

# BIOLOGICAL ENVIRONMENT

## Botanical Resources

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### Introduction

This section describes the affected environment and environmental consequences for threatened, endangered and sensitive plant species as well as certain Watch List species, collectively referred to in this document as rare plants. It describes the area potentially affected by the alternatives and existing resource conditions within that area. Measurement indicators are used to describe the existing conditions for the SNF. The measurement indicators will be used in the analysis to quantify and describe how well the proposed action and alternatives meet the project objectives and address resource concerns.

Of the Forest Service Regions, the Pacific Southwest Region contains the largest assemblage of sensitive plant species in comparison to its land base. Of the more than 8,000 vascular plant species occurring in California, well over half are known to occur on National Forest System (NFS) lands. This is due to topography, geography, geology and soils, climate and vegetation, the same factors that account for the exceptionally high endemic flora of the State. Over 100 plant species are found only on NFS lands in California and no where else in the world (Powell 2001).

Management of plant and fungi species, habitat and maintenance of a diversity of plant communities, is an important part of the mission of the Forest Service (Resource Planning Act of 1974, National Forest Management Act of 1976). Management activities on NFS lands must be planned and implemented so that they do not jeopardize the continued existence of threatened or endangered species or lead to a trend toward listing or loss of viability of Forest Service Sensitive species. In addition, management activities should be designed to maintain or improve habitat for rare plants and natural communities to the degree consistent with multiple-use objectives established in each National Forest LRMP. Key parts include: developing and implementing management practices to ensure that species do not become threatened or endangered because of FS actions; maintaining viable populations of all native and desired non-native wildlife, fish and plant species in habitats distributed throughout their geographic range on NFS lands and developing and implementing management objectives for populations and/or habitats of rare species. The Pacific Southwest Region has over 425 rare plant species to manage.

Management decisions related to motorized travel can affect plant and fungi species, their habitats and natural communities. Potential effects include, but are not limited to: death or injury to plants; habitat modification; habitat fragmentation and degradation of habitat quality. Examples of effects on habitat are: increased rates of weed introduction and spread, changes in hydrology, increased erosion, soil compaction, increased sedimentation of streams and meadows, killing or reducing populations of pollinators, loss of surrounding vegetation or other factors reducing or eliminating plant growth and reproduction (see Trombulak and Frissell 2000). The FS provides a process and standard through which rare plants receive full consideration throughout the planning process, reducing negative impacts on species and enhancing opportunities for mitigation by developing and implementing management objectives for populations and/or habitats of sensitive species. It is Forest Service policy to minimize damage to soils and vegetation, avoid harassment to wildlife and avoid significant disruption of wildlife habitat while providing for motorized public use on NFS lands (FSM 2353.03(2)). Therefore, management decisions related to motorized travel on NFS lands must consider effects to plant species, fungi species and their habitats.

## Analysis Framework: Statute, Regulation, Forest Plan (LRMP) and Other Direction

Direction relevant to the proposed action as it affects botanical resources includes:

**Endangered Species Act (ESA).** The Endangered Species Act of 1973 (16 USC 1531 et seq.) requires that any action authorized by a Federal agency not be likely to jeopardize the continued existence of a threatened or endangered (TE) species or result in the destruction or adverse modification of habitat of such species that is determined to be critical. Section 7 of the ESA, as amended, requires the responsible Federal agency to consult the USFWS and the National Marine Fisheries Service concerning TE species under their jurisdiction. It is Forest Service policy to analyze impacts to TE species to ensure management activities are not likely to jeopardize the continued existence of a TE species or result in the destruction or adverse modification of habitat of such species that is determined to be critical. This assessment is documented in a Biological Assessment (BA) and is summarized or referenced in this Chapter.

**E.O. 13112 Invasive Species 64 FR 6183 (February 8, 1999).** To prevent and control the introduction and spread of invasive species.

**Forest Service Manual and Handbooks (FSM2670, FSH 2609.25).** Forest Service Sensitive (FSS) species are plant species identified by the Regional Forester for which population viability is a concern. The Forest Service develops and implements management practices to ensure that rare plants and animals do not become threatened or endangered and ensure their continued viability on National Forests. It is Forest Service policy to analyze impacts to sensitive species to ensure management activities do not create a significant trend toward Federal listing or loss of viability. This assessment is documented in a Biological Evaluation (BE) and is summarized or referenced in this Chapter.

**Sierra Nevada Forest Plan Amendment (SNFPA) (USDA-FS 2001, 2004a).** Forestwide standard and guidelines (S&G) that were not superseded by the 2001 or 2004 amendments applicable to the Travel Management project for botanical resources include:

- Noxious weeds management (Management S&Gs 36-49).
- Wetland and Meadow Habitat (Management S&G 70): See Water Resources section.
- Riparian Habitat (Management S&G 92): See Water Resources section.
- Bog and Fen Habitat (SNFPA ROD page 65, S&G #118): Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans and wheeled vehicles.
- Sensitive Plant Surveys (Corrected Errata, April 19, 2005) - Conduct field surveys for threatened, endangered, proposed and sensitive TEPS plant species early enough in project planning process that the project can be designed to conserve or enhance TEPS plants and their habitat. Conduct surveys according to procedures outline in the Forest Service Handbook (FSH 2609.25.11). If additional field surveys are to be conducted as part of project implementation, survey results must be documented in the project file. (Management S&G 125). The standards and guidelines provide direction for conducting field surveys, minimizing or eliminating direct and indirect impacts from management activities and adherence to the Regional Native Plant Policy (USDA-FS 2004b).

**Sierra National Forest Land Management Plan (LRMP) (1991).** LRMP direction for Sensitive plant species is to develop and implement management practices to ensure that Sensitive species do not become threatened or endangered because of Forest Service actions. The SNF Land and Resource Management Plan contains the following direction relevant for motorized travel management and botanical resources:

- Manage sensitive plant species to avoid future listing as threatened and endangered.
- Standard and Guideline 68 directs the SNF to ensure maintenance of genetic and geographic diversity and viable populations of sensitive plants.
- The LRMP also states that the SNF will conduct sensitive plant surveys and field investigations prior to any ground-disturbing activity in areas that sensitive plants are known or suspected to occur. Avoidance or mitigation measures are to be included in project plans and Environmental Assessments (USDA-FS 1991).

## Effects Analysis Methodology

The analysis of effects on rare plant species was a three-step process (FSM 2672.43). In the first step, all rare species that are known or are believed to have potential to occur in the analysis area were identified. Existing Forest records, Global Information System (GIS) and tabular data from the California Natural Diversity Database (CNDDDB) (CDFG 2008), the Inventory of Rare and Endangered Plants of California (CNPS 2007) and the Jepson Manual (Hickman 1993) were reviewed to determine known locations, range and habitat requirements for each species. Aerial photography was also utilized to identify potential fens and rare plant habitat. A list of species to include in the analysis was then compiled using the U.S. Fish and Wildlife List for the Sierra National Forest (USDI-USFWS 2007), the USDA Forest Service Pacific Southwest Region Sensitive Species List (USDA-FS 2006a) and the Sierra National Forest Watch List USDA-FS 2006b). Species considered in this analysis are listed in the Affected Environment section below.

The second step was field reconnaissance surveys, focused primarily on routes within or adjacent to areas with potential habitat for sensitive plant species or habitat. Field surveys have been conducted on at least 300 miles of unauthorized routes. Field surveys were conducted at the time of year when plants and/or habitat were evident and identifiable. Additionally, information on rare plants from past field surveys, monitoring and personal field observations made by Forest Service or other professional botanists were utilized during the analysis (SNF files 1990 to 2008). Every proposed route and use area in Alternatives 2, 4 and 5 were surveyed by a SNF botanist in 2007 or 2008. Mapping methodology varied, but included use of a Global Positioning System (GPS), topographic maps and/or aerial photos.

All of this information was used in step three of the analysis, where data were imported into a GIS and used to analyze potential habitat and proximity of known occurrences to routes, as well as to identify effects and develop mitigation measures. Each affected road, trail and use area proposed in the alternatives has been reviewed by resources specialists and their findings documented in the project record and as a summary in Appendix A Route Specific Data. Readers seeking more detailed information concerning the environmental effects associated with a specific road, trail or area are directed to Appendix A and the project record, where details of field data observations are documented.

For projects covering as much area as the Travel Management proposal, evaluation of potential effects is often more meaningful if specific types of habitat for groups of rare plant species are contrasted. For the purposes of this analysis, four basic habitat types or “guilds” are used to evaluate broad scale differences among the alternatives. The guilds are: Riparian, Forested, Rock Outcrop and Chaparral. Some TES species do not fall into the listed habitat categories, in which

case effects of the alternatives are discussed separately. The guilds are described in the affected environment section.

## Assumptions Specific to Botanical Resources Analysis

1. Vehicle use on and off established routes has affected or has the potential to affect rare plant populations, either directly by damage or death to individual plants from motor vehicles (stem breaking, crushing, etc.) or indirectly by altering the habitat through soil disturbance, changes in hydrologic functioning or by the introduction of non-native, invasive plant species that can out-compete sensitive species for water, sunlight and nutrients.
2. Motor vehicle use is unlikely to impact certain rare plant habitats due to the steep or rocky nature of the surrounding terrain; motor vehicle use is more likely to impact other rare plant habitats, such as meadows and granite domes, which exist on gentle slopes or flat terrain with little or no vegetation or natural barriers to motor vehicles.
3. Without specific prevention and/or control measures, invasive non-native plants (weeds) will continue to spread along and within surfaced and unsurfaced motor vehicle roads/trails/areas.
4. Motor vehicle use of unsurfaced roads/trails/areas will increase sediment production and erosion. As use increases, sediment production and erosion will increase.
5. Changes in vehicle class will not result in differing effects to TES plants.
6. For General Assumptions and Limitations applied to the effects analysis in each section, please see Chapter 3, pages 5 and 6.

## Data Sources

As described above, there were a number of ways that data for this project was obtained but the primary source was through botanical field surveys conducted in 2007 and 2008. All proposed routes and roads were walked on the ground and areas within 100 ft of either side of the road were examined. Sensitive habitat areas such as fens or wet meadows near proposed roads or routes were also examined within 200 feet of proposed routes. All proposed use areas were surveyed in 2007 or 2008; use areas were surveyed with rare plant habitat being the primary focus (e.g. rock outcrops). Historical data was used to inform survey work and known populations of TES plants (and noxious weeds) were visited to assess their current status. This information is incorporated into the Forest's GIS database and on field survey forms supplied to the California Department of Fish and Game's Natural Diversity Database (rare plants) or the Forest's noxious weed database, as described above.

Indicators were derived for the Travel Management DEIS in order to have a quantitative way to compare alternatives in terms of resource impacts. The following indicators were used by the SNF to compare the relative effect of the alternatives on rare plants:

## Botanical Resources Indicators

- Number of rare plant species and populations within the analysis units (see Chapter 3, Affected Environment Overview, page 3 and discussion in Botanical Resources Affected Environment).
- Number of rare plant species and populations within analysis units.
- Number of rare plant populations within or adjacent to routes/areas.

- Number of rare plant populations or sensitive habitat areas affected by changes in road closures.
- Miles of routes/areas open for motor vehicle use within riparian habitat, including meadows, fens and streambanks.

As previously described (Chapter 2), there are three actions being proposed in this project: the prohibition of cross-country travel, adding facilities to the SNFTS and changes to the existing NFTS. Effects to botanical resources must be considered both spatially and temporally, along with the indicators felt to be appropriate for comparing alternatives. With the exception of the prohibition of cross-country travel, botanical surveys were the primary method of obtaining information about proposed routes, roads and use areas. A summary of the methodology by these main actions are listed below:

## Botanical Resources Methodology by Action

### 1. Direct/Indirect effects of the prohibition of cross-country motor vehicle travel.

**Short-term timeframe:** 1 year. Short term effects include immediate effects from changes in travel management that will be evident within the first year of implementation.

**Long-term timeframe:** 20 years. Climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this time frame speculative. These timeframes will apply for each action proposed in all alternatives.

**Spatial boundary:** The ten analysis units shown in Figure 1 of the SNF Travel Management DEIS [SNF, excluding wilderness areas, Research Natural Areas (RNAs) and Botanical Areas] where cross-country travel has been occurring. This area will apply to all actions in each alternative.

**Indicator(s):** (1) Number of rare plant populations within analysis areas. The number of rare plant populations in a given analysis areas provides a way to show what impact each alternative has in comparison to the baseline condition, i.e. the no-action alternative.

**Methodology:** GIS analysis of existing unauthorized routes in relation to rare plant occurrences. .

### 2. Direct/Indirect Effects of adding facilities (presently unauthorized roads, trails and/or areas) to the NFTS, including identifying seasons of use and vehicle class.

**Short-term timeframe:** 1 year (see above).

**Long-term timeframe:** 20 (see above).

**Spatial boundary:** Analysis areas (see above).

**Indicator(s):** (1) Numbers of plant populations within or adjacent to routes/areas. This indicator will be used to compare alternatives with the number of rare plant populations found within 100 ft of proposed routes as this will take into account direct and indirect effects of motorized recreation; (2) Miles of routes/areas open for motor vehicle use within riparian habitat, including meadows and streambanks. This is being used as a baseline indicator of how much riparian habitat is being affected by alternative. This includes streambanks, wet meadows, fens and some dry meadows as well.

**Methodology:** (1) Botanical survey of proposed routes, roads and use areas; (2) GIS analysis of added routes and sensitive plant sites/habitat.

### 3. Changes to the existing NFTS (changing season of use and year round prohibitions).

**Short-term timeframe:** 1 year (see above).

**Long-term timeframe:** 20 years (see above).

**Spatial boundary:** Analysis areas (see above).

**Indicator(s):** (1) Number of rare plant populations or sensitive habitat areas affected by changes in road closures. Vehicle class has already been discussed as having no discernible difference in effect to botanical resources and so this will not be analyzed or discussed further. Some seasonal road closures will affect certain plant populations and/or sensitive plant habitat (e.g. fens, Botanical Areas) and these areas will be analyzed to their effects.

**Methodology:** (1) GIS analysis of NFTS roads

#### 4. Cumulative Effects

**Short-term timeframe:** Not applicable; cumulative effects analysis will be done only for the long-term time frame.

**Long-term timeframe:** 20 years.

**Spatial boundary:** Rangeland for certain rare plant species; Forestwide for other species and guild/habitat areas. Certain rare plant species on the SNF have a distribution beyond that of the SNF and when effects may have significant negative impacts on the species, effects to the metapopulation may be discussed. For other species, cumulative effects discussions will be done in the frame of the SNF project boundaries.

**Indicator(s):** (1) Numbers of rare plant populations within or adjacent to routes/areas. Plant occurrences known within 100 ft of proposed routes will be compared between alternatives to display the relative impacts of each. (2) Miles of routes/areas open for motor vehicle use within riparian habitat, including meadows and streambanks. As for rare plant populations, this indicator for riparian habitat will be contrasted between alternatives to display the relative impact of proposed actions on this guild. These indicators will tie to the direct and indirect effects discussion and allow for a comparative look at the cumulative effects between the alternatives as proposed and past, present and reasonably foreseeable future actions.

**Methodology:** (1) Botanical survey of proposed routes, roads and use areas; (2) GIS analysis of all routes and sensitive plant sites/habitat.

## Affected Environment

This section describes the affected environment for threatened, endangered and sensitive (TES) plant species on the SNF to set the stage for understanding how these resources are potentially affected by the proposed action and alternatives. Measurement indicators introduced in the Effects Analysis Methodology section above are used to describe the existing conditions for the forest and the ten analysis areas. These measurement indicators are used in the Environmental Consequences section to quantify and describe how well the proposed action and alternatives meet the project objectives and address concerns about impacts to botanical resources from motor vehicle travel.

The SNF spans 1.3 million acres of the central Sierra Nevada and has a remarkable variety of vegetation types and a high diversity of native plant species. This reflects the enormous elevation range (from below 1,000 feet elevation in the lower foothills of the Sierra Nevada's west slope to the top of the Sierra Crest above 13,000 feet) and the variety of rock types, soil types, aspects and wetlands found in the Forest.

