3.09 SENSITIVE PLANTS

Analysis Framework: Statute, Regulation, Forest Plan and Other Direction

No federally listed plants occur on the Stanislaus National Forest. FSM 2670 and the Forest Plan provide direction for management of sensitive plants.

Sensitive Plants are defined as “those plant … species identified by a regional forester for which population viability is a concern, as evidenced by: a) significant current or predicted downward trends in population numbers or density and b) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution” (FSM 2670.5). It is the Secretary of Agriculture's direction to "avoid actions which may cause a species to become threatened or endangered" (USDA 2008d). Further, it is a Forest Service objective to "maintain viable populations of all native ... plant species in habitats distributed throughout their geographic range on National Forest System lands" (FSM 2670.22). Forest Service policy set out in FSM 2670.32 is to "avoid or minimize impacts to [Sensitive] species whose viability has been identified as a concern." Where it is determined that impacts cannot be avoided, "the line officer with project approval authority, [may make] the decision to allow or disallow impact, but the decision must not result in loss of species viability or create significant trends toward federal listing."

Forest Plan direction for Sensitive Plants is to "provide for protection and habitat needs of sensitive plants, so that Forest activities will not jeopardize their continued existence." Forest Plan Standards and Guidelines advise to "modify planned projects to avoid or minimize adverse impacts to sensitive plants" (USDA 2010a, p. 60).

The Forest Plan Compliance (project record) document identifies the Forest Plan Standards and Guidelines that specifically apply to this project and related information about compliance with the Forest Plan.

Effects Analysis Methodology

Assumptions Specific to Sensitive Plants

- The remaining 2% of the area that has not been surveyed for Sensitive Plants would be completed prior to implementation.
- Management requirements would be applied to the newly discovered populations.

Data Sources

- Rare plant occurrences, survey locations and habitats (GIS).
- RareFind 5 Database from the California Natural Diversity Data Base (CDFW 2014c), California Department of Fish and Wildlife (CDFW 2014d).
- Soil Survey, Stanislaus National Forest Area, California (USDA 1981).
- Tuolumne County Lithography.
- 2009 GIS Ortho Photo layers.
- Google Earth satellite aerial photos.
- Specimen herbarium records (CCH 2014).
- The paper-based Groveland Ranger District surveys completed atlas.

Sensitive Plant Indicators

- Sensitive Plant occurrences.
- Suitable habitat for sensitive plants and the condition of those habitats.
- Number of sensitive plants impacted by the project, the intensity of the impacts and the duration of the impacts.

Sensitive Plants Methodology by Action

A list of all federally listed Threatened, Endangered or Proposed plant species which might occur in the Stanislaus was acquired from the U.S. Fish and Wildlife Service (USFWS 2015).

A pre-field review was conducted to determine which sensitive plant species might occur or are known to occur within the project area (project record). Habitat attributes such as geology and soil types, elevation range, aspect and presence of closed canopy and forest openings were used to determine availability of suitable habitat for each species.

The effects of the Rim Reforestation project were analyzed using data from sensitive plant inventories, local observations of effects to the various plant species, anecdotal information for specific species documented in Regional Sensitive List revision forms and, where available, published research papers.

The project area will serve as the geographic bounds for effects analysis of sensitive plants. The project area is an appropriate size to assess the effects of the proposed activities because all potential disturbances and effects to sensitive plants would occur within this boundary. Any predictable effects to vegetation would remain within this area. For sensitive plants, the project area also serves as the area of analysis for cumulative effects because effects of other past, present, and foreseeable activities would interact with effects of the proposed project only within the project area.

The time frame considered for future effects is 10 years after implementation.

