

3.11 Botanical Resources

3.11.1 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 6,000 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 nowhere 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 on NFS lands.

Management decisions related to motor vehicle use 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 motor vehicle use on NFS lands (FSM 2353.03(2)). Therefore, management decisions related to motor vehicle use on NFS lands must consider effects to plant species, fungi species and their habitats.

Analysis Framework: Statute, Regulation, LRMP and Other Direction

Direction relevant to the analysis of the alternatives 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 is not 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. Federally-listed species that were considered in the analysis for this project include:

- Mariposa pussypaws (*Calyptidium pulchellum*), Federally Threatened (FT). Date Listed- Sep. 14, 1998. Five Year Review for Mariposa pussypaws- Jan. 10, 1998. (http://ecos.fws.gov/docs/five_year_review/doc1871.pdf)
- Keck's checkermallow (*Sidalcea keckii*), Federally Endangered (FE). Date listed- Feb. 16, 2000. Final Rule for Designation of Critical Habitat for Keck's checkermallow- Mar. 18, 2003 (68 FR 12863-12880). Five Year Review for Keck's checkermallow- Jan. 10, 2008 (http://ecos.fws.gov/docs/five_year_review/doc1870.pdf).

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).

SNF Land and Resource 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 LRMP 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).

SNF TES Plant Guides, Conservation Assessments: The following references were used in establishing effects analysis for certain TES plant species on the SNF:

- Merced clarkia (*Clarkia lingulata*) Conservation Agreement (USDA-FS 1999).
- Mountain lady's slipper (*Cypripedium montanum*) and clustered lady's slipper (*C. fasciculatum*) orchid Conservation Assessment (Kaye and Cramer 2005).
- Three-ranked hump moss (*Meesia triquetra*) and broad-nerved hump moss (*M. uliginosa*) Conservation Assessment (Dillingham 2005).

Effects Analysis Methodology

The analysis of effects on rare plant species was a three-step process (FSM 2672.43). First, 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 2009), the Inventory of Rare and Endangered Plants of California (CNPS 2009) 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 SNF Forest (USDI-USFWS 2007), the USDA Forest Service Pacific Southwest Region Sensitive Species List (USDA-FS 2006a) and the SNF Watch List USDA-FS 2006b). Species considered in this analysis are listed in the Affected Environment section below.

Second, field surveys were conducted, focused primarily on unauthorized routes within or adjacent to areas with potential habitat for sensitive plant species. Botanical field surveys were conducted over 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 2009). Every proposed route and Open Area in Alternatives 2, 4 and 5 was surveyed by a SNF botanist from 2007 through 2009; however in some cases only an assessment of suitable habitat was possible, especially for large proposed areas with habitat for early-blooming sensitive plants such as the Mono Hot Springs evening primrose, Yosemite bitterroot, or Kellogg's lewisia. 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 unauthorized routes, as well as to identify effects and develop mitigation measures. Each road, trail and area proposed in the alternatives has been reviewed by resources specialists and their findings are 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 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. The idea is to evaluate relative risk or benefits of the alternatives on habitat types inhabited by rare plants, especially to conceptualize how Alternative 1, which allows cross-country travel, compares with Alternatives 2-5, which prohibit cross-country travel. 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. Motor vehicle use on and near unauthorized routes has affected or has the potential to affect rare plant populations, either directly by damage or death to individual plants (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. Examples of scientific literature documenting the validity of this assumption are: Groom et al (2007); Ouren et al (2007); Trombulak and Frissell (2000); and Kutiel et al (1999).
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/motorized trails/areas. Examples of scientific literature documenting or reviewing the validity of this assumption are: Sheley et al (1999) review the factors involved in preventing noxious weed expansion, and cite an experiment demonstrating that vehicles spread spotted knapweed in Montana. Rooney (2005) studied weed dispersal in relation to ORVs in Wisconsin, and concluded that ORVs were likely agents for weed seed movement at least in some cases.

4. Motor vehicle use on unsurfaced roads/motorized 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. Open Areas include cross-country areas that are open to all vehicles, parking areas that are open to 'highway-legal vehicles only', and staging areas that are open to 'highway-legal vehicles only'. Of the three types of those open to all vehicles tend to have the highest level of impact to rare plants. To be conservative, all three types will be analyzed as if they were open to all vehicles and analyzed for the highest level of impact. As such, the three different types of areas will not be analyzed separately. Throughout the remainder of this report, they will be cumulatively referred to as Open Areas or areas

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 from 2007 through 2009. All proposed motorized trails and roads were walked on the ground and areas within 100 feet 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 motorized trails. All proposed areas were surveyed with rare plant habitat being the primary focus (e.g. rock outcrops, gravel flats, meadows). Historical rare plant and noxious weed data was used to inform survey work and known populations of rare plants (and noxious weeds) were visited to assess their current status. This information is incorporated into the SNF GIS database and on field survey forms supplied to the California Department of Fish and Game's Natural Diversity Database (rare plants) or the SNF noxious weed database, as described above.

Indicators were derived for the analysis in order to have a semi-quantitative gauge for comparing 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 Measurement Indicators

- Number of rare plant species and populations within the analysis units as a way to compare Alternative 1 with the action alternatives.
- Number of rare plant populations within or adjacent to proposed roads, motorized trails and areas, as a proxy for likelihood of direct and indirect effects.
- Season of Use /Prohibition of NFTS Use: Number of rare plant populations or sensitive habitat areas affected by changes in seasonal road closures.
- Miles of proposed facilities open for motor vehicle use within riparian habitat, including meadows, fens and streambanks.