There are 46 Forest Service Sensitive Plant species and 2 Federally listed species on the SNF list. Of these 48 TES plant species, 37 have the potential to be affected by the Travel Management proposed action and alternatives, these are shown in Table 138. Seven plant species are endemic to the SNF (Bolander's clover, carpenteria, Merced clarkia, Mono Hot Springs evening primrose orange lupine, Rawson's flaming trumpet and Shuteye Peak fawn-lily). Please see the Biological Assessment / Biological Evaluation for Plants for more details about each species.

**Table 138. Rare Plants Included in this Analysis**

Name/Family	Status	Elev. Range (feet)	Habitat	Habitat Guild	Analysis Unit (AU)
<i>Allium yosemitense</i> YOSEMITE ONION Liliaceae	FS Sensitive, State Rare	1500-6900	Rocky talus and scree slopes, seeps and outcrops. Chaparral, foothill woodland, Lower and upper montane conifer forest	Rock outcrop	South Fork
<i>Botrychium ascendens</i> UPSWEPT MOONWORT Ophioglossaceae	FS Sensitive	9000-11000	Meadows, seeps and fens in subalpine zone.	Riparian	Possible in higher elevation subalpine habitats.
<i>Botrychium crenulatum</i> SCALLOPED MOONWORT Ophioglossaceae	FS Sensitive	9000-11000	Meadows, seeps and fens in subalpine zone.	Riparian	Possible in higher elevation subalpine habitats.
<i>Botrychium lineare</i> SLENDER MOONWORT Ophioglossaceae	FS Sensitive; Federal Candidate	9000-11000	Rocky/moist sites in subalpine zone.	Riparian	Possible in higher elevation subalpine habitats.
<i>Botrychium lunaria</i> COMMON MOONWORT Ophioglossaceae	FS Sensitive	9000-11000	Meadows, seeps and fens in subalpine zone.	Riparian	Possible in higher elevation subalpine habitats.
<i>Botrychium minghamense</i> MINGAN MOONWORT Ophioglossaceae	FS Sensitive	9000-11000	Meadows, seeps and fens in subalpine zone.	Riparian	Possible in higher elevation subalpine habitats.
<i>Botrychium montanum</i> MOUNTAIN MOONWORT Ophioglossaceae	FS Sensitive	9000-11000	Meadows, seeps and fens in subalpine zone.	Riparian	Possible in higher elevation subalpine habitats.

Name/Family	Status	Elev. Range (feet)	Habitat	Habitat Guild	Analysis Unit (AU)
<i>Bruchia bolanderi</i> BOLANDER'S CANDLE MOSS Moss	FS Sensitive	5000- 7500	Endemic to meadows of the Sierra Nevada in the mixed conifer zone. Found on vertical banks of streams	Riparian	Tamarack-Dinkey
<i>Calyptridium pulchellum</i> MARIPOSA PUSSYPAWS Portulacaceae	Federally listed - Threatened	1500- 4000	Decomposed granite gravel associated with outcrops in foothill woodland and chaparral	Rock outcrop	Jose-Chawanakee
<i>Camissonia sierrae</i> ssp. <i>alticola</i> Endemic MONO HOT SPRINGS EVENING- PRIMROSE Onagraceae	FS Sensitive	4500- 8500	Gravel and sand pans and ledges associated with outcrops in chaparral, ponderosa pine, mixed conifer and red fir/lodgepole forests	Rock outcrop	Gaggs; Stump Springs-Big Creek; East of Kaiser Pass
<i>Carlquistia muirii</i> MUIR'S TARPLANT Asteraceae	FS Sensitive	4000- 7000	Granite or metamorphic outcrops, in ledges or cracks and gravel flats. In montane chaparral and conifer forest	Rock outcrop	Tamarack-Dinkey
<i>Carpenteria californica</i> (CACA) CARPENTERIA, TREE ANEMONE Philadelphaceae	FS Sensitive: State listed Threatened	1500- 4400	Chaparral, foothill woodland, lower ponderosa pine forest. Concentrated in draws and moist areas but found on open dry slopes as well.	Chaparral	Mammoth; Jose-Chawanakee
<i>Clarkia biloba</i> ssp. <i>australis</i> MARIPOSA CLARKIA Onagraceae	FS Sensitive	1000- 2500	Chaparral, foothill woodland, only in Merced River Canyon within 2 miles of S. Fork confluence	Chaparral	South Fork

Name/Family	Status	Elev. Range (feet)	Habitat	Habitat Guild	Analysis Unit (AU)
<i>Collomia rawsoniana</i> Endemic RAWSON'S FLAMING TRUMPET Polemoniaceae	FS Sensitive	2000- 7000	Along streams and around meadows in ponderosa pine and mixed conifer forest, sometimes in open forest where subsurface moisture is present	Riparian	Westfall; Gaggs; Mammoth
<i>Cypripedium montanum</i> MOUNTAIN LADY'S- SLIPPER Orchidaceae	FS Sensitive	4000- 7200	Moist areas and dry slopes in late-successional conifer forest.	Forested	Westfall
<i>Dicentra nevadensis</i> TULARE COUNTY BLEEDING HEART Papaveraceae	FS Sensitive	7500- 10000	Alpine fell fields, gravelly crevices and openings in subalpine conifer forest Only known occurrence on SNF is in John Muir Wilderness	Rock outcrop; forested	Known within ¼ mile of Dinkey-Kings, possible elsewhere.
<i>Epilobium howellii</i> SUBALPINE FIREWEED Onagraceae	FS Sensitive	5000- 8800	Streamsides, wet meadows and mossy seeps in subalpine conifer forest	Riparian	Globe; Stump Springs- Big Creek; East of Kaiser Pass; Tamarack-Dinkey; Dinkey-Kings
<i>Erigeron aequifolius</i> HALL'S DAISY Asteraceae	FS Sensitive	5200- 8000	Steep, rocky ridges and in crevices in mixed conifer forests. Only SNF occurrence is on limestone at 5900' in Monarch Wilderness	Rock outcrop	Only known from the Monarch Wilderness but could occur in Dinkey-Kings.
<i>Eriophyllum congdonii</i> CONGDON'S WOOLLY SUNFLOWER Asteraceae	FS Sensitive	1850- 6000	Cracks and talus of metamorphic rocks, mostly on steep inaccessible slopes in chaparral, foothill woodland, lower montane conifer forest	Rock outcrop	South Fork

Name/Family	Status	Elev. Range (feet)	Habitat	Habitat Guild	Analysis Unit (AU)
<i>Erythronium pluriflorum</i> Endemic SHUTEYE PEAK FAWN LILY Liliaceae	FS Sensitive	6500-9000	Rocky open sites as well as meadow-type sites in red fir/lodgepole forest and in subalpine conifer forest	Riparian; rock outcrop	Gaggs
<i>Fissidens apheilotaxifolious</i> BROOK POCKET-MOSS Moss	FS Sensitive	0-6300	Wet soil and rocks near streams, waterfalls and drainages where peak flow does not occur	Riparian	Gaggs
<i>Helodium blandowii</i> BLANDOW'S BOG-MOSS Moss	FS Sensitive	6500-9000	Wet meadows, fens and seeps in subalpine coniferous forests	Riparian	Not confirmed yet on SNF with nearest location on the INF
<i>Horkelia parryi</i> PARRY'S HORKELIA Rosaceae	FS Sensitive	0-3500	Dry, open areas in chaparral, with partial to full shade; often with live oaks. Prefers slightly to moderately acidic soils	Chaparral	South Fork
<i>Peltigera hydrothyria</i> VEINED WATER LICHEN Lichen	FS Sensitive	4000-8000	Cold, clear, unpolluted streams in conifer forests.	Riparian	Westfall; Gaggs; Tamarack-Dinkey
<i>Hulsea brevifolia</i> SHORT-LEAVED HULSEA Asteraceae	FS Sensitive	5000-9000	Granitic or volcanic soils in openings and under canopy in mixed conifer and red fir forest	Forested	Westfall; Globe; Stump Springs-Big Creek; Tamarack-Dinkey
<i>Leptosiphon serrulatus</i> MADERA LEPTOSIPHON Polemoniaceae	FS Sensitive	1000-4100	Dry slopes in cismontane oak woodland and lower montane coniferous forest. Usually in decomposed granite gravel, one instance on serpentine.	Chaparral; Forested	Stump Springs-Big Creek

Name/Family	Status	Elev. Range (feet)	Habitat	Habitat Guild	Analysis Unit (AU)
<i>Lewisia congdonii</i> CONGDON'S LEWISIA Portulacaceae	FS Sensitive	1900-7000	Rock faces, cracks and ledges; scree and talus, spoil piles of Barite Mine. Metamorphics or granitics. Chaparral and conifer forest.	Rock outcrop	South Fork
<i>Lewisia disepala</i> YOSEMITE LEWISIA Portulacaceae	FS Sensitive	4000-7500	Granitic sand and gravel in ponderosa pine, mixed conifer and upper montane coniferous forest	Rock outcrop	Westfall; Mammoth; Dinkey-Kings
<i>Lewisia kelloggii</i> ssp. kelloggii KELLOG'S LEWISIA Portulacaceae	FS Sensitive	6000-11000	Open, gravelly flats in mixed conifer and subalpine forest	Rock outcrop	Gaggs
<i>Lupinus citrinus</i> var. citrinus Endemic ORANGE LUPINE Fabaceae	FS Sensitive	1500-5500	Granitic sand and gravel on flats and pans of outcrops and in coarse soil adjacent to outcrops. Chaparral, foothill woodland, ponderosa pine and mixed conifer forest.	Rock outcrop	Stump Springs-Big Creek; Jose-Chawanakee; Dinkey-Kings
<i>Meesia triquetra</i> THREE-RANKED HUMP MOSS	FS Sensitive	6000-8000	Fens in montane meadows in conifer forest.	Riparian	Gaggs; Globe; Mammoth; Stump Springs-Big Creek; Tamarack-Dinkey; Dinkey-Kings
<i>Meesia uliginosa</i> ONE-NERVED HUMP MOSS	FS Sensitive	7500-9000	Saturated meadows at upper elevations of mixed conifer forest and red fir/lodgepole forest	Riparian	The only known occurrence is about 1 mile east of the boundary of Dinkey-Kings, however habitat exists in many AUs.

Name/Family	Status	Elev. Range (feet)	Habitat	Habitat Guild	Analysis Unit (AU)
<i>Mielichhoferia elongata</i> Moss	FS Sensitive	0-3550	Metamorphic, sedimentary, limestone or serpentine soils with high copper content. Usually chapparral or foothill woodland	Rock outcrop	South Fork
<i>Mimulus filicaulis</i> SLENDER-STEMMED MONKEYFLOWER Scrophulariaceae	FS Sensitive	3900-5700	Vernally moist sites in foothill woodland, conifer forest	Other	Near South Fork. Not yet confirmed on the SNF although the type specimen is Snow Creek, near the SNF boundary.
<i>Mimulus gracilipes</i> SLENDER-STALKED MONKEY FLOWER Scrophulariaceae	FS Sensitive	1500-4225	Open gravelly areas in chaparral, ponderosa pine forest (often in burns and disturbed areas)	Rock outcrop, Chaparral	Jose-Chawanakee; Dinkey-Kings
<i>Mimulus pulchellus</i> PANSY MONKEY FLOWER Scrophulariaceae	FS Sensitive	1950-6500	Vernally wet areas in conifer forest (not yet found on the SNF)	Riparian	Only known sites are near South Fork; not yet known on SNF.
<i>Ribes menziesii</i> var. <i>Ixoderme</i> AROMATIC CANYON GOOSEBERRY Grossulariaceae	FS Watch List	1800 – 3500	Chaparral and cismontane woodland.	Chaparral	Dinkey-Kings
<i>Trifolium bolanderi</i> BOLANDER'S CLOVER Fabaceae	FS Sensitive	6500-7500	Montane meadows in mixed conifer and upper montane conifer forest/ mesic	Riparian	Westfall; Gags; Globe; Tamarack-Dinkey; Dinkey-Kings

The remainder of the eleven SNF TES plant species do not occur or have habitat where motorized travel takes place, thus they will not be analyzed in this DEIS; these are shown in Table 139.

Note: The Federally listed species, *Sidalcea keckii* is excluded from further analysis.

**Table 139. Rare Plants Excluded from Further Analysis**

Name and Family	Fed/State	Elev. Range (feet)	Habitat	Rationale for excluding from analysis
<i>Clarkia lingulata</i> Endemic MERCED CLARKIA Onagraceae	State listed Endangered	1000- 2500	Chaparral, foothill woodland, Merced River Canyon/Bear Creek drainage only	The two known populations are in South Fork along Highway 140. None are subject to motorized travel impacts because of the steepness and inaccessibility of the slopes.
<i>Delphinium inopinum</i> UNEXPECTED LARKSPUR Ranunculaceae	FS Sensitive	6000- 9000	Rocky sites in upper montane conifer forest (Monarch Wilderness)	This species is primarily a southern Sierran species, with its northern distributional limit in the Monarch Wilderness about 5 miles east of the Dinkey-Kings Analysis Area.
<i>Draba sharsmithii</i> MT. WHITNEY DRABA Brassicaceae	FS Sensitive	Above 11000'	Talus in subalpine forests and alpine fell-fields, on dry granitic sands and gravels or in protected rock crevices.	Only known occurrence is in wilderness, outside of the project area.
<i>Eriogonum nudum</i> var. <i>regivirum</i> KINGS RIVER BUCKWHEAT Polygonaceae	FS Sensitive	700- 2000	Carbonate slopes in chaparral and foothill woodland.	The only known occurrence is in the Kings River Special Management Area, outside of the project area.
<i>Heterotheca monarchensis</i> MONARCH GOLDENASTER Asteraceae	FS Sensitive	5700- 6000	Limestone cracks, ledges and sandy flats at base of cliffs surrounded by canyon live oak woodland.	Known from three occurrences on a limestone formation northeast of the Horseshoe Bend of the Kings River near Boyden Cave.
<i>Lupinus gracilentus</i> SLENDER LUPINE Fabaceae	FS Sensitive	8000- 11,500	Subalpine coniferous forest.	Only known occurrence is in wilderness and National Parks adjacent to the project area. Not found during field surveys.
<i>Lupinus lepidus</i> var. <i>culbertsonii</i> HOCKETT MEADOW LUPINE Fabaceae	FS Sensitive	8000- 10,000	Meadows, sub-alpine coniferous forests on mesic rocky sites.	Not yet found in the SNF, not likely to occur within project area.
<i>Petrophyton caespitosum</i> ssp. <i>acuminatum</i> MARBLE ROCKMAT Rosaceae	FS Sensitive	3900- 7550	Lower to upper coniferous forests on carbonate or granitic, rocky substrates	Not yet found in SNF, nearest location is Boyden Cave region – habitat precludes threats for the most part.

Name and Family	Fed/State	Elev. Range (feet)	Habitat	Rationale for excluding from analysis
<i>Sidalcea keckii</i> KECK'S CHECKERBLOOM Malvaceae	Federally listed: Endangered	400-1500	Serpentine soils; clay soils. Valley and foothill woodlands, chaparral.	Not yet found in SNF, no unauthorized routes occur near suitable habitat.
<i>Streptanthus fenestratus</i> TEHIPITE VALLEY JEWEL-FLOWER Brassicaceae	FS Sensitive	4000-7000	Lower montane conifer forest, Upper montane conifer forest	Only known occurrence is in wilderness in the vicinity of Tehipite Valley, outside the project area.
<i>Viola pinetorum</i> ssp. <i>grisea</i> GREY-LEAVED VIOLET Violaceae	FS Sensitive	(4875) 8,000-11050	Dry peaks and slopes in subalpine zone.	In SNF, only known from the wilderness at high elevations. Lower elevation populations are found in San Bernardino NF.

Please see the Biological Assessment/Biological Evaluation for TES Plants for further details.