Affected Environment

Existing Habitat Conditions

The geology of the project area, as it relates to sensitive plant habitat, is quite varied. Bedrock and soil parent material are composed of granite, especially on the eastern half of the project, metasedimentary rock primarily on the western half of the project, or volcanically derived andesitic tuff (Mehrten Formation) which is isolated on some of the ridge tops and surrounding slopes. Soils in the project area are diverse, running the full range from deep sandy or loamy granitics to rocky clays of metasedimentary origin. The andesitic tuff breccia tends to be shallow, coarse and fast draining. This variety of soils and parent material allows for the establishment of rare plants, many of which have affinities for very specific types of soils or parent material. Lava caps were disturbed by the Rim Fire and some were also impacted during suppression activities. Before the fire, some of the lava caps were impacted by unauthorized motorized use causing localized disturbance.

Before the Rim Fire, plant communities within the project boundaries included Westside Ponderosa Pine Forest, Sierran Mixed Conifer Forest, several different chaparral communities such as Montane Manzanita Chaparral and Northern Mixed Chaparral, Montane Meadow, White Alder Riparian Forest, Aspen Riparian Forest, Blue Oak Woodland, and other oak woodland communities (Holland 1986). Among these were mixed conifer stands which had not burned in wildfires in more than 100 years and provided excellent habitat for occurrences of *Cypripedium montanum*, and small, low gradient perennial streams which provided excellent habitat for *Peltigera gowardii*. These high functioning ecosystems were relatively free of noxious weeds. Many of them burned with a moderate to high intensity in the Rim Fire where the conifer overstory was completely killed.

Wildfire has been an important component driving plant community composition within the analysis area during the past 100 years. Dating back as far as 1908, 124 wildfires occurred within the Rim Fire boundary (USDA 2010d). Some of the past fires overlapped with each other, burning some areas three, four or even five times prior to the Rim Fire. Other drivers of the pre-Rim Fire mix of plant communities include past logging, reforestation activities, cattle grazing and effective fire suppression.

Many of the Westside Ponderosa Pine Forest areas were conifer plantations 10 to 40 years of age. Some of the plantations were isolated and the result of old clear-cut timber harvests. However, most of the plantations were planted as part of the recovery from the1973 Granite Fire, the 1987 Stanislaus Complex fires and the 1996 Ackerson Complex or Rogge Complex fires. The Wrights Creek plantations dated from the 1950s and the Sawmill plantations dated from the 1960s and were also the result of post-fire recovery. The past wildfires and subsequent salvage logging and reforestation activities created thousands of acres of disturbed habitat. These plantations were in various phases of growth and many had been thinned in the past 15 years. Due to their mostly early seral nature, the understories had low native plant diversity and were primarily composed of disturbance followers such as non-native annual grasses and native shrubs like deerbrush (*Ceanothus integerrimus*), manzanita (*Arctostaphylos* sp.), bearclover (*Chamaebatia foliolosa*) and Sierra gooseberry (*Ribes roezlii*).

Sensitive Species

As described in the Sensitive Plant BE and Botany Report, rarity in plants can be the result of a number of things. Loss of habitat is a key factor for some species. Reproductive isolation through loss of populations is another factor. In many cases, the scarcity of the habitat in which the species evolved is the limiting factor which makes the species rare. Many of the sensitive plants considered in the Rim Reforestation project are limited to specialized or scarce habitats such as cliffs, vernal pools, fens (spring-fed seep or meadow areas containing 16 inches or more of peat), or “lava caps” (prehistoric volcanic ash mud flows also known as lahars and composed of andesitic tuff).

Within the Rim Reforestation project, the majority of the treatment units have been surveyed for all sensitive species based on the unit’s habitat attributes and the current Sensitive Plant List. Approximately 2% of the project area remains unsurveyed.