As previously described (Chapter 2), there are four actions proposed: the prohibition of cross-country travel, adding facilities to the NFTS, changes to the NFTS, and two non-significant LRMP amendments. Effects to botanical resources were considered both spatially and temporally, along with the indicators deemed 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 motorized trails, roads and open areas. A summary of the methodology by these four actions are described below as well as a description of how cumulative effects were assessed:

Botanical Resources Methodology by Action

The analysis methodologies for each of the four actions that make up the alternatives and cumulative effects of the actions are described below.

1. Direct and 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 1-2 [SNF, excluding wilderness areas, Research Natural Areas (RNAs) and Botanical Areas] where cross-country travel has been occurring.

Indicator(s): (1) Number of rare plant populations within analysis units. This indicator provides a way to compare Alternative 1 with the action alternatives for analysis units or portions of analysis units below 6800 feet where cross-country travel would be allowed to continue. An analysis unit with a higher number of species and populations of rare plants below 6800 feet elevation would be assumed to have a greater probability of direct and indirect impacts from cross-country travel than an analysis unit with fewer or less vulnerable species and populations.

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

2. Direct and indirect effects of adding facilities (roads, motorized 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 years (see above).

Spatial boundary: Analysis units (see above).

Indicator(s): (1) Number of plant populations within or adjacent to proposed facilities. This indicator is used to compare alternatives using the number of rare plant populations found within 100 ft of proposed facilities as this will take into account direct and indirect effects of motorized recreation, including parking one vehicle-length off motorized trails or roads; (2) Miles of proposed facilities 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 streamsides, wet meadows, fens and some dry meadows as well.

Methodology: (1) Botanical survey of proposed motorized trails, roads and open areas; (2) GIS analysis of proposed facilities and sensitive plant sites/habitat.

3. Changes to the NFTS (changes to vehicle class, season of use, and opening or closing roads).

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

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

Spatial boundary: Analysis units (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 are analyzed to determine their effects.

Methodology: (1) GIS analysis of NFTS roads.

4. Non-significant LRMP Amendment

As explained in section 3.1.1 the non-significant LRMP amendments do not have unique effects when compared to the other actions analyzed in this FEIS. Therefore the environmental consequences have been analyzed and will not be discussed further in the botanical resources section.

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 the SNF, in which case effects to the metapopulation may be discussed (for the purposes of this analysis the metapopulation would be all populations within the Sierra Nevada).

Indicator(s): (1) Number of rare plant populations within or adjacent to proposed facilities. The alternatives are compared by evaluating how many rare plant occurrences occur within 100 feet of proposed motorized trails; (2) Miles of proposed facilities 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 among the alternatives as proposed and past, present and reasonably foreseeable future actions.

Methodology: (1) Botanical survey of proposed motorized trails, roads and open areas; (2) GIS analysis of all proposed facilities and sensitive plant sites/habitat.

3.11.2 Affected Environment

This section summarizes 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. More detailed information is found in the BA/BE for plants.

There are 47 Forest Service Sensitive Plant species and 2 Federally-listed species on the SNF list. Of these 49 TES plant species, 39 have the potential to be affected by the Travel Management alternatives, these are shown in Table 3- 111. Seven rare 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).

Table 3- 111. 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	6000-11000	Meadows, seeps and fens in montane and subalpine zones.	Riparian	Possible in higher elevation subalpine habitats.
<i>Botrychium crenulatum</i> SCALLOPED MOONWORT Ophioglossaceae	FS Sensitive	6000-11000	Meadows, seeps and fens in montane and subalpine zones.	Riparian	Possible in higher elevation subalpine habitats.
<i>Botrychium lineare</i> SLENDER MOONWORT Ophioglossaceae	FS Sensitive; Federal Candidate	6000-11000	Rocky/moist sites in montane and subalpine zones.	Riparian	Possible in higher elevation subalpine habitats.
<i>Botrychium lunaria</i> COMMON MOONWORT Ophioglossaceae	FS Sensitive	6000-11000	Meadows, seeps and fens in montane and subalpine zones.	Riparian	Possible in higher elevation subalpine habitats.
<i>Botrychium manganese</i> MINGAN MOONWORT Ophioglossaceae	FS Sensitive	6000-11000	Meadows, seeps and fens in montane and subalpine zones.	Riparian	Possible in higher elevation subalpine habitats.
<i>Botrychium montanum</i> MOUNTAIN MOONWORT Ophioglossaceae	FS Sensitive	6000-11000	Meadows, seeps and fens in montane and subalpine zones.	Riparian	Possible in higher elevation subalpine habitats.
<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

Name/Family	Status	Elev. Range (feet)	Habitat	Habitat Guild	Analysis Unit (AU)
<i>Calyptidium 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 ssp. 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, Riparian	Mammoth; Jose-Chawanakee
<i>Clarkia biloba ssp. 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
<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, Riparian	Westfall

Name/Family	Status	Elev. Range (feet)	Habitat	Habitat Guild	Analysis Unit (AU)
<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
<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 aphelotaxifolious</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

Name/Family	Status	Elev. Range (feet)	Habitat	Habitat Guild	Analysis Unit (AU)
<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; Gags; Tamarack-Dinkey
<i>Hulsea brevifolia</i> SHORT-LEAVED HULSEA Asteraceae	FS Sensitive	5000-9000	Granitic or volcanic soils 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 oak woodland and lower montane coniferous forest. Usually in decomposed granite gravel, one instance on serpentine.	Chaparral; Forested	Stump Springs-Big Creek
<i>Lewisia congdonii</i> CONGDON'S LEWISIA Portulacaceae	FS Sensitive	1900-7000	Rock faces, cracks and ledges; scree and talus. 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. <i>kelloggii</i> KELLOG'S LEWISIA Portulacaceae	FS Sensitive	6000-11000	Open, gravelly flats in mixed conifer and subalpine forest	Rock outcrop	Gags

Name/Family	Status	Elev. Range (feet)	Habitat	Habitat Guild	Analysis Unit (AU)
<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.
<i>Mielichhoferia elongata</i> Moss	FS Sensitive	0-3550	Metamorphic, sedimentary, limestone or serpentine soils with high copper content. Usually chaparral 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.

