



United States
Department of
Agriculture

Forest
Service

July 2015



Tobias Ecosystem Restoration Project

Biological Evaluation/Assessment (Plants)

Western Divide Ranger District, Sequoia National Forest
Tulare and Kern Counties, California

SUMMARY: This botanical biological evaluation documents analysis of effects of land disturbance associated with the Tobias Ecosystem Restoration Project on the east-slope of the Greenhorn Mountains in the Bull Run Watershed, a tributary to the Kern River. This vegetation management project proposes to commercially thin approximately 1,117 acres and to implement non-commercial treatments on approximately 3,781 acres, within the 11,000 acres project area. The proposed action would thin forest stands in the project area to reduce tree density, reduce fuel loads, and modify species composition. Treatments to promote forest resilience, promote wildlife habitat, and reduce fire severity

Based on timing, habitat affected and other factors, the project would have no effect on species listed for protection under the Endangered Species Act of 1973 (ESA), would not cause or contribute to a trend leading to loss of viability or listing for Forest Service designated sensitive species or species identified as of local interest (see summary table below for species addressed).

Species ^{Status} <i>Scientific name</i>	Determination
Shirley Meadow Star-Tulip ^{FS} (<i>Calochortus westonii</i>)	Not likely to result in a trend toward Federal listing or loss of species viability.
Muir's Raillardella ^{FS} (<i>Carlquistia muirii</i>)	Not likely to result in a trend toward Federal listing or loss of species viability.
Unexpected Larkspur ^{FS} (<i>Delphinium inopinum</i>)	Not likely to result in a trend toward Federal listing or loss of species viability.
Greenhorn Fritillary ^{FS} (<i>Fritillaria brandegeei</i>)	Not likely to result in a trend toward Federal listing or loss of species viability.

FS = FS Sensitive Species

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INTRODUCTION

Table 1 lists Forest Service sensitive plant species (FS) that may be affected by the proposed action. A full list of identified plant species at risk that may be found within or indirectly affected by actions within the Wester Divide Ranger District are listed in Appendix A with the rationale for inclusion in this document for detailed analysis or not.

This report meets the requirements of a biological evaluation (BE) and follows the standards established in Forest Service Manual direction (FSM 2672.42) (USDA-FS, 2011).

CONSULTATION TO DATE

The forest-wide list (species list) of proposed, endangered, and threatened species (listed species) which may occur in or be affected by projects in the area of the Sequoia National Forest was updated from the USDI, Fish and Wildlife Service (USFWS web site (<https://ecos.fws.gov/ipac/gettingStarted/map>) as of July 27th, 2015. No listed plant species will be affected by the project. No further consultation is required and a biological assessment will not be prepared.

CURRENT MANAGEMENT DIRECTION

This project is consistent with the management direction including Riparian Conservation Areas and meets the Riparian Conservation Objectives outlined in the Supplemental Environmental Impact Statement for the Sierra Nevada Forests Plan Amendment and Record of Decision (USDA-Forest Service 2004)

DESCRIPTION OF THE PROPOSED PROJECT

The Tobias Ecosystem Restoration Project proposes to commercially thin approximately 1,117 acres and to implement non-commercial treatments on approximately 3,781 acres, within the 11,000 acres project area. The proposed action would thin forest stands in the project area to reduce tree density, reduce fuel loads, and modify species composition. Treatments to promote forest resilience, promote wildlife habitat, and reduce fire severity. The project area is located on the east-slope of the Greenhorn Mountains in the Bull Run Watershed, a tributary to the Kern River.

PROJECT DESIGN REQUIREMENTS FOR WATERSHED RESOURCES

- SQF-LRMP B1 (p.4-3): Maintain or improve long term soil productivity.
 - SQF-LRMP B4 (p.4-4): Emphasize protection management and improvement of riparian areas during the planning and implementation of land and resource management activities along stream courses on the forest.
 - SQF-LRMP C3n3 (p. 4-9): Meadows will be managed to a fair and better condition and to maintain their existing acreage and restore any that have been damaged. Trails will be rerouted away from meadows where unacceptable damage is occurring. On the meadow edge, large tree character and a diverse environment of structural “edge” effects will be provided.
 - SQF-MSA Exhibit D (p.9): “...Plans will be developed from prioritized Watershed Improvement Needs Inventory (WINI) to re-establish hydrologic characteristics and riparian habitat...”
 - SNFPA RCO#2-105 (p.64): At either the landscape or project scale, determine if the age class, structural diversity, composition and cover of riparian vegetation are within the range of natural variability for the vegetative community. If conditions are outside the range of natural variability, consider implementing mitigation and/or restoration actions that will result in an upward trend. Actions could include restoration of aspen or other riparian vegetation where conifer encroachment is identified as a problem.
- SNFPA RCO#6-122 (p.66): Recommend restoration practices in: (1) areas with compaction in excess of soil quality standards, (2) areas with lowered ground water tables, or (3) areas that are either actively down cutting or that have historic gullies. Identify other management practices, for example, road building, recreational use, grazing, and timber harvests that may be contributing to the observed degradation.