The following Sensitive Plant species are known to occur within the project area: *Balsamorhiza macrolepis, Clarkia australis, Clarkia biloba* ssp. *australis, Cypripedium montanum, Erythronium taylori, Mimulus filicaulis, Mimulus pulchellus,* and *Peltigera gowardii.*

In addition, suitable habitat within the appropriate geographic and elevational ranges exists within the project area for the following species: *Allium tribracteatum, Allium yosemitense, Arctostaphylos nissenana, Botrychium ascendens, Botrychium crenulatum, Botrychium lineare, Botrychium lunaria, Botrychium minganense, Botrychium montanum, Botrychium pedunculosum, Botrychium pinnatum, Bruchia bolanderi, Cinna bolanderi, Dendrocollybia racemosa, Eriastrum tracyi, Eriogonum luteolum var. saltuarium, Eriophyllum congdonii, Eriophyllum nubigenum, Erythronium tuolumnense, Fissidens aphelotaxifolius, Helodium blandowii, Horkelia parryi, Hulsea brevifolia, Lewisia kelloggii* ssp. *hutchisonii, Lewisia kelloggii* ssp. *kelloggii, Lomatium stebbinsii, Meesia uliginosa, Mielichhoferia elongata, Mielichhoferia shevockii* and *Tauschia howellii.*

The following plant profiles are for species which are known from the project area.

Balsamorhiza macrolepis (big-scale balsamroot) is a perennial herb in the sunflower family, Asteraceae. It reproduces by seed. *Balsamorhiza macrolepis* begins growing in late winter or early spring and blooms in mid-spring. The plant goes dormant during the summer, after seeds are produced. The range of *Balsamorhiza macrolepis* is the Sierra Nevada Foothills from Tehama County south to Mariposa County, and the interior Coast Range from Tehama County (Mendocino National Forest) south to Santa Clara County. *Balsamorhiza macrolepis* inhabits a variety of soil and plant community habitats. It has been reported from ponderosa pine forest, chaparral, vernally moist meadows and grasslands or grassland within oak woodland. Most of the occurrences are found in serpentine substrates, but it is also known to grow in soils derived from sandstone, basalt, and rocky clays of metasedimentary origin. The known occurrences in the Rim Fire burned area and the Yosemite occurrence are on granitic soils. *Balsamorhiza macrolepis* is usually found in openings or

under an open brush cover. The elevation range is listed as below 4,600 feet (Jepson Flora Project 2014). It occurs as high as 4,700 feet elevation in the Stanislaus.

Clarkia australis (Small's southern clarkia) is an annual herb which grows in openings in ponderosa pine and mixed-conifer stands often in association with bearclover. *Clarkia australis* prefers sites with little or no competition from aggressive weedy species. When not associated with bearclover, the species is usually observed growing in bare mineral soil or with a very light layer of leaf litter. *Clarkia australis* has a very narrow range in Tuolumne and northern Mariposa Counties. The Rim Fire burned through a large portion of the known occurrences of this species.

Clarkia biloba ssp. *australis* is an annual herb which usually grows under light shade in oak woodland, chaparral and conifer forests. Like *Clarkia australis*, it prefers to grow where there is little competition from weedy species.

Cypripedium montanum (mountain ladyslipper orchid) is a perennial herb in the orchid family, Orchidaceae. It arises in early spring from shallow rhizomes and dies back by late summer. The appropriate identification period for this species is mid-spring, approximately early May to mid or late June. In the Stanislaus, *Cypripedium montanum* inhabits sites which are relatively undisturbed with a moderate to dense overstory, usually containing Douglas-fir or white fir. These sites are typically west or north-facing with fairly damp, deep loamy soils and a welldeveloped duff layer. In the Stanislaus, *Cypripedium montanum* ranges in elevation from 3,500 to 6,500 feet. The elevation range for California is listed as 650 to 7,200 feet (Jepson Flora Project 2014).