Name/Family	Status	Elev. Range (feet)	Habitat	Habitat Guild	Analysis Unit (AU)
<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, Forested	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>Sidalcea keckii</i> KECK'S CHECKER-BLOOM	Federally listed: Endangered	400-1500	Serpentine or clay soils in valley and foothill grasslands, woodlands, or chaparral.	Other	Only known sites are near Dinkey-Kings; not yet known on SNF
<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; Gagg's; Globe; Tamarack-Dinkey; Dinkey-Kings

The remainder of the ten SNF TES plant species do not occur or have habitat where motor vehicle use takes place, thus they will not be analyzed in this FEIS; these are shown in Table 3-112. Note: The Federally listed species, *Sidalcea keckii* is excluded from further analysis.

Table 3- 112. 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 only	The two known populations are in South Fork Analysis Unit along Highway 140. None are subject to motorized travel impacts because of the steepness and inaccessibility of the slopes.
<i>Delphinium inopinum</i> UNEXPECTED	FS Sensitive	6000-9000	Rocky sites in upper montane conifer forest	This species is primarily a southern Sierran species,

Name and Family	Fed/State	Elev. Range (feet)	Habitat	Rationale for excluding from analysis
LARKSPUR Ranunculaceae			(Monarch Wilderness)	with its northern distributional limit in the Monarch Wilderness about 5 miles east of the Dinkey-Kings Analysis Unit.
<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 SNF 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, subalpine 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.
<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 streamsides, 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 distinct from surrounding areas in that they usually have higher species diversity of plants and animals than adjacent upland habitats on the SNF. Fens are areas of peat accumulation (at least 40 cm [15.7 inches] or organic horizons within the upper 80 cm [31.5 inches] of soil) where organic matter production exceeds the rate of decomposition (Weixelman and Cooper, 2009). Fens are sensitive to hydrological changes and are not easy to restore once degraded (rates of peat accumulation in the Rocky Mountains are between 4 and 16 inches per thousand years (Chimner and Cooper, 2002). Although fens comprise a small percentage of the land base, even of the relatively small meadow land base, they are disproportionately important to plant biodiversity because they provide habitat for several rare moss and vascular plant species (Weixelman and Cooper, 2009).

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 are adapted to lower light conditions than species of rock outcrops. Many rare plant species on forested sites 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 (e.g. 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 californicum*),

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 chaparral in much of California. In Mariposa County, typical chamise chaparral is abundant. 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 3- 113 displays rare plant occurrences by analysis unit. Plant species in the table are ones known to occur in the project area (also see Table 3- 111). This was done in order to give a sense of the amount of potential impact posed by Alternative 1. This data represents all known occurrences within an analysis unit; this is not an effects summarization but rather a tool to understand the relative scope of the project area relative to the proposed actions.

Table 3- 113. 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 ¹			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 ¹										1	1
TRBO		1	1	24					7	5	38
Total	29	23	84	64	17	21	8	78	70	97	490

* See environmental consequences section for plant codes; ¹watch list species

3.11.3 Environmental Consequences

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

Alternative 1 – No Action

Direct and Indirect Effects

Cross-country Motor Vehicle Travel

General effects to rare plants from uncontrolled motor vehicle use include crushing and killing of plants (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; compaction 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 (Brooks and Berry 2006). Repeated crushing of plants by motor vehicles can eventually kill them (Groom, 2007); 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 can bring in propagules of invasive non-native plants and noxious weeds from infested areas (Sheley, 1999; Rooney, 2005). When this is combined with the disturbance soil and reduction of native vegetation by motor vehicles, the spread of noxious weeds can increase dramatically (Rooney 2005). Areas of high motor vehicle use that were dominated with native shrub species have undergone 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).

The overall direct and indirect effects of the no action alternative (outside of the discussion of the Forest Order in the above section) are discussed below for rare plant species, organized by guilds.

RIPARIAN GUILD

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

This group of species is found in montane and subalpine habitats in areas of non-granitic parent material (Colwell et al, 2009), usually in wet or moist meadows, fens, seeps and even some stands of some trees. While the only currently known populations in the SNF are in wilderness areas, there is potential habitat in the analysis units. The largest threat to habitat for these species from motor vehicle use is alteration of hydrologic functioning due to ruts or compaction that changes drainage patterns. This could affect water tables, pH, infiltration, water temperature, and pollute the water with petroleum products. Wet meadows and fens could suffer the most from these effects, although fens within 200 ft of unauthorized 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 Gags 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. Indirect effects could include erosion of soil into riparian habitat and increased sedimentation of streams, which could alter germination and establishment of new populations of Rawson's flaming trumpet within portions of its range.

Subalpine fireweed- *Epilobium howellii* (EPHO)

Approximately 87 occurrences of subalpine fireweed are found within the analysis units. Many are in close proximity to NFTS 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, the affinity of subalpine fireweed for disturbed areas lessens the concern for irreversible damage from motor vehicles to this species. Indirect effects of fugitive dust, hydrologic alteration and invasive plant dispersal could also pose some risks to SNF populations.

