MOON CAMP PROPERTY, FAWNSKIN AREA: VEGETATION AND SPECIAL STATUS PLANTS

PRELIMINARY DRAFT: August 2007

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Project site location: USGS Fawnskin 7½-minute topographic map, Township 2 North, Range 1 West, portion of Section 13.
APN:
Owner /Applicant:
Principal Investigator: Scott D. White, Scott White Biological consulting (above).

CERTIFICATION: I hereby certify that the statements furnished in this report and in the attached exhibits present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief. Field work conducted for this assessment was performed by me and under my direct supervision. I certify that I have not signed a non-disclosure or consultant confidentiality agreement with the project applicant or applicant's representative and that I have no financial interest in the project.

DRAFT REPORT ONLY

DATE: _____ SIGNED: _____
Scott D. White, Report Author

Additional field work performed by:

DATE: _____ SIGNED: _____
Justin Wood

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TABLE OF CONTENTS

MAPS, APPENDICES, AND ATTACHMENTS

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I: SUMMARY

The Moon Camp property supports two sensitive plant communities (Pebble Plain and meadow habitats), one federally listed plant species (ash-gray Indian paintbrush) and four State Species of Special Concern (Parish's rock-cress, Big Bear Valley woollypod, Heckard's paintbrush, and silver-haired ivesia). Project development is expected to have both direct and indirect impacts to these sensitive biological resources. Several recommendations are discussed to minimize these impacts.

II: PROJECT AND PROPERTY DESCRIPTION

The San Bernardino County Planning Department is reviewing an application for residential development on the former Moon Camp site in Fawnskin. The project site is on the north shore of Big Bear Lake, in the eastern part of Fawnskin, in unincorporated San Bernardino County. It is about 62 acres, on both sides of State Highway 38, between Oriole Lane and Polique Canyon Road (on the Fawnskin USGS 7½' quadrangle map, in the north half of Section 13, Township 2N and Range 1W). The project site slopes from north to south. Elevation ranges from 6,960 feet in the northeastern portion of the site to 6,750 feet near the lakeshore (see Exhibits 1 and 2).

The project site occurs within an area that is described by the Open Space element of San Bernardino County's General Plan as, "This area includes the entire watershed area of Big Bear Lake, and contains a number of specialized habitat areas, which support a large number of endangered plants and animals (as well as commonly occurring mountain species). Habitat values here should be maintained, potentially by controlling development to prevent damage to important habitat areas."

This report addresses the potential presence of twp special status plant communities and several sensitive plant species occurring or potentially occurring on the property.

III. FOCUSED STUDY / SPECIES OF CONCERN

There are four federally listed threatened or endangered plant species endemic to meadows and three federally listed threatened or endangered plant species endemic to "pebble plain" habitat in the Big Bear Valley area of the northern San Bernardino Mountains (USDI Fish and Wildlife Service 1984, 1998). In addition, there are numerous other special status plant species occurring in this area (Appendix 2). This report focuses on the following plant species:

Exhibit 1: TBD

Exhibit 2: TBD

Meadow Species:

- San Bernardino bluegrass (*Poa atropurpurea*) (federally endangered);
- Bird-foot checkerbloom (*Sidalcea pedata*) (federally and state endangered);
- California dandelion (*Taraxacum californicum*) (federally endangered); and
- Slender-petaled thelypodium (*Thelypodium stenopetalum*) (federally endangered).

Pebble Plain Species:

- Bear Valley sandwort (*Arenaria ursina*) (federally threatened);
- Ash-gray Indian paintbrush (*Castilleja cinerea*) (federally threatened); and
- Southern mountain buckwheat (*Eriogonum kennedyi* var. *austromontanum*) (federally threatened).

Previous surveys of the Project Site identified ash-gray Indian paintbrush as present on the site (Michael Brandman Associates 2000; White & Leatherman BioServices 2002). White and Leatherman (2002) also mapped the extent of suitable habitat for ash-gray Indian paintbrush, based on the extent of its host plant, Wright's matting buckwheat. Bear Valley sandwort was reported as occurring on the site in the California Natural Diversity Data Base (California Department of Fish and Game 2007).

IV. METHODS

Available literature relative to special status plants or plant communities known from the project site and vicinity were reviewed. Literature sources included previous biological reports (Michael Brandman Associates 2000; White & Leatherman BioServices 2002), the California Natural Diversity Data Base (California Department of Fish and Game 2007a, USGS Fawnskin, Big Bear City, Big Bear Lake, Butler Peak, Keller Peak, and Moonridge 7½' topographic quads), California Native Plant Society's *Inventory of Rare and Endangered Vascular Plants of California* (Tibor 2001), the CNPS *Electronic Inventory* (2007, for the same quads) and compendia of special status species published by the US Fish and Wildlife Service (2006) and California Department of Fish and Game (2007b). All species identified by this literature review, and others known from the general region, are included in Appendix 1 or 2 (attached). Appendix 1 lists those species not considered for this report due to elevational or geographic ranges, or specialized habitat requirements not found on the site. Appendix 2 lists special status species known from comparable habitats in the region and summarizes their natural history, conservation status, and occurrence probability onsite.

Scott D. White and Justin Wood (Scott White Biological Consulting) surveyed pebble plains habitat found on the site on 30 April, 7 June, and 8 August 2007. All plant species observed were identified in the field or collected for later identification. Plants were identified using keys, descriptions, and illustrations in Hickman (1993), Munz (1974), Abrams (1923-1960), and other regional references. All species noted on the site are listed in Appendix 3.

Surveys were conducted in conformance with California Department of Fish and Game guidelines (2000), during flowering seasons for the above listed special status plants. It should be noted that very low rainfall in 2006-2007 and surveys may not be conclusive for all annual plants.

Maps produced previously by White and Leatherman BioServices (2002) of the pebble plain habitat and open upland habitat supporting Wright's matting buckwheat (*Eriogonum wrightii* ssp. *subscaposum*) were used as base maps for this study.

V. RESULTS

Due to the drought conditions, the authors used previous reports and their own judgment of habitat quality to estimate the probability that each special status plant might occur on the site.

A. PLANT COMMUNITIES

The following two plant communities were dominant plant communities found on the site:

Jeffrey Pine Forest

Most of the site above Highway 38 is covered by the Jeffrey pine series (Sawyer and Keeler-Wolf 1995). This vegetation also matches descriptions of Jeffrey pine forest (Holland 1986; McBride 1988), and montane coniferous forest (Munz 1959). Jeffrey pine forest covers most of the eastern half of the project site and occurs in patches interspersed with pebble plains (below) in the western half (see Exhibit 3). Jeffrey pine (*Pinus jeffreyi*) is the dominant tree; white fir (*Abies concolor*), incense cedar (*Calocedrus decurrens*), western juniper (*Juniperus occidentalis*), singleleaf pinyon pine (*Pinus monophylla*), and black oak (*Quercus kellogii*) occur throughout Jeffrey pine forest, at lower densities. The understory is sparse, consisting of scattered shrubs including greenleaf manzanita (*Arctostaphylos patula*), mountain whitethorn (*Ceanothus cordulatus*), cupleaf ceanothus (*Ceanothus greggii*), deer brush (*Ceanothus integerrimus*), California mountain mahogany (*Cercocarpus betuloides*), and curl-leaf mountain mahogany (*Cercocarpus ledifolius*). Herbaceous cover is generally low, consisting of grasses and forbes in scattered patches. Jeffrey pine forest occurs in mountains throughout most of California at elevations between about 5000 and 9000 feet. Many local and regional associations have been described (Sawyer and Keeler-Wolf 1995).

Shoreline Habitats

Most plants along the shore itself are herbaceous native and non-native species of periodically saturated soils, including willowherb (*Epilobium ciliatum*), wire-grass (*Juncus arcticus*), cursed buttercup (*Ranunculus sceleratus*), and several cinquefoil species (*Potentilla* spp.). Numerous seedling cottonwood trees (*Populus balsamifera* spp. *trichocarpa*) also occur there.

Just above the high-water level, there are small patches of various upland and wetland vegetation types. These patches are too small to map. Small areas of Jeffrey pine forest are interspersed open wet meadows and grasslands and scattered patches of arroyo willow (*Salix lasiolepis*) and red willow (*Salix laevigata*). There are no alkaline meadow or dry meadow habitats (below) along the lake shore.