PROJECT DESIGN REQUIREMENTS FOR BOTANICAL RESOURCES

Design Criteria to prevent the introduction and spread of noxious weeds into the proposed treatment areas have been built into the project. These Design Criteria include:

- All mastication will be accomplished between July 15th and September 30th.
- All equipment will be washed and inspected for noxious weeds prior to arrival at project area.
- Only certified weed-free erosion control materials will be used, and only to the minimum extent needed to stabilize bare soil.
- Any noxious weed occurrences found during project layout or implementation will be reported to the Forest botanist.
- Avoid any known infestations during project implementation.

AFFECTED ENVIRONMENT AND EFFECTS

GENERAL HABITAT DISCUSSION

The project area is located on the east-side of the Greenhorn Mountains in the Bull Run Drainage from 5,200 feet to over 8,250 feet. Plant communities include Chaparral, Canyon Live Oak Woodland, Black Oak Woodland, Mountain Meadow, Rock Outcrop, Lower Mixed Conifer-Pine, Mixed Conifer-White Fir, Mixed Fir Forest, Montane Brushfield, and Red Fir Forest.

SPECIES ACCOUNTS

A search of the Sequoia national Forest sensitive plant database and geographic information system (GIS) layer found populations of *Calochortus westonii*, *Carlquistia muirii*, and *Delphinium inopinum* within the project area. A search of the California Natural Diversity Data Base (CDFW 2015) for the Tobias Peak, 7.5 minute map quadrangle, in which the Tobias Ecosystem Restoration Project is located, returned occurrences of the FS Sensitive Species *Calochortus westonii*, *Delphinium inopinum* and *Fritillaria brandegeei*.

Watch list plant species in Region 5 are plants of local concern that are not on the R5 sensitive list. The watch list may include plants on various California State or California Native Plant Society (CNPS) lists or may be added due to local rarity, human impacts (such as collection), location at the edge of their range, or other reasons. Generally the potential for watch list plants to occur in a proposed analysis area would not necessitate botanical surveys, but they are inventoried incidentally, while performing surveys for any Sequoia NF sensitive plants.

The Tobias Ecosystem Restoration Project mechanical activity units were surveyed for sensitive plants and watch list plants in the late spring and early summer of 2013 and additional units added. These surveys confirmed occurrences of Shirley Meadow Star-Tulip, (*Calochortus westonii*) within mastication units. No Forest Service Sensitive plants were discovered within mechanical Tractor and Skyline units. Additionally, no Forest Service watch list plants were discovered within mechanical harvest units.

Species accounts are summarized here with specific intent to focus on location or habitat preferences that may be affected by the proposed action.

Table 1: Plant Species of Concern within the Tobias Ecosystem Restoration Project Area

Common Name ^{Status} <i>Scientific name</i>	Habitat Type / Soils / Elevation	Risk/Rationale
Shirley Meadow Star-Tulip FS (<i>Calochortus westonii</i>)	Openings in Chaparral, Ponderosa Pine, or Mixed Coniferous Forest, 4,900 to 6,800 ft. Granite Ledges/Cracks or Gravelly/Sandy Flats	Moderate, in meadow and moist mixed conifer forest
Muir's Raillardella FS (<i>Carlquistia muirii</i>)	Openings in Chaparral, Ponderosa Pine, or Mixed Coniferous Forest, 3,600 to 8,200 ft. Granite Ledges/Cracks or Gravelly/Sandy Flats	Low, on rock outcrops and in sandy flats.
Unexpected Larkspur ^{FS} (<i>Delphinium inopinum</i>)	Open Rock Outcrops & Ridges in Conifer and Red Fir Forest, 5,500 to 9,000 ft. Metamorphic Substrates (Granite Occasionally)	Low, on rock outcrops.
Greenhorn Fritillary ^{FS} (<i>Fritillaria brandegeei</i>)	Openings in lower mixer Conifer Forest and Black Oak Woodland, 4,200 to 7,300 ft. Sandy Granitic soil or Shallow Decomposed Granite Deposits	Moderate, in mixed conifer forest.