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

With five large populations centered on Shuteye Peak in the Gags 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 (Alternative 2), Alternative 3, Alternative 4 and/or Alternative 5. However, the overall risk from this alternative to Shuteye Peak fawn lily is in possible damage or death of individual plants on a limited scale.

Brook pocket moss - *Fissidens aphelotaxifolius*

The brook pocket-moss is only known from two sites in California, one in the Sierra National Forest along Owl Creek at about 6300 feet (Madera County). The species grows on wet soil, humus and rocks along narrow streams and in the vicinity of small waterfalls, and in damp or wet crevices of cliffs (Pursell 1976). It is not expected in areas where peak flows wash mosses away. The species occurs from sea level to 6300 feet. Direct effects to the one known location are unlikely as plants grow under a rock near a small waterfall, but direct and indirect effects are possible if additional unknown occurrences exist in more accessible areas. Direct effects could be crushing and killing of plants if they were to be driven over, and indirect effects could be the deposition of sediment onto plants or the loss of streambank habitat due to erosion.

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.

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

As a species of wet meadows or fens, this moss may not be at high risk from direct effects of motor vehicle use but rather is at risk from indirect effects of such use. Indirect effects could include soil erosion and/or deposition into riparian areas and alteration of meadow or fen hydrology, to which this species is particularly sensitive (Cooper, Chimner and Wolf 2005). For example, lowering of the water table in a fen when headcuts result from ruts caused by tires could negatively affect current populations. Some direct impacts may occur when plants are driven on (though generally vehicles do not drive in meadows or riparian areas). Over 27 occurrences of three-ranked hump moss are known within the Alternative 1 area, with some at higher risk of suffering negative effects than others, due to greater accessibility of certain meadows or riparian features to vehicles.

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 (most likely in the South Fork analysis unit). Its habitat consists of open, vernal wet areas in coniferous forests. It is assumed that this habitat type could have at least some negative impacts from cross-country motor vehicle use.

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

An aquatic lichen (formerly *Hydrothyria venosa*) found in unpolluted montane streams, at least twelve populations 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 at stream crossings, thus direct and indirect effects to this species can be assumed. Direct effects from tire impacts are possible but indirect effects from sedimentation and erosion of stream channels can have a large impact on this lichen, due to its preference for clear

stream water, preferred substrate and specific hydrologic conditions. Several occurrences could be affected enough to decrease the amount of occupied stream reach occupied by the lichen.

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

Spread across the SNF in montane wet meadows, this species is known from 38 populations in the Alternative 1 area. Unauthorized use of motor vehicles could lead to direct impact for this species if vehicles were to drive in meadows, but indirect effects from soil erosion and alteration of hydrology would be more likely. Because many of the populations are extensive the species is not at high risk under this alternative, but the possibility is greater than under the other alternatives for a decrease in size or vigor of individual populations (if indirect effects were to continue and result in a cumulative watershed effect over the long term).

OVERALL RIPARIAN EFFECTS

In Alternative 1 there are 4.65 miles of unauthorized routes within meadows and other riparian features. This compares to Alternatives 2, 3, and 4 with 0 miles and Alternative 5 with 0.08 miles of proposed facilities within meadows and other riparian features.

CHAPARRAL GUILD

Carpenteria- *Carpenteria californica* (CACA)

Carpenteria is a medium to tall shrub. Thus, most carpenteria populations would not be as likely to experience direct effects from motor vehicle use as herbaceous 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. Cross-country travel in areas where seedlings are establishing could result in direct effects to the fragile seedlings, jeopardizing the maintenance of adequate genetic variability over the long term.

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

Parry's horkelia is 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. Possible indirect effects would be the introduction and spread of noxious weeds on the wheels of motor vehicles, and the rapid establishment of weeds in areas of increased soil disturbance.

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 unauthorized routes above a given population would be more likely to affect habitat for this species.

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 motor vehicle use.

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 and 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 add NFTS facilities. The USFWS criteria are for designating currently unauthorized routes, not restricting current motor vehicle travel on the SNF.

Muir's tarplant- *Carlquista 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 unauthorized 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.

Keck's checkerbloom – *Sidalcea keckii* (SIKE)

With cross-country travel allowed, because there is a small amount of suitable habitat in the southwestern portion of the Forest, there is a slight chance that undiscovered populations of Keck's checkerbloom could experience direct effects if plants were to be driven over during their growing cycle, or indirect effects if habitat were altered by soil compaction or erosion.

OVERALL EFFECTS

General effects to TES plants in Alternative 1 would be at least moderately negative, with some species receiving more negative direct and indirect effects than others. Species from the rock outcrop and riparian guilds are likely to have more impacts from the continuation of unauthorized motor vehicle travel, due to their particular environmental constraints and sensitivity to changes in those physical environments. Significant reductions in population health are reasonably expected for certain species that are already being impacted by motor vehicles (Yosemite lewisia, orange lupine, slender-stalked monkeyflower).

Additions to the NFTS

There are no proposed additions to the NFTS in Alternative 1.

Changes to the NFTS (changes to vehicle class, season of use, and opening or closing roads)

There are no proposed changes to the NFTS in Alternative 1 and no change from current condition for TES plant species.

Cumulative Effects

Cumulative negative effects to SNF TES plants from Alternative 1 would be most likely under this alternative. Cumulative effects have been broken down by guilds 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. Existing parking and open areas along NFTS facilities can compact soils and possibly increase surface runoff into riparian zones. 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 unauthorized 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 relatively 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 unauthorized 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. Cumulative negative effects to species in this guild are expected and over time, some specific TES plant population health may be greatly affected.