## Habitat Type Guilds

As introduced above in the Effects Methodology section, gauging effects to rare plants can be facilitated by using the concept of habitat type guilds. While the rare plant species known or suspected to occur in the analysis area vary widely in their ecological requirements and life history characteristics, many occur in similar broad habitat types where the effects of motor vehicle use are comparable. For the purposes of this analysis, the rare plant species being considered have been grouped into guilds, based on general habitat requirements. A species may occur in one or more guilds. The guilds are summarized below:

### Riparian guild

Riparian areas are areas between wetlands and uplands (Potter 2005) that are continually, partially or periodically inundated with water. This also extends to areas that contain a water source such as a spring or seep that is below ground. Riparian habitats under this guild include streambanks, lakeshores, wet meadows, fens, springs and seeps. Vegetation in these areas depend on the close proximity of water for optimal growth; riparian plant communities tend to be distinctive from surrounding areas in that they usually have higher species diversity of plants and animals and higher plant density and vigor than adjacent upland habitats on the SNF.

### Forested guild

For the purposes of this analysis, forested habitats are characterized as areas of developed, non-riparian soils within the boundaries of a stand of trees, usually mixed-conifer or other coniferous forest types on the SNF. These areas have at least partial canopy cover and species here are adapted to lower light conditions than species of rock outcrops. Some species require mycorrhizae or a duff layer in order to survive.

### Rock outcrop guild

Rock outcrop habitats are open, sunny areas of prominent granitic, metamorphic, volcanic or carbonate rock formations that contain little organic matter but may have eroded material in shallow depressions or cracks. These features contain the substrate that rock outcrop species

thrive on, as there is usually little competition from surrounding vegetation that requires organic materials. This habitat is fairly common on the SNF across all analysis areas.

## Chaparral guild

The mixed chaparral of the SNF foothills is a unique type that has not been well-represented in classifications of California vegetation (Sawyer and Keeler-Wolf 1995). SNF mixed chaparral is dominated by sclerophyllous shrubs in lower elevations, south aspects or shallow-soil areas. This is a fire-adapted vegetation type with shrubs that recover from fire by sprouting, producing seedlings or both. Dominant species in this type of chaparral are buckbrush (*Ceanothus cuneatus*), chaparral whitethorn (*C. leucodermis*), yerba santa (*Eriodictyon californicus*), Mariposa manzanita (*Arctostaphylos viscida* ssp. *mariposa*), redberry (*Rhamnus ilicifolia*) and mountain mahogany (*Cercocarpus betuloides*). In most of the Madera and Fresno county portions of the Forest, there is a conspicuous absence of chamise (*Adenostoma fasciculatum*), which is a dominant of much chaparral in California. In Mariposa County, typical chamise chaparral is found on the northern part of the Forest. Montane chaparral is found in areas above 5000 ft where frequent fires or poor soils occur, but the rare plant species of interest in this analysis are not found in montane chaparral as a rule.

## Analysis Units

As described in the introduction to Chapter 3, analysis units were devised to divide the SNF into areas defined by geographic and transportation boundaries that would be easily understood by the public on a map. The following is a summary of botanical resources found within each analysis unit:

### South Fork Analysis Unit (SFM)

This analysis unit includes the Devil's Peak Botanical Area. Most of the rare plant populations are not threatened by motor vehicle impacts because they grow in areas inaccessible to vehicles. Rare plant species known to occur in this analysis area are: Mariposa clarkia, Merced clarkia, Yosemite onion, Congdon's lewisia, Congdon's woolly sunflower and Parry's horkelia. There are six known noxious weed species.

### Westfall Analysis Unit (WES)

Several fens occur in this unit. There are six known sensitive plant species: the mountain lady's slipper orchid, Rawson's flaming trumpet, three-ranked hump moss, veined water lichen and Yosemite bitterroot. There are eight known noxious weed species.

### Globe Analysis Unit (GLO)

The sensitive plant species known to occur in this unit are: mountain lady's slipper orchid, Bolander's clover, three-ranked hump moss, veined water lichen and short-leafed hulsea. There are three known noxious weed species.

### Gaggs Analysis Unit (GAG)

There are eight known sensitive plant species in this unit: two endemic species are almost entirely contained within this area, including the Shuteye Peak fawn lily and Rawson's flaming trumpet. In addition; short-leafed hulsea, Mono Hot Springs evening primrose, Bolander's clover, brook pocket moss, Kellogg's lewisia, subalpine fireweed and veined water lichen are known to occur in this unit. There are five known noxious weed species.

## Mammoth Analysis Unit (MAM)

The following rare plant species are known to occur in this unit: carpenteria (tree anemone – the only Madera County population), Yosemite lewisia, Mono Hot Springs evening primrose, three-ranked hump moss, subalpine fireweed and Rawson's flaming trumpet. There are three known noxious weed species.

## Stump Springs-Big Creek Analysis Unit (SSB)

The sensitive plant species known to occur in this unit are: Mono Hot Springs evening primrose, short-leafed hulsea, subalpine fireweed and three-ranked hump moss. There are three known noxious weed species.

## East of Kaiser Pass Analysis Unit (EKP)

The rare plant species known to occur in this unit are subalpine fireweed and Mono Hot Springs evening primrose. There are three known noxious weed species.

## Jose-Chawanakee Analysis Unit (JCH)

This analysis unit contains the two SNF populations of the Federally threatened Mariposa pussypaws as well as the bulk of the populations of carpenteria. Other rare plant species known to occur in this unit are: orange lupine and slender-stalked monkey flower. There are seven known noxious weed species.

## Tamarack-Dinkey Analysis Unit (TAD)

The rare plant species known to occur in this unit are: short leafed hulsea, three-ranked hump moss, Bolander's candle moss, subalpine fireweed and Bolander's clover. There are five known noxious weed species.

## Dinkey-Kings Analysis Unit (DNK)

A large number of central Sierra endemic species are found in this unit including Yosemite lewisia orange lupine and tree anemone. Other rare plants occurring in this area are three-ranked hump moss, Bolander's clover, veined water lichen, Muir's tarplant and Tulare County bleeding heart. There are eight known noxious weed species.

## Summary of Analysis Unit Data

Table 140 displays rare plant occurrences by analysis unit. Plant species in the table are ones known to be in the project area (also see Table 138). This was done in order to give a sense of the amount of potential impact posed by Alternative 1. This data represents all occurrences within an analysis unit that are known; this is not an effects summarization but rather a tool to understand the relative scope of the project area relative to the proposed actions. Effects analysis for these species is found in the next section- Environmental Consequences.

**Table 140. Rare Plant Occurrences by Analysis Unit on the SNF**

Plants*	SFM	WES	GAG	GLO	MAM	SSB	EKP	JCH	TAD	DNK	Total
ALYO	2										2
BRBO				1					3		4
CACA					1			5		8	14
CAMU									1	5	6
CAPU								2			2
CASIA			1			4	7				12
CLBIA	7										7
CLLI	2										2
CORA		2	61		8						71
CYMO		13									13
EPHO			4	24		4	1		28	26	87
ERCO	9										9
ERNUR										1	1
ERPL			5								5
ERPRA <sup>1</sup>			3	3							6
HAPY	1										1
HOPA	3										3
HUBR		1		5		8			23		37
LECO	5										5
LEDI		2			5					5	12
LEKE			3								3
LESE						2					2
LUCIC						1		65		35	101
METR			2	7	3	2			6	7	27
MIGR								6		1	7
PEHY		4	4						2	2	12
RIME <sup>1</sup>										1	1
TRBO		1	1	24					7	5	38
<b>Total</b>	<b>29</b>	<b>23</b>	<b>84</b>	<b>64</b>	<b>17</b>	<b>21</b>	<b>8</b>	<b>78</b>	<b>70</b>	<b>97</b>	<b>490</b>

\* See Environmental Consequences section for plant codes; <sup>1</sup> watch list species

## Environmental Consequences

See the effects analysis methodology section above regarding how this analysis was conducted.

### Alternative 1 – No Action

In summary, most TES plants can be negatively affected by direct/indirect impacts from motor vehicles. General effects include crushing of plants, which can often destroy some plants with as few as ten passes (Wilshire, Shipley and Nakata 1978). Indirect effects to plants can occur when habitat is altered due to soil erosion, soil compaction, increase in bare soil, introduction of noxious weeds, reduction in vegetation cover, shift in community composition and fugitive dust. Soil erosion can either remove suitable topsoil required for germination of rare plants or eroded soil can be deposited onto existing plants, depriving them of light or crushing them. Compacted soils affect infiltration rates of precipitation, causing increased surface runoff and diverting water from plants; it can also affect root growth and seed germination, forcing roots to spread out to

find more friable soil and hampering the ability of seedlings to put roots out (Davidson and Fox 1974). Repeated crushing of plants by motor vehicles can eventually kill them; and the resultant absence of plant cover along with soil compaction, can lead to increased bare soil in areas that formerly were suitable for plant establishment. Increased vehicle use in certain areas can bring in propagules of non-native plants from other infested areas. When this is combined with the disturbance of local native vegetation by motor vehicles, the spread of noxious weeds can increase dramatically (Rooney 2005). Other studies have shown that high motor vehicle use in areas dominated with shrub species have caused shifts to forb and grass-dominated communities (Payne, Foster and Leininger 1983). Finally, fugitive dust from motor vehicle use in dry areas can impact plants by inhibiting photosynthesis and reproductive ability (MWLAP and GCC 2004).

One administrative legacy on the SNF is Forest Order 15-90-22. This plan identified two areas where motorized travel was either prohibited or restricted to designated routes. These areas are shown in Figure 1 in Chapter 1. In this alternative, 660,000 acres of National Forest Land would remain open to motorized cross-country use in these areas. Although this Forest Order had been enforced, illegal routes were still created and effects to botanical resources occurred. The assumption is that if this alternative were to be chosen, that the enforcement of Forest Order 15-90-22 would continue and that no new illegal routes would be created and no routes ridden that were not already designated before this project. Direct effects to rare plants in these areas would cease after implementation of the alternative. While this does not change effects analyses for many rare plants on the SNF, some plants may have some changes in negative effects. These changes will be discussed below by guild:

### *Riparian guild*

Species in this guild that would be at least partially affected by the cessation of motor vehicle activity on illegal routes include all moonwort species (listed fully in the effects analysis for continued unauthorized cross-country travel), Bolander's candle moss, Rawson's flaming trumpet, subalpine fireweed, Shuteye Peak fawn lily, three-ranked hump moss, veined-water lichen and Bolander's clover. Direct effects would essentially cease to plants in these areas, although negative indirect effects would continue to occur in many instances. These effects would be soil erosion, soil compaction, stream morphology alteration, oil, gas, nitrate and heavy metal pollution, system fragmentation and invasive plant dispersal/establishment. In some cases, these effects would compose most of the negative impact to these species and so the original analyses would remain unchanged. Cessation of direct effects would lower some negative impacts to certain species in this guild, primarily subalpine fireweed and Shuteye Peak fawn-lily. Many of these species in this guild also have occurrences below the designated areas and motor vehicle activity in that area would be unabated in this alternative. With that in mind, a significant portion of the guild species would have effects occur as discussed in the section on continuation of unauthorized use.

### *Rock outcrop guild*

Four species effects analyses would be at least somewhat affected by the Forest Order enforcement: Muir's tarplant, Mono Hot Springs evening primrose, Yosemite lewisia and Kellogg's lewisia. As direct effects would assume to cease in these areas, these species would receive some decreased impacts from vehicles. Indirect effects would continue for some period although for this guild indirect effects are not as important as direct effects in terms of negative impacts. Again, as for the riparian guild, all of these species span above and below the area where cross-country motor vehicle travel is prohibited and many populations would continue to receive full direct effects as discussed in the main analyses for this guild. Mono Hot Springs evening primrose is probably the only exception to this as most of the populations are known in these areas. Direct effects for this particular plant would be assumed to stop with implementation of

this alternative if chosen. This would lower the negative effects to SNF populations to a low level.

### *Forested guild*

The only species analysis in this guild affected by Forest Order 15-90-22 is short-leaved hulsea. Enforcement of the Forest Order would cease motor vehicle activity on illegal routes if this alternative were selected. Direct effects to short-leaved hulsea would then also stop and indirect effects would be the only consideration for this species. Indirect effects include habitat (canopy) alteration, soil erosion, soil compaction and noxious weed dispersal/establishment. As this species has multiple occurrences both in and out of these areas, effects would be diminished to some degree but not significantly. Because the negative impact to the species was analyzed to be low to moderate originally, it may become just low with this consideration. However, some individuals and even some occurrences may be extirpated due to their location outside of these areas.

### *Chaparral guild*

No species in this guild are expected to have any change in effects analysis.

### *Other habitats*

No other species analyzed in the project area would be affected by enforcement of the Forest Order.

## Direct and Indirect Effects

### *Continued Cross-country Travel*

The direct and indirect effects of the no action alternative are discussed below for rare plant species, grouped into vegetation types.

#### RIPARIAN GUILD

Rare moonworts: *Botrychium* species (*Botrychium ascendens*, *B. crenulatum*, *B. lineare*, *B. lunaria*, *B. minganense*, *B. montanum*)

This group of species is found in montane and subalpine habitats, usually in wet or moist meadows, fens, seeps and even some stands of some trees. While the only currently known populations are in wilderness areas, there is potential habitat in the project area. The largest threat to habitat for these species is from alteration of hydrologic functioning due to motor vehicles causing ruts or compaction that change drainage patterns. This could affect water tables, pH, infiltration, water temperature and/or pollution. Wet meadows and fens could suffer the most from these effects, although fens within 200 ft of routes are probably the most susceptible. Rare moonworts may be negatively affected if undiscovered populations occur where cross-country motor vehicle riding intensifies.

Rawson's flaming trumpet- *Collomia rawsoniana* (CORA)

There are over 63 occurrences of flaming trumpet on the Bass Lake Ranger District, primarily in Gaggs analysis unit. Because many populations are extensive and grow in areas of riparian habitat where motor vehicle riding is not generally occurring, it is not expected to be severely threatened by unauthorized motor vehicle use. Extirpation of individuals and some smaller portions of occurrences would be expected, though, over time and could affect the health of the species, resulting in decreased fecundity for those individual populations. Indirect effects would include erosion of soil into riparian habitat and increased sedimentation of streams, which would likely alter germination and establishment of new populations of Rawson's flaming trumpet.

Subalpine fireweed- *Epilobium howellii* (EPHO)

Approximately 87 occurrences of subalpine fireweed are found within the no action alternative area. Many are in close proximity to existing roads and trails and in some cases seem to thrive on a certain amount of disturbance. While risk of direct damage from unauthorized motor vehicle traffic is likely due to the amount of known occurrences, our widening capacity in surveying success and its affinity for disturbed areas lessens the potential impact by motor vehicles to this species. Indirect effects of fugitive dust, hydrologic alteration and invasive plant dispersal could also pose some negative effects to SNF populations. The population as a whole is not considered at risk but individual occurrences could be damaged or possibly extirpated under this alternative

Shuteye Peak fawn lily- *Erythronium pluriflorum* (ERPL)

With five large populations centered on Shuteye Peak in the Gaggs analysis unit, this endemic species is at some risk from motor vehicle impacts. There are hundreds of thousands of plants in this area, most of which are not accessible by motor vehicles. Under Alternative 1, cross-country motor vehicle travel would impact individual plants for the populations that are accessible to motor vehicles. The risk of negative direct and indirect effects to this species from this alternative is significantly higher than those from the proposed action, the cross-country travel prohibition only alternative, the resource alternative and/or the improved access motorized recreation opportunities alternative. However, the overall risk from this alternative to Shuteye Peak fawn lily is in possible damage or death of individual plants. Occurrences may suffer some decrease in reproductive health and expansion of populations to suitable habitat would likely not occur.

Brook pocket moss- *Fissidens aphelotaxifolius*

As a moss found in riparian areas, this species is thought to exist on the SNF. While it has not been found during botanical surveys for this project and others, it is assumed to be on the forest. This moss is found in wet but not inundated areas and can be assumed to be at risk from unauthorized motor vehicle activity. As there is no current indication as to the amount or health of brook pocket-moss on the SNF, it can only be surmised that there would be some detrimental effect to the species but would not likely cause extirpation as it is found in other National Forests in the Sierra Nevada.