Sensitive Plant Communities

In addition to the above common plant communities, two sensitive plant communities were identified on the project site. Exhibit 3 shows the location of each of these sensitive plant communities.

Exhibit 3: TBD

Pebble Plain Plant Community

Pebble plain plant community occurs on XX acres within the western portion of the site north of Highway 38. This habitat occurs in smaller patches to the east (see Exhibit 3). The Pebble plain plant community (also called pavement plain) was described by Derby and Wilson (1978, 1979). A detailed discussion was prepared by the San Bernardino National Forest (1990) and brief descriptions appear in Holland (1986) and Sawyer and Keeler-Wolf (1995). This plant community is characterized by an underlying layer of clay soil with quartzite pebbles and gravel that are continually pushed to the surface, evidently through frost action (Holland 1986). Vegetation structure on these sites is similar to the mat-forming structure of alpine sites at much higher elevations. Vegetation consists largely of well-spaced cushion-forming perennials and a variety of tiny annuals. Bunchgrasses and some succulents may also occur. At least two species, both listed as endangered, are endemic to the Big Bear pebble plain plant community: Bear Valley sandwort and southern mountain buckwheat (Derby and Wilson 1978).

On the Moon Camp site, much of the pebble plain habitat has been disrupted by vehicle use on the site. This disturbance has reduced vegetation cover, disturbed the natural hydrologic pattern, and perhaps reduced habitat quality for the sensitive pebble plain plant species (San Bernardino National Forest 1990). The Forest Service has determined that vehicle disturbance does not permanently alter habitat suitability for these species. The Forest Service has fenced degraded pebble plains in the Sugarloaf area and found that plant diversity returns after a few years.

The pebble plain plant community onsite has been classified as "southern montane black sagebrush pebble plains" by CDFG (2002). This plant community is "a series or association considered rare and worthy of consideration" by the California Natural Diversity Data Base.

Meadow Habitats

Small patches of dry and wet meadows occur along the lakeshore, south of Highway 38. They grade into upland grasslands, and we could not delineate their extent due to dry conditions. Meadows in the Big Bear Valley may be perennially saturated (i.e., "wet meadows") or may have saturated soils only seasonally or during wet years (called "dry meadows," "xeric meadows," or "vernal meadows"). Meadows of the San Bernardino Mountains were described by Krantz (1994). They are generally dominated by sedges (*Carex* spp.), rushes (*Juncus* spp.) and grasses (*Poa* spp., *Elymus* spp.). Dry meadows and the margins of wet meadows support sagebrush (*Artemisia tridentata, A. rothrockii*). These meadows themselves are not ranked as special status communities by CDFG (2002) but several locally endemic plants occur in them and they, therefore, are recognized locally as important habitats (Krantz, no date).

B. SENSITIVE PLANT AND WILDLIFE SPECIES

Big Bear Valley has a high proportion of rare and locally endemic species (Krantz, no date; Krantz 1994). All of these species are addressed in Appendix 1 or 2 (habitat and range, agency status and probability of occurring on the site). Only those species potentially occurring on the site (see Appendix 2) are discussed below.

Listed Threatened or Endangered Plants Identified on the Site

Ash-gray Indian paintbrush (*Castilleja cinerea*): Ash-gray Indian paintbrush is a federally-listed threatened species and is on CNPS's List 1B. It is a root parasite on other plants, often parasitizing the listed threatened southern Mountain buckwheat (below) or a similar but common mat-forming

buckwheat (*E. wrightii* ssp. *subscaposum*). It is a perennial herb, and typically blooms between May and August. It occurs in pebble plains, meadows and seeps, and open pinyon or Jeffrey pine forest between about 5,900 and 10,000 feet elevation. It is endemic to the eastern San Bernardino Mountains (Big Bear Valley, Holcolmb Valley, Onyx Summit, Snow Valley, and Sugarloaf Ridge). It was mapped on the project site by Michael Brandman Associates (2000) and in the California Natural Diversity Data Base (2007). This survey confirmed these occurrences and noted no substantial changes to densities or distribution in 2007.

Sensitive Plants Occurring on the Site

Parish's rock-cress (*Arabis parishii*): Parish's rock cress is CNPS's List 1B. It is a perennial herb that typically blooms in April or May. It occurs in pebble plains, and other sites with heavy or rocky soils, including carbonate soils, within pinyon woodlands and montane forests between about 3,900 and 8,000 feet elevation. It is endemic to the San Bernardino Mountains. Suitable habitat occurs on the project site in areas shown on Exhibit 3. This survey confirmed its presence onsite and noted no substantial changes to densities or distribution in 2007.

Big Bear Valley woollypod (*Astragalus leucolobus*): Big Bear Valley woollypod is on CNPS's List 1B. It is a perennial herb that typically blooms between May and July. It occurs in rocky soils of montane conifer forests and woodlands and pebble plains, between about 5,600 and 8,000 feet elevation. It is endemic to the high mountains of southern California (San Bernardino, San Gabriel, San Jacinto, and Santa Rosa Mountains). Suitable habitat is found throughout the site. White & Leatherman BioServices (2002) observed it occasionally throughout the project site. This survey confirmed these occurrences and noted that it was especially common on pebble plains in 2007.

Heckard's paintbrush (*Castilleja montigena, C. applegateii* ssp. *martinii*): Heckard's paintbrush is on CNPS's List 4. It is a perennial herb, typically flowering between May and August. It occurs in montane forests between about 6,400 and 9,200 feet elevation. It is endemic to the San Bernardino Mountains, where it is common in forest habitats throughout the mountain range. It was originally described by Lawrence Heckard (1980), but Heckard regarded it as a minor variant of *Castilleja applegateii* and not as a distinct species in his Jepson Manual treatment of the genus (1993). This survey found it occurring occasionally in Jeffery pine forest on the Moon Camp site.

Silver-Haired Ivesia (*Ivesia argyrocoma*): Silver-haired ivesia is on CNPS's List 1B. It is a perennial herb that typically blooms between June and August. It occurs in alkaline meadows and seeps, pebble plains, and montane forest between about 4900 and 8800 feet elevation. It occurs in the San Bernardino Mountains and a disjunct site in the mountains of Baja California. It was reported on the project site by Michael Brandman Associates (2000) and White and Leatherman BioServices (2002). This survey observed it throughout the pebble plain habitat (Exhibit 3).

Listed and Candidate Threatened or Endangered Plants Potentially Occurring on the Site

Bear Valley sandwort (*Arenaria ursina*): Bear valley sandwort is a federally-listed as threatened and is on CNPS's List 1B. It is a perennial herb and typically blooms from May to August. It occurs in pebble plains and sometimes in carbonate soils, between about 6,400 and 6,900 feet elevation. It is endemic to Big Bear Valley in the San Bernardino Mountains. It has been reported from the Moon Camp site (CNDDB 2007), but was not observed in 2007 nor was it observed by Michael Brandman Associates (2000) or White & Leatherman BioServices (2002). Due to poor rainfall in 2006-07, this survey could not evaluate whether Bear Valley sandwort was present or absent from

the site. Suitable habitat occurs in pebble plains on the project site, and this survey determined that there is a high probability of it occurring onsite.

Southern mountain buckwheat (*Eriogonum kennedyi* var. *austromontanum*): Southern mountain buckwheat is federally listed as threatened and is on CNPS's List 1B. It is a mat-forming woody perennial, generally flowering late in the season (between about June and August). It is endemic to pebble plains habitats in Big Bear and Holcomb valleys in the San Bernardino Mountains, between about 5,800 and 7,500 feet elevation. It often serves as a host plant for the hemi-parasitic *Castilleja cinerea* (above) and also is a food plant for a newly described locally-endemic San Bernardino blue butterfly. It is very similar to a more common Wright's matting buckwheat (*E. wrightii* ssp. *subscaposum*), which is common on the project site. The two species are distinguished by presence or absence of branching in their inflorescences (Hickman 1993; Reveal 1989, 2005). We examined flowers and remains of dried inflorescences of mat-forming buckwheats throughout the project site on each site visit. Most of them were either unidentifiable (due to absence of inflorescences) or were identified as Wright's matting buckwheat, based on their branching inflorescences. Within the mapped pebble plain habitat, about 10-20% of the matting buckwheat plants had mostly unbranched inflorescences during the 8 August site visit. Reveal (2005) noted that the two plants intergrade to some extent in Big Bear Valley and A. Sanders (pers. comm.) has made similar observations. It was concluded that some of the matting buckwheats on pebble plains at the Moon Camp site are intergradations between the endangered southern mountain buckwheat and the common Wright's matting buckwheat.