Common Name ^{Status} <i>Scientific name</i>	Habitat Type / Soils / Elevation	Risk/Rationale
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FS = FS Sensitive Species

FEDERALLY PROTECTED (LISTED) SPECIES

There are no federally protected plants or suitable habitats for such species in the project vicinity.

FOREST SERVICE SENSITIVE SPECIES (INCLUDING FEDERAL CANDIDATES)

Forest Service sensitive species were eliminated from further consideration if: 1) they had no known occurrences in or near the project area; and/or 2) no potentially suitable habitat for the species exists in the project area (see full list of species considered in appendix A).

The analysis area has known populations or unsurveyed suitable habitat for the Pacific Southwest Region (R5) Forest Service Sensitive plant species displayed in Table 1.

SHIRLEY MEADOW STAR-TULIP, (*CALOCHORTUS WESTONII*)

Abundance: Over 1,200 acres of known habitat; occurrences may fluctuate, depending on varying habitat conditions. At least 20-30 extant occurrences currently known, most with dozens to thousands of plants each.

Range/Distribution: Currently known range approximately 50 miles (north-south) by 16 miles (east-west) in the Tule River and Kern River drainages of Tulare and Kern Counties, respectively. Occurrences may be either small, apparently isolated pockets of plants or large, contiguous colonies scattered from as far north and west as Case Mtn., to just below Mountain Home State Forest and the Camp Nelson area, to as far east as Baker Point Road and the Vincent/Dry/Tyler Meadows area, to as far south as the type locality at Shirley Meadows and Cooks Peak and a short distance below. The Case Mountain population(s) is on BLM land, and a few tracts of private land within Sequoia NF include occurrences of *Calochortus westonii*. The majority of populations and habitat, however, exist on NFS lands (Sequoia NF).

Trend: Unknown; presumably stable. *Calochortus westonii* was initially thought to be a highly localized endemic of the area around Shirley Peak in the Greenhorn Mountains after it was collected and tentatively identified in 1927. In 1984, a Species Management Guide was developed to provide protection primarily in relation to timber harvest and ensure long-term conservation of the species. Five more occurrences were discovered in 1990 approximately 10 miles to the north just before a large wildfire burned over 2,400 acres throughout much of the area. Approximately 115 acres of additional occurrences were found throughout the burned area during post-fire surveys (1991), and were flagged and excluded from salvage timber harvest, according to a 1990 agreement with USFWS. Many of those occurrences did not persist, however, in subsequent post-fire years in burned habitat in which ecological conditions were not suitable for the species. Apparently established occurrences have been found in many areas north of the burn since then (1992-1996). Populations appear to be able to tolerate moderate disturbance (the species is a bulbiferous, perennial herb), and have the potential to colonize new sites when habitat conditions are suitable.

Protection of Occurrences: Since 1990, the USFS has implemented a "flag and avoid" policy for *Calochortus westonii*, according to an agreement with the USFWS. The 1984 Species Management Guide was updated in 1997 to incorporate new demographic information and propose similar (and additional) land management recommendations for enhancing suitable habitat and protecting and promoting the species.

Threats: Timber harvest and related activities (potential), over-grazing, off road vehicles, competition from larger, more "aggressive" species.

Fragility/habitat specificity: Habitat for *Calochortus westonii* is typically partially open, mixed conifer/black oak and associated dry meadow edges, from approximately 5,000 to 7,200 feet elevation. Soils may be granitic or metamorphic and are moderately loamy and deep when occurring in or adjacent to meadows and dry out early in the season. They may also be somewhat shallower and rockier on steeper forest slopes (usually less than 40% slope).

MUIR'S RAILLARDELLA, (*CARLQUISTA MUIRII*)

General Distribution: *Carlquistia muirii* is known from 21 occurrences that range across an estimated 200-mile (322-kilometer) section of the southern Sierra Nevada in Fresno, Tulare, and Kern Counties. One disjunct occurrence is found on the Los Padres National Forest 160 miles (257 kilometers) to the west in the Ventana Wilderness in Monterey County.

Habitat Description: *Carlquistia muirii* occurs in dry open sites on granitic soils at elevations of 3,600-8,200 feet (1,100–2,500 meters). It grows from granite ledges and crevices and on gravelly or sandy flats in openings of montane chaparral, ponderosa pine forest, and lower and upper mixed conifer forest.