Blandow's bog-moss- *Helodium blandowii*

A moss species associated with montane fens, seeps and wet meadows, it is thought to exist on the SNF but has not yet been discovered during surveys. As it requires inundation, maintenance of hydrologic functions for riparian features is important. Unauthorized motor vehicle activity across the forest would likely impede functioning of some of these features and may degrade habitat for this species. Because the number of populations is unknown, it is assumed that continuing to allow motor vehicle activity as it exists will negatively affect this species to some degree.

Three-ranked hump moss - *Meesia triquetra* (METR)

As a species usually found in wet meadows or fens, this moss may not be at high risk from direct effects of motor vehicle use immediately but rather is more at risk from indirect effects of such use. Indirect effects would include soil erosion and/or deposition into riparian areas and alteration of meadow or fen hydrology, to which this species is particularly sensitive to (Cooper, Chimner and Wolf 2005) Lowering of the water table in a fen by headcuts to adjacent streams or ruts from tires causing increased runoff from the fen could lower water tables and therefore negatively affect current populations. Some direct impact may occur, however, if unauthorized use included trails through meadows or riparian areas. Over 27 occurrences are known within the no action alternative area, with some at higher risk of suffering negative effects than others, due to

accessibility of certain meadows or riparian features. This species is at risk of incurring negative indirect effects affecting its habitat.

Pansy monkeyflower- *Mimulus pulchellus* (MIPR)

This particular species has not been confirmed on the SNF but potential habitat exists for it and so it is assumed to be within the project area boundary (most likely on the South Fork analysis unit). Its habitat consists of vernal wet areas in coniferous forests. It is not known how much impact motor vehicle activity would have on this species due to our lack of known population data, but it can be assumed that the potential habitat would have at least some minor negative impacts from unauthorized motor vehicle driving.

Veined water-lichen- *Peltigera hydrothyria* (PEHY)

An aquatic lichen (formerly *Hydrothyria venosa*) found in unpolluted montane streams, there are at least twelve populations that could be affected under Alternative 1. This species has been used to determine the relative water quality of montane streams (Davis 1999). Unauthorized motor vehicle activity has been observed to include stream crossings by such vehicles (as verified in the past on the SNF) and with that observation, direct and indirect effects to this species can be assumed as well. Actual impactation by tires (direct effects) of the species may be relatively low but indirect effects to the species will be detrimental as sedimentation and erosion of stream channels can have a large impact on this particular lichen, due to its habitat requirements of clear stream water, preferred substrate and specific hydrologic conditions. Several occurrences could be affected enough to reduce fecundity and/or decrease the amount of occupied stream reach by the lichen.

Bolander's clover- *Trifolium bolanderi* (TRBO)

Spread across the SNF in montane wet meadows, this species is found in 38 known populations in the no action alternative area. Unauthorized use of motor vehicles could lead to direct impact of this species in these areas, as it has happened occasionally in the past, but the main impacts are expected to be indirect effects from soil erosion and alteration of hydrology. Due to its large and extensive populations, this plant is not expected to be extirpated under this alternative but would suffer impacts to its fecundity. Individual populations would be expected to decrease in size and/or health over time.

## RIPARIAN EFFECTS

The amount of inventoried routes within meadows and other riparian features is 4.65 miles. This compares to Alternative 2 with zero miles, Alternative 3 with zero miles, Alternative 4 with zero miles and Alternative 5 with 0.08 miles.

## CHAPARRAL GUILD

Carpenteria- *Carpenteria californica* (CACA)

Due to its form as a shrub, most carpenteria populations would not receive as much effect from motor vehicle use as other plants. With 14 populations and some of those quite extensive, the species is not in danger of extirpation or severe damage. However, unauthorized motor vehicle use could damage some individual shrubs and cutting down of shrubs to create new routes would negatively affect species health.

Parry's horkelia- *Horkelia parryi* (HOPA)

Known from three robust occurrences (one of which is just over 2 acres) in the South Fork analysis unit. Cross-country motor vehicle riding could crush plants and fragment the populations into smaller units over time.

Madera linanthus- *Leptosiphon serrulatus* (LESE)

Two known populations of Madera linanthus are found on the SNF on steep roadside banks. Direct effects from motor vehicle use cannot be ruled out but they will likely have little impact as the known populations would not be easily accessed by motor vehicles. Indirect effects from erosion caused by routes above a certain population may have more impact over time than direct effects from tires or driving.

ROCK OUTCROP GUILD

Yosemite onion- *Allium yosemitense* (ALYO)

With three populations (out of six known for the species) on the SNF, Yosemite onion populations are in inaccessible areas not likely to experience negative impacts of motorized travel.

Mono Hot Springs evening primrose- *Camissonia sierrae ssp. alticola* (CASIA)

Twelve populations of Mono Hot Springs evening primrose are found in areas that are subject to motor vehicle activity. See the Forest Order discussion in the beginning of this alternative for changes to this analysis. Indirect effects from past motor vehicle activity would continue to impact some populations. These effects would be altered soil deposition, oil, gas and nitrate pollution and inadvertent invasive plant dispersal. Because of this species' location in the areas where cross-country motor vehicle travel is currently prohibited, the risk of overall negative effects are relatively small.

Mariposa pussypaws (Federally Threatened) - *Calyptridium pulchellum* (CAPU)

There are two known populations of Mariposa pussypaws in the SNF with both occurring in the Jose-Chawanakee analysis unit. These populations are located at elevations between 2500-3500 ft on granitic outcrops. Under this alternative direct effects are not expected to occur as the two populations are fenced off but indirect effects could be substantial over time. Soil deposition can easily cover the fine gravel substrate this plant requires and therefore could be impacted by high, unauthorized motor vehicle use. Jose Basin, where these populations are located, is currently popular for motor vehicle riders and has a plethora of unauthorized routes. Additionally, the relatively low reproductive capacity and annual status of the species makes it more susceptible to environmental perturbations (Hinton 1975). Due to the allowance of unrestricted motor vehicle travel, the U.S. Fish and Wildlife (USFWS) design criteria for Mariposa pussypaws (USDI-USFWS 2007) could not be implemented in this alternative. This alternative does not restrict cross-country travel or establish new additional routes to the SNFTS. The USFWS criteria are for designating currently unauthorized routes, not restricting current motor vehicle travel on the SNF.

Muir's tarplant- *Carlquistia muirii* (CAMU)

Six populations of this species are known in the no action alternative area, with the majority located in the Dinkey-Kings analysis unit. Though most of these populations are located on extremely rough terrain features (steep rock outcrops), there is some risk of direct effect to the species from unauthorized motor vehicle use as the number of populations are near roads and therefore theoretically accessible. Indirect effects from soil erosion could be more damaging to the plant but lack of accessibility would dampen negative effects.

Congdon's woolly sunflower- *Eriophyllum congdonii* (ERCO)

All nine occurrences for this species are concentrated in the South Fork analysis unit. Unauthorized motor vehicle activity poses a threat to this species but direct effects would likely be small as areas are hard to access. Soil erosion is an indirect effect that poses a larger impact to

the species, as deposition from eroded routes could cover existing plants while also covering areas that could germinate new seedlings.

Congdon's lewisia- *Lewisia congdonii* (LECO)

Another endemic species with only five populations located exclusively within the South Fork analysis unit, this plant faces a slight risk from direct effects of unauthorized motor vehicle use. For the most part, plants grow where the terrain is inaccessible to motor vehicles.

Yosemite lewisia- *Lewisia disepala* (LEDI)

Yosemite lewisia has ten populations on the SNF spread between Dinkey-Kings, Gags and Mammoth analysis units. The populations are located mostly on open granitic outcrop areas in mixed-conifer forest that are attractive to motor vehicle users. One area (Quarry Dome) had to be rocked off in places in 2006 to discourage riders from driving over gravel pans that form the main habitat for this species (Tuitele-Lewis 2006). Although its distribution spans across the central Sierras, the populations on the SNF would be at risk from direct effects of motor vehicle use due to the preference of riders for these granitic habitat areas. Extirpation of many populations on the SNF from direct and indirect effects, although unlikely, could occur under this alternative.

Orange lupine- *Lupinus citrinus* var. *citrinus* (LUCIC)

Found on the same granitic habitat as slender-stemmed monkeyflower and Yosemite lewisia, this species is much more common on the SNF than any other granitic habitat plant. Approximately 101 occurrences are known, with most of the occurrences found in Dinkey-Kings and Jose-Chawanakee analysis units. As it is so closely affiliated with granitic outcrops and gravel pans, this makes it susceptible to unauthorized motor vehicle activity and subsequent damage from being driven over. It is likely that several populations may be affected; some populations would likely be extirpated under this no action alternative. Complete extirpation of the species on the SNF is unlikely but significant effects to population health are probable.

Slender-stemmed monkeyflower- *Mimulus filicaulis* (MIFI)

The nearest known location to the SNF is the type locality, given as "Snow Creek" near Darrah. If there are undiscovered populations on the SNF, there is some risk of damage from motor vehicle riding.

Slender-stalked monkeyflower – *Mimulus gracilipes* (MIGR)

Approximately seven populations of this species are known on the SNF at this time with the focal point being in Jose–Chawanakee analysis unit. Their affiliation with gravel pans and open granitic areas make them particularly susceptible to unauthorized motor vehicle use. That susceptibility is increased by the accessibility of most of the locations to motor vehicles. Jose-Chawanakee has relatively accessible and attractive terrain for motor vehicles and the granitic pans that composes the habitat for this species are often open, increasing the likelihood of direct and indirect impacts. Viability of the species on the SNF could be compromised by the no action alternative in the absence of monitoring and conservation measures.

## FORESTED GUILD

Mountain lady's-slipper- *Cypripedium montanum* (CYMO)

Due to its sensitive habitat requirements and physiology (Kaye and Cramer 2005), disruption or extirpation of mountain lady-slipper populations has a stronger effect on the viability of individuals or populations relative to some other forested TES species. All thirteen populations in the no action alternative area are at some risk from motor vehicle use, especially so as their focused population distribution is in an area with high amounts of recreational motor vehicle

activity (Westfall analysis unit). Effects from cross-country motor vehicle use would likely damage some populations, reducing the plants health on the SNF. Extirpation of individual occurrences is unlikely but cannot be ruled out.

#### Short-leaved hulsea- *Hulsea brevifolia* (HUBR)

Though endemic to the central Sierra, this species is found extensively in higher elevations (5500-8000 ft) across the SNF. With 41 large populations known in the no action alternative area, the species is not at high risk from unauthorized motor vehicle use but would suffer a notable decline in health and loss of individual populations. As much of the habitat is under partial or full canopy of larger red fir trees and often not far from roads or trails, there exists some risk of direct effects to individuals and occurrences; however, the magnitude of that effect is harder to estimate but likely is moderate (risk of extirpation of species is very low but damage to individual SNF populations could be high).

#### OTHER HABITAT

##### Mariposa clarkia- *Clarkia biloba* ssp. *australis* (CLBIA)

At risk from unauthorized motor vehicle use but would not likely be extirpated due to the proximity to already disturbed areas, existing roads and steep local terrain. Direct effects from unauthorized motor vehicle use includes crushing of plants; indirect effects would encompass erosion of soil from plant populations, deposition onto plants and the dispersal of invasive plant seeds and propagules in Mariposa clarkia habitat. A decrease in population numbers (seven populations known on the SNF) is unlikely but cannot be dismissed. A small to moderate reduction in health and fecundity of Mariposa clarkia plants is more likely.

### Cumulative Effects

Cumulative negative effects to SNF TES plants from Alternative 1 (No Action, Cross-Country Allowed) would be significant overall, especially in comparison to the action alternatives. Cumulative effects have been broken down to TES plant habitat groupings to clarify the magnitude and specificity of those effects:

#### *Riparian Guild*

Cumulative effects from motor vehicle activity and other past, present and reasonably foreseeable actions to riparian species would likely be significant. Over time, assuming unauthorized motor vehicle activity stays at least the same level of use it does currently, indirect effects to streams, wet meadows, fens, seeps and springs would accumulate. Other forest activities that also impact riparian species include grazing and fuels treatments. Cattle grazing in meadows, fens and streamside areas can alter stream morphology and increase soil erosion. Planned fuels treatments often have streamside buffers but can still increase sediment deposition in particular watersheds. Hydrology of wet meadows and fens are particularly susceptible to perturbations and changes to water level, sediment input, pH or water temperature could alter these systems to a degree such that they no longer function as fens but rather as wet meadows (Cooper, Chimner and Wolf 2005); wet meadows could become dry meadows. Streambank species, such as Rawson's flaming trumpet, subalpine fireweed and veined water-lichen would be only slightly more robust to alterations in the physical environment. Veined water-lichen would be the most susceptible, as its requirement for cold temperatures, laminar flow and clean granitic substrates can be easily altered with sediment input from erosion of routes or pollution from vehicles. Rawson's flaming trumpet and subalpine fireweed are streambank dwellers within the high-flow reach of a channel and the most likely cumulative effects would be those intermittent disturbances that alter or remove these plants by traveling vehicles or equipment.

### *Rock Outcrop Guild*

Rock outcrop species can be considered to be highly susceptible to unauthorized motor vehicle activity and therefore cumulative effects could be significant for this group of species. Although not many projects take place on rock outcrops, motor vehicle activity alone can be considered to be the main catalyst for cumulative effects for rock outcrop species. Any current or planned projects on the SNF that have rock outcrops within their project area have design measures built in that exclude equipment and vehicles, avoid piling materials on the outcrops and prevent spraying of any chemicals without further consultation with a SNF botanist. Over time, rock outcrop species populations, especially those of Mariposa pussypaws, Yosemite lewisia and slender-stemmed monkeyflower could suffer moderate to severe losses in habitat (clean granitic pans on outcrops) and species viability for the aforementioned species would decrease measurably. Mono Hot Springs evening primrose is more robust due to its extensive populations in wilderness areas and distributional range but it too could suffer some decline in population health. Carbonate/metamorphic outcrops on the SNF are located in hard to access areas but cumulative effects for this grouping of species could also be evident. A few species have extremely limited distribution in this grouping and these plants (Yosemite onion, Congdon's woolly sunflower and Congdon's lewisia) can be considered to be highly sensitive to cumulative effects. Although the number of forest projects in the vicinity of these species (Merced River) are presently limited, the risk of landslides coupled with recreation activities and recent wildfires pose a threat when considered with unauthorized motor vehicle activity for these species. Erosion from routes could possibly alter or cover plants and even occasional direct effects from tire trampling could occur to individuals over time. Population viability for these three species could be compromised and while not likely, extirpation of one or more of these species is a small but real consideration when considering cumulative effects.

### *Chaparral Guild*

Cumulative negative effects for chaparral species would occur but to what degree is harder to ascertain as some species are used to regular disturbance. Carpenteria may be somewhat resistant to negative direct effects from motor vehicle activity, but when considered with other effects, such as that of wildfire or fuels treatments, negative cumulative risk to this species increases. Motor vehicle activity may not be a major contributor to cumulative effects for this species but some loss of plants may occur over time as motorized trails would likely proliferate and cutting of individuals by motor vehicle users to create or access existing trails may occur. Parry's horkelia has a small distribution of occurrences that could be sensitive to motor vehicle activity over time, especially if the population is fragmented. Although its population is large (just over 2 acres), the threat of unauthorized motor vehicle activity along with nearby vectors of high-risk noxious weeds (yellow starthistle, Klamathweed) and the potential for wildfire, it may suffer severe declines in fecundity and could even be extirpated. Madera linanthus would most likely suffer the least negative effects due to its locations and preferences for moderately disturbed areas.

### *Forested Guild*

The species in the forested habitat are more robust than other habitat groupings but some cumulative effects are expected under this alternative. Short-leaved hulsea is widespread enough that while individual populations may diminish or even be extirpated, the metapopulation would be only slightly negatively affected although some SNF populations could be more negatively affected. Mountain lady's-slipper is probably more susceptible to unauthorized motor vehicles and this combined with ongoing and foreseeable timber projects in the Westfall analysis unit (Fish Camp Project, Sugar Pine Adaptive Management Project) makes cumulative effects for this species at least somewhat negative. Although design measures have been built in to these projects

for mountain lady-slipper, the opening of the canopy and understory can increase access to occurrences of this plant by motor vehicles.