Erythronium taylori (Taylor's fawn lily) is a perennial herb in the lily family, Liliaceae. It was discovered by Dean Taylor, Ph.D. in 1996 in the Groveland Ranger District and described by James R. Shevock and Geraldine A. Allen (1997). It emerges from a corm in early spring and withers by mid-June. The appropriate identification period for this species is early spring, approximately the month of April. *Erythronium taylori* is found in habitat that is shaded, northfacing cliffs. Because other species of *Erythronium* can inhabit a variety of north-facing habitats, it's possible that *Erythronium taylori* might occur on sites, which are not cliff-like. The elevation is approximately 4,200 feet.

Mimulus filicaulis (the slender-stemmed or Hetch-Hetchy monkey flower) and *Mimulus pulchellus* (the pansy monkey flower) are annual herbs which occur in seasonally damp soils, seeps, springs, meadows and drainages in openings in forests or chaparral. *Mimulus pulchellus* is often found growing in “lava cap” soils. *Mimulus filicaulis* has a very narrow range from the Tuolumne River south to Mariposa County. Most of the occurrences are centered on the area east of Cherry Lake Road and north of Highway 120 and west of the boundary with Yosemite National Park. The range of *Mimulus pulchellus* is Calaveras, Tuolumne and Mariposa Counties. Both *Mimulus filicaulis* and *Mimulus pulchellus* prefer to grow in areas with little competition. Both tolerate low levels of soil disturbance, such as caused by gophers after the plants have gone to seed.

Peltigera gowardii (Goward’s waterfan) is a lichen which grows submerged or within spray zones of perennial streams. The streams are shallow and often fed by cold water springs. The water is very clear and peak flows are not of the intensity that would lead to scouring. The range of this species is from southern Alaska to Fresno County in California.

In addition to Sensitive Plants, the Botany Report analyzed Forest Watchlist and Botanical Interest species. Forest Watchlist species include those which are locally rare (as opposed to declining throughout their range), are of public concern, occur as disjunct populations, are newly described taxa, or lack sufficient information on population size, threats, trend, or distribution. Botanical interest species are those which are protected or enhanced for the purpose of conserving botanical richness or diversity within the National Forest. These are typically species which are uncommon in the Forest, but not necessarily uncommon at a regional or global scale. They are sometimes species at

the extent of their geographic ranges, disjunct from areas where they are common, or are limited by habitats which are uncommon in the Forest, but more numerous elsewhere.

Environmental Consequences

Alternative 1 (Proposed Action)

DIRECT AND INDIRECT EFFECTS

Sensitive Plant occurrences will be avoided during implementation. Additionally, sun-loving species of sensitive plants would be provided with a buffer to remove the indirect effects of shading from replanting. No occurrences are expected to be eliminated as a result of these situations. Table 3.09-1 shows the number of known occurrences and their acreage overlapping proposed treatments.

Table 3.09-1 Alternatives 1, 3 and 5: Sensitive Plant Occurrences Overlapping Treatment Areas

Sensitive Plant Species	Occurrences in units (number)	Occurrences in units (acres)
Balsamorhiza macrolepis	4	0.21
Clarkia australis	170	154.85
Clarkia biloba ssp. *australis*	45	105.11
Cypripedium montanum	21	3.08
Erythronium taylori	1	11.53
Mimulus filicaulis	88	66.93
Mimulus pulchellus	15	27
Peltigera gowardii	6	7.41

With avoidance of most sensitive plant occurrences, only *Clarkia australis*, *Clarkia biloba* ssp. *australis*, *Mimulus filicaulis* and *Mimulus pulchellus* would possibly be directly affected by the proposed activities. In some of these occurrences, manual site preparation would be allowed during the dry non-growing period when the species are present as seed, not living plants. Conducting manual site preparation within these occurrences poses a low to moderate risk of damage or death of some of the seeds even when implemented during the dry, non-growing period. The risk would come from trampling by workers. The amount of seed damaged or lost is expected to be minimal.