Occurrence Status and population trends: *Carlquistia muirii* is known from 21 occurrences: 8 in the Sierra National Forest in the North Fork Kings River drainage (Fresno County), 2 in the Sequoia National Forest in the Kern River drainage (Tulare County), 5 in Kings Canyon National Park in the Kings River drainage (Fresno Co.), 4 in Sequoia NP in the Kaweah River drainage, 1 on BLM land at Owens Peak in Kern County, and 1 in the Los Padres National Forest in the Ventana Wilderness near the coast. Number of plants reported in each occurrence varies 3 to 590 plants. Around one-third of the occurrences have 100 plants or more. The species' habitat is generally undisturbed and free of nonnative undesirable plants, and overall population trends are apparently stable. Populations in the Sierra Nevada have also been assessed as stable on the basis of habitat and population conditions.

Threats or other information: For occurrences next to trails or near lookouts (Baker Point), foot traffic, cattle trampling, or trail maintenance could impact populations. Most Sierra NF occurrences are next to roads or trails, and one is along an access road to a PG&E penstock, where penstock construction work or road work pose potential threats. Habitat is generally undisturbed. The Los Padres National Forest occurrence of *Carlquistia muirii* is not subject to any known threats.

UNEXPECTED LARKSPUR, (*DELPHINIUM INOPINUM*)

Abundance: *Delphinium inopinum* has 32 reported occurrences, containing from approximately 10 to 100 plants in the smaller occurrences to (more often) 100's or 1000's in the larger colonies.

Range/Distribution: *Delphinium inopinum* is found in disjunct populations mostly in the Sequoia NF (the majority on the Monarch Divide, Slate Mountain, and the Piutes), the Sierra NF (Monarch Divide), as well as in Sequoia NP and on BLM land (near Lamont Peak), from Fresno County through Tulare, Inyo, and Kern Counties.

Trend: Unknown, assumed stable.

Protection of Occurrences: Occurrences along the Monarch Divide (Sierra and Sequoia NF) are in a remote area in the Monarch Wilderness, with no need of special protection. Some of the large colonies in the Slate Mtn. complex are within a candidate Botanical Area, but no specific protection measures have been established, other than management as a current FS sensitive species.

Threat(s): The Summit National Recreation Trail (31E14) runs through the middle of the Slate Mtn. colonies, putting them at some risk of adverse impact from 2-wheeled motorized and non-motorized traffic. Past and potential proposed recreation projects and timber sales on Slate Mtn. have also created potential threats requiring special management. The Piute Mtns. occurrences also have potential threats from logging, mining, and recreation.

Fragility/habitat specificity: *Delphinium inopinum* inhabits dry, rock outcrops and open, rocky ridges in pine and red fir forests, at approximately 6000' to 8800' elevation. It is often found in association with FS sensitive species *Eriogonum twisselmannii*, *E. breedlovei* var. *breedlovei*, and *Oreonana purpurascens*. The more rugged sites along the Monarch Divide are relatively stable, but the saddle along the top of Slate Mountain and the Piute habitats may be vulnerable to disturbances.

GREENHORN FRITILARY, (*FRITILLARIA BRANDEGEEI*)

General distribution: This species is found in the southern Sierra Nevada, especially the Greenhorn Mountains, and also in the Tehachapi Mountains area. It is endemic to California.

Habitat description: *Fritillaria brandegeei* is found at elevations between about 490 and 2200 m (1600-7200 ft), although most sites are above 1250 m (4100 ft). It has been found in pine groves, in woodland, at the edges of meadows,

in marshes, and on road banks. The one reported aspect was north-facing, but others may occur. The soil is granitic, and may have much or little organic material. Surrounding vegetation may be riparian, lower montane coniferous forest, mixed conifer-oak forest or woodland, or yellow pine forest.

Occurrence status and population trends: Plants of *Fritillaria brandegeei* have been reported to be scattered, but probably are patchy in forest openings. Population sizes from 2 to 400 have been documented. The number of plants flowering in a given year probably varies with climatic conditions, and some years only a few plants will flower even in a large population.

Threats or other information: Grazing, logging, foot traffic, and over-collecting have been named as threats. The reduction or loss of this species' forest opening habitat, due to growth and reproduction of conifers in these areas, may also be a threat. *Fritillaria brandegeei* is found exclusively on granitic soils, not on soils derived from ferro-magnesium rocks, and therefore its distribution may be related to edaphic conditions.