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 could experience fragmentation of habitat over time and possibly accumulation of invasive nonnative grasses which might make seedling recruitment less likely. Parry's horkelia has a small distribution of occurrences that could be sensitive to motor vehicle activity over time, however with the recent expansion of population boundaries after fuels reduction, motor vehicle use is unlikely to bring about cumulative effects. Madera linanthus would most not be likely to experience cumulative effects due to its inaccessible locations and preference for moderately disturbed areas. Existing parking and open areas adjacent to chaparral areas can be vectors for noxious weeds, which can decrease potential habitat for chaparral species. Cumulative negative effects for the chaparral guild are expected to be relatively low in comparison to other guilds.

Forested Guild

The species in the forested habitat are more robust than other habitat groupings but some cumulative effects may occur under this alternative. Short-leaved hulsea is widespread enough, that cumulative effects are unlikely. Mountain lady's-slipper is probably more susceptible to motor vehicle use 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 possible though not likely. Although protective design measures have been built in to these projects for mountain lady-slipper, the opening of the canopy and understory could increase access to occurrences of this plant by motor vehicles. Cumulative negative effects for these species are expected to be at a relatively low level but some periodic disturbance resulting from motor vehicle use or forest projects could have more impacts to the mountain lady-slipper population.

Other Habitat

Mariposa clarkia populations are hard to access by vehicle, thus direct effects are not generally expected, but with erosion, mass soil movement, wildfire and invasive plants continually threatening this species, low to moderate negative cumulative effects are possible under this alternative.

Alternative 2

Direct and Indirect Effects

Cross-country Motor Vehicle 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. Recovery would be most beneficial in granitic and metamorphic/carbonate habitats, where ecological processes for recovery take longer and these areas have received a disproportionate amount of motor vehicle traffic. 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.

Additions to the NFTS

Alternative 2 proposes to add approximately 44 miles of existing, unauthorized routes to the NFTS as motorized trails and 5 miles as roads to the NFTS. There are a total of 6 acres of areas being proposed as well for this alternative. In comparison, Alternative 1 has 605,000 acres open to motorized cross-country travel (approximately 552 miles of unauthorized routes), Alternative 3 is adding 0 miles and 0 acres, Alternative 4 is adding 51 miles and 37 acres and Alternative 5 is proposing 85 miles and 105 acres. Table 3- 114, Table 3- 115, and Table 3- 116 list the proposed motorized trails, roads and areas that affect botanical resources in Alternative 2. These effects are described below by guild or habitat grouping.

ROAD AND TRAIL ADDITIONS, SNF TES AND WATCH LIST SPECIES

Riparian Guild

Rawson's flaming trumpet

One proposed trail will have direct or indirect effects 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, also located on JSM70- see discussion below). 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. 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 motorized trails will have direct or indirect effects 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 the prescriptive action to define the travelway (associated with resource issue code BO-3) there would be a reduction of inadvertent travel or parking over the subalpine fireweed populations, reducing the effects to low for both populations. This mitigation should have little impact to other resources as the work 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 motorized trails will have direct or indirect effects on populations of veined water-lichen. These trails include JSM70 in Gaggs, 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 would take place before mitigations begin to confirm whether this action is appropriate. Monitoring of veined water-lichen occurrences and mitigations would occur at an interval to be determined by the SNF botanists.

General meadow habitat effects

In Alternative 2 there would be 0 miles of proposed facilities within meadows and other riparian features. This compares to Alternative 1 with 4.65 miles of unauthorized routes, Alternatives 2 and 4 with 0 miles and Alternative 5 with 0.08 miles of proposed facilities within meadows and other riparian features.

Chaparral Guild

Carpenteria

Two proposed motorized trails will have direct or indirect effects on one population of carpenteria. These trails include JH1 and SR-3 in Jose-Chawanakee analysis unit. The population indicated is the largest population of carpenteria on the SNF. There are expected to be few direct impacts as the plant 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. Any maintenance activity that would be undertaken to bring these roads and motorized trails up to standard would first be reviewed by a SNF botanist to ensure carpenteria populations are not negatively affected. Monitoring of carpenteria occurrences and mitigations will occur over an interval to be determined by SNF botanists.

Negative indirect impacts are expected to be relatively low with mitigations although some of the indirect effects may pose slightly higher negative impacts.

Table 3- 114. Alternative 2 – Unauthorized Routes added as NFTS Motorized Trails with Resource Issues

Route	Affected Species	# of Occurrences	Analysis Unit	Resource Issue Code
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 3- 115. Alternative 2 – Unauthorized Routes Added as NFTS Roads with Resource Issues

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

PROPOSED OPEN AREA ADDITIONS, SNF TES AND WATCH LIST SPECIES

Riparian Guild

Bolander’s clover

Proposed Open 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 Open Area. However, because the Open 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 Open 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 Open 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 would trigger an interdisciplinary review.

Table 3- 116. Alternative 2 – Areas with Resource Issues

Open Area	Acres	Affected Species	# of occurrences	Analysis Unit	
TULEMDW1	6.12	TRBO	1	Tamarack-Dinkey	Monitoring
Total acres with botanical resources known		Total acreage proposed		Proportion with botanical resources affected	
6.12		6.12		100 percent	

Changes to the NFTS (changes to vehicle class, season of use, and opening or closing roads)

Note: Changes in vehicle class will not result in differing effects to TES plants (see assumptions in Section 3.11.1)

SEASON OF USE AND PROHIBITION OF NFTS USE

The following changes to Alternative 2 will have these expected effects to TES plant species: NFTS roads and motorized trails were reviewed by resource specialists. Relevant and current resource information was applied and in some cases resulted in proposed new seasons of use or year-round closures. Some seasonal or year-round closures were made for TES plants, reducing direct negative effects. Several NFTS roads that have botanical resources in the vicinity of the road are now proposed to be either closed year-round to the public or have a seasonal restriction. See Table 3- 117 for a listing of roads with known botanical issues. Road 09S310 (Kaweha Road) will be changed from closed year-round to seasonally closed. 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 because the dispersed nature of the carpenteria population reduces the potential for extirpation of the entire population. In general, these closures will reduce negative direct and indirect effects (i.e. soil compaction and erosion) to TES plants when compared to their current status (Alternative 1).