San Bernardino bluegrass (*Poa atropurpurea*): San Bernardino bluegrass is a federally listed endangered species and is on CNPS's List 1B. It is a rhizomatous perennial grass that typically flowers between May and June. It occurs in mesic meadows and seeps between about 4,400 and 8100 feet elevation. It is known only from the San Bernardino Mountains and Laguna mountains (San Diego County). Although marginally suitable habitat occurs along the lakeshore areas on the project site, San Bernardino bluegrass was not observed onsite. Based on habitat, it was concluded there is a low probability that it may occur there.

Bird's foot checkerbloom (*Sidalcea pedata*): Bird's foot checkerbloom is a federally- and state-listed endangered species and is on CNPS's List 1B. It is a perennial herb that typically blooms between May and July. It occurs in meadows and seeps, between about 5,200 and 8,100 feet elevation. It is endemic to the San Bernardino Mountains. Although marginally suitable habitat occurs near the lakeshore, bird's foot checkerbloom was not observed during field surveys. It was not reported as occurring in previous surveys. Based on habitat, it was concluded that there is a low probability that it may occur.

California dandelion (*Taraxacum californicum*): California dandelion is a federally-listed endangered species and is on CNPS's List 1B. It is a perennial herb that typically blooms between May and July. It is endemic to the San Bernardino Mountains, occurring only in and around Big Bear Valley, in meadows and seeps between about 6,300 and 7,800 feet elevation. Although marginally suitable habitat occurs in meadow areas near the lakeshore, the species was not observed during the surveys or reported in prior surveys. Based on habitat, it was conclude that there is a low probability that it may occur onsite.

Sensitive Plants Potentially Occurring Onsite

Although not observed during the survey, the following sensitive plant species were judged as having a moderate or high probability of occurring onsite:

Table 1
Sensitive Plant Species Having a Moderate or High Probability of Occurring Onsite

Species	Scientific Name	Probability	Location
Rock sandwort	*Arenaria lanuginosa* ssp. *saxosa*	Moderate probability	meadow, lakeshore
Crested milk vetch	*Astragalus bicristatus*	High probability	rocky areas
Big Bear Valley milk vetch	*Astragalus lentiginosus* var. *sierrae*	High probability	open forest
Palmer's mariposa lily	*Calochortus palmeri* var. *palmeri*	Moderate probability	meadow
Western sedge	*Carex occidentalis*	Moderate probability	meadow
San Bernardino Mountain owl's clover	*Castilleja lasiorhyncha*	Moderate probability	meadow
San Bernardino Mountains dudleya	*Dudleya abramsii* ssp. *affinis*	Moderate probability	pebble plains
Southern Sierra woolly sunflower	*Eriophyllum lanatum* var. *obovatum*	High probability	forest
Jepson's bedstraw	*Galium jepsonii*	High probability	forest
Johnston's bedstraw	*Galium johnstonii*	Low to moderate probability	forest
Parry's sunflower	*Hulsea vestita* ssp. *parryi*	Low to moderate probability	open slopes
Duran's rush	*Juncus duranii*	Moderate probability	meadow
Short-sepaled lewisia	*Lewisia brachycalyx*	Moderate probability	meadow
Baldwin Lake linanthus	*Linanthus killipii*	High probability	pebble plains
San Bernardino Mountain monkeyflower	*Mimulus exiguus*	High probability	meadow margin, etc.
Purple monkeyflower	*Mimulus purpureus*	High probability	meadow margin, etc.
Chickweed oxytheca	*Oxytheca caryophylloides*	High probability	open forest
Parish's yampah	*Perideridia parishii* ssp. *parishii*	Low to moderate probability	meadow
Transverse Range phacelia	*Phacelia exilis*	High probability	meadow margin, etc.
Mojave phacelia	*Phacelia mohavensis*	High probability	meadow margin, etc.

Table 1 (Cont.)
Sensitive Plant Species Having a Moderate or High Probability of Occurring Onsite

Species	Scientific Name	Probability	Location
Bear Valley phlox	*Phlox dolichantha*	High probability	throughout
Bear Valley pyrrocoma	*Pyrrocoma uniflora* ssp. *gossypina*	Low - moderate probability	meadow
Parish's rupertia	*Rupertia rigida*	High probability	throughout
Tehachapi ragwort	*Senecio ionophyllus*	Moderate probability	throughout
Laguna Mountains jewelflower	*Streptanthus bernardinus*	Moderate probability	forest
Southern jewelflower	*Streptanthus campestris*	High probability	forest
Pine green-gentian	*Swertia neglecta*	High probability	Forest
Small-flowered bluecurls	*Trichostema micranthum*	High probability	meadow

C. SAN BERNARDINO COUNTY PROTECTED PLANTS

The San Bernardino County Native Plant Protection policy (1989) regulates removal of trees greater than 6 inches diameter at breast height (dbh), smoke trees, mesquite, creosote rings, and all plants in the agave family, including Joshua trees. Although there are no smoke trees, mesquite, creosote rings or species in the agave family that occur on property, Jeffrey pines and other native forest trees greater than 6 inches dbh do occur onsite. An arborist survey and report on these trees is recommended.

VI. IMPACTS

A. IMPACTS TO SPECIAL STATUS PLANTS AND HABITAT

Project construction includes grading new roads, driveways and building pads throughout most of the property, and the loss of some of the native vegetation. Pebble plains and open forest patches on the site are occupied by at least one threatened or endangered plant (ash-gray Indian paintbrush) and four other sensitive but unlisted plant species (Parish's rock-cress, Heckard's paintbrush, Bear Valley woollypod and silver-haired ivesia). Development could eliminate or substantially reduce the populations of all five plant species populations. Although these habitats are somewhat degraded by vehicles and invasive plants, adverse impacts to listed species would meet the CEQA threshold for mandatory findings of significance.

Similarly, development could eliminate or substantially reduce the populations of five other listed plants that potentially occur on the site but were not identified during previous surveys. These species include Bear Valley sandwort, southern mountain buckwheat, bird-foot checkerbloom, San Bernardino bluegrass, and California dandelion. Impacts to any of those species, if present, would meet the CEQA threshold for mandatory findings of significance if any of these listed plants occur on the site.

Impacts to the sensitive but unlisted plants listed in Table 1 generally would not meet the CEQA threshold for mandatory findings of significance.

VII. RECOMMENDATIONS

A. AGENCY CONSULTATION OR FURTHER STUDIES

To minimize loss of forest canopy on the property, we recommend that an arborist map and inventory trees on the site, and designing roads and building sites to minimize the number of overstory trees to be removed. Once those trees that must be removed are identified, we recommend applying to San Bernardino County for applicable permits under the County's native plant protection policy.

B. MITIGATION MEASURES

1. Additional Surveys

Surveys of wet meadow habitat near the lakeshore should be repeated to determine presence or absence of the listed threatened or endangered species whose presence or absence could not be determined this year. If the surveys determine that one or more listed species occurs in the meadow area, then additional compensation will be required.

2. Avoidance or Minimization

Avoiding or minimizing impacts to sensitive plant habitat is the preferred mitigation measure. However, this mitigation measure would likely reduce project feasibility. It may not provide long-term conservation of the listed plants due to the isolation that will result from project development.

3. Off-site Compensation

Off-site compensation is an available mitigation measure for impacts to ash-gray Indian paintbrush and the pebble plain habitat. The San Bernardino National Forest actively manages to preserve pebble plain habitat, including areas supporting ash-gray paintbrush. There are numerous privately-owned sites in the Big Bear Valley that support pebble plain that could be purchased and managed for conservation. In addition, the California Wildlife Foundation has established a fund, administered by the California Department of Fish and Game, for the purchase and conservation of pebble plain habitat in the Big Bear area.

It is recommended that the anticipated loss of a federally listed threatened plant (ash-gray Indian paintbrush) and pebble plain habitat be mitigated by contributing to the funding of purchase and management of off-site habitat through the California Wildlife Foundation fund. It is anticipated that mitigation will be required at 3:1 ratio.

4. Onsite Management

Impacts to the pebble plains habitat and sensitive plants will be minimized by the project's design, which will place the pebble plain area, particularly the area occupied ash-gray Indian paintbrush habitat, into a permanently protected open space. The long-term conservation value of the proposed open space requires active onsite land management to prevent "edge effects" from

existing and proposed new adjacent land uses. Exhibit 4 shows these areas on the project site that would be expected to be subject to edge effects.