### *Other Habitat*

Mariposa clarkia is limited in distribution, which increases any negative cumulative effects impact. As populations are hard to access by vehicle, direct effects are not generally expected, but with erosion, mass soil movement, wildfire and invasive plants continually threatening this species negative cumulative effects are still expected under this alternative. These impacts would likely decrease fecundity of the species as well as decrease areas for population expansion. Extirpation for this species is a remote possibility but cannot be ruled out.

## **Alternative 2 – Proposed Action**

Indicators for measuring the amount of impact by an alternative is the number of populations of SNF TES plant or SNF Watch List plants within 100 ft of a proposed road/trail/area. That distance is assumed to cover both direct and indirect effects resulting from the proposed establishment of facilities with noted exceptions. It does not account for past actions along that unauthorized route or area.

## **Direct and Indirect Effects**

### *Prohibition of Cross-country Travel*

The direct effects of implementing a prohibition on cross-country motor vehicle travel on botanical resources are widespread and would generally be beneficial for almost all plants across all habitat types. Cessation of motor vehicle activity in most areas of the SNF would result in improved health of individual plants, which leads to generally improved reproductive ability. Populations at risk or previously impacted by motor vehicles would be able to recover in most cases, although it may be that some populations would have moved beyond a threshold of recovery and would not be able to sustain themselves without active management. Recovery would be most beneficial in granitic and metamorphic/carbonate habitats, where ecological processes for recovery take longer. Riparian habitat plants would also benefit greatly, as certain hydrologic functions are needed for plant population stability. If those functions are not impacted by unauthorized motor vehicle activity, then the plants in those areas will have a higher probability of maintaining or even increasing population numbers. Some of those hydrologic functions include water table level, stream sedimentation, stream morphology, water pH and stream disturbance. TES plants in forested and chaparral habitats would also benefit, although the effect would not likely be as significant as it would be for the previously mentioned habitats as the habitats tend to be more dynamic and disturbance-prone.

Indirect effects of implementing the cross-country travel prohibition would be decreased habitat alteration across the spectrum of habitats, which would lead to improved or at least stable population health for TES and watch list plants. These alterations include canopy cover, substrate removal, erosion/deposition, water temperature, pollution (by oil, nitrates, ozone and /or heavy metals) and dust. Decreasing the activities responsible for those alterations leads to slight to significant beneficial effects for almost all TES and watch list plant species. Another indirect effect of cessation of cross-country travel is the reduced probability of spreading noxious weed propagules across the SNF by motor vehicles. This in turn leads to less competition for resources by native vegetation and improves ecosystem stability and health.

### *Addition of Facilities*

Alternative 2 proposes to add approximately 44 miles of existing, inventoried unauthorized routes to the NFTS as trails and 6 miles as roads to be added to the SNFTS. There are a total of six acres of use areas being proposed as well for this alternative. In comparison, Alternative 1 has 479 miles of known routes, Alternative 3 is adding 0 miles and 0 acres, Alternative 4 is adding 51 miles and 37 acres and Alternative 5 is proposing 90 miles and 113 acres. Tables 141, 142 and 143 list the proposed routes, roads and use areas that affect botanical resources in Alternative 2. These effects are described below by guild or habitat grouping.

## **ROADS AND/OR TRAILS, SIERRA NATIONAL FOREST TES AND WATCH LIST SPECIES**

### **RIPARIAN GUILD**

#### **Rawson's flaming trumpet**

One proposed trail will have direct or indirect effect on one population of Rawson's flaming trumpet. This trail includes JSM70 in the Gags analysis unit. Direct effects of tire trampling on Rawson's flaming trumpet plants would be likely although limited in scope as the population is spread along the riparian corridor both upstream and downstream from the route area. This impact, however, could fragment the population and reduce fecundity. Indirect effects of possible increased erosion, compaction of soil, pollutants, dispersal of noxious weed propagules and habitat alteration would negatively impact the population over time. It is hard to estimate the scale of impact for this particular population but it would be at least slightly negative and possibly moderately negative. If a stream crossing is installed as a design measure, it is suggested that a bridge be used as it will generate the least impact to Rawson's flaming trumpet and veined water-lichen. Other crossing types such as culverts or low-water crossings are likely to generate negative short-term effects that could significantly impact Rawson's flaming trumpet and veined water-lichen. Consultation between a SNF hydrologist, road engineer and botanist should take place before mitigations begin to confirm whether this action is appropriate. If not, the trail is recommended to be dropped from the SNF Motor Vehicle Use Map (MVUM). Monitoring of Rawson's flaming trumpet occurrences and mitigations would be implemented when routes are brought on the MVUM; the interval and timing of which will be determined by SNF botanists.

#### **Subalpine fireweed**

Two proposed trails will have direct or indirect effect on two populations of subalpine fireweed. These trails include KD-218 in Dinkey-Kings and PK-85 in Tamarack-Dinkey analysis units. Although the plant is adapted to moderately disturbed riparian habitat, it is unlikely that repeated trampling of the plant by motor vehicle tires would enhance its viability. By applying mitigation measures (BO-3) to define the travelway it would reduce the likelihood of inadvertent travel over the subalpine fireweed population, reducing the effects to low for both populations. This mitigation should have little impact to other resources as the work needed for it can be done by hand using local materials. The KD-218 population is small and located in mesic conditions adjacent to the roadside; while impacts may occur, it is already in an area that is marginal for its viability. As for the PK-85 population, it is slightly larger but conditions are similar in respects to exposure and hydrology. Because this plant is being found increasingly throughout the SNF, its ecology is being understood better and the current consensus on the SNF is that the metapopulation is robust and disturbance in some subpopulations is not likely to impact this plant in a significant way. Monitoring of subalpine fireweed occurrences and mitigations would occur at an interval to be determined by SNF botanists.

#### **Veined water-lichen**

Six proposed trails will have direct or indirect effect on populations of veined water-lichen. These trails include JSM70 in Gags, JD2, ML403, PK24, PK25 and SR-112 in Westfall analysis units. Direct effects for this aquatic lichen would include stream crossings by vehicles, which occurs in every aforementioned route with the exception of PK25, which comes within 30 meters (98 feet) of the same stream that PK24 does. This would crush or remove plants located in the immediate vicinity of the crossing. Of more concern are the indirect effects of motor vehicle traffic in these streams which include increased sedimentation, pollution by oil and/or gas (along with exhaust) and alteration of streambed morphology. As veined water-lichen depends on clear and cold fresh water, alterations to these parameters have significant negative impact to the viability of the species (Davis 1999). Additionally, increased sedimentation would cover favorable substrate (clean granitic rocks) areas where veined water-lichen prefers to live, eradicating both existing plants and preventing the expansion of new plants. The scope of the impacts would be limited to areas downstream of such crossings but that is considerable for some stretches of streams. . If a hardened stream crossing is installed, it is suggested that a bridge be used as it will generate the least impact to veined water-lichen. Other crossing types such as culverts or low-water crossings are likely to generate negative short-term effects that could significantly impact veined water-lichen. Consultation between a SNF hydrologist, road engineer and botanist should take place before mitigations begin to confirm whether this action is appropriate. If not, the trail is recommended to be dropped from the MVUM. Monitoring of veined water-lichen occurrences and mitigations would occur at an interval to be determined by the SNF botanists.

#### **General meadow habitat effects**

The amount of inventoried routes within meadows and other riparian features is 0 miles. This compares to Alternative 1 with 4.65 miles, Alternative 3 with 0 miles, Alternative 4 with 0 miles and Alternative 5 with 0.08 miles.

### **CHAPARRAL GUILD**

#### **Carpenteria**

Two proposed trails will have direct or indirect effect on one population of carpenteria. These trails include JH1 and SR-3 in Jose-Chawanakee analysis unit. The population indicated is the largest population (17,000 acres) of carpenteria on the SNF. There are expected to be few direct impacts as the plant form is a medium to large shrub but vehicular traffic can remove branches and stems. Indirect effects are more problematic; some of those effects are soil compaction, removal or alteration of existing shrubs to facilitate motor vehicle use, the spread of noxious weed propagules and/or wildfire resulting from contact with heated vehicle parts. Mitigations for these routes would be that any maintenance activity that would be undertaken to bring these routes up to standard would first be reviewed by a SNF botanist to ensure carpenteria populations are not affected. Monitoring of carpenteria occurrences and mitigations will occur over an interval to be determined by SNF botanists.

**Table 141. Alternative 2 – Unauthorized Routes added as NFTS Trails with Resource Issues**

Route	Affected Species	# of Occurrences	Analysis Unit	Mitigation Measure
JH1	CACA	1	Jose-Chawanakee	BO-4
SR-3	CACA	1	Jose-Chawanakee	BO-4
JD2	PEHY	1	Westfall	BO-7
JSM70	PEHY,CORA	PEHY-1, CORA-1	Gaggs	BO-7
ML-403	PEHY	1	Westfall	BO-7
PK24	PEHY	PEHY-1	Westfall	BO-7
PK25	PEHY	1	Westfall	BO-7
SR-112	PEHY	PEHY-1	Westfall	BO-7

**Table 142. Alternative 2 – Unauthorized Routes Added as NFTS Roads with Resource Issues**

Route	Affected species	# of occurrences	Analysis Unit	Mitigation measure
KD-218	EPHO	1	Dinkey-Kings	BO-3
PK-85	EPHO	1	Tamarack-Dinkey	BO-3

**USE AREAS, SIERRA NATIONAL FOREST TES AND WATCH LIST SPECIES**

**RIPARIAN GUILD**

**Bolander’s clover**

Proposed use area TULEMDW1 in Tamarack-Dinkey analysis unit will have indirect effects on one population of Bolander’s clover. In the current location (per GPS data) no direct effects are expected to occur, as the population exists outside the use area. However, because the use area boundary is within 200 ft of some portion of the population, indirect effects have the potential to occur. Those effects include run-off from the use area, fugitive dust and alteration of hydrology. While it is likely these indirect effects would be small, they still are possible and the impact would be negative to the population. The magnitude of the impact to this population of Bolander’s clover would most likely be small but population fecundity and health could be impacted, especially by altered hydrology, as this species is found in perennially wet meadows. No specific botanical mitigation measures were proposed but monitoring of this use area for potential indirect effects will occur on an annual basis for a period that will be at least 3 years, after which monitoring may switch to a biennial interval. Any indication that indirect effects are harming Bolander’s clover in this location should trigger an interdisciplinary (IDT) review.

**Table 143. Alternative 2 – Use Areas with Resource Issues**

Use area	Acres	Affected Species	# of occurrences	Analysis Unit	Mitigation measure
TULEMDW1	6.12	TRBO	1	Tamarack-Dinkey	Monitoring
<b>Total acres with botanical resources known*</b>		<b>Total acreage proposed</b>		<b>Proportion with botanical resources affected*</b>	
6.12		6.12		100 percent	

*Changes to the Existing NFTS*

**SEASON OF USE**

The following changes to the season of use from Alternative 2 will have these expected effects to TES plant species: Road closures under this alternative will differ from some current road restrictions as they are in Alternative 1. Roads were reviewed by the appropriate resource personnel for the High Sierra and Bass Lake Ranger Districts. Road closure periods were reviewed for current maintenance level 3 and 2 roads. Relevant and current resource information was applied to roads when they were reviewed and in some cases resulted in proposed new closure periods for these roads based on resource issues. Some seasonal or year round closures were made for TES plants. Direct negative effects from Alternative 2 to TES plants will be reduced in terms of seasonal use of roads. Several roads that were identified with botanical resources in the vicinity of the road are now proposed to be either closed year round to the public or have a wet-weather closure to prevent damage to those resources; see Table 144 for a listing of roads with known botanical issues. Only in one case in Alternative 2, (09S310 aka Kaweha Road) will a road be changed from closed year round to a wet-weather closure. Some indirect negative impacts to carpenteria may occur but are expected to be very low as most effects have already occurred due to road construction and also to the dispersed nature of the carpenteria population. In general, these closures will reduce direct and indirect effects to pertinent plants, especially soil compaction and erosion, when compared to their current status (Alternative 1).

**Table 144. Alternative 2 – Road Closures for Botanical Resource Issues**

Road ID	Road Name	Analysis Unit	Status in Alternative 1	Alternative 2 Open: From-To	
07S031A	Daulton Station	Stump Springs-Big Creek	Open year round	Apr. 20	Dec. 1
08S008AB	Agua B	Jose-Chawanakee	Open year round	Closed year round	
08S008JB	RR Grade Line JB	Jose-Chawanakee	Open year round	Closed year round	
08S008JC	RR Grade Line JC	Jose-Chawanakee	Open year round	Closed year round	
08S008JCA	RR Grade Line JCA	Jose-Chawanakee	Open year round	Closed year round	
08S008JCB	RR Grade Line JCB	Jose-Chawanakee	Open year round	Closed year round	
09S006EA	Rector Spur EA	Jose-Chawanakee	Open year round	Closed year round	
09S061B	Buster	Jose-Chawanakee	Open year round	Closed year round	

Road ID	Road Name	Analysis Unit	Status in Alternative 1	Alternative 2 Open: From-To	
09S061C	Toad	Jose-Chawanakee	Open year round	Closed year round	
09S310	Kaweha	Jose-Chawanakee	Closed year round	Apr. 20	Dec. 1
10S034	Garfield	Tamarack-Dinkey	Closed year round	Closed year round	
10S069*	Dinkey-Trimmer	Dinkey-Kings	Open year round	May 20	Dec. 1
				Apr. 20	Dec. 1
11S040K	General Phil	Tamarack-Dinkey	Open year round	Closed year round	
11S061	Nutmeg Saddle	Dinkey-Kings	Closed year round	Closed year round	

\*Two sections of the road have different closure periods- the longer restriction period is for MP 4.20 to 11.50; the second shorter period for 11.50 to 20. 80

## Cumulative Effects

Cumulative impacts resulting from this alternative and past, present and reasonably foreseeable future actions on the SNF to TES plants are hard to gauge but they are most likely beneficial in comparison with Alternative 1 and moderately beneficial relative to Alternative 5. The amount of total proposed trails, roads and use areas is smaller than in either Alternatives 1 or 5 and the effects to botanical resources is less altogether in Alternative 2 than either alternative. Negative cumulative impacts to TES plants are still feasible in this alternative; the spread of noxious weed seeds inadvertently by motor vehicles is a constant risk to rare plants and SNF ecosystems. Veined water-lichen is most likely to be susceptible to negative cumulative impacts that include the proposed unauthorized motorized routes; all of veined water-lichen occurrences under this alternative are located in Westfall analysis unit. Jose-Chawanakee analysis unit will have some low cumulative effects for orange lupine and carpenteria. Most other analysis units have low cumulative effects or no cumulative effects to TES plants from this proposed alternative. In addition, Westfall and Jose-Chawanakee analysis units also have concurrent or reasonably expected fuels treatment projects which add to the level of cumulative negative impacts for these species. It is expected that TES plants overall will have moderately beneficial cumulative effects resulting from this alternative (with the aforementioned exceptions) as it will decrease the amount of available routes and use areas significantly from current levels of use.

## Alternative 3

### Direct and Indirect Effects

#### *Prohibition of Cross-country Travel*

Direct and indirect effects of the prohibition on cross-country travel are similar to those described in Alternative 2 with the exception that no facilities are proposed to be added to the NFTS under this alternative and that any positive effects from the prohibition of cross-country travel would be increased across the SNF. This would result in a slightly to moderately positive effect for most TES plant species. No negative impacts are expected from this alternative to known populations of TES plants on the SNF.

### Cumulative Effects

When combined with past, present and reasonably foreseeable future actions (including roadside hazard sales, grazing and prescribed burns), the cumulative effects of Alternative 3 for TES plants

would be moderately to strongly positive for most TES plant species. Prohibiting cross-country travel would have similar effects to those described under Alternative 2.

## **Alternative 4**

### **Direct and Indirect Effects**

#### *Prohibition of Cross-country Travel*

Direct and indirect effects of the prohibition on cross-country travel are similar to those described in Alternative 2 with the exception of those areas where facilities are being added to the SNFTS. Those additions will be described below.

