bounded in this manner because direct/ indirect effects from proposed project activities will be limited in geographic scope to the project area and none of these taxa are exceedingly rare.

How many acres of habitat are present in the area?
There are 73 acres of habitat for these four plant species within the area of cumulative effects analysis. Only areas occupied with the species are considered habitat.

How many acres will be treated with this project?
The project will only affect 0.2 acres *L. dalesiae* habitat. All other areas of habitat will be excluded from project activities. Past, present and reasonably foreseeable future actions will impact an additional six acres of *C. fasciculatum* habitat. This will bring the total cumulative impacts to habitat for these species to 6.2 acres; approximately 0.1 percent of habitat will be treated.

What is the timeframe for the analysis?
In assessing cumulative effects for these species, impacts of past actions were included for actions implemented since 1984. The date for past actions is based on the Cumulative Watershed Effects Analysis date for full vegetative recovery from past activities (See hydrology report chapter 3). Also, actions preceding that date were not included because spatial data for past projects does not exist. A GIS was created of all past, present, and future foreseeable actions. Spatial distribution of these past and future projects was then compared to known plant locations. There are no known past projects that overlap known occurrences of the four taxa in table 4.

What are the baselines for these species?
The baseline level of habitat is the estimated amount of habitat that the area would be capable of providing under optimum conditions. The baseline associated with this cumulative effects analysis area is the current occupied habitat for these species. This can be seen in table 4, acres of species in the project area. These baselines are comprised of the best known population data for the project area and have been compiled from botanical surveys spanning 21 years (See table 2). It is likely that historic disturbances such as mining and timber removal negatively impacted *B. montanum, C. fasciculatum,* and *H. venosa* because these taxa are not known from habitats with recent ground disturbance. Specifically, it has been observed on the Plumas National Forest that *C. fasciculatum* has been extirpated following clear cutting (personal communication Linnea Hanson FRRD District Botanist 2007, Jim

Belsher-Howe, MHRD Botanist, 2007). *H. venosa* is found in clear, perineal streams, historic mining activities may have impacted habitat, through increased seasonal discharge and siltation, however these are assumptions and not based on scientific data.

What are the threshold levels for these species?
We attempt to preserve the genetic diversity present within the species. To accomplish this two main criteria are examined:

1. The geographic distribution of the species. Populations at the extreme edges of the range are considered very import as they may contain unique genes.
2. Populations present in unique, plant community associations and soils.

ANALYSIS OF EFFECTS FOR FUNGI

Phaecollybia olivacea

How many acres of habitat are present in the area?
Based on the 2006 Vegetation Management Solutions habitat model, there are approximately 670 acres of potential habitat in the project area (See table 5).

What are the potential direct/ indirect effects?
It is known that some silviculture practices can be detrimental to some fungal species while beneficial to others. It is believed that *P. olivacea* is associated with older mature stands with a hard wood tree component. It is also known that large clear cuts that are more detrimental than small openings and equipment that breaks up the underground network of mycelia and compacts soil are also detrimental to fungi.

What is the analysis area?
The cumulative effects analysis area for *P. olivacea* is the Sugarberry project area. The area of cumulative effects analysis was bounded in this manner because direct/ indirect effects from proposed project activities will be limited in geographic scope to the project area. Also, lingering negative effects of past projects will also be contained to the project area.

What is the timeframe for the analysis?
The timeframe for the analysis is 2006-2008. Actions prior to 2006 have not been addressed because the habitat model is based on current landscape vegetation information. Without demographic data and detailed historic vegetation maps it is difficult to determine the number of acres of potential habitat that used to exist.

How many acres will be treated with this project?
The project will treat approximately 48 acres of potential habitat.

Are past projects contributing negative lingering effects to P. olivaceae?
It is difficult to determine what the effects of past projects are to this species. Areas that have been managed for conifer production do not contain habitat for this species because it is associated with hardwoods. There is no overlap between past projects and current potential habitat. Also, there is no overlap of high to medium-high potential habitat for projects between 2006-2008.

What is the baseline for this species?
The baseline level of habitat is the estimated amount of habitat that the area would be capable of providing under optimum conditions. It is assumed that all areas of medium to medium-high potential habitat are occupied. Therefore the baseline for *P. olivaceae* is 670 acres for this analysis area.