The following discussion of edge effects on rare plants is based on an analysis by the Conservation Biology Institute (2000) addressing San Fernando Valley spineflower, an endemic southern California species threatened by development and surrounding land uses in the Santa Clarita Valley. Sensitive plants found near developed lands tend to die out due to a variety of edge effects, including:

- Exclusion by invasive weedy plants introduced deliberately or accidentally into developed landscapes;
- Trampling or soil damage caused by foot traffic, vehicles, bicycles, or other recreation.
- Altered hydrology caused by irrigation overspray, road runoff, or water diversions installed for erosion control;
- Direct damage by pets and feral animals (e.g., digging by dogs and cats);
- Indirect effects of non-native animals, such as elimination of native pollinators by invasive Argentine ants;
- Vegetation clearing, especially for fuel modification to reduce fire hazards to adjacent homes; and
- Pollution from over-sprayed or runoff landscaping chemicals (insecticides, herbicides, fertilizers).

Conservation planners can design "buffer areas" to separate managed sensitive species or habitat areas from the indirect effects from adjacent land uses. Roads, trails, or fuel modification land uses were not considered consistent with buffer function. The Conservation Biology Institute analysis (2000) estimated that buffer widths of 200 feet would be "highly likely to be effective" in buffering sensitive plant occurrences from a series of adverse edge effects from adjacent land uses.

Most land surrounding the proposed Moon Camp site is in private ownership, except in the northeastern corner where National Forest land is adjacent to the north and east. None of the surrounding private land is managed as either a buffer area or for conservation. Most of the adjacent land has been developed and would not be available for conservation or a buffer area. The proposed project will be subject to substantial edge effects from adjacent residential development and roads, especially Highway 38 (see Exhibit 4).

IX. CONCLUSION

Two sensitive plant communities (Pebble Plain and meadow habitats) occur on the project sites. These two plant communities support an array of endemic plant species, including the federally threatened ash-gray Indian paintbrush and four plant species of special concern (Parish's rock-cress, Big Bear Valley woollypod, Heckard's paintbrush, and silver-haired ivesia). Development of the project site is expected to result in direct and indirect impacts to the sensitive plant communities and associated endemic plant species. Several recommendations are made to help minimize these impacts.

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Appendix 1: Special Status Species Not Addressed

Appendix 1: Special Status Plants of the Bear Valley Region Not Addressed Due to Habitat or Range

Common name	Latin name	Reason for exclusion
White-margined everlasting	*Antennaria marginata*	Outside geogr. range (only local occurrences in Barton Flats area)
Pinyon rock-cress	*Arabis dispar*	Outside geogr. range (only local occurrences on desert-facing slopes)
Shockley's rock-cress	*Arabis shockleyi*	Outside geogr. range (only local occurrences on desert-facing slopes)
Cushenbury milk-vetch	*Astragalus albens*	No suitable habitat (carbonate)
Triple-ribbed milk-vetch	*Astragalus tricarinatus*	No habitat (desert shrubland), well above elev. range (below about 4000 ft.), Cushenbury Cyn report erroneous
Parish's small-scale	*Atriplex parishii*	No suitable habitat (alkali sink)
Fremont barberry	*Berberis fremontii*	No local occurrences (presumed extinct in Cushenbury area)
Scalloped moonwort	*Botrychium crenulatum*	No suitable habitat (marshes, bogs)
Plummer's mariposa lily	*Calochortus plummerae*	Above elev. range (below about 5500 ft.)
Alkali mariposa lily	*Calochortus striatus*	No habitat (desert alkaline meadows, seeps) above elev. range (below about 5300 ft.)
Parish's daisy	*Erigeron parishii*	No suitable habitat (carbonate)
Cushenbury buckwheat	*Eriogonum ovalifolium var. vineum*	No suitable habitat (carbonate)
Moss gentian	*Gentiana fremontii*	Well below elev. range (occurs in San Gorgonio Wilderness)
Los Angeles sunflower	*Helianthus nuttallii ssp. parishii*	Well above elev. range (below about 4000 ft. elev.)
Barton Flats horkelia	*Horkelia wilderae*	Outside geogr. range (endemic to Barton Flats area)
California satintail	*Imperata brevifolia*	Well above elev. range (below about 3000 ft.)
San Bernardino Mtn. bladderpod	*Lesquerella kingii ssp. bernardinus*	No habitat (carbonate)
Adder's mouth	*Malaxis monophyllos ssp. brachypoda*	Well below elev. range (occurs in San Gorgonio Wilderness)
Cienega Seca oxythexca	*Oxytheca parishii var. cienegensis*	Outside geogr. range (known only from Cienega Seca and Pipes Cyn areas)
Cushenbury oxytheca	*Oxytheca parishii var. goodmaniana*	No habitat (carbonate)
Frosted mint	*Poliomintha incana*	No suitable habitat (desert dunes and sandy flats)
Narrow-leaved cottonwood	*Populus angustifolia*	No San Bernardino Mountain occurrences (local reports unverified)
Latimer's woodland gilia	*Saltugilia latimeri*	No habitat (desert shrubland,pinyon woodland); above elev. range (below about 6200 ft.)
Slender-petaled thelypodium	*Thelypodium stenopetalum*	No habitat (alkaline meadows)

Appendix 2: Special Status Species

Appendix 2: Special Status Species Potentially Occurring on the Project Site

Special Status Plants	Habitat and Distribution	Flower season	Conservation Status	Occurrence Probability
Abronia nana ssp. *covillei* Coville's dwarf abronia	Perennial herb; carbonate and sandy soils within pinon-juniper woodlands; San Bernardino Mts. and mountains of E Mojave, about 5,200 - 10,200 ft.	May -August	Fed: none Calif: S3.2 CNPS List 4.2	Low (marginally suitable habitat)
Allium parishii Parish's onion	Bulb; open shrubland & woodland, gen. sandy bajadas or mtn slopes, often carbonate soil, about 3000 – 5,500 ft. elev.; N San Bern Mtns and Moj Des Mtns, to W Ariz.	Apr - May	Fed: none Calif: S3.3? CNPS List 4.3	Minimal (above elev. range)
Arabis parishii Parish's rock cress	Perennial herb; pebble plains, occas. on carbonate soil; open dry sites in conifer forest; about 5,800 – 9,500 ft. elev.; San Bernardino Mtns. endemic	April - May	Fed: none Calif: S2.1 CNPS List 1B. 2	Occurs (2007 survey; NDDB report)
Arenaria lanuginosa ssp. *saxosa* (*A. confusa*) Rock sandwort	Perennial herb; sandy soils, streams or meadows; about 5900 to 8600 ft. elev.; San Bernardino Mtns, W US and N Baja Calif.	July - Aug	Fed: none Calif: S1.3 CNPS List 2.3	Moderate (moderately suitable habitat)
Arenaria ursina Bear Valley sandwort	Perennial herb, pebble plains, occas. on carbonate soils, about 5,900 – 9,500 ft. elev.; San Bernardino Mtns. endemic	June - July	Fed: THR Calif: S 2.1 CNPS: List 1B.2	Occurs? (NDDB record #23)
Aster bernardinus (*Symphyotrichum defoliatum*) San Bernardino aster	Perennial herb; wetlands and margins, near sea level to about 6,700 ft. elev.; formerly widespread, Kern Co to San Diego Co, but most sites extirpated	July - Nov	Fed: none Calif: S 3.2 CNPS List 1B.2	Low (field surveys; upper margin of elev. range)
Astragalus bicristatus Crested milk vetch	Perennial herb; rocky slopes, montane conifer forest; about 5,500 – 9,000 ft. elev.; San Bernardino, San Gabriel, and San Jacinto Mtns	May - August	Fed: none Calif: S3.3 CNPS List 4.3	High (suitable habitat occurs)
Astragalus lentiginosus var. *sierrae* Big Bear Valley milk vetch	Perennial herb; open rocky soils or compacted areas in pine forest; about 5,900 – 8,500 ft. elev.; San Bernardino Mtns endemic	April - August	Fed: none Calif: S1? CNPS List 1B.2	High (suitable habitat occurs)
Astragalus leucolobus Bear Valley woollypod	Perennial herb; open or disturbed soils, pine forests and sagebrush scrub, about 5,600-8,800 ft. elev.; San Gabriel Mtns to Santa Rosa Mtns	May - July	Fed: none Calif: S 2.2 CNPS List 1B.2	Occurs