Table 3- 117. 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	
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 motorized trails, roads and 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 grazing, fuels treatments, wildfire, and the proposed motorized facilities; 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 as it will decrease the amount of available motorized trails and areas significantly from current levels of use.

Alternative 3

Direct and Indirect Effects

Cross-country Motor Vehicle 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 slight to moderate beneficial effect for most TES plant species. No negative impacts are expected from this alternative to known populations of TES plants on the SNF.

Additions to the NFTS

There are no proposed additions to the NFTS in Alternative 3.

Changes to the NFTS (changes to vehicle class, season of use, and opening or closing roads)

There are no proposed changes to the NFTS in Alternative 3 and no change from current condition for TES plant species.

Cumulative Effects

When combined with past, present and reasonably foreseeable future actions (including roadside hazard sales, existing open areas, grazing and prescribed burns), the cumulative effects of Alternative 3 for TES plants would be moderately to strongly beneficial 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

Cross-country Motor Vehicle Travel

Direct and indirect effects of the prohibition on cross-country travel are similar to those described in Alternative 2.

Additions to the NFTS

Alternative 4 has a total of 51 miles of motorized trails and roads and 37 acres of proposed areas to be brought in to the SNF transportation system. This is in comparison to 552 miles of unauthorized routes in Alternative 1, 44 miles of proposed motorized trails and 6 acres in Alternative 2 and 85 miles of motorized trails with 105 acres of areas in Alternative 5. Table 3-118, Table 3-119, and Table 3-120 display the motorized roads, trails and areas affecting botanical resources. These resources are discussed below by habitat grouping.

NFTS ROAD AND TRAIL ADDITIONS, SNF TES AND WATCH LIST SPECIES

Riparian Guild

Rawson's flaming trumpet

One proposed trail will have direct or indirect effects 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 vehicle 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. It is important that mitigation measures are implemented before this trail is 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. When mitigations are implemented, direct and indirect negative 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 would take place before mitigations begin to confirm whether this action is appropriate and/or feasible. Monitoring of veined water-lichen occurrences and mitigations would occur at an interval to be determined by SNF botanists. Negative effects for veined water-lichen under this alternative are expected to be at a low level with a bridge crossing but higher levels of impact would be expected until there is a crossing established.

Fen habitat

One proposed trail will have direct or indirect effects on an identified fen in the Gaggs analysis unit. This has been addressed 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 (S&G #118). 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 impair fen ecological processes. Due to the fen's location downhill from proposed trail JG5 in Gaggs 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. 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. Negative effects to this fen will be low with implemented mitigation measures but without implementation, negative indirect effects will be low to moderate.

General meadow habitat effects

In Alternative 4 there would be 0 miles of proposed facilities within meadows and other riparian features. This compares to Alternative 1 with 4.65 miles of unauthorized routes, Alternatives 2 and 3 with 0 miles and alternative 5 with 0.08 miles of proposed facilities within meadows and other riparian features.

Rock Outcrop Guild

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 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. Prescriptive actions associated with resource issue codes BO-1 and 3 would minimize negative effects by defining the trailway and keeping motor vehicle users off open granitic areas that form this plant's main habitat. Barriers should be made with locally obtained, 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 botanical, aquatic, cultural, hydrological or wildlife resources are expected as a result of using local rock for barriers but if heavy equipment is used, it should be washed before arriving on site to minimize the risk of spreading noxious weed propagules. Additionally, rocks must be obtained from a local source that has the least 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. Overall negative effects are expected to be low with mitigations and low to moderate without implementation.

Forested Guild

Short-leaved hulsea

Two proposed motorized trails will have direct or indirect effects 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 FEIS, 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. 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. With application of these prescriptive actions associated with resource issue codes BO-2 and 3, negative effects would be low.

Table 3- 118. Alternative 4 – Unauthorized Routes Added as NFTS Motorized Trails with Resource Issues

Route	Affected Species	# of occurrences	Analysis Unit	Resource Issue Code
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 3- 119. Alternative 4 – Unauthorized Routes Added as NFTS Roads with Resource Issues

Route	Affected Species	# of Occurrences	Analysis Unit	Resource Issue Code
PK-05X	CASIA	CASIA	East of Kaiser Pass	BO-1; BO-3

PROPOSED OPEN AREA ADDITIONS, SNF TES AND WATCH LIST SPECIES

Riparian Guild

Bolander’s clover

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

Direct effects stemming from this proposed parking/staging 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 areas will have the following direct and 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 the population health over time. Application of prescriptive actions associated with resource issue codes BO-1 and 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 natural 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 3- 120. Alternative 4 – Open Areas with Botanical Resource Issues

Open area	Acres	Affected Species	# of Occurrences	Analysis Unit	Resource Issue Code*
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
Total acres with botanical resources known		Total acreage proposed		Proportion with botanical resources affected	
31.22		37.13		84 percent	

Changes to the NFTS (changes to vehicle class, season of use, and opening or closing roads)

Note: Changes in vehicle class will not result in differing effects to TES plants (see assumptions in Section 3.11.1).