#### *Addition of Facilities*

Alternative 4 has a total of 51 miles of proposed trails and roads and 37 acres of proposed use areas to be brought in to the SNF transportation system. This is in comparison to 479 miles of routes in Alternative 1, 50 miles of proposed trails and 6 acres in Alternative 2 and 90 miles of proposed trails with 113 acres of use areas in Alternative 5. Tables 145, 146 and 147 display the proposed roads, trails and use areas affecting botanical resources. These resources are discussed below by habitat grouping.

### **ROADS AND/OR TRAILS, SIERRA NATIONAL FOREST TES AND WATCH LIST SPECIES**

#### **RIPARIAN GUILD**

##### **Rawson's flaming trumpet**

One proposed trail will have direct or indirect effect on one population of Rawson's flaming trumpet. This trail is JSM70 in Gaggs analysis unit. As this trail crosses a tributary to Browns Creek, it goes through a riparian area that contains Rawson's flaming trumpet along its banks. Expected direct effects would be crushing of plants by vehicles tires. Indirect effects would include alteration of riparian habitat, erosion of streambanks, compaction of soils and the inadvertent spread of noxious weed propagules into Rawson's flaming trumpet habitat. As this stream also contains veined water-lichen (discussed below), it is important that mitigation measures are implemented before this trail could be brought into the SNF transportation system. If noxious weeds such as bull thistle or Himalayan blackberry were accidentally brought in, these could have a more significant impact on the population and on the riparian habitat. Mitigations for this route are discussed below in the veined water-lichen section. If mitigations are used, direct and indirect effects will be relatively low to Rawson's flaming trumpet. Monitoring periodicity would be similar to those suggested for Rawson's flaming trumpet in Alternative 2.

##### **Veined water-lichen**

One proposed trail will have direct or indirect effect on one population of veined water-lichen. This trail is JSM70 in Gaggs analysis unit. Direct effects to this species would be trampling by vehicle tires. Indirect effects include increased sediment load in the stream, oil, gas and nitrate pollution and alteration of stream morphology. If a hardened water-crossing is installed, it is suggested that a bridge be used as it will generate the least impact to veined water-lichen. Other crossing types such as culverts or low-water crossings are likely to generate negative short-term effects that could significantly impact veined water-lichen. Consultation between a SNF hydrologist, road engineer and botanist should take place before mitigations begin to confirm whether this action is appropriate and/or feasible. If not, the trail is recommended to be dropped

from the MVUM. Monitoring of veined water-lichen occurrences and mitigations would occur at an interval to be determined by SNF botanists.

### **Fen habitat**

One proposed trail will have direct or indirect effects on an identified fen in the Gags analysis unit. This has been added because while there are no known TES plants located in this fen, it is a specialized habitat that is extremely sensitive to environmental variations and is noted in the Sierra Nevada Forest Plan Amendment (USDA-FS 2004a) as a type of habitat to be protected from certain project activities (S&G #118). Due to its location downhill from proposed trail JG5 in Gags analysis unit, it is at risk from indirect and cumulative effects resulting from trail use. Although it is located across a road (Road 07S034) from JG5, erosion and drainage from the trail threaten to have negative impacts on the fen habitat. Fen ecology depends on the slow buildup of clonal mosses, sedges, reeds and other plants that can exist due to high water levels, pH, water temperature and macronutrients (Cooper, Chimner and Wolf 2005). Alterations to those functions can damage or eradicate the fen process. Increased sediment input from proposed trail JG5 poses the risk of indirect effects. The mitigation measures for the fen habitat near JG5 will be verified after a site visit with appropriate specialists to determine what will be the most effective at reducing sediment deposition and erosion. The soil and watershed mitigation measures for this route (SW-1,2,5,9,16) will be monitored to determine effectiveness for protecting the fen habitat.

### **General meadow habitat effects**

The amount of inventoried routes within meadows and other riparian features is 0 miles. This compares to Alternative 1 with 4.65 miles, Alternative 2 with 0 miles, Alternative 3 with 0 miles and Alternative 5 with 0.08 miles.

## **ROCK OUTCROP GUILD**

### **Mono Hot Springs evening primrose**

One proposed trail will have direct or indirect effect on one population of Mono Hot Springs evening primrose. This trail is PK-05x in East of Kaiser Pass analysis unit. Direct effects would be expected to have the most impact on this population but as the population is rather large in size, those negative impacts will likely be low with the possibility of a number of individual plants being crushed. Mitigation measures (BO-1 and 3) would minimize negative effects by emphasizing the trailway and keeping motor vehicle users off open granitic areas that form this plants main habitat. Barriers should be made with local material, ideally rock from areas not containing Mono Hot Springs evening primrose and used in the most efficient way possible to prevent effects occurring to plants. Little negative effect to resources are expected in the way of using local rock for barriers but if equipment is used, it should be washed before brought on to site to minimize the risk of spreading noxious weed propagules. Additionally, rocks must be obtained from a local source that has the least relative impact on soils, watershed, aquatics/terrestrial biology and vegetation. Monitoring of the occurrence and its mitigations are to be done at intervals determined by the SNF botanists.

## **FORESTED GUILD**

### **Short-leaved hulsea**

Two proposed trails will have direct or indirect effect on one population of short-leaved hulsea. These trails include PK-65 and PK-66 in Tamarack-Dinkey. Direct effects on short-leaved hulsea would be crushing plants with vehicle tires. Indirect effects would include soil erosion, dispersal of noxious weed seeds and fugitive dust. During botanical surveys along this route for the Travel Management DEIS, a small number of short-leaved hulsea plants (approx. ten mature plants) were observed having some direct and indirect effects occurring to them. Proposed mitigation

measures for the short-leaved hulsea population is to define the travelway near the population to direct traffic in that area and potentially altering the trail pathway if deemed feasible. With application of these mitigation measures BO-2 and 3, these effects would be low. Re-alignment of the trail within 50 ft (15m) will be done in a way to minimize potential for soil erosion, altered hydrology or alteration of surrounding vegetation. Work equipment will need to be washed before coming onsite to prevent the inadvertent dispersal of noxious weed propagules. Monitoring of the re-route and short-leaved hulsea occurrences are expected at least on a biennial basis for a period to be determined by SNF botanists.

**Table 145. Alternative 4 – Unauthorized Routes Added as NFTS Trails with Resource Issues**

Route	Affected Species	# of occurrences	Analysis Unit	Mitigation measures
JG5	None, fen	Fen	Gaggs	SW-1; SW-2; SW-5; SW-9; SW-16; BO-6
PK-65	HUBR	1	Tamarack-Dinkey	BO-2; BO-3
PK-66	HUBR	1	Tamarack-Dinkey	BO-2; BO-3
JSM70	PEHY, CORA	PEHY-1, CORA-1	Gaggs	BO-7

**Table 146. Alternative 4 – Unauthorized Routes Added as NFTS Roads with Resource Issues**

Route	Affected Species	# of occurrences	Analysis Unit	Mitigation measures
PK-05X	CASIA	CASIA	East of Kaiser Pass	BO-1; BO-3

**USE AREAS, SIERRA NATIONAL FOREST TES AND WATCH LIST SPECIES**

**Bolander’s clover**

The addition of 6.1 acres of proposed use area in Tamarack-Dinkey analysis unit will have the following direct/indirect effects on one population of Bolander’s clover:

Direct effects stemming from this proposed use area are similar to those detailed in Alternative 2 for the same area. There are no additional effects or impacts expected from this alternative.

**ROCK OUTCROP GUILD**

**Yosemite lewisia**

The addition of 25.1 acres of proposed use areas will have the following direct/indirect effects on two populations of Yosemite lewisia:

Westfall: Direct effects for this species would be crushing of plants from vehicle tires and the removal of suitable substrate from granitic pans by vehicles as well. Indirect effects would include alteration of hydrology and soil deposition that could alter the ‘clean’ granitic gravel that is preferred by this species (lacking organic matter). Pollution from oil, gas and heavy metals could also affect species health over time. With the suggested mitigation measures (BO-1; BO-3), negative impacts are expected to be low to either population. The mitigation measures would be rock barriers (some may be wood depending on material availability) in areas to both protect

granitic pans and to designate areas for motor vehicle travel on the rock outcrop. Annual monitoring of both populations would ensure the efficacy of these mitigations and adjustments could be made over time to further enhance protection of this species. Using local rock or wood from the surrounding area is not expected to have discernible negative impacts on resources. If equipment is used to carry or extract rock, it should be washed before being brought on site to prevent accidental dispersal of noxious weed seeds.

**Table 147. Alternative 4 – Use Areas with Botanical Resource Issues**

Use area	Acres	Affected Species	# of Occurrences	Analysis Unit	Mitigation measures
TULEMDW1	6.12	TRBO	1	Tamarack-Dinkey	Monitoring
VSTDM363	21.28	LEDI	1	Westfall	BO-1; BO-3
CHPOSDDL390	3.82	LEDI	1	Westfall	BO-1; BO-3
<b>Total acres with botanical resources known</b>		<b>Total acreage proposed</b>		<b>Proportion with botanical resources affected</b>	
<b>37.13</b>		<b>31.22</b>		<b>84 percent</b>	

### *Changes to the Existing NFTS*

#### **SEASON OF USE**

Changes to the season of use for roads and routes under Alternative 4 are not expected to affect SNF TES species in a significant manner but will have some beneficial effects; effects will be similar to those of Alternative 3. Table 148 shows road closures for botanical (and other) reasons. Most are similar to those in Alternative 2 but there are additional roads in this alternative as well as some changes to closure periods. These additions and changes in closure periods will benefit some TES plant populations as well as botanical areas and special interest areas. The only change in seasonal closure that will have potential for negative effects to TES plant species is the Kaweha Road in Jose-Chawanakee which will go from having a year round closure to a wet-weather closure. Some indirect negative impacts to carpenteria may occur but are expected to be very low as most effects have already occurred due to road construction and also to the dispersed nature of the carpenteria population.

**Table 148. Alternative 4 – Road Closures for Botanical Resources**

Road ID	Road Name	Analysis Unit	Alternative 1 Status	Alternative 4 Open: From-To	
07S031A	Daulton Station	Stump Springs-Big Creek	Open year round	Apr. 20	Dec. 1
08S001A	John Boy	Stump Springs-Big Creek	Open year round	Closed year round	
08S008JB	RR Grade Line JB	Jose-Chawanakee	Open year round	Closed year round	
08S008JC	RR Grade Line JC	Jose-Chawanakee	Open year round	Closed year round	
08S008JCA	RR Grade Line JCA	Jose-Chawanakee	Open year round	Closed year round	
08S008JCB	RR Grade Line JCB	Jose-Chawanakee	Open year round	Closed year round	

Road ID	Road Name	Analysis Unit	Alternative 1 Status	Alternative 4 Open: From-To	
09S006EA	Rector Spur EA	Jose-Chawanakee	Open year round	Closed year round	
09S061B	Buster	Jose-Chawanakee	Open year round	Closed year round	
09S061C	Toad	Jose-Chawanakee	Open year round	Closed year round	
09S310	Kaweha	Jose-Chawanakee	Closed year round	Apr. 20	Dec. 1
10S020B	Ahart Meadow Spur B	Tamarack-Dinkey	Closed year round	Closed year round	
10S034	Garfield	Tamarack-Dinkey	Closed year round	Closed year round	
10S043X	Blue Canyon OHV # 1	Dinkey-Kings	Open year round	Closed year round	
10S073B	Straight Spur B	Tamarack-Dinkey	Closed year round	Closed year round	
10S403	Blue Rock	Dinkey-Kings	Open year round	Closed year round	
11S002F	Lower Rancheria	Dinkey-Kings	Open year round	Closed year round	
11S039B	Roetzli	Dinkey-Kings	Open year round	Closed year round	
11S040K	General Phil	Tamarack-Dinkey	Open year round	Closed year round	
11S061	Nutmeg Saddle	Dinkey-Kings	Closed year round	Closed year round	

## Cumulative Effects

Alternative 4 cumulative effects from motor vehicle travel and other past, present and foreseeable projects are expected to be moderately beneficial for most TES plants when compared to Alternatives 1 and 5 with the exception of the discussed effects to listed species in Alternative 4. It is expected to be slightly beneficial or neutral when compared to Alternative 2; again, with the exception to those TES plants already discussed in this alternative. For those plants affected by this alternative, Yosemite lewisia is likely to receive the most negative cumulative impact as the amount of acreage to be added has more effect due to the size of the proposed use areas in comparison to other affected populations. Mitigations for Yosemite lewisia populations will decrease those impacts significantly but will not decrease them to a level of no effect. Other current and foreseeable projects are expected to have little or no impact to Yosemite lewisia, due to design measures built in for rock outcrop species. As for the other TES plants discussed under this alternative, overall negative cumulative effects are expected to be very low with mitigations in place. The impacted fen habitat is expected to have moderate negative cumulative effects if mitigations are not put in; after mitigations are put in, those effects are expected to be low.

## Alternative 5

### Direct and Indirect Effects

#### *Prohibition of Cross-country Travel*

Direct and indirect effects of the prohibition on cross-country travel are similar to those described in Alternative 2 with the exception of those areas where facilities are being added to the SNFTS. Those additions will be described below.

#### **ADDITION OF FACILITIES**

Alternative 5 is proposing approximately 90 miles of routes and roads to be added to the SNFTS. There are a total of 113 acres of use areas being proposed for this alternative. In comparison, Alternative 1 has 479 miles of known routes, Alternative 2 is proposing 50 miles and 6 acres, Alternative 3 is adding 0 miles and 0 acres and Alternative 4 is adding 51 miles and 37 acres. No routes, roads or use areas are being proposed for this alternative in Dinkey Lakes Wilderness or Kings River Special Management Area despite their inclusion in the project area. Tables 140, 150 and 151 list the proposed routes, roads and use areas that affect botanical resources in Alternative 5. These effects are described below by habitat.

#### **ROADS AND/OR TRAILS, SIERRA NATIONAL FOREST TES AND WATCH LIST SPECIES**

##### RIPARIAN GUILD

###### **Rawson's flaming trumpet**

Two proposed trails will have direct or indirect effect on two populations of Rawson's flaming trumpet. These trails include PK47 in Westfall and JSM70 in Gags analysis units. Direct effects include trampling of mature plants by vehicle tires. For possible indirect effects, increased erosion of streambanks, compacted soils/altered hydrology and the dispersal of noxious weed seeds are the most likely negative effects.

**Gags:** JSM70 is a stream crossing route that has been discussed in Alternatives 2 and 4; please refer to those alternatives for effects analyses and mitigations. Alternative 5 does not change or alter those determinations made in those alternatives.

**Westfall:** PK47 does not cross the perennial stream that Rawson's flaming trumpet is located around (North Fork Willow Creek) but it still comes within 5 meters (16 feet) of the waters edge. Direct effects for the PK47 route are likely to be low as plants were not found within the immediate area 49 feet (15 m) around the route. However, some plants were located downstream of the route (within 164 feet (50 m)) that can be affected by indirect effects, especially erosion and noxious weed establishment. Application of mitigation measure BO-1 is expected to reduce the threat of indirect effects to an acceptably low factor. Mitigation measure BO-1 includes blocking downstream access to vehicle with an appropriate barrier made with local materials (there is a lot of rock just up trail from the stream which seems appropriate for use). Using local rock (or wood) material is not expected to have negative impacts on soils, cultural, watershed or aquatic/terrestrial wildlife; however, appropriate resource specialists will be contacted before barriers are installed to ensure that. Monitoring periodicity would be similar to those suggested for Rawson's flaming trumpet in Alternatives 2 and 4.

###### **Shuteye Peak fawn lily**

One proposed trail will have direct or indirect effect on one population of Shuteye Peak fawn lily. This trail includes TH-161z in Gags analysis unit. Direct effects to this population would be

crushing of plants by vehicle tires. Indirect effects for Shuteye Peak fawn lily are inadvertent dispersal of noxious weed propagules by vehicles, soil erosion and/or compaction and pollution by oil, gas or heavy metals. Both direct and indirect effects for the population as a whole are expected to be low as the population spans a large area over the top of Shuteye Peak. Barriers will be put up to avoid preferred habitat by this species (wet meadows, streamsides or seeps). Local materials will be used if possible; quarried rock if not. There are no expected negative effects to resources from installing barriers but equipment used should be washed before being brought on site to prevent the spread of noxious weeds. Kellogg's lewisia also has a concurrent population near TH-161z and the trailway will be designated in such a way to minimize all possible effects for both species. Monitoring of the mitigations will also take place, but the frequency of this monitoring interval has not yet been decided.