Appendix 2: Special Status Species Potentially Occurring on the Project Site

Special Status Plants	Habitat and Distribution	Flower season	Conservation Status	Occurrence Probability
Calochortus palmeri vars. *palmeri* and *munzii* Palmer's & Munz's mariposa lilies	Bulb; meadows or seasonally moist sites; about 3,300 – 7,200 ft. elev.; var. *palmeri* occurs S Coast & Transverse Ranges, reported but not verified San Jacinto Mtns; var. *munzii* endemic to San Jacintos, reported but not verified in San Bernardinos	May - July	Fed: none CNPS List 1B.2 var *palmeri*: Calif: S 2.1 var. *munzii*: Calif: S 1.2	Moderate (marginally suitable habitat)
Carex occidentalis Western sedge	Rhizomatous perennial; meadows & seeps; San Bernardino Mtns, White Mtns, scattered in western states; about 6,200 - 10,300 ft. elev.	June - Aug	Fed: none Calif: S2S3 CNPS List 2.3	Moderate (marginal habitat)
Castilleja cinerea Ash-gray Indian paintbrush	Perennial herb; pebble plains, dry meadows, about 5,900 to 9,100 ft. elev.; partially parasitic usually on matting buckwheats; San Bernardino Mtns endemic	May - August	Fed: THR Calif: S2.2 CNPS List 1B.2	Occurs (field survey and CNDDB report)
Castilleja lasiorhyncha (*Orthocarpus lasiorhynchus*) San Bernardino Mountain owl's clover	Annual; meadows, streamsides, seeps, etc., about 4,200-7,800 ft. elev.; San Bernardino Mtns. and (historically) San Jacinto Mtns.; reports from San Diego Co. unconfirmed	June - Aug	Fed: none Calif: S2.2 CNPS List 1B.2	Moderate (marginal habitat)
Castilleja applegateii ssp. *martinii* H *C. angustifolia* (=*C. montigena, C. martinii* var. *ewanii*) Heckard's paintbrush	Perennial herb; conifer forest; San Bernardino Mountains endemic (treated as a species by CNPS but considered a hybrid by Chuang & Heckard in Jepson Manual)	March - July	Fed: none Calif: S3.3 CNPS List 4.3	Occurs (Jeffrey pine forest)
Dryopteris filix-mas Male fern	Perennial herb; widespread in N hemisphere, esp. at high latitudes; only two reports in Calif., incl. Holcomb Valley	July - Sept.	Fed: none Calif: S 1.3 CNPS List 2.3	Low (local rarity)
Dudleya abramsii ssp. *affinis* San Bernardino Mts. dudleya	Perennial herb, pebble plains & rock outcrops (often carbonate); pinyon woodland, open pine forests, about 5,200-8,500 ft. elev.; San Bernardino Mtns endemic	April - June	Fed: none Calif: S 2.2 CNPS: List 1B.2	Moderate (marginal habitat)
Eriogonum foliosum (*E. evanidum*) Leafy buckwheat	Annual; sandy soil, woodlands or shrublands; about 3,900-7,200 ft. elev.; scattered locations, Big Bear Valley to N Baja Calif.; may be extinct in Calif.	July - Oct.	Fed: none Calif: SH CNPS List 1B.2	Minimal (presumed extinct, local rarity)

Appendix 2: Special Status Species Potentially Occurring on the Project Site

Special Status Plants	Habitat and Distribution	Flower season	Conservation Status	Occurrence Probability
Eriogonum kennedyi var. *austromontanum* Southern mountain buckwheat	Matting woody perennial; pebble plains and similar soils, about 5,800 – 7,800 ft. elev.; nearly endemic to Big Bear area, also reported at Mt. Pinos	July - August	Fed: THR Calif: S2.2 CNPS: List 1B.2	Apparent introgression w/ Wright's buckwheat (see text)
Eriogonum microthecum var. *lacus-ursi* Bear Lake buckwheat	Subshrub; montane forests and shrublands; only known occurrence at Big Bear Lake shore ca. 7,200 ft. elev.	July - Sept	Fed: none Calif: S 1 CNPS List 1B.1	Minimal (field survey)
Eriophyllum lanatum var. *obovatum* Southern Sierra woolly sunflower	Perennial herb; open montane coniferous forests, 4,200-8,200 ft. elev.; S Sierra Nevada and western San Bernardino Mtns	June - July	Fed: none Calif: S3.3 CNPS: List 4.3	High (suitable habitat occurs)
Galium jepsonii (*G. angustifolium* var. *subglabrum*) Jepson's bedstraw	Perennial herb; sandy or gravelly soils, montane conifer forest, 6,500-8,100 ft. elev.; San Gabriel and San Bernardino Mtns	July - August	Fed: none Calif: S3.3 CNPS: List 4.3	High (suitable habitat occurs)
Galium johnstonii (*G. angustifolium* var. *pinetorum*) Johnston's bedstraw	Perennial herb, dry slopes, chaparral, lower montane forest, pinyon and juniper woodland; about 4,000-7,600 ft. elev.; San Bernardino, San Gabriel, maybe San Jacinto mtns	June - July	Fed: none Calif: S3.3 CNPS: List 4.3	Low-moderate (suitable habitat occurs; margin of elev. range)
Gilia leptantha ssp. *leptantha* San Bernardino Mtn. gilia	Annual; sandy or gravelly soils, open pine forest; endemic to upper Santa Ana Riv. watershed, San Bernardino Mtns., about 5,000 to 7,700 ft. elev.	June - Aug	Fed: none Calif: S2.3 CNPS: List 1B.3	Low (probably outside geogr. range)
Heuchera hirsutissima Shaggy-haired alum root *Heuchera parishii* Parish's alumroot	Perennial herbs; rocky outcrops, cliffs, slopes; montane forest or alpine boulderfields; above about 4,800 ft. elev.; *H. hirsutissima* is endemic to San Jacinto and Santa Rosa Mtns (unconfirmed from San Bernardino Mtns); *H. parishii* endemic to San Bernardino Mtns	May - July	Fed: none Calif: S2.3 CNPS: List 1B.3	Low (poorly suitable habitat)
Hulsea vestita ssp. *parryi* Parry's sunflower	Perennial herb; gen. conifer forests, on loose eroding soil and talus; San Bernardino Mtns and Little San Bern. Mtns; about 5,500-9,500 ft. elev.	April - August	Fed: none Calif: S 3.3 CNPS: List 4.3	Low-moderate (marginal habitat)

Appendix 2: Special Status Species Potentially Occurring on the Project Site

Special Status Plants	Habitat and Distribution	Flower season	Conservation Status	Occurrence Probability
Ivesia argyrocoma Silver-haired ivesia	Perennial herb; pebble plains, seasonal meadows, drainages; about 4,900-8,800 ft. elev.; San Bernardino Mtns and a long-disjunct site in Baja Calif mtns	June - August	Fed: none Calif: S2.2 CNPS: List 1B.2	Occurs (field survey & NDDB record)
Juncus duranii Duran's rush	Perennial herb; meadows, seeps, etc., montane forest, about 5,800-9,000 ft. elev.; San Bernardino, San Gabriel, and San Jacinto Mtns	July - August	Fed: none USFS: none Calif: S 3.3 CNPS: List 4.3	Low (masrginal habitat occurs)
Lewisia brachycalyx Short-sepaled lewisia	Perennial herb; wet meadows, mesic forest openings, about 4,500-7,600 ft. elev.; San Bernardino Mtns to Baja Calif, Utah, New Mexico	May - June	Fed: none Calif: S3.2 CNPS: List 2.2	Low-Moderate (marginal habitat)
Lilium parryi Lemon lily	Bulb; meadows and streambanks, about 4,200 – 8,600 ft. elev.; mtns of S Calif. and SE Arizona	July - August	Fed: none Calif: S2.1 CNPS: List 1B.2	Low (marginal habitat)
Linanthus killipii Baldwin Lake linanthus	Annual; pebble plains, alkaline meadows, forest openings, about 5,500-7,900 ft. elev.; San Bernardino Mtns endemic	May - July	Fed: none Calif: S 2.1 CNPS: List 1B.2	High (suitable habitat occurs)
Mimulus exiguus San Bernardino Mountain monkeyflower	Annual; open, seasonally moist meadows, seeps, drainages, about 5,900 – 7,600 ft. elev.; San Bernardino Mtns. and high mtns of Baja Calif.	June - July	Fed: none Calif: S 2.2 CNPS: List 1B.2	High (suitable habitat occurs)
Mimulus purpureus Purple monkeyflower	Annual; meadow edges, forests, drainages, seeps, about 6,200 – 7,600 ft. elev.; San Bernardino Mtns and high mtns of Baja Calif.	May - July	Fed: none Calif: S 2.2 CNPS: List 1B.2	High (suitable habitat occurs)
Navarretia peninsularis Baja navarretia	Annual herb; open, seasonally wet places in coniferous forests, about 4,900 -7,600 ft. elev.; mtns of central and S Calif. and N Baja Calif.	June - August	Fed: none Calif: S2.2 CNPS: List 1B.2	Low (small patches of marginal habitat)
Oxytheca caryophylloides Chickweed oxytheca	Annual; sandy soils in conifer forests, 3,900-8,500 ft. elev.; S Sierra Nevada, Transverse Ranges, San Jacinto Mtns	July - Sept.	Fed: none Calif: S3.3 CNPS: List 4.3	High (suitable habitat occurs)
Perideridia parishii ssp. *parishii* Parish's yampah	Perennial herb; meadows, moist areas in conifer forest, about 4,800 – 9,900 ft. elev.; San Bernardino Mtns and (disjunct) AZ, Nevada, New Mexico	June - August	Fed: none Calif: S2.2? CNPS: List 2.2	Low - moderate (marginal habitat)