Effects to *Clarkia australis* are reduced by not allowing equipment to track through occurrences smaller than 0.25 acre and to minimize tracking through occurrences larger than 0.25 acre. Rather than impacting growing plants, activities in *Clarkia australis* occurrences would be restricted to the dry, non-growing period, when they would have less impact by allowing annual seed set and conserving seed in the soil. These standard management requirements greatly reduce the risk that occurrences of *Clarkia australis* would be eliminated. The benefit of conducting mastication within occurrences of *Clarkia australis* is the reduction of fuels (trees and brush) and inter-tree competition which would contribute to fuel loading and thereby lower the risk of losing occurrences during the next wildfire. Additionally, mastication might help prevent or diminish the establishment of dense brush which might otherwise dramatically reduce the quality of the habitat for Clarkia which prefers to grow in forest openings with little or no competition. The benefit of subsoiling in *Clarkia australis* occurrences is the enhancement of habitat.

Conducting manual site preparation within occurrences of *Clarkia australis*, *Clarkia biloba* ssp. *australis*, *Mimulus filicaulis* or *Mimulus pulchellus* poses a low to moderate risk of damage or death of some of the seeds even when implemented during the dry, non-growing period. The risk would come from trampling by workers. The amount of seed damaged or lost is expected to be minimal.

Table 3.09-2 details the number of occurrences affected by manual treatment. The acres presented are the amount of treatment that intersects with sensitive plant occurrences rather than the acres of

sensitive plants affected. As a result, the number of acres for each species is likely inflated. Most of the percentages are low with *Clarkia biloba* ssp. *australis* being the most affected with 53% of the occurrences impacted, but only 5% of the total acreage. *Clarkia australis* is moderately affected in terms of occurrences affected (17%), but only has 7% of the total acreage in the project area affected. *Mimulus fillicaulis* has a negligible amount affected while *Mimulus pulchellus* is not affected by hand treatments.

Table 3.09-2 Alternative 1: Occurrences Intersecting Manual Treatments

Sensitive Plant Species	**Number of Occurrences in units** (percent of total)	**Acres of Occurrences in units** (percent of total)
Clarkia australis	29 (17%)	11.3 (7%)
Clarkia biloba ssp. australis	24 (53%)	5.3 (5%)
Mimulus filicaulis	2 (2%)	0.24 (less than1%)
Mimulus pulchellus	0	0

The Sensitive aquatic lichen *Peltigera gowardii* may be affected indirectly by project activities. It is expected that activities which change these habitat characteristics – increase sedimentation, scour or sun exposure – would likely lead to a reduction or loss of individuals, and depending on the degree of impact, perhaps loss of the occurrence. Sedimentation or scouring could damage the thin, gelatinous thallus of *Peltigera gowardii* by abrading it, leading to death of the organisms (USDA 2010c). Sedimentation could also cover the organisms, blocking their ability to photosynthesize (USDA 2010c). The soil and watershed BMPs would prevent direct impacts to the species, and would reduce the amount of activity-created sediment in these occurrences. Planting trees will have the long-term benefit of producing shade by returning the canopy back to previous conditions.

Noxious weed eradication has the potential to indirectly affect rare plant species through accidental spills, spray drift, surface runoff, or a combination of these factors. These potential effects would be greatly limited by implementing BMPs and management requirements. Noxious weed invasion can result in negative impacts to all habitat types, although different habitats may be invaded by different suites of noxious weed species. Noxious weed infestations can lead to changes in habitat characteristics that are detrimental to sensitive plant species. Once weeds have become established they can indirectly impact sensitive species through allelopathy (the production and release of chemical compounds that inhibit the growth of other plants), altering fire regimes, and competing for nutrients, light, and water. Treatment of known noxious weed sites reduces the risk of the impacts, while also potentially opening up suitable habitat for colonization for sensitive plant populations near infested areas.

Thinning existing plantations to an ICO structure would likely benefit species found within thinning units, *Balsamorhiza macrolepis*, *Clarkia australis*, *Clarkia biloba* ssp. *australis*, *Mimulus filicaulis* and *Mimulus pulchellus*, if the occurrences are in close proximity to open patches to potentially colonize. One occurrence of *Cypripedium montanum* has less than 0.01 acre within thinning units. This species would benefit by maintaining clumps on its edge.