SEASON OF USE (INCLUDES CLOSED YEAR-ROUND)

Changes to the season of use for roads and motorized trails 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 2. Table 3- 121 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 09S310 road (Kaweha Road in Jose-Chawanakee) which will change from closed year-round to a seasonal 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 due to the dispersed nature of the carpenteria population. General beneficial effects to botanical resources are expected with the seasonal or year-round closure of NFTS roads and motorized trails under this alternative.

Table 3- 121. 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	
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-Dinke	Closed year-round	Closed year-round	
10S034	Garfield	Tamarack-Dinke	Closed year-round	Closed year-round	
10S043X	Blue Canyon OHV # 1	Dinke-Kings	Open year-round	Closed year-round	
10S073B	Straight Spur B	Tamarack-Dinke	Closed year-round	Closed year-round	
10S403	Blue Rock	Dinke-Kings	Open year-round	Closed year-round	
11S002F	Lower Rancheria	Dinke-Kings	Open year-round	Closed year-round	
11S039B	Roezli	Dinke-Kings	Open year-round	Closed year-round	
11S040K	General Phil	Tamarack-Dinke	Open year-round	Closed year-round	
11S061	Nutmeg Saddle	Dinke-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. 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. Cumulative effects to TES plants are expected to be relatively negative in comparison to

Alternative 3. 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 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. Expected projects from past, present and foreseeable future activities that would impact these species include cattle grazing, fuels treatments, hazard tree removal, and motorized special-use events. 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

Cross-country Motor Vehicle Travel

Direct and indirect effects of the prohibition on cross-country travel are similar to those described in Alternative 2. Those additions will be described below.

Additions to the NFTS

Alternative 5 is proposing approximately 85 miles of motorized trails and roads to be added to the SNFTS. There are a total of 105 acres being proposed for this alternative. In comparison, Alternative 1 has 552 miles of unauthorized routes, Alternative 2 is proposing 44 miles and 6 acres, Alternative 3 is adding 0 miles and 0 acres and Alternative 4 is adding 51 miles and 37 acres. Table 3- 122, Table 3- 123, and Table 3- 124 list the proposed motorized trails, roads and areas that affect botanical resources in Alternative 5. These effects are described below by habitat.

ROAD AND TRAIL ADDITIONS, SNF TES AND WATCH LIST SPECIES

Riparian Guild

Rawson's flaming trumpet

Two proposed motorized trails will have direct or indirect effects 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. Increased erosion of streambanks, compacted soils/altered hydrology and the dispersal of noxious weed seeds are the most likely negative indirect 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 where Rawson's flaming trumpet is located (North Fork Willow Creek) but it still comes within 5 meters (16 feet) of the water's 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 prescriptive actions associated with resource issue code BO-1 would reduce the threat of indirect effects to an acceptably low factor. Actions include blocking downstream access to vehicle with an appropriate barrier made with local materials. 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. Monitoring schedule would be similar to that suggested for Rawson's flaming trumpet in Alternatives 2 and 4.

Veined water-lichen

Four proposed motorized trails will have direct or indirect effects on four populations of veined water-lichen. These trails include BP21 and JSM70 in Gags analysis unit as well as JD2, PK24, SR-112 and SR-119 in Westfall analysis unit. Overall negative effects for veined water-lichen in this alternative are expected to be relatively low with bridge crossings implemented but indirect effects may be at a moderate level until implementation is completed.

Gags: JSM70 has been discussed for veined water-lichen in Alternatives 2 and 4 and there is no change for that analysis under this alternative.

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 and indirect effects. Mitigations as discussed above will be the same for these populations as well. SR-119 effects are similar to those for SR-112 and the proposed mitigations are the same (bridge recommended for a hardened water crossing).

Fen habitat

One proposed trail will have direct or indirect effects on an identified fen in the Gags analysis unit. This trail is JG 5; this habitat was analyzed in Alternative 4 and there are no changes expected under this alternative.

General Meadow Habitat Effects

In Alternative 5 there would be 0.08 miles of proposed facilities within meadows and other riparian features. This compares to Alternative 1 with 4.65 miles of unauthorized routes, Alternatives 2, 3 and 4 with 0 miles of proposed facilities within meadows and other riparian features.

Rock Outcrop Guild

Orange lupine

Two proposed motorized trails will have direct or indirect effects 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 prescriptive actions associated with resource issue codes 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, negative effects are expected to be low; monitoring of mitigations will occur to ensure efficacy (at least annually for the first 2 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.

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 prescriptive actions associated with resource issue code BO-1 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.

Chaparral Guild

Carpenteria

Two proposed motorized 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 motorized trails will have direct or indirect effects 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. Mitigations recommended are also the same as Alternative 4.

WATCH LIST PLANTS

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

Two proposed motorized trails will have direct and 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 negative impact but indirect effects will likely have the most negative 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 will be minimized with a minor alteration of the trail (within 49 feet (15 m)) to avoid the noxious weed populations (prescriptive action associated with resource issue code 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 3- 122. Alternative 5 – Unauthorized Routes Added as NFTS Motorized Trails

Route	Affected Species	# of Occurrences	Analysis Unit	Resource Issue Code
BP21	PEHY	2	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
PK-66	HUBR	1	Tamarack-Dinkey	BO-2; BO-3
SR-112	PEHY	1	Westfall	BO-7
SR-119	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 3- 123. Alternative 5 – Unauthorized Routes added as NFTS Roads

Route	Affected Species	# of Occurrences	Analysis Unit	Resource Issue Code
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

PROPOSED OPEN AREA ADDITIONS, SNF TES AND WATCH LIST SPECIES

Chaparral Guild

Carpenteria

The addition of 0.66 acres of proposed areas will have the following direct and 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 Open Area to this plant low as only a few plants may be affected by this Open Area.