EFFECTS

The effects section discusses effects to known occurrences as well as suitable habitat and any possible undiscovered sensitive plants that might grow in the project area.

NO ACTION ALTERNATIVE

Direct and Indirect

Under this alternative there will be no direct, indirect, or cumulative effects to known populations of Shirley Meadow Star-Tulip (*Calochortus westonii*), and undiscovered individuals of Muir's Raillardella (*Carlquistia muirii*); Unexpected Larkspur (*Delphinium inopinum*); and Greenhorn Fritillary (*Fritillaria brandegeei*).

ALTERNATIVE 2, PROPOSED ACTION - COMMERCIAL TREATMENT

Direct and Indirect

No known populations of Shirley Meadow Star-Tulip, (*Calochortus westonii*); Muir's Raillardella, (*Carlquistia muirii*); Unexpected Larkspur, (*Delphinium inopinum*); or Greenhorn Fritillary, (*Fritillaria brandegeei*) are found within the units proposed for Tractor/Skyline logging and none were discovered in botany surveys for the project. As such there will be no direct or indirect effects on these species from the commercial logging.

Shirley Meadow Star-Tulip is a bulb that grows, flowers, set seed, and dies back to the ground by June 31st in most years. Because populations of Shirley Meadow Star-Tulip (*Calochortus westonii*) are known and were found within mastication units, the mastication activity will be confined to a limited operating period (LOP), July 15th to September 30th. This will limit the direct effect on populations of Shirley Meadow Star-Tulip to light to moderate soil disturbance at a time of year when most of the plants/bulbs are underground. Late flowering individuals may be affected by mastication mechanical disturbance after the LOP is lifted, but this would be a small minority (less than 1%) of any population. The indirect effects of this soil disturbance would be to increase surface soil erosion by a moderate amount (with natural levels) because of the soil disturbance and the removal of some of the organic cover.

No populations of Muir's Raillardella, (*Carlquistia muirii*); Unexpected Larkspur, (*Delphinium inopinum*); or Greenhorn Fritillary, (*Fritillaria brandegeei*) are found within the units proposed for mastication and none were discovered in botany surveys for the project. Mastication may have direct effects of undiscovered individuals of these species but would not lead to a loss of viability.

In Alternative 2, the Proposed Action, indirect short-term increases in risks from the introduction and spread of noxious weeds from equipment used during implementation of the project as well as reductions of soil cover can be expected. Reductions of soil cover increases the risk of introduction that weeds can become established. Noxious weed infestations are a threat to sensitive plants and their habitats. Design Criteria to prevent the introduction and spread of noxious weeds into the proposed treatment areas have been built into the project. These Design Criteria include:

- Require equipment washing prior to arrival at project area under timber sale contract provision
- Avoid any known infestations during project implementation.
- Use weed-free erosion control materials.
- Any noxious weed occurrences found during project layout and implementation would be reported to the Forest botanist.

These practices would fully mitigate the risk of negative indirect effects from noxious weeds on sensitive plants.

ALTERNATIVE 3, NON - COMMERCIAL TREATMENT

Direct and Indirect

Alternative 3 does not include any commercial tractor or skyline logging. Therefore the only potential for light to moderate soil disturbance comes from the mechanical mastication.

Shirley Meadow Star-Tulip is a bulb that grows, flowers, set seed, and dies back to the ground by June 31st in most years. Because populations of Shirley Meadow Star-Tulip (*Calochortus westonii*) are known and were found within mastication units, the mastication activity will be confined to a limited operating period, July 15th to September 30th. This will limit the direct effect on populations of Shirley Meadow Star-Tulip to light to moderate soil disturbance at a time of year when the plants/bulbs are underground. The indirect effects of this soil disturbance would be to increase surface soil erosion by a moderate amount (with natural levels) because of the soil disturbance and the removal of some of the organic cover.

No populations of Muir's Raillardella, (*Carlquista muirii*); Unexpected Larkspur, (*Delphinium inopinum*); or Greenhorn Fritillary, (*Fritillaria brandegeei*) are found within the units proposed for mastication and none were discovered in botany surveys for the project. Mastication may have direct effects of undiscovered individuals of these species but would not lead to a loss of viability.