Appendix 2: Special Status Species Potentially Occurring on the Project Site

Special Status Plants	Habitat and Distribution	Flower season	Conservation Status	Occurrence Probability
Phacelia exilis (*P. mohavensis* var. *exilis*) Transverse Range phacelia	Annual; sandy or gravelly soils, forest openings, meadows, pebble plains, about 3,600 – 8,900 ft. elev.; S Sierra Nevada and Transverse Ranges	May - August	Fed: none Calif: S 3.3 CNPS: List 4.3	High (suitable habitat occurs)
Phacelia mohavensis Mojave phacelia	Annual; sandy or gravelly soil; dry meadows and streambeds gen. within pine forest, about 4,500-8,100 ft. elev.; San Gabriel & San Bernardino Mtns.	April - August	Fed: none Calif: S 3.3 CNPS: List 4.3	High (suitable habitat occurs)
Phlox dolichantha Bear Valley phlox	Perennial herb; montane forest and pebble plains; about 6,000 – 9,800 ft. elev.; San Bernardino Mtns endemic	May - July	Fed: none Calif: S 2.2 CNPS: List 1B.2	High (suitable habitat occurs)
Poa atropurpurea San Bernardino bluegrass	Open, flat meadows, about 6,700 – 7,500 ft. elev. in the San Bernardinos; endemic to San Bernardino Mtns and San Diego Co. (Palomar and Laguna Mtns where it ranges down to about 4,400 ft. elev.)	May - June	Fed: END Calif: S2.2 CNPS: List 1B.2	Low (habitat marginal at best)
Potentilla glandulosa ssp. *ewanii* Ewan's cinquefoil	Perennial herb; mesic conifer forest, about 6,200-7,900 ft. elev.; nearly endemic to San Gabriel Mtns., but also reported from Fawnskin area, San Bernardino Mtns.	June - July	Fed: none Calif: S 1.3 CNPS List 1B.3	Low (field survey)
Pyrrocoma uniflora ssp. *gossypina* (*Haplopappus uniflorus* ssp. *gossypinus*) Bear Valley pyrrocoma	Perennial herb; meadows (usually alkaline), pebble plains, about 5,200 – 7,600 ft. elev.; San Bernardino Mts endemic	July - August	Fed: none Calif: S2.2 CNPS: List 1B.2	Low - moderate (marginally suitable habitat occurs)
Rupertia rigida (*Psoralea rigida*) Parish's rupertia	Perennial herb; chaparral, forests, and woodlands, about 2,300-8,200 ft. elev.; San Bernardino Mtns, Peninsular Ranges, Baja Calif.	June - July	Fed: none Calif: S3.3 CNPS: List 4.3	High (suitable habitat occurs)
Selaginella asprella Bluish spike-moss	Herb; rocks, crevices, & rocky soils, dry sites in conifer forests, about 5,200-8,800 ft. elev.; scattered mtn. ranges of cent. & S Calif., Baja Calif.	July	Fed: none Calif: S3.3 CNPS: List 4.3	Low (marginal habitat)
Senecio bernardinus (*Packera bernardinoa*) San Bernardino butterweed	Perennial herb; dry meadows (incl. alkaline), about 5,900-7,600 ft. elev.; San Bernardino Mtns endemic	May - July	Fed: none Calif: S 2.2 CNPS: List 1B.2	Low (marginally suitable habitat)

Appendix 2: Special Status Species Potentially Occurring on the Project Site

Special Status Plants	Habitat and Distribution	Flower season	Conservation Status	Occurrence Probability
Senecio ionophyllus Tehachapi ragwort	Perennial herb; crevices, rocky places in dry conifer forest, about 4,800-8,900 ft. elev.; S Sierra Nevada, San Gabriel and San Bernardino Mtns	June - July	Fed: none Calif: S3.3 CNPS: List 4.3	Moderate (suitable habitat)
Sidalcea hickmanii ssp. *parishii* Parish's checkerbloom	Perennial herb; chaparral, oak shrubland or woodland, pine forest; San Bernardino Mtns. and a few Santa Barbara Co. sites, about 3,200 – 6,000 ft. elev.	June - August	Fed: none CA: Rare S 1.2 CNPS: List 1B.2	Minimal (marginal habitat, above elev. range)
Sidalcea pedata Bird's foot checkerbloom	Perennial herb; meadows (freshwater or alkaline clay), sometimes streambanks, about 5,200-8,200 ft. elev.; San Bernardino Mtns endemic	May - July	Fed: END Calif: END, 1.1 CNPS: List 1B.1	Low (habitat marginal at best)
Sphenopholis obtusata Prairie wedge grass	Perennial grass; riparian woodlands, meadows, streambanks; about 1,000 – 6,600 ft. elev.; few scattered locns in Calif. but widespread in N America	April - July	Fed: none Calif: S2.2 CNPS: List 2.2	Low (upper margin elev. range; poor habitat)
Streptanthus bernardinus Laguna Mountains jewelflower	Perennial herb; chaparral, hardwood & conifer forest, about 3,900-8,100 ft. elev.; mtns of S Calif. (gen. W half of San Bernardino Mtns)	June - July	Fed: none Calif: S 3.3 CNPS: List 4.3	Moderate (margin of geogr. range)
Streptanthus campestris Southern jewelflower	Perennial herb; shrublands, forests, woodlands, often rocky sites, about 2,900 -7,600 ft. elev.; Transverse and Peninsular Ranges, Baja Calif.	May - July	Fed: none Calif: S 2.3 CNPS: List 1B.3	High (suitable habitat occurs)
Swertia neglecta (*Frasera neglecta*) Pine green-gentian	Perennial herb; conifer forests and pinyon woodland., about 4,600-8,200 ft. elev.; S Coastal Ranges and Transverse Ranges	May - July	Fed: none Calif: S 3.3 CNPS: List 4.3	High (suitable habitat occurs)
Taraxacum californicum California dandelion	Perennial herb; wet meadows, about 5,300 – 9,200 ft. elev.; San Bernardino Mtns endemic	May - Aug	Fed: END Calif: S2.1 CNPS: List 1B.2	Low - moderate (suitable habitat occurs)
Thelypodium stenopetalum Slender-petaled thelypodium	Perennial herb; meadows (mesic, usually alkaline clay), about ,5200 – 8,200 ft. elev.; endemic to Big Bear and Holcomb Valleys	May - Aug	Fed: END Calif: END, 1.1 CNPS: List 1B.1	Minimal (no alkaline meadow habitat)
Trichostema micranthum Small-flowered bluecurls	Annual; dry margins of lakes, meadows, and streams, 5,000-7,600 ft. elev., San Bernardino Mtns and Baja Calif.	July - Sept.	Fed: none Calif: S3.3 CNPS: List 4.3	High (suitable habitat occurs)

Special Status Plants	Habitat and Distribution	Flower season	Conservation Status	Occurrence Probability
Viola pinetorum ssp. *grisea* Grey-leaved violet	Perennial herb; montane forests, about 4,900 -11,200 ft. elev.; S Sierra Nevada and reported San Bernardino Mtns (CNPS but no other source)	April - July	Fed: none Calif: S 1.3 CNPS: List 1B.3	Low (suitable habitat occurs; may be outside geogr. range)
General references: CDFG 2007a, 2007b; CNPS 2007; Hickman (ed.) 1993; Munz 1974; Sanders et al. 1995; Tibor 2001, US Fish and Wildlife Service 2006.				