CUMULATIVE EFFECTS

Present and future projects planned within the Rim Reforestation project area (Appendix B) incorporate management requirements which reduce the risk of loss of occurrences. The combined effects of the proposed activities in Alternative 1 with other present and foreseeable future actions, shown in Table 3.09-3, are not expected to result in adverse cumulative effects to sensitive plants, mainly due to flagging and avoiding known sites. Individuals may be adversely affected by proposed project activities. However, these impacts are not expected to be so great in intensity or duration that any of these occurrences would be eliminated, even when combined with other Forest activities.

Table 3.09-3 Alternatives 1, 3, 4 and 5: Sensitive Plants Overlapping Cumulative Effects Activities

Sensitive Plant Species	Project Activity Type	ALT 1 (acres)	ALT 3 (acres)	ALT 4 (acres)	ALT 5 (acres)
Balsamorhiza macrolepis	Grazing	0.21	0.21	0.09	0.21
Balsamorhiza macrolepis	Rim HT: MP	0.09	0.09	0.09	0.09
Balsamorhiza macrolepis	Rim Recovery: HP, MP, JP, Burn	0.10	0.10	0	0.10
Clarkia australis	Grazing	154.85	154.85	72.58	154.85
Clarkia australis	Rim HT: MP	16.12	16.12	8.50	16.12
Clarkia australis	Rim Recovery: HP, MP, JP, Burn	84.23	84.23	66.22	84.23
Clarkia australis	Wildlife Habitat Enhancement: Encroaching conifers	0.15	0.15	0.15	0.15
Clarkia biloba ssp. *australis*	Grazing	105.11	105.11	0.76	105.11
Clarkia biloba ssp. *australis*	Rim HT: MP	50.92	50.92	0.45	50.92
Clarkia biloba ssp. *australis*	Rim Recovery: HP, MP, JP, Burn	21.00	21.00	0.30	21.00
Cypripedium montanum	Grazing	3.08	3.08	1.48	3.08
Cypripedium montanum	Rim HT: MP	0.47	0.47	0.47	0.47
Cypripedium montanum	Rim Recovery: HP, MP, JP, Burn	1.21	1.21	0.96	1.21
Cypripedium montanum	Rim Rehabilitation: Great Gray Owl: Ackerson	0.30	0.30	0	0.30
Erythronium taylori	Grazing	11.53	11.53	11.53	11.53
Erythronium taylori	Rim Recovery: LS, JP, Burn	11.53	11.53	11.53	11.53
Mimulus filicaulis	Grazing	66.93	66.93	2.26	66.93
Mimulus filicaulis	Rim HT: MP	9.13	9.13	0.64	9.13
Mimulus filicaulis	Rim Recovery: HP, MP, JP, Burn	10.39	10.39	1.29	10.39
Mimulus filicaulis	Rim Rehabilitation: Meadow-Stream/meadow North Sawmill	0.33	0.33	0	0.33
Mimulus filicaulis	Soldier Timber Sale	0.20	0.20	0	0.20
Mimulus pulchellus	Grazing	27.00	27.00	1.22	27.00
Mimulus pulchellus	Rim HT: MP	1.07	1.07	0	1.07
Mimulus pulchellus	Rim Recovery: HP, MP, JP, Burn	16.08	16.08	1.22	16.08
Mimulus pulchellus	Wildlife Enhancement: Meadow handwork Lower Femmons	0.08	3.64	0.72	3.64
Peltigera gowardii	Grazing	7.41	7.41	5.17	7.41
Peltigera gowardii	Rim HT: MP	3.48	3.48	3.28	3.48
Peltigera gowardii	Rim Recovery: HP, MP, JP, Burn	3.08	3.08	1.67	3.08
Peltigera gowardii	Rim Recovery: LS, JP, Burn	0.10	0.10	0.10	0.10