### **Veined water-lichen**

Five proposed trails will have direct or indirect effect on five populations of veined water-lichen. These trails include BP21 and JSM70 in Gaggs analysis unit as well as JD2, PK24 and SR-112 in Westfall analysis unit.

**Gaggs:** JSM70 has been discussed for veined water-lichen in Alternatives 2 and 4 and there is no change for that analysis under this alternative. BP21 crosses an intermittent/perennial stream that has veined water-lichen up and downstream of the crossing. Direct effects are trampling of plants by vehicles as they cross the stream; indirect effects include alteration of stream morphology, increased sedimentation and pollution by oil, gas and nitrates. Indirect effects pose the highest threat to this species. If a hardened water-crossing is installed, it is suggested that a bridge be used as it will generate the least impact to veined water-lichen. Other crossing types such as culverts or low-water crossings are likely to generate negative short-term effects that could significantly impact veined water-lichen. Consultation between a SNF hydrologist, road engineer and botanist should take place before mitigations begin to confirm whether this action is appropriate and/or feasible. If not, the trail is recommended to be dropped from the MVUM. Monitoring periodicity would be similar to those suggested for veined water-lichen in Alternative 4.

**Westfall:** JD2, PK24 and SR-112 have been analyzed in Alternative 2 for veined water-lichen and there are no significant changes expected under this alternative for direct/indirect effects. Mitigations as discussed above will be the same for these populations as well.

### **General meadow habitat effects**

The amount of inventoried routes within meadows and other riparian features is 0.08 miles. This compares to Alternative 1 with 4.65 miles, Alternative 2 with 0 miles, Alternative 3 with 0 miles and Alternative 4 with 0 miles.

## **ROCK OUTCROP GUILD**

### **Orange lupine**

Two proposed trails will have direct or indirect effect on two populations of orange lupine. These trails include ES10 and SR-36 in Jose-Chawanakee analysis unit. Direct effects for orange lupine are crushing of plants by tires and removal of granitic gravel from pans by vehicles. Indirect effects are alteration of hydrology and/or soil (gravel) deposition on rock outcrops. ES10 has a population near the beginning of the trail. SR-36 has a population at the top of the trail and is bisected by it. Application of mitigation measures BO-1 and BO-3 for SR-36 include defining the travelway (with rocks or other markers) to emphasize where the trail is located. ES10 would have a barrier put in place to prevent vehicles from staging or turning out into the population. With these mitigation measures in place, effects are expected to be low for both populations;

monitoring of mitigations will occur to ensure efficacy (at least annually for the first two years). Material for barriers should be rock large enough to prevent accidental intrusion by motor vehicles. It is expected that using rock should not impact natural resources in any measurable negative way.

#### **Kellogg's lewisia**

One proposed trail will have direct or indirect effect on one population of Kellogg's lewisia. This trail is TH-161z in Gaggs analysis unit (also contains Shuteye Peak fawn lily). This population is found on the granitic areas surrounding the proposed route and while motor vehicle users may not venture off route, mitigations may be needed in order to prevent staging or turning out onto Kellogg's lewisia plants. Direct effects would pose the highest threat to the species, including direct trampling of plants and removal of gravel substrate from suitable areas. Invasive plant dispersal and soil erosion also pose some risk to the population. With the mitigation measures BO-1 and BO-3 (barriers and a defined travelway) applied for Shuteye Peak fawn lily on the same route, these mitigations would prove adequate for this species as well. Direct/indirect negative effects would be reduced to a low level. Monitoring of these mitigations would occur as discussed in the Shuteye Peak fawn lily analysis. Materials for the barriers and trailways are expected to be from local sources and the work for implementing them will not have any significant negative effects on known resources. Equipment used for barrier construction or implementation should be washed before being brought on site to prevent the inadvertent spread of noxious weed propagules.

#### **Mono Hot Springs evening primrose**

One proposed trail will have direct or indirect effects on one population of Mono Hot Springs evening primrose. This trail is PK-05x in East of Kaiser Pass analysis unit. Direct effects include crushing of plants by vehicle tires and removal of substrate from granitic pans. Indirect effects from motor vehicle use would be alteration of soil pan deposition and hydrology, oil, gas, nitrate and heavy metal pollution from vehicles. With mitigation measures BO-1 and BO-3 applied (barriers and/or a defined travelway), negative effects to the population would be reduced to a low level. Materials for the barriers (rock) and trailways are expected to be from local sources and the work for implementing them will not have any significant negative effects on known resources. If local sources cannot be used without resource damage, then clean granitic rock from a SNF site shall be used. Equipment used for barrier construction or implementation should be washed before being brought on site to prevent the inadvertent spread of noxious weed propagules. Monitoring will be similar to that proposed in Alternative 4 for Mono Hot Springs evening primrose.

#### **Slender-stemmed monkeyflower**

One proposed trail will have direct or indirect effects on one population of slender-stemmed monkeyflower. This trail is SR-36 in Jose Chawanakee analysis unit. Direct effects for this species are trampling of plants with vehicle tires and removal of granitic substrate; indirect effects are soil erosion (away from plants) and deposition (onto existing plants) and dispersal of noxious weed species. This population of slender-stemmed monkeyflower shares roughly the same area as the orange lupine population for this proposed trail. When mitigation measures BO-1 and BO-3 are applied, direct and indirect effects are expected to be low. The mitigation and monitoring for this population and for the orange lupine population (defined travelway) can be combined into one due to their proximity. Materials for the barriers and trailways are expected to be from local sources and the work for implementing them will not have any significant negative effects on known resources. Equipment used for barrier construction or implementation should be washed before being brought on site to prevent the inadvertent spread of noxious weed propagules.

## CHAPARRAL GUILD

### Carpenteria

Two proposed trails will have direct or indirect effects on one population of carpenteria. These trails are JH1 and SR-3 in Jose-Chawanakee analysis unit. As JH-1 was analyzed for this species under Alternative 2, the determination remains the same as no additional factors are expected to affect this species under this alternative. SR-3 also has scattered populations of carpenteria either along or near the trail. Similar mitigation measures would be applied for SR-3 as were proposed for JH1, this should bring any negative effects to carpenteria to a minimal level.

## FORESTED GUILD

### Short-leaved hulsea

Two proposed trails will have direct or indirect effect on one population of short-leaved hulsea. These trails include PK-65 and PK-66 in Tamarack-Dinkey analysis unit. These trails have been analyzed under Alternative 4 and the determination is the same for this alternative as well.

## WATCH LIST PLANTS

### Aromatic canyon gooseberry - *Ribes menziesii* var. *ixoderme* (RIMEI)

Two proposed trails will have direct/indirect effects on one population of aromatic canyon gooseberry. These trails are ZZ25 and ZZ26 in Dinkey-Kings analysis unit. Direct effects include damage to the plant by removal of plant parts or in some cases, removal of the whole plant. Indirect effects would include the accidental dispersal of noxious weed propagules by motor vehicles, soil erosion and soil compaction. This population of aromatic canyon gooseberry is spread between at least two occurrences in the immediate vicinity of the trail (less than 49 feet (15 m)) and another occurrence south of the trail off the main thoroughfare (greater than 328 feet (100 m)). Direct effects are expected to have some small impact but indirect effects will likely have the most impact. The potential to spread noxious weeds is particularly high in this area as there are at least four noxious weed species within a mile of the population (Italian thistle, tocalote, bull thistle and cheatgrass). These effects can be minimized with a minor alteration of the trail (within 49 feet (15 m)) to avoid the noxious weed populations (mitigation measure BO-2). Any equipment working to alter the trail will follow SNFPA ROD (USDA-FS 2004a) standards and Forest Service Manual direction concerning noxious weeds by cleaning equipment before and after leaving the work area. Alteration of the trail would also minimize soil erosion and removal of vegetation. Negative effects would then be relatively low. Monitoring of the occurrences and mitigations would be annually for at least 2 years, subsequent monitoring would be at an interval to be determined by SNF botanists.

**Table 149. Alternative 5 – Unauthorized Routes Added as NFTS Trails**

Route	Affected Species	# of Occurrences	Analysis Unit	Mitigation Measures
BP21	PEHY	1	Gaggs	BO-7
JD2	PEHY	1	Westfall	BO-7
JG5	fen	1	Gaggs	BO-6
JH1	CACA	1	Jose-Chawanakee	BO-4
JSM70	CORA;PEHY	CORA-1; PEHY-1	Gaggs	BO-7
PK24	PEHY	1	Westfall	BO-7
PK47	CORA	1	Westfall	BO-1
PK-65	HUBR	1	Tamarack-Dinkey	BO-2; BO-3

Route	Affected Species	# of Occurrences	Analysis Unit	Mitigation Measures
PK-66	HUBR	1	Tamarack-Dinkey	BO-2; BO-3
SR-112	PEHY	1	Westfall	BO-7
SR-3	CACA	1	Jose-Chawanakee	BO-4
ZZ25	RIME	2	Dinkey-Kings	BO-2
ZZ26	RIME	2	Dinkey-Kings	BO-2

**Table 150. Alternative 5 – Unauthorized Routes added as NFTS Roads**

Route	Affected Species	# of Occurrences	Analysis Unit	Mitigation measures
ES10	LUCIC	1	Jose-Chawanakee	BO-1;
PK-05X	CASIA	1	East of Kaiser Pass	BO-1; BO-3
SR-36	LUCIC; MIGR	1	Jose-Chawanakee	BO-1; BO-3
TH-161z	ERPL; LEKE	1	Gaggs	BO-1; BO-3

## USE AREAS, SIERRA NATIONAL FOREST TES AND WATCH LIST SPECIES

### CHAPARRAL GUILD

#### Carpenteria

The addition of 0.66 acres of proposed use areas will have the following direct/indirect effects on one population of carpenteria:

**Jose-Chawanakee:** Direct effects are loss of individual plants from tire trampling. Indirect effects from noxious weed dispersal and soil compaction may affect some plants but these effects are expected to be low for the population due to two factors- One factor is the population size (same population affected by JH1 and SR-3 in Alternative 2) and the other is the dispersed nature of carpenteria throughout the basin. Plants in the Jose Basin area are found as individuals or small groups clumped together but never in large occurrences. This makes the likelihood of negative effects from this use area to this plant low as only a few plants may be affected by this use area.

#### Yosemite lewisia

The addition of 25.1 (93.9) acres of proposed use areas will have the following direct/indirect effects on two (four) populations of Yosemite lewisia:

**Westfall:** The two known populations in Westfall analysis unit are moderate to large populations of Yosemite lewisia. Direct effects from tire trampling and removal of granitic gravel from pans on the outcrop pose the biggest threat. Indirect effects from alteration of soil deposition and hydrologic flow are feasible but have less impact to the population health. Application of mitigation measures BO-1 and BO-3 (establish barriers around known areas of plants and plant habitat [barriers would be local rock or wood] and in some areas, defining the travelway) would keep vehicle traffic away from sensitive areas. These mitigation measures, along with subsequent annual monitoring for at least two years afterwards, would lower the probability of negative effects to a low level.

**Gaggs:** These two areas have strong possibility of containing Yosemite lewisia or Kellogg's lewisia. Due to the early blooming period of either species (March-May), confirmation of presence was not affirmed. The suggested mitigation measure (BO-5) for both use areas is to conduct surveys in spring of 2009 to confirm presence of either species. If presence is confirmed, then subsequent mitigations consisting of barriers to protect plants and defined travelways in

sensitive areas will be installed, with subsequent monitoring to determine efficacy. If there are no plants found during botanical surveys, then the use area is likely to have no negative effect for any TES plant species. However, a follow-up survey would be conducted the next spring to ensure no plants exist, as the ephemeral nature of these species makes it hard to find if survey timing does not align with the flowering of the plant.

**Kellogg’s lewisia**

The addition of (68.8) acres of proposed use areas will have the following direct/indirect effects on potentially two populations of Kellogg’s lewisia:

See the discussion above under Yosemite lewisia in Gags analysis unit for this species. Presence has not been confirmed in these two use areas. If presence is confirmed after surveying, then appropriate mitigation measures would be applied to reduce direct and indirect effects to the populations.

**Orange lupine**

The addition of 0.66 acres of proposed use areas will have the following direct/indirect effects on one population of orange lupine:

Jose-Chawanakee: This use area also contains the carpenteria population discussed above. Orange lupine effects from motor vehicles would be trampling from tires as well as the removal of granitic gravel from shallow pans on granite outcrops. Indirect effects from alteration of soil deposition, soil erosion or noxious weed dispersal could also occur. Direct effects would likely be low as the population exists just on the periphery of the use area but indirect effects may have more impact to the population over time. Deposition of organic matter from vehicle onto granitic gravel may pose the largest threat over time. Mitigation for this use area is the annual monitoring of the site for observed effects to orange lupine and if negative effects occur, the use area will be removed from the Motor Vehicle Use Map (MVUM) until appropriate mitigations are installed, which include (but are not limited to) barriers, designated trailways or decreasing use area size in the most sensitive area.

**Table 151. Alternative 5 – Use Areas**

Use Area	Acres	Affected Species	Analysis Unit	Mitigations
SGRLFHL223	0.66	CACA, LUCIC	Jose-Chawanakee	BO-3; BO-4
CNTRLCMPSPR345	4.0	LEDI or LEKE	Gags	BO-5
VSTDM363	21.28	LEDI	Westfall	BO-1; BO-3
CHPOSDDL390	3.82	LEDI	Westfall	BO-1; BO-3
RCKCRKSPR391	64.8	LEDI or LEKE	Gags	BO-5
<b>Total acres with botanical resources known</b>		<b>Total acreage proposed</b>	<b>Proportion with botanical resources affected</b>	
<b>94.56</b>		<b>113.02</b>	<b>84 percent</b>	

*Changes to the Existing NFTS*

Changes to the season of use for roads and routes under Alternative 5 are not expected to affect SNF TES species in a significant manner. Effects will be similar to those of Alternative 3 with the exception that 91 miles of routes (including roads) and 113 acres of use areas will be added under this alternative. Table 152 shows road closures for botanical (and other) reasons. Again, this list is similar to that in Alternative 4 with one additional road and some changes to closure periods. The direct/indirect effects of these road closures will be small but positive for TES species as a whole.

Botanical areas and special interest areas also benefit from these closure periods; most are year round maintenance level one (ML 1) closures that will emphasize protection of resources in those areas. One exception is Straight Spur B in Tamarack-Dinkey analysis unit where a current year round closure would change to an August 1 to December 1 closure. This is not expected to have much negative effect on the botanical resource located near this road as the closure period will cover most of the plants important life stages but does not offer the beneficial effects of a year round closure.