In Alternative 3, the non-commercial alternative, indirect short-term increases in risks from the introduction and spread of noxious weeds from equipment used during implementation of the project as well as reductions of soil cover can be expected. Reductions of soil cover increases the risk of introduction that weeds can become established. Noxious weed infestations are a threat to sensitive plants and their habitats. Design Criteria to prevent the introduction and spread of noxious weeds into the proposed treatment areas have been built into the project. These Design Criteria include:

- Require equipment washing prior to arrival at project area under timber sale contract provision
- Avoid any known infestations during project implementation.
- Use weed-free erosion control materials.
- Any noxious weed occurrences found during project layout and implementation should be reported to the Forest botanist.

These practices would fully mitigate the risk of negative indirect effects from noxious weeds on sensitive plants.

Cumulative Effects of Both Action Alternatives (Alternative 2 and Alternative 3)

A critical step in cumulative effects analysis is to compare the current condition and the projected changes due to management activities. This can be difficult because of the background natural variability in the resources and processes of concern. Plant and population ecology is not known for most sensitive plants on the Sequoia NF. Additionally, many sensitive plant habitats on the Forest have a long history of disturbance and an undisturbed reference habitat is often lacking. Minimizing on-site changes to sensitive plants can be the most effective way of reducing cumulative impacts. If adverse effects have not been minimized at the local level, cumulative effects could occur.

Management activities that have cumulatively impacted sensitive plant occurrences within the analysis area include logging, salvage logging, road construction, grazing, wildfire, fire suppression, sivicultural planting/release, mining, and recreational use. These cumulative impacts have altered the present landscape to various degrees. Cumulative impacts vary from species to species.

Past and current activities on National Forest System lands have altered potential habitats for the following sensitive plant species: Shirley Meadow Star-Tulip, (*Calochortus westonii*); Muir's Raillardella, (*Carlquista muirii*); Unexpected Larkspur, (*Delphinium inopinum*); and Greenhorn Fritillary, (*Fritillaria brandegeei*). Effects have resulted from forest road development, timber harvest, mining, recreation activities, invasive exotic noxious weed invasions, and changes to hydrology. Limited operating periods are used as a management strategy to reduce cumulative impacts to known occurrences, for both plants and animals. For this project, a limited operating period will be effective in reducing cumulative impacts and is the recommended method for the occurrences of sensitive plants, and their habitats associated with this project

DETERMINATION

NO ACTION ALTERNATIVE

It is my determination that the direct, indirect and cumulative impacts of the no action alternative are **not likely to cause or contribute to a trend leading to protection under the Endangered Species Act or loss of viability** for the following Forest Service Sensitive Plants: Shirley Meadow Star-Tulip, (*Calochortus westonii*); Muir's Raillardella, (*Carlquistia muirii*); Unexpected Larkspur, (*Delphinium inopinum*); and Greenhorn Fritillary, (*Fritillaria brandegeei*).

ALTERNATIVE 2, PROPOSED ACTION - COMMERCIAL TREATMENT

It is my determination that the direct, indirect and cumulative impacts of the proposed action **are not likely to cause or contribute to a trend leading to protection under the Endangered Species Act or loss of viability** for the following Forest Service Sensitive Plants: Shirley Meadow Star-Tulip, (*Calochortus westonii*); Muir's Raillardella, (*Carlquistia muirii*); Unexpected Larkspur, (*Delphinium inopinum*); and Greenhorn Fritillary, (*Fritillaria brandegeei*). Late flowering individuals may be affected by mastication mechanical disturbance after the LOP is lifted, but this would be a small minority (less than 1%) of any population. No plant species listed for protection, proposed or candidate for listing for protection under the federal Endangered Species Act of 1973 as amended would be affected by this project.

Appropriate Design Criteria have been incorporated into the project design to avoid or mitigate potential adverse effects.

ALTERNATIVE 3, NON - COMMERCIAL TREATMENT

It is my determination that the direct, indirect and cumulative impacts of the non-commercial alternative **are not likely to cause or contribute to a trend leading to protection under the Endangered Species Act or loss of viability** for the following Forest Service Sensitive Plants: Shirley Meadow Star-Tulip, (*Calochortus westonii*); Muir's Raillardella, (*Carlquistia muirii*); Unexpected Larkspur, (*Delphinium inopinum*); and Greenhorn Fritillary, (*Fritillaria brandegeei*). No plant species listed for protection, proposed or candidate for listing for protection under the federal Endangered Species Act of 1973 as amended would be affected by this project.

Appropriate Design Criteria have been incorporated into the project design to avoid or mitigate potential adverse effects.

REFERENCES

Material has not been directly cited, but species account information came from the following sources:

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