HC=Hand Cut; HP=Hand Pile; JP=Jackpot Burn; LS=Lop and Scatter; MP=Machine Pile (with dozer)

Alternative 2 (No Action)

DIRECT AND INDIRECT EFFECTS

Alternative 2 has no direct effects to Sensitive Plants. Indirect effects could occur from increased invasion of existing noxious weed populations, potential increase in the risk of future high severity wildfire due to not removing standing biomass and woody fuels. In some cases dense brush is likely to take over some habitat, overtopping rare plant species and effectively shading them out of former habitat. The potential benefits to annual species and *Balsamorhiza macrolepis* would not be realized as existing plantations would not be thinned and denser canopies over a larger area would be maintained.

CUMULATIVE EFFECTS

Projects that occur within the cumulative effects area (such as Rim Recovery and Rim HT) utilized flag and avoid to minimize effects to sensitive species. As a result, these actions are not expected to contribute to adverse cumulative effects. *Peltigera gowardii* occurrences are at a high risk of loss to sedimentation in Alternative 2 since no reforestation activities would contribute to soil stabilization to prevent sedimentation.

Alternative 3

DIRECT AND INDIRECT EFFECTS

Table 3.09-1 shows the number of occurrences potentially affected in Alternative 3 are the same as Alternative 1; however, two of those occurrences of *Clarkia australis* could be affected by subsoiling. Alternative 3 also proposes 2,583 fewer acres of noxious weed treatments than Alternative 1, while also proposing the opening of more bare mineral soil through hand grubbing. Additionally, weed treatment does not include herbicides, which would make the treatments less effective and noxious weeds would persist at sites within the project longer. The risk of noxious weed invasion is high in Alternative 3 compared to moderate in Alternative 1. The potential effects to Sensitive plants are also comparatively higher.

CUMULATIVE EFFECTS

Same as Alternative 1 (Table 3.09-3).

Alternative 4

DIRECT AND INDIRECT EFFECTS

The direct and indirect effects of this alternative would be similar to those described in Alternative 1. However, as Table 3.09-4 shows, Alternative 4 has the least treatment acres, so less occurrences of most of the species would be affected. A greater percentage of occurrences fall within hand treatments in Alternative 4 compared to Alternative 1 and Alternative 4 would create more ground disturbance through prescribed burning than the rest of the action alternatives.

Alternative 4 has a greater risk of weed spread since no herbicides are proposed for use in weed eradication and fewer weed populations and species would be targeted. Therefore, even though this alternative proposes treatment in fewer rare plant occurrences the overall risk of noxious weed invasion into these areas is greater.

Table 3.09-4 Alternative 4: Sensitive Plants Overlapping Proposed Reforestation Activities

Sensitive Plant Species	Occurrences in units (number)	Occurrences in units (acres)
Balsamorhiza macrolepis	1	0.09
Clarkia australis	62	75.28
Clarkia biloba ssp. *australis*	5	0.76
Cypripedium montanum	10	1.48
Erythronium taylori	1	11.53
Mimulus filicaulis	12	2.26
Mimulus pulchellus	2	1.22
Peltigera gowardii	2	5.17

CUMULATIVE EFFECTS

Table 3.09-3 shows fewer occurrences would be cumulatively affected in Alternative 4 as compared to Alternative 1. The effects are expected to be similar to those described in Alternative 1, but the magnitude of the effects would be smaller since less occurrences of annual species would potentially be treated.

Alternative 5

DIRECT AND INDIRECT EFFECTS

Same as Alternative 1 (Table 3.09-1).

CUMULATIVE EFFECTS

Same as Alternative 1 (Table 3.09-3).