**Table 152. Alternative 5 – Road Closures for Botanical Resources**

Road ID	Road Name	Analysis unit	Alternative 1 Status	Alternative 5 Open: From-To	
07S031A	Daulton Station	Stump Springs-Big Creek	Open year round	Closed year round	
08S001A	John Boy	Stump Springs-Big Creek	Open year round	Closed year round	
08S008JB	RR Grade Line JB	Jose-Chawanakee	Open year round	Closed year round	
08S008JC	RR Grade Line JC	Jose-Chawanakee	Open year round	Closed year round	
08S008JCA	RR Grade Line JCA	Jose-Chawanakee	Open year round	Closed year round	
08S008JCB	RR Grade Line JCB	Jose-Chawanakee	Open year round	Closed year round	
09S006EA	Rector Spur EA	Jose-Chawanakee	Open year round	Closed year round	
09S008A	Sugarloaf Spur A	Jose-Chawanakee	Open year round	Closed year round	
09S061B	Buster	Jose-Chawanakee	Open year round	Closed year round	
09S061C	Toad	Jose-Chawanakee	Open year round	Closed year round	
09S310	Kaweha	Jose-Chawanakee	Closed year round	Closed year round	
10S034	Garfield	Tamarack-Dinkey	Closed year round	Closed year round	
10S043X	Blue Canyon OHV # 1	Dinkey-Kings	Open year round	Closed year round	
10S073B	Straight Spur B	Tamarack-Dinkey	Closed year round	Aug. 1	Dec. 1
10S403	Blue Rock	Dinkey-Kings	Open year round	Closed year round	
11S002F	Lower Rancheria	Dinkey-Kings	Open year round	Closed year round	
11S040K	General Phil	Tamarack-Dinkey	Open year round	Closed year round	
11S039B	Roezli	Dinkey-Kings	Open year round	Closed year round	
11S061	Nutmeg Saddle	Dinkey-Kings	Closed year round	Closed year round	

## Cumulative Effects

Cumulative effects to TES plants under Alternative 5 and other present and future projects are expected to be low to moderate (negative) for those species analyzed in this alternative when compared to Alternatives 2, 3 and 4. In comparison to Alternative 1, however, effects for TES species will be moderately beneficial with exceptions for some species. For the most potentially negative effects, veined water-lichen may bear the most impact when proposed routes in this alternative are considered with the cumulative effects of all other Forest projects as the species is fairly susceptible to changes in stream functioning. Five occurrences would be affected in this alternative; along with the remaining population across the SNF this poses a moderate to moderately high negative risk to veined water-lichen over time without mitigations proposed for the species put in place. While this cumulative impact is not expected to be as great as it would be under Alternative 1 and about equivalent to those in Alternative 2, it still can be considered a significant impact to the species. Even with ideal mitigations in place (bridge crossings, as discussed in Alternatives 2, 4 and 5), these cumulative effects would lessen to a lower but still negative level.

Yosemite lewisia also stands to receive a portion of negative cumulative effects under this alternative. The populations in the proposed use areas are large and represent a significant fraction of the Bass Lake RD Yosemite lewisia distribution. Even with mitigations in place, these populations will likely receive low level cumulative effects as it will be hard to mitigate for the indirect effects of altered gravel deposition and hydrologic functioning. Kellogg's lewisia may also receive negative cumulative effects if confirmed in proposed use areas. These effects would be lessened with mitigation but the size of the areas combined with the relative rarity of the species on the SNF increases the magnitude of effects for this species.

Other species discussed under this alternative would have some negative cumulative effects when all applicable forest projects are considered. Many of the remaining species are found in riparian, rock outcrops or chaparral guilds. Mitigations for these species would reduce the cumulative impacts for these species but negative effects may still occur despite that. Rock outcrop species may be the most vulnerable due to the relative accessibility of the habitat in the proposed use areas (mostly flat granite outcrops). Riparian areas are usually designated exclusion zones from most equipment or project activities, but are still vulnerable to cumulative effects resulting from fuels projects, wildfire and grazing. Chaparral habitat may be the most resilient and the species within that habitat (carpenteria, *Ribes menziesii* var. *ixoderme*) are medium to large-sized shrubs that are more likely to be resistant to damage from motor vehicles but effects from noxious weeds and large, intense wildfires still pose a threat to these species health and ecology.

## Summary of Effects Analysis across All Alternatives

Alternative 3 has the least relative impact to botanical resources overall while Alternative 1 has the most relative impact. Alternative 4 has the least impact of the action alternatives while Alternative 5 has the most impact; one category where Alternative 4 ranks slightly worse than Alternative 2 is 'Acres of areas open for public motor vehicle use.' In that instance, Alternative 2 would be better for TES plants near proposed use areas. Alternative 2 has moderate relative impact in comparison to the other action alternatives.

All action alternatives are considered better for TES plant species than Alternative 1 due to the allowance of continued motor vehicle use in Alternative 1. Because the area of effect is much larger, the impact to TES occurrences both known and unknown will be undoubtedly greater, thereby causing the most direct and indirect effects to plant species overall.

## Summary of Effects Determinations for TES species

### Threatened species

#### *Alternative 1*

It is my determination that the Travel Management project may affect but is not likely to adversely affect *Calyptridium pulchellum* as allowing unauthorized motor vehicle activity to continue and perpetuate poses the threat of negative indirect effects to the two known populations on the SNF.

#### *Alternatives 2, 3, 4 and 5*

It is my determination that the Travel Management project will not affect *Calyptridium pulchellum* because of the design measures proposed by U.S. Fish and Wildlife Service (USDI FWS 2006) that the SNF will follow to avoid damaging this plant species. These design measures apply only to unauthorized routes and use areas, not to system roads, areas or trails. The design measure reads:

- Route or area is not within 500 feet of known habitat for *Mariposa pussypaws*

Another portion of the design measures includes a closure period for routes during flowering season in (March-June) suitable habitat areas determined by the SNF Botanist. Proposed routes in all alternatives (except Alternative 1) in the suitable habitat area (Jose Basin) have wet-weather and aquatic wildlife species closures.

### Endangered species

#### *Alternative 1*

It is my determination that Alternative 1 of the Travel Management project may affect but is not likely to adversely affect *Sidalcea keckii* or its designated critical habitat as continued use and growth of unauthorized motor vehicle routes could impact designated critical habitat (serpentine-derived clay soils) on the SNF.

#### *Alternatives 2, 3, 4 and 5*

It is my determination that Alternative 2 of the Travel Management project will not affect *Sidalcea keckii* or its designated critical habitat because there has been to date no record of this plant found on the SNF and suitable habitat for this species is limited to a small, inaccessible area on the southwestern portion of NFS lands.

### Forest Service Sensitive species

#### *Alternative 1*

It is my determination that the Travel Management project on the SNF will not affect *Clarkia lingulata*, *Delphinium inopinum*, *Draba sharsmithii*, *Eriogonum nudum* var. *regerivum*, *Heterotheca monarchensis*, *Lupinus gracilentus*, *Lupinus lepidus* var. *culbertsonii*, *Petrophyton caespitosum* ssp. *acuminatum*, *Streptanthus fenestratus* or *Viola pinetorum* ssp. *grisea* because no populations or suitable habitat are known for these species within the project area.

It is my determination that the Travel Management project on the SNF may affect individuals but is likely not to cause a trend to Federal listing or a loss of viability to *Allium yosemitense*, *Botrychium species* (*B. ascendens*, *B. lineare*, *B. lunaria*, *B. manganese*, *B. montanum*), *Bruchia bolanderi*, *Camissonia sierrae* ssp. *alticola*, *Carlquista muirii*, *Carpenteria californica*, *Clarkia*

*biloba* ssp. *australis*, *Collomia rawsoniana*, *Cypripedium montanum*, *Dicentra nevadensis*, *Epilobium howellii*, *Erigeron aequifolius*, *Eriophyllum congdonii*, *Erythronium pluriflorum*, *Fissidens aphelotaxifolius*, *Horkelia parryi*, *Hulsea brevifolia*, *Leptosiphon serrulatus*, *Lewisia congdonii*, *Lewisia disepala*, *Lewisia kelloggii* ssp. *kelloggii*, *Lupinus citrinus* var. *citrinus*, *Meesia triquetra*, *Meesia uliginosa*, *Mielichhoferia elongata*, *Mimulus filicaulis*, *Mimulus gracilipes*, *Mimulus pulchellus*, *Peltigera venosa* and *Trifolium bolanderi* because populations and suitable habitat for these species will be affected although the threat to viability to almost all species can be considered low.

### Alternative 2

It is my determination that the Travel Management project on the SNF will not affect *Clarkia lingulata*, *Delphinium inopinum*, *Draba sharsmithii*, *Eriogonum nudum* var. *regerivum*, *Heterotheca monarchensis*, *Lupinus gracilentus*, *Lupinus lepidus* var. *culbertsonii*, *Petrophyton caespitosum* ssp. *acuminatum*, *Streptanthus fenestratus* or *Viola pinetorum* ssp. *grisea* because no populations or suitable habitat are known for these species within the project area.

It is my determination that the Travel Management project on the SNF will not affect *Allium yosemitense*, *Botrychium species* (*B. ascendens*, *B. lineare*, *B. lunaria*, *B. manganese*, *B. montanum*), *Bruchia bolanderi*, *Camissonia sierrae* ssp. *alticola*, *Carlquista muirii*, *Clarkia biloba* ssp. *australis*, *Cypripedium montanum*, *Dicentra nevadensis*, *Erigeron aequifolius*, *Eriophyllum congdoni*, *Erythronium pluriflorum*, *Fissidens aphelotaxifolius*, *Horkelia parryi*, *Hulsea brevifolia*, *Leptosiphon serrulatus*, *Lewisia congdonii*, *Lewisia disepala*, *Lewisia kelloggii* ssp. *kelloggii*, *Meesia triquetra*, *Meesia uliginosa*, *Mielichhoferia elongata*, *Mimulus filicaulis*, *Mimulus gracilipes* and *Mimulus pulchellus* because proposed routes, roads and use areas will not impact these species due to their location.

It is my determination that the Travel Management project on the SNF may affect individuals but is likely not to cause a trend to Federal listing or a loss of viability to *Carpenteria californica*, *Collomia rawsoniana*, *Epilobium howellii*, *Lupinus citrinus* ssp. *citrinus*, *Peltigera hydrothyria* and *Trifolium bolanderi* because these populations will receive some direct and/or indirect impacts but species viability is not threatened.

*P. hydrothyria* (veined water-lichen) will receive the most relative negative impact with six occurrences being affected. Other affected species in this alternative will have low negative impacts resulting from the implementation of this alternative.

### Alternative 3

It is my determination that the Travel Management project on the SNF will not affect *Allium yosemitense*, *Botrychium species* (*B. ascendens*, *B. lineare*, *B. lunaria*, *B. manganese*, *B. montanum*), *Bruchia bolanderi*, *Carlquista muirii*, *Carpenteria californica*, *Clarkia biloba* ssp. *australis*, *Clarkia lingulata*, *Collomia rawsoniana*, *Cypripedium montanum*, *Delphinium inopinum*, *Dicentra nevadensis*, *Erigeron aequifolius*, *Eriogonum nudum* var. *regerivum*, *Eriophyllum congdoni*, *Fissidens aphelotaxifolius*, *Horkelia parryi*, *Leptosiphon serrulatus*, *Lewisia congdonii*, *Lewisia disepala*, *Lewisia kelloggii* ssp. *kelloggii*, *Lupinus citrinus* var. *citrinus*, *Lupinus gracilentus*, *Lupinus lepidus* var. *culbertsonii*, *Meesia triquetra*, *Meesia uliginosa*, *Mielichhoferia elongata*, *Mimulus filicaulis*, *Mimulus gracilipes*, *Mimulus pulchellus*, *Peltigera hydrothyria*, *Petrophyton caespitosum* ssp. *acuminatum*, *Streptanthus fenestratus*, *Trifolium bolanderi* and *Viola pinetorum* ssp. *grisea* because proposed routes, roads and use areas will not impact these species due to their location.

It is my determination that the Travel Management project on the SNF may affect individuals but is likely not to cause a trend to Federal listing or a loss of viability to *Camissonia sierrae* ssp.

*alticola*, *Epilobium howellii*, *Erythronium pluriflorum* and *Hulsea brevifolia* because these species are located near existing motor vehicle routes but viability is not threatened for the species.

#### Alternative 4

It is my determination that the Travel Management project on the SNF will not affect *Allium yosemitense*, *Botrychium* species (*B. ascendens*, *B. lineare*, *B. lunaria*, *B. minganese*, *B. montanum*), *Bruchia bolanderi*, *Carlquistia muirii*, *Clarkia biloba* ssp. *australis*, *Clarkia lingulata*, *Cypripedium montanum*, *Delphinium inopinum*, *Dicentra nevadensis*, *Erigeron aequifolius*, *Eriophyllum congdoni*, *Erythronium pluriflorum*, *Fissidens aphelotaxifolius*, *Horkelia parryi*, *Leptosiphon serrulatus*, *Lewisia congdonii*, *Lewisia kelloggii* ssp. *kelloggii*, *Lupinus gracilentus*, *Lupinus lepidus* var. *culbertsonii*, *Meesia triquetra*, *Meesia uliginosa*, *Mielichhoferia elongata*, *Mimulus filicaulis*, *Mimulus gracilipes*, *Mimulus pulchellus*, *Petrophyton caespitosum* ssp. *acuminatum*, *Streptanthus fenestratus* and *Viola pinetorum* ssp. *grisea* because proposed routes, roads and use areas will not impact these species as the proposed facilities are not located near known occurrences or habitat of these species.

It is my determination that the Travel Management project on the SNF may affect individuals but is likely not to cause a trend to Federal listing or a loss of viability to *Camissonia sierrae* ssp. *alticola*, *Collomia rawsoniana*, *Hulsea brevifolia*, *Lewisia disepala*, *Peltigera hydrothyria* and *Trifolium bolanderi* because the magnitude and scale of negative effects to species populations are relatively low in this alternative.

*Lewisia disepala* (Yosemite lewisia) will stand to receive the most negative impact from Alternative 4 if implemented as the amount of area affected is significant (two populations at 25.1 acres total). However, these impacts will likely be indirect effects and minor (possible altered hydrology) due to the mitigations recommended for those use areas.

#### Alternative 5

It is my determination that the Travel Management project on the SNF will not affect *Allium yosemitense*, *Botrychium* species (*B. ascendens*, *B. lineare*, *B. lunaria*, *B. minganese*, *B. montanum*), *Bruchia bolanderi*, *Carlquistia muirii*, *Clarkia biloba* ssp. *australis*, *Clarkia lingulata*, *Cypripedium montanum*, *Delphinium inopinum*, *Dicentra nevadensis*, *Draba sharsmithii*, *Epilobium howellii*, *Erigeron aequifolius*, *Eriogonum nudum* var. *regerivum*, *Eriophyllum congdoni*, *Fissidens aphelotaxifolius*, *Heterotheca monarchensis*, *Horkelia parryi*, *Leptosiphon serrulatus*, *Lewisia congdonii*, *Lupinus gracilentus*, *Lupinus lepidus* var. *culbertsonii*, *Meesia triquetra*, *Meesia uliginosa*, *Mielichhoferia elongata*, *Mimulus filicaulis*, *Mimulus pulchellus*, *Petrophyton caespitosum* ssp. *acuminatum*, *Streptanthus fenestratus*, *Trifolium bolanderi* and *Viola pinetorum* ssp. *grisea* because proposed routes, roads and use areas will not impact these species as the proposed facilities are not located near known occurrences or habitat of these species.

It is my determination that the Travel Management project on the SNF may affect individuals but is likely not to cause a trend to Federal listing or a loss of viability to *Camissonia sierrae* ssp. *alticola*, *Carpenteria californica*, *Collomia rawsoniana*, *Erythronium pluriflorum*, *Hulsea brevifolia*, *Lewisia disepala*, *Lewisia kelloggii* ssp. *kelloggii*, *Lupinus citrinus* ssp. *citrinus*, *Mimulus gracilipes* and *Peltigera hydrothyria* because the magnitude and scale of negative effects to species populations are relatively low.

Veined water-lichen and Yosemite lewisia will receive the most relative negative impacts in this alternative but with mitigations implemented, even these effects should be confined to minor indirect effects. Kellogg's lewisia, if presence is confirmed in two areas, may also incur some

negative impacts from proposed routes due to the relative size of the potential habitat areas but similar mitigations as those suggested for Yosemite lewisia would be implemented and those effects would be limited to some indirect impacts.

## **Compliance with the Forest Plan (LRMP) and Other Direction**

### **Alternative 1**

*Complies with Forest Plan (LRMP) and Forest Service direction regarding TES plants?*

No. Alternative 1 violates the Sierra Nevada Forest Plan Amendment concerning Bog and Fen Habitat (SNFPA ROD page 65, S&G #118, USDA-FS 2004a) and SNF LRMP direction for sensitive plant species to: 'manage sensitive plant species to avoid future listing as threatened and endangered.'

### **Alternative 2**

*Complies with Forest Plan (LRMP) and Forest Service direction regarding TES plants? Yes.*

### **Alternative 3**

*Complies with Forest Plan (LRMP) and Forest Service direction regarding TES plants? Yes.*

### **Alternative 4**

*Complies with Forest Plan (LRMP) and Forest Service direction regarding TES plants? Yes.*

### **Alternative 5**

*Complies with Forest Plan (LRMP) and Forest Service direction regarding TES plants? Yes.*