What is the bottom line for P. olivaceae?
Based on the cumulative effects analysis, there will be a minor reduction in habitat. There will be project related activities on approximately 48 acres of potential habitat however not all of these actions will be detrimental because overstory shade will be maintained, host trees will be preserved, and soil disturbance will be avoided. The activities that are likely to have the greatest negative impact are group selection, and tractor piles because overstory canopy

and host species will be removed. There may also be soil compaction associated with these actions. There are a total of 36 acres of group selection treatment located within *P. olivaceae*. When compared to the total amount of habitat in the area, this project is only affecting 5% of the total habitat in the analysis area.

CUMULATIVE EFFECTS SUMMARY FOR ALTERNATIVES B, C, AND G FOR ALL TAXA

The extent of cumulative effects depends on the management of potential direct and indirect effects, as well as the attributes of the sensitive plant species located within the analysis area, their distribution within the analysis area, and the ability to design future project with sensitive plant attributes in mind. Overall, management of the direct and indirect effects through project design and mitigation measures is assured to minimize the potential for cumulative effects. Adverse cumulative effects are not expected as a result of implementation of the Sugarberry project for the following reasons:

- The project area has been adequately surveyed for Threatened, Endangered, Proposed, Sensitive species and noxious weeds.
- Noxious weed mitigation measures shall be applied to the project.
- Known occurrences of sensitive species will be protected through a variety of methods, including changes in management prescriptions, limited operating periods, and avoidance (See table 4).
- Road layout has been designed to avoid rare plant occurrences.
- Sporax will have no detrimental effect to rare species, because there will be no applications will be made adjacent to sensitive plants. Also, the closest application is approximately 0.4 miles from the closest sensitive plant occurrence. Furthermore, the primary break-down component is boron, an essential element that plants need.
- Harvest units have been dropped and modified to protect *C. fasciculatum.*
- The modification to *P. olivaceae* habitat is minor.

VII. DETERMINATION:

The Effects Determination discussed here is based on professional experience and judgment, existing information, including existing condition of the analysis area, and the potential impacts of the alternatives. An effects determination is also the culmination of potential direct, indirect, and cumulative effects.

It is my determination that the Sugarberry Project:

Alternative A-No action:

__X__ Will not affect: Threatened, Endangered, Proposed, or Sensitive species in the Sugarberry Project area.

Alternatives B, C, and G

__X__ Will not affect: *Botrychium ascendens, Botrychium crenulatum, Botrychium lunaria, Botrychium minganense, Botrychium pinnatum, Bruchia bolanderi, Eleocharus torticulumis, Fissedens aphelotaxifolius, Fissedens pauperculus, Lewisia cantelovii, Meesia longiseta, Meesia triquetra, Meesia uliginosa, Mielichhoferia elongate,* and *Oreostemma elatum.*

Reasons:

1. Adequate surveys have been performed in the Sugarberry project area.
2. No known occurrences exist within the project area.
3. Potential habitat will not be negatively impacted as a result of project implementation.

__X__ May impact individuals but not likely to cause a trend toward federal listing or loss of viability to: *Buxbaumia viridis, Bruchia bolanderi, Cypripedium montanum, Lewisia cantelovii, Lewisia kellogii ssp. hutchinsonii, Lewisia kellogii ssp. kelloggii,* and *Penstemon personatus.*

Reasons:

1. Adequate surveys have been performed in the Sugarberry project area.
2. No known occurrences exist within the project area.

__X__ May impact individuals but not likely to cause a trend toward federal listing or loss of viability to:

Botrychium montanum, Buxbaumia viridis, Cypripedium fasciculatum, Hydrotheria venosa, and *Lupinus dalesiae*
Reasons:

1. Adequate surveys have been performed in the Sugarberry project area.
2. *Lupinus dalesiae* will likely respond positively to ground disturbing activities.
3. The project has been designed to exclude all know sensitive plant occurrences from Group selection / Harvest units.
4. *Botrychium montanum, Buxbaumia viridis, Cypripedium fasciculatum, Hydrotheria venosa,* will be protected from project activities through the use of exclusions/ controlled areas.

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X. CONTRIBUTIORS:

Hanson, LC. 2007 Personal communication.

XI. APPENDICES:

Appendix A: Botany Report
Appendix B: Botany Protection Plan
Appendix C: Noxious Weed Risk Assessment
Appendix D: Management Indicator Species