Appendix 3: Species List

Appendix 3: Species Observed

The following species were observed onsite during the 2007 survey period.

Plants			
Latin Name	**Common Name**	**Frequency/Location**	**Voucher #**
CUPRESSACEAE	**CYPRESS FAMILY**		
Calocedrus decurrens	Incense cedar	Occas. / forest	
Juniperus occidentalis	Western juniper	Comm. / forest	
PINACEAE	**PINE FAMILY**		
Abies concolor	White fir	Occas. / forest	
Pinus jeffreyi	Jeffrey pine	Comm. / forest	
Pinus monophylla	Pinyon pine	Occas. /forest	
APIACEAE	**CELERY FAMILY**		
Lomatium nevadense	Nevada lomatium	Uncomm. / forest	11669
Tauschia parishii	Parish tauschia	Scarce / open places	11668
ASTERACEAE	**ASTER FAMILY**		
Achillia millefolium	California yarrow	Comm. / esp. mesic sites	
Agoseris retrorsa	Spear-leaved agoseris	Occas. / throughout	
Antennaria dimorpha	Low everlasting	Comm. / pebble plains	
Artemisia dracunculus	Tarragon	Occas. / esp. near road, lakeshore	
Artemisia ludoviciana	Western mugwort	Occas. / open places, washes	
Artemisia tridentata	Great Basin sagebrush	Comm. / open forest	
Aster frondosus	Short-rayed alkali aster	Occas.-comm. / near shore	
Chrysothamnus nauseosus	Common rabbitbrush	Occas. / throughout	
Chrysothamnus viscidiflorus	Curlleaf rabbitbrush	Occas.-comm. / throughout	
Cirsium occidentale var. californicum	California thistle	Uncomm. / open sites	
* *Cirsium vulgare*	Bull thistle	Occas. / near shore	
Erigeron breweri	Brewer's daisy	Occas. / forest	
Erigeron divergens	Diffuse daisy	Comm. / gen. open places	11667
Eriophyllum confertiflorum	Golden yarrow	Comm. / ± throughout	
Gnaphalium canescens	Perennial cudweed	Uncomm. / gen. open places	
* *Gnaphalium luteo-album*	Pearly everlasting	Occas. / roadside, shoreline	
Hymenopappus filifolius	Columbia cutleaf	Uncomm. / open forest	
* *Lactuca serriola*	Prickly lettuce	Occas. / mostly roadside	
Lessingia filaginifolia (Corethrogyne filaginifolia)	Chaparral aster	Occas. / open forest	
Madia elegans	Elegant tarplant	Occas. / forest	
* *Senecio vulgaris*	Common groundsel	Uncomm. / gen. roadside	
Solidago californica	California goldenrod	Occas. / mesic sites	
* *Sonchus oleraceus*	Common sow thistle	Occas. / near shore	

Appendix 3: Species Observed

The following species were observed onsite during the 2007 survey period.

Plants			
Latin Name	**Common Name**	**Frequency/Location**	**Voucher #**
* *Taraxacum officinale*	Common dandelion	Occas. / roadside, shoreline	
Tetradymia comosa	Hairy horsebrush	Occas. / open forest	
* *Tragopogon dubius*	Oyster plant, salsify	Occas. / roadside, forest	
BORAGINACEAE	**BORAGE FAMILY**		
Cryptantha micrantha	Purple root cryptantha	Occas. / open places	
Cryptantha simulans	Popcorn flower	Scarce / open places	11670
BRASSICACEAE	**MUSTARD FAMILY**		
Arabis holboellii (?)	Holboell's rock-cress	Occas. / open forest	
** *Arabis parishii*	Parish's rock-cress	Occas. / pebble plains	11665
Caulanthus major	Slender wild-cabbage	Occas. / forest	
Descurainia incisa (D. richardsonii)	Mountain tansy mustard	Uncomm. / near road	
Descurainia pinnata	Tansy mustard	Occas. / mostly open forest	
Erysiumum capitatum	Douglas wallflower	Occas. / ±throughout	
* *Lepidium virginicum v. pubescens*	Wild peppergrass	Occas. / mostly roadside, shoreline	
* *Sisymbrium altissimum*	Tumble mustard	Occas. / roadside	
CACTACEAE	**CACTUS FAMILY**		
Opuntia basilaris var. basilaris	Common beavertail cactus	Uncomm. / open forest	
CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**		
Symphoricarpos rotundifolius var. parishii	Parish snowberry	Occas. / shaded forest	
CARYOPHYLLACEAE	**CARNATION FAMILY**		
Silene verecunda ssp. platyota	Cuyamaca campion	Occas. / forest	
CHENOPODIACEAE	**GOOSEFOOT FAMILY**		
* *Chenopodium album (?)*	Common goosefoot	Occas. / throughout	
* *Salsola tragus*	Russian thistle, tumbleweed	Occas. / mostly roadside	
CONVOLVULACEAE	**MORNING GLORY FAMILY**		
Calystegia malacophylla ssp. fulcrata (C. fulcrata)	Morning glory	Occas. / throughout	
ERICACEAE	**MANZANITA FAMILY**		
Arctostaphylos patula	Greenleaf manzanita	Occas.-comm. / forest	
EUPHORBIACEAE	**SPURGE FAMILY**		
Chamaesyce albomarginata	Rattlesnake spurge	Occas. / open forest	
Euphorbia palmeri	Wood spurge	Occas. / uplands	
FABACEAE	**PEA FAMILY**		
Amorpha californica	California false indigo	Occas. / mesic forest	
** *Astragalus leucolobus*	Bear Valley woollypod	Comm. / pebble plains	11705
Astragalus douglasii	Douglas rattleweed	Uncomm. / open places	

Appendix 3: Species Observed

The following species were observed onsite during the 2007 survey period.

Plants			
Latin Name	**Common Name**	**Frequency/Location**	**Voucher #**
Lotus argyraeus	Silver lotus	Occas. / open forest	
Lotus nevadensis	Nevada lotus	Comm. / open places	
Lupinus cf. breweri	Silver mat lupine	Comm. / pebble plains, etc.	
Lupinus excubitus var. austromontanus	Southern mountain lupine	Occas. / ± throughout	11666
Lupinus lepidus v. confertus	Prairie lupine	Occas. / lakeshore	
* *Medicago lupulina*	Black medick	Uncomm. / near lakeshore	
* *Melilotus alba*	White sweet-clover	Occas.-comm. / roadsides, shore	
FAGACEAE	**OAK FAMILY**		
Quercus kelloggii	California black oak	Comm. / forest	
GERANIACEAE	**GERANIUM FAMILY**		
* *Erodium cicutarium*	Red-stemmed filaree	Occas.-comm. / roadsides, etc.	
HYDROPHYLLACEAE	**WATERLEAF FAMILY**		
Eridictyon trichocalyx	Yerba santa	Occas. / open forest	
Phacelia distans (?)	Common phacelia	Uncomm. / open forest	
Phacelia imbricata	Broad-sepaled phacelia	Uncomm. / open forest	
LAMIACEAE	**MINT FAMILY**		
Monardella linoides (?) (or M. odoratissima)	Flax-leaved monardella	Occas. / forest	
Scutellaria siphocampyloides (S. austinae)	Austin's skullcap	Uncomm. / mesic forest	
LOASACEAE	**STICK-LEAF FAMILY**		
Mentzelia sp.	Unid. stick-leaf	Uncomm. / uplands	11674
MALVACEAE	**MALLOW FAMILY**		
* *Malva parviflora*	Cheeseweed	Occas. / mostly lakeshore	
ONAGRACEAE	**EVENING PRIMROSE FAMILY**		
Clarkia sp.	Unid. annual clarkia	Uncomm. / shaded forest	
Epilobium brachycarpum (E. paniculatum)	Summer cottonweed	Occas.-comm. upland margins	
Epilobium ciliatum	Willow-herb	Occas. / mostly lakeshore	
Gaypohytum sp.	Unid. gayophytum	Comm. / open forest	
POLEMONIACEAE	**PHLOX FAMILY**		
Gilia latiflora (?)	Broad-flowered gilia	Uncomm. / open forest	
Gilia modocensis	Modoc gilia	Occas. /open places	11659
Eriastrum densifolium ssp. densifolium	Mojave woolly-star	Occas. / open forest	
Eriastrum sapphirinum	Sapphire woollystar	Occas. / open forest	
Linanthus breviculus	Mojave linanthus	Comm. / open forest	
Phlox gracilis	Slender phlox	Comm. / open places	11660

Appendix 3: Species Observed

The following species were observed onsite during the 2007 survey period.