Yosemite lewisia

The addition of 25.1 (93.9) acres of proposed areas will have the following direct and 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 possible but have less impact to the population health. Application of prescriptive actions associated with resource issue codes 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 2 years afterwards, would lower the probability of negative effects to a low level.

Gaggs: These two areas are likely to have undiscovered populations of Yosemite lewisia or Kellogg's lewisia. Due to the early blooming period of both species (March-May), confirmation of presence was not affirmed. The prescriptive action associated with resource issue code BO-5 for both areas is to conduct surveys in spring of 2010 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 Open Area is likely to have no negative effect for any TES plant species.

Kellogg's lewisia

The addition of (68.8) acres of proposed Open Areas will have the following direct and indirect effects on potentially two populations of Kellogg's lewisia:

See the discussion above under Yosemite lewisia in Gaggs analysis unit for this species. Presence has not been confirmed in these two open areas. If presence is confirmed after surveying, then appropriate mitigation measures would be applied to reduce direct and indirect effects to the populations. If there are no plants found during botanical surveys, then the Open Area is likely to have no negative effect for any TES plant species.

Orange lupine

The addition of 0.66 acres of proposed Open Areas will have the following direct and indirect effects on one population of orange lupine:

Jose-Chawanakee: This Open 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 Open 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 Open Area would be the annual monitoring of the site for observed effects to orange lupine and if negative effects occur, the Open Area would 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 Open Area size in the most sensitive area.

Table 3- 124. Alternative 5 – Open Areas

Area	Acres	Affected Species	Analysis Unit	Resource Issue Code
SGRLFHL223	0.66	CACA, LUCIC	Jose-Chawanakee	BO-3; BO-4
CNTRLCMPSPR345	4.0	LEDI or LEKE	Gaggs	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	Gaggs	BO-5
Total acres with botanical resources known		Total acreage proposed	Proportion with botanical resources affected	
94.56		105.00	90 percent	

Changes to the NFTS (changes to vehicle class, season of use, and opening or closing roads)

Note: Changes in vehicle class will not result in differing effects to TES plants (see assumptions in Section 3.11.1)

SEASON OF USE AND PROHIBITION OF NFTS USE

Changes to the season of use for roads and motorized trails under Alternative 5 are not expected to affect SNF TES species in a significant manner. Effects will be similar to those of Alternative 2 with the exception that 91 miles of roads and motorized trails and 113 acres of areas will be added under this alternative. Table 3- 125 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 and 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 3- 125. 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	Roekli	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 past, present and reasonably foreseeable 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 motorized trails 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. Other projects that would contribute impacts would be fuels treatment, grazing, and thinning projects. 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 open 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 Open 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 Open 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 Open 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 facilities proposed to be added, not to NFTS facilities. The design measure reads:

- Proposed facilities are not within 500 feet of known habitat for *Mariposa pussypaws*

Another portion of the design measures includes a closure period for NFTS facilities during flowering season (March-June) in suitable habitat areas determined by SNF botanists. Proposed facilities 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 areas of suitable 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 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 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*, *Carlquistia 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 hydrthyria* 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 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 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 congdonii*, *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 motorized trails, roads and areas will not impact these species due to their location.

It is my determination that the Travel Management project 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 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 congdonii*, *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 motorized trails, roads and areas will not impact these species due to their location.

It is my determination that the Travel Management project 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 NFTS facilities but viability is not threatened for the species.

Alternative 4

It is my determination that the Travel Management project will not affect *Allium yosemitense*, *Botrychium* species (*B. ascendens*, *B. lineare*, *B. lunaria*, *B. manganese*, *B. montanum*), *Bruchia bolanderi*, *Carlquistia muirii*, *Clarkia biloba* ssp. *australis*, *Clarkia lingulata*, *Cypripedium montanum*, *Delphinium inopinum*, *Dicentra nevadensis*, *Erigeron aequifolius*, *Eriophyllum congdonii*, *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 motorized trails, roads and 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 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 Open Areas.

Alternative 5

It is my determination that the Travel Management project will not affect *Allium yosemitense*, *Botrychium* species (*B. ascendens*, *B. lineare*, *B. lunaria*, *B. manganese*, *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 congdonii*, *Erythronium pluriflorum*, *Fissidens aphelotaxifolius*, *Heterotheca monarchensis*, *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*, *Trifolium bolanderi* and *Viola pinetorum* ssp. *grisea* because proposed motorized trails, roads and 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 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*, *Hulsea brevifolia*, *Lewisia disepala*, *Lupinus citrinus* ssp. *citrinus*, 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 facilities 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 LRMP and Other Direction

Alternative 1

Complies with 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 LRMP direction for sensitive plant species to: ‘manage sensitive plant species to avoid future listing as threatened and endangered.’

Alternative 2

Complies with LRMP and Forest Service direction regarding TES plants?

Alternative 2 complies with LRMP S&Gs relative to botany, and therefore is in compliance with SNF and Forest Service direction regarding TES plants.

Alternative 3

Complies with LRMP and Forest Service direction regarding TES plants?

Alternative 3 complies with LRMP S&Gs relative to botany, and therefore is in compliance with SNF and Forest Service direction regarding TES plants.

Alternative 4

Complies with LRMP and Forest Service direction regarding TES plants?

Alternative 4 complies with LRMP S&Gs relative to botany, and therefore is in compliance with SNF and Forest Service direction regarding TES plants.

Alternative 5

Complies with LRMP and Forest Service direction regarding TES plants?

Alternative 5 complies with LRMP S&Gs relative to botany, and therefore is in compliance with SNF and Forest Service direction regarding TES plants.