Summary of Effects Analysis across All Alternatives

For all action alternatives, the Rim Reforestation project will not impact *Allium tribracteatum, Allium yosemitense, Arctostaphylos nissenana, Eriastrum tracyi, Helodium blandowii, Meesia uliginosa, Mielichhoferia elongata,* and *Mielichhoferia shevockii* because activities are not proposed in their habitats.

For all action alternatives, the Rim Reforestation project may affect individuals, but are not likely to result in a trend toward federal listing or loss of species viability for *Balsamorhiza macrolepis, Botrychium ascendens, Botrychium crenulatum, Botrychium lineare, Botrychium lunaria, Botrychium minganense, Botrychium montanum, Botrychium pedunculosum, Botrychium pinnatum, Bruchia bolanderi, Cinna bolanderi, Cypripedium montanum, Dendrocollybia racemose, Eriogonum luteolum* var. *saltuarium, Eriophyllum congdonii, Eriophyllum nubigenum, Erythronium taylori, Erythronium tuolumnense, Fissidens aphelotaxifolius, Horkelia parryi, Hulsea brevifolia, Lewisia kelloggii* ssp. *hutchisonii, Lewisia kelloggii* ssp. *kelloggii, Lomatium stebbinsii, Peltigera gowardii.*and *Tauschia howellii* because even though flagging and avoiding will be in place or known locations do not exist, some undiscovered populations may be affected within suitable habitat that will be treated.

For *Clarkia australis, Clarkia biloba* ssp. *australis, Mimulus filicaulis,* and *Mimulus pulchellus,* all action alternatives of the Rim Reforestation project may affect individuals, but are not likely to result in a trend toward federal listing or loss of species viability because portions of their occurrences would likely receive adverse effects, but populations are not expected to be eliminated within the project area.

Even though the no action alternative does not manage for the increased risk of weed spread in the project area the effects to sensitive plants is minor because no disturbance activities would be implemented. The consequences are that it may affect individuals, but is not likely to result in a trend toward federal listing or loss of species viability for all sensitive species with suitable habitat in the project area.

The comparison of effects between alternatives concentrates on three main factors. The first factor is the amount of annual species (*Clarkia australis, Clarkia biloba* ssp. *australis, Mimulus filicaulis,* and *Mimulus pulchellus)* affected by treatments. This impact corresponds to the Sensitive Plant indicators: Sensitive Plant occurrences; and number of sensitive plants impacted by the project, the intensity of the impacts and the duration of the impacts. The second factor is the risk of weed spread inherent in each alternative. This impact corresponds to the Sensitive Plant indicators: suitable habitat for sensitive plants and the condition of those habitats; and the number of sensitive plants impacted by the project, the intensity of the impacts and the duration of the impacts. The third factor is the amount of habitat rehabilitated to pre-fire conditions. This impact corresponds to the Sensitive Plant indicator: suitable habitat for sensitive plants and the condition of those habitats.

Table 3.09-5 presents the comparison of effects between alternatives by assigning a value of 1 through five for each impact factor. A one indicates the lowest level of impact while a five indicates the highest level of impact. In the case of identical effects, each alternative was given the same value while the next highest impact was given the next available value. For example, for the amount of habitat restored to pre-fire conditions impact, alternatives 1, 3 and 5 were given a value of 1 while the next alternative was given a value of 4. All four of the impacts were weighted equally.

This comparison of impacts between alternatives indicates that Alternative 1 and 5 have the least impact followed by Alternatives 3, 4 and 2 in order of higher impact.

Table 3.09-5 Comparison of Alternatives: Impacts to Sensitive Plants

Impact Factor	**Alternative 1** (Proposed Action)	**Alternative 2** (No Action)	**Alternative 3**	**Alternative 4**	**Alternative 5**
Amount of annual species affected	5	1	5	2	5
Risk of noxious weed spread	1	5	3	4	1
Amount of habitat restored to pre-fire conditions	1	5	1	4	1
Aggregate impact score	7	11	9	10	7