

Botany: Rare plants and Noxious Weeds _____

Affected Environment

Rare Plants

Three species of Forest Service sensitive plants occur in the Sugar Pine project area. Generally speaking, the project area is relatively homogeneous from the standpoint of rare plant habitat, being dominated by various phases of the mixed conifer forest type typical of the western slope of the Sierra Nevada. There are no meadows, fens, or significant areas of rock outcrop or open gravel habitats. The area is characterized by Sierran mixed conifer forest dominated by white fir (*Abies concolor*), ponderosa pine (*Pinus ponderosa*), incense cedar (*Calocedrus decurrens*), sugar pine (*Pinus lambertiana*), with black oak (*Quercus kelloggii*) as the major hardwood within the stands. Areas vary from drier sites with a solid understory of bear clover (*Chamabaetia foliolosa*) to more mesic sites with an understory of dogwood (*Cornus nuttallii*) and hazelnut (*Corylus cornuta*). Common shrubs are *Arctostaphylos viscida* var. *mariposa*, *A. patula*, *Chrysolepis sempervirens*, *Ceanothus integerrimus*, *C. diversifolius*, and *C. cordulatus*.

The threatened, endangered, or sensitive plants considered in this document are displayed in the following table.

Table 1. Threatened and Sensitive Plant Species Considered

Latin Name	Common Name	Status
<i>Calyptridium pulchellum</i>	mariposa annual pussypaws	Fed. Threatened
<i>Cypripedium montanum</i>	mountain lady's slipper orchid	FS Sensitive
<i>Epilobium howellii</i>	subalpine fireweed	FS Sensitive
<i>Hulsea brevifolia</i>	short-leaved hulsea	FS Sensitive
<i>Peltigera hydrotheria</i>	veined water lichen	FS Sensitive

The Sierra National Forest botanist checked the U.S. Fish and Wildlife Service web site for Federally-listed plants that may be found in the project area (USFWS 2009). The list contains two plant species and two categories of critical habitat that may occur within the Forest. *Sidalcea keckii* is only known from outside the Forest to the south, and if it were to occur in the Sierra National Forest, it would not be found north of the San Joaquin River at the elevations of the Sugar Pine Adaptive Management Project. It grows in clay soils (derived from serpentinite) in sparsely-vegetated grasslands at elevations between 400 and 1,400 feet in the foothills of California's central western Sierra Nevada. The proposed critical habitat for *Sidalcea keckii* falls entirely outside the national forest boundary.

The proposed critical habitat for vernal pool plants does not fall within the Sugar Pine Adaptive Management Project area, and none of the Federally-listed vernal pool plants are known or expected to occur in the Sierra National Forest.

Calyptridium pulchellum (Mariposa annual pussypaws) is known to occur in the Sierra National Forest at elevations below 3600 feet, but there are no known occurrences of Mariposa pussypaws in or near the project area, and no suitable habitat exists. The elevation of the Sugar Pine Project is well above the upper elevation limit for the Mariposa pussypaws. No consultation is necessary with U.S. Fish and Wildlife Service, and no further analysis will occur.

Forest Service Sensitive Plant Species in the project area

Populations of mountain lady's slipper orchids, short-leaved hulsea, subalpine fireweed, and veined water lichen occur within the project area. No other Forest Service sensitive plants were found during surveys, and the following effects analysis will focus on these four species.

Subalpine fireweed – *Epilobium howellii*

Subalpine fireweed is known from meadows, riparian areas, and seeps at approximately 120 sites in the Sierra NF. Most of these have been discovered since 2005, showing that this species has until recently been overlooked and may be more common than previously thought. This small, delicate herb prefers bare soil around riparian areas with little competition, and based on new information gathered in recent years, it seems to thrive in areas with at least some disturbance (e.g. silt deposits in streambeds, ski runs, roadsides). The species ranges from Sierra County at Yuba Pass to Fresno County. ***One population of subalpine fireweed was found in a meadow 1,000 feet north of unit RX-08 on road 5S06.***

Short-leaved hulsea – *Hulsea brevifolia*

The short-leaved hulsea is a locally endemic perennial herb found in montane forests of the central and southern Sierra Nevada (Hickman 1993). Plants are 3 to 6 dm tall, with leafy stems. Leaves are toothed, and stems and leaves are covered with hairs, some of which are glandular, making plants sticky to the touch. Flowerheads are bright yellow-orange, less than 20 mm in diameter (Hickman 1993). Elevation range is from 5,000 to 9,000 feet, but most occurrences are found above 6500 feet in the red fir forest type. This plant grows in dry forests and openings.