Plants			
Latin Name	**Common Name**	**Frequency/Location**	**Voucher #**
POLYGONACEAE	**BUCKWHEAT FAMILY**		
Eriogonum davidsonii (=E. molestum var. davidsonii)	Davidson buckwheat	Occas. / open forest	
Eriogonum wrightii ssp. subscaposum	Wright's buckwheat	Comm. & characteristic / pebble plains	
Eriogonum umbellatum v. munzii	Munz sulfur buckwheat	Occas. / open forest	
* *Polygonum arenastrum*	Common knotweed	Occas. / roadside, lake shore	
* *Rumex crispus*	Curly dock	Occas. / mostly lakeshore	
Rumex salicifolius	Willow dock	Uncomm. / near lakeshore	
PORTULACACEAE	**PURSLANE FAMILY**		
Lewisia rediviva	Bitter root	Occas.-comm. / pebble plains	
RANUNCULACEAE	**BUTTERCUP FAMILY**		
Delphinium parishii (?)	Parish larkspur	Occas. / forest	
* *Ranunculus sceleratus*	Cursed buttercup	Occas. / lakeshore	11656
RHAMNACEAE	**BUCKTHORN FAMILY**		
Ceanothus cordulatus	Mountain whitethorn	Occas. / open forest	
Ceanothus greggii	Cupleaf ceanothus	Uncomm. / open forest	
Ceanothus integerrimus	Deerbrush	Occas. / forest	
ROSACEAE	**ROSE FAMILY**		
Amelanchier utahensis	Service berry	Comm. / ± throughout	
Cercocarpus betuloides	Birch-leaf mountain mahogany	Uncomm.	
Cercocarpus ledifolius	Curlleaf mountain mahogany	Comm. / ± throughout	
Horkelia rydbergii (H. bolanderi s. parryi)	Transverse range horkelia	Occas. / mostly near lake	
** *Ivesia argyrocoma*	Silver-haired ivesia	locally comm. / pebble pl.	11658
Potentilla anserina	Silverweed	Comm. / lakeshore	
Potentilla biennis	Biennial cinquefoil	Comm. / lakeshore	11671
Potentilla gracilis	Slender cinquefoil	Occas. / mesic places	
Potentilla wheeleri	Wheeler cinquefoil	Scarce / near lakeshore	11673
RUBIACEAE	**COFFEE FAMILY**		
* *Galium aparine*	Goose grass	Uncomm. / shaded forest	
Galium parishii	Parish bedstraw	Occas. / forest	
SALICACEAE	**WILLOW FAMILY**		
Populus balsamifera trichocarpa	Black cottonwood	Seedlings only / lakeshore	
Salix laevigata (?)	Red willow	Uncomm. / lakeshore	
Salix lasiolepis (?)	Arroyo willow	Comm. / lakeshore	

Appendix 3: Species Observed

The following species were observed onsite during the 2007 survey period.

Plants			
Latin Name	**Common Name**	**Frequency/Location**	**Voucher #**
SCROPHULARIACEAE	**SNAPDRAGON FAMILY**		
** *Castilleja cinera*	Ash-gray paintbrush	Localized / pebble plains	11657
** *Castilleja montigena (C. applegatei ssp. martinii)*	Heckerd's paintbrush	Occas. / forest	
Collinsis parviflora	Small-flowered blue-eyed Mary	Comm., patchy / peb. pl.	11661
Limosella acaulis	Mudwort	Comm.-abund. / wet lakeshore	11655
Mimulus guttatus	Seep monkeyflower	Occas. / lakeshore	
Pedicularis semibarbata	Pine-woods lousewort	Occas. / forest	11664
Penstemon eatonii	Eaton firecracker	Occas. / forest	
* *Verbascum thapsus*	Common muellin	Occas. / throughout	
SOLANACEAE	**NIGHTSHADE FAMILY**		
Solanum xanti	Chaparral nightshade	Uncomm. / forest	
STERCULIACEAE	**CACAO FAMILY**		
Fremontodendron californicum	Flannel bush	Occas.-comm. / open forest	
TAMARICACEAE	**TAMARISK FAMILY**		
Tamarix ramosissima	Mediterranean tamarisk	Occas. / lakeshore	
URTICACEAE	**NETTLE FAMILY**		
Urtica dioica ssp. holosericea	Stinging nettle	Occas. / lakeshore	
VIOLACEAE	**VIOLET FAMILY**		
Viola douglasii	Douglas violet	Occas. / pebble plains	11663
Viola purpurea	Mountain violet	Occas. / throughout	11662
VISCACEAE	**MISTLETOE FAMILY**		
Arceuthobium campylopodum	Dwarf mistletoe	Uncomm. / on yellow pines	
CYPERACEAE	**SEDGE FAMILY**		
Carex athrostachya	Slender-beaked sedge	Occas. / near lake	
Carex sp.	Unid. sedge	Uncomm. / near lakeshore	11671
JUNCACEAE	**RUSH FAMILY**		
Juncus arcticus (incl. vars. balticus and mexicanus)	Wire-grass	Occas.-comm. / mesic areas	
LILIACEAE	**LILY FAMILY**		
Allium parryi	Parry's onion	Occas. / mostly pebble plains	
Calochortus kennedyi	Kennedy's mariposa lily	Uncomm. / open forest	
POACEAE	**GRASS FAMILY**		
Agrostis sp.	Unid. bentgrass	Occas. / lakeshore	
Alopecurus aequalis	Short-awn foxtail	Comm., patchy / near shore	
Bromus carinatus	California brome	Occas. / uplands, ±throughout	

Appendix 3: Species Observed

The following species were observed onsite during the 2007 survey period.

Plants			
Latin Name	**Common Name**	**Frequency/Location**	**Voucher #**
Bromus orcuttianus (?)	Orcutt brome	Uncomm. / mesic forest	
* *Bromus tectorum*	Cheat grass	Comm. / ± throughout	
Elymus elymoides (Sitanion hystrix v. hystrix)	Bottlebrush squirreltail	Occas. / ± throughout	
Elymus glaucus	Blue wild-rye	Occas. / ± throughout	
Hordeum jubatum	Foxtail barley	Uncomm. / mostly near lake	
* *Koeleria macrantha*	Junegrass	Occas. / mesic forest, uplands	
Melica stricta	Nodding melic	Uncomm. patchy, uplands	
Muhlenbergia rigens	Deergrass	Occas. / throughout	
Poa fendleriana	Fendler bluegrass	Occas.-comm. / forest	
Poa secunda	Nodding bluegrass	Comm. / ± throughout	
* *Polypogon monspeliensis*	Rabbitfoot grass	Occas.-comm. / near shore	
Pucinellia nuttalliana	Alkali grass	Uncomm. / low-lying mesic site	
Stipa coronata ssp. depauperata (Achnatherum parishii)	Parish needlegrass	Occas. / mostly open forest	
Stipa lettermannii	Letterman's needlegrass	Occas. / forest	
Vulpia microstachys (Festuca microstachys, F. reflexa, F. pacifica, F. confusa)	Annual fescue	Uncomm. patchy / upland	

Alien species indicated by asterisk, special status species indicated by two asterisks. This list includes only species observed on the site. Others may have been overlooked or unidentifiable due to season.

Plants were identified using keys, descriptions, and illustrations in Abrams (1923-1951), Hickman (1993), Munz (1974), and other regional references. Taxonomy and nomenclature generally follow Hickman.

Some plants were collected as vouchers (see collection numbers at right) and will be donated to the Herbaria at Rancho Santa Ana