Short-leaved hulsea is a perennial herb. There are about 46 occurrences documented on the Sierra National Forest, and others on adjacent forests and in Yosemite National Park. Elevational range is 5000 to 9000 feet, from Tuolumne County south to Tulare County. Habitat for short-leaved hulsea is gravelly or sandy exposed areas as well as densely wooded sites in coniferous forest, usually red fir forest. Occurrences range in size from a few dozen plants to many thousand plants. Most occurrences appear to represent a variety of age classes, from the current year's seedlings to older, well established plants (information on file at Sierra National Forest, North Fork, CA), and many populations consist of thousands of individuals. Five populations of short-leaved hulsea occur along Forest Roads 5S22Y and 5S06.

Veined water lichen – *Peltigera hydrotheria*

Veined water lichen is found in cold unpolluted streams in conifer forests along the western slope of the Sierra Nevada. The California occurrences are disjunct from other U.S. populations. This aquatic lichen is a foliose species with a delicate "leafy" thallus. It is a black "lettuce"-like lichen growing on rocks and on stream bottoms. Clumps range in size from a few centimeters to over a decimeter. Reproductive structures have been observed, but how the lichen actually colonizes new habitats is unknown.

Threats are activities that change the water chemistry, alteration of the stream channel, excessive alteration of riparian vegetation thereby increasing water temperature or increasing flows that scour the gravels and rocks on which the lichen is attached. This species occurs in streams with clear, unpolluted, water. Peak flows are probably not of the intensity that would lead to scouring. The streams have a rich aquatic bryophyte flora (Shevock 1998). Increased sedimentation, nutrients, or a rise in temperature would significantly impact occurrences (Davis 1999).

The Sugar Pine Adaptive Management project area contains abundant suitable habitat for the veined water lichen, and ***one occurrence was found in 2007 within the project area, in the***

tributary to Lewis Creek flowing from the Westfall area. Additional stretches of perennially flowing water within the project area may contain additional veined water lichen populations.

Appendix A of the **Biological Assessment and Evaluation for Plant Species** provides a full list of the threatened, endangered, and sensitive plants that might be found in the Sierra National Forest, a summary of information about their biology and habitat, and rationale for including or excluding them in this analysis.

Noxious Weeds

Noxious weed species known to occur in the Sugar Pine project area are: bull thistle (*Cirsium vulgare*), foxglove (*Digitalis purpurea*), klamathweed (*Hypericum perforatum*), oxeye daisy (*Leucanthemum vulgare*), perennial sweet pea (*Lathyrus latifolius*), and Spanish broom (*Spartium junceum*). Other species that occur in the general vicinity and along roads leading to the project area are: yellow starthistle (*Centaurea solstitialis*), spotted knapweed (*Centaurea maculosa*), and medusahead (*Taeniatherum caput-medusae*).

Bull thistle is a biennial herb native to Eurasia that can grow to heights of 2 meters (Hickman 1993). It is fairly common in California, though less so at higher elevations or more pristine sites in the Sierra National Forest. Large plants can produce over 100,000 seeds (Randall 2000). Bull thistle tends to spread rapidly in disturbed meadows and in areas where soil disturbance favors weeds such as logged areas or areas cleared for fuels reduction (Randall 2000). There are over 300 infestations of bull thistle mapped within the Sierra National Forest, ranging from a few stems to infestations of several acres. There are 9 infestations within the Sugar Pine project area, mostly confined to roadsides and other disturbed areas such as old landings. Hand removal of plants within the project area occurred in 2007 and 2008, and will be conducted again in 2009 and into the future until infestations are eradicated.

Foxglove is a tall biennial herb native to Europe and Africa, originally introduced as an ornamental that tends to invade wet areas and streamsides. The plants are toxic to livestock and wildlife and can form monocultures in riparian areas to the exclusion of the native vegetation (Harris 2000). There is at least one small population of foxglove in the project area, possibly more along streamsides.

Klamathweed is a rhizomatous perennial native to Europe. Plants can form dense patches that eventually replace native plants and can cause severe problems for conifer regeneration (CDFA 2009). Spread is by seed and vegetative growth underground (CDFA 2009). Plants produce an average of 15,000 to 33,000 seeds, which can remain viable for up to 10 years and are spread by a variety of vectors, including tires and heavy equipment (CDFA 2009). There are over 100 infestations of klamathweed in the Sierra National Forest with several along roads leading to the Sugar Pine project area, and this is one of the fastest-spreading weeds in the Forest. One infestation of klamathweed was documented and hand-pulled in the project area in 2008.

Oxeye daisy is a rhizomatous perennial herb that has escaped cultivation in many areas of the West. Its potential for spread at high elevations is of concern. The oxeye daisy is native to Europe. It displaces native plants in wildlands. When infestations are not controlled early, they form large seedbanks of seeds that can remain viable for 20 years. Reproduction is by seed and by underground spread via the rhizomes (Alvarez 2000). There is a cluster of oxeye daisy along road 5S17, which is rumored to have originated from a large infestation on a nearby private parcel. Hand-pulling began in 2008 and will continue in 2009.

Perennial sweet pea is a perennial, sprawling, herb that has escaped cultivation and can form large masses that exclude native vegetation. There is at least one small infestation in the project area that should be easy to eliminate.

Spanish broom is an invasive shrub that is native to the southern Mediterranean region, originally introduced to California as an ornamental in the 1800s (Nilsen 2000). Shrubs spread in wildlands, excluding native plants and posing a fire hazard. There is a dense infestation of Spanish broom just south of Tenaya Lodge in the northwest portion of the project area within units proposed for fuels reduction activities. This area will be flagged for avoidance to ensure that seeds are not spread during project implementation.

Alternative 1 – No Action

Under the No Action alternative, current management plans would continue to guide activities in the project area. This includes all ongoing activities with existing decisions or permits that would not be changed if this alternative were selected including: underburning, plantation maintenance, cattle grazing, recreation, and recreation residences. Known sites for botanical resources would continue to be managed to maintain present diversity of the species as specified in the LRMP (USDA-FS 2001a) and SNFPA ROD (USDA-FS 2004).

Direct Effects

No direct effects would occur to threatened, endangered, or Forest Service sensitive plants if the no action alternative is chosen because project activities would not take place.

Indirect and Cumulative Effects

Indirect and cumulative effects have the potential to occur to TES plants under the no action alternative primarily from the increased potential for uncontrolled wildland fire. Uncontrolled wildfire has the potential to cause significant disturbance to soil, ground cover and canopy cover, placing Forest Service sensitive riparian species at risk. For example, lady's slipper orchid populations could be extirpated if the canopy and soil organic layers were incinerated under extreme fire conditions (Kaye and Cramer 2005). The veined water-lichen population could be extirpated if the extreme heat prevailed for long enough to kill the thalli (plants) within the stream reach containing the lichens.

Except for under the most severe of fire conditions, which would kill all the seeds in the soil, the short-leafed hulsea would probably survive and perhaps ultimately benefit from wildfire as it tends to thrive along roadsides and in post-burn conditions (e.g. the Big Creek fire in 1994 resulted in vigorous recovery of short-leafed hulsea near Huntington Lake).

Uncontrolled wildland fire also introduces a higher potential for the spread of weeds through suppression actions. Fires can also allow the opportunity for the introduction and spread of invasive non-native weeds when seeds or contaminated soil area introduced, which can affect Forest Service sensitive species through competition for resources. However, the overall risk is probably about the same as under the action alternatives.

Alternative 2 – Proposed Action

Direct Effects

The following direct effects to sensitive plants are possible as a result of timber harvest or fuels reduction activities: Direct killing of plants when equipment runs over them or parks on them, when logs are skidded or dragged over them, when slash piles block their light, and when piles are burned directly over them and the heat intensity is too great to survive. Mastication could directly kill plants by running them over or by covering them with a dense layer of chipped wood and limbs.

Indirect Effects

A possible indirect effect to sensitive plants is the degradation or loss of habitat resulting from the introduction or spread of noxious or invasive weeds. Noxious weeds are plant species that can spread rapidly and compete with native plants for water and other resources, in some cases forming solid stands of plants that may crowd out sensitive plant species. Noxious weeds can be transported by vehicles and heavy equipment when equipment passes through or excavates soil in contaminated areas and carries weed seeds to new areas. Risk of noxious weed introduction and spread can be greatly reduced by power washing all heavy equipment before bringing it onto the project site, as recommended by the Forest Service “Guide to Noxious Weed Prevention Practices (USDA-FS 2001b).” Noxious weed prevention measures have been incorporated into the design of this project, thus these indirect effects should be minimal.

Mountain lady’s slipper orchid – *Cypripedium montanum*

Eight populations of lady’s slipper orchids were discovered within the project area. Most are well within the riparian conservation zone and the streamside management zone (see aquatics design measures). Reducing canopy cover below 60% is thought to be damaging to lady’s slipper orchids. Populations are often very small and isolated from each other; therefore, concerns exist related to population size, genetic fitness and the overall viability of the species (Kaye and Cramer 2005). However, in the past 5 years, at least 15 new populations have been found in the Sierra National Forest, varying in size from a few stems to more than a hundred bringing the total number of known populations up to 24 within the Sierra NF.

The eight known populations are well-protected from detrimental changes in canopy cover or soil parameters because they occur next to streams or are flagged for avoidance such that canopy cover will not be reduced and heavy equipment will not be allowed. If any new occurrences of lady’s slipper orchids were to be discovered in the future they would be protected as follows (plants do not emerge every year therefore one year of surveying may not reveal all populations that are present): Any new populations would have a zone flagged around them where no timber harvest or heavy equipment would be allowed within approximately 60 feet (average tree height in the area). The buffer was determined to be sufficient to ensure that canopy cover remains at 60% or higher within the populations. Populations would also be monitored post-project to ensure that these measures were followed and to evaluate the status of the populations. The project design measures are expected to prevent any negative direct or indirect effects to the mountain lady’s slipper orchids.

Subalpine fireweed – *Epilobium howellii*

Because meadow habitat will be protected by the project design measures for aquatic species (see EIS), and because the only population of subalpine fireweed occurs outside the project by at least 1000 feet, there will be no direct or indirect effects to this species.

Short-leaved hulsea – *Hulsea brevifolia*

Because any short-leaved hulsea populations will be flagged for avoidance prior to project implementation, there will be no direct or indirect effects to this species.

Veined water lichen - *Peltigera hydrotheria*

One new veined water lichen population was found during field surveys for the Sugar Pine Adaptive Management project, and more may exist in areas not directly surveyed (not every mile of perennial stream was surveyed). As this species is sensitive to water pollution and prefers cold clear water, any activities that alter water quality or raise water temperature could negatively impact plants and habitat. Because of the project design measures for RCAs prohibiting ground-

disturbing activities within 100 feet of perennial streams, no negative effects are expected. In addition, stream temperatures will not rise as a result of the project because canopy cover will not change significantly near streams.

Cumulative Effects

The geographic boundaries delineated for surveys and subsequent effects analysis were defined by the boundaries of the Sugar Pine Adaptive Management Project area since this is where the proposed activities with potential effects on plant species are to occur. Table 3, on page 25 is a listing of past, present and reasonably foreseeable future activity within the project area utilized in determining cumulative effects on plant species.

This project and the subsequent maintenance and further vegetation work will move the areas treated closer to the pre-European natural range of variability for the area, except for possibly the areas where non-native annual grasses become more common after clearing.

Foreseeable future activity within the project area may include prescribed burning, ongoing vegetation maintenance by handwork or possibly heavy equipment, management of the plantations (thinning), and road maintenance. Other activities likely to occur include personal fuel woodcutting, recreational uses such as hiking, bike riding, OHV and dirt bike use, and dispersed camping.

Because suitable habitats for TES plants will be avoided and noxious weed mitigations will be implemented, negative effects to any undiscovered sensitive plants are expected to be minimal to non-existent for the Sugar Pine Adaptive Management Project, and therefore should not add to any cumulative effects of activities in the project area on sensitive plants.

Alternative 3

Direct, Indirect and Cumulative Effects

Effects for rare plants and noxious weeds would be the same as Alternative 2.

Alternative 4

Direct, Indirect and Cumulative Effects

Effects for rare plants and noxious weeds would be the same as Alternative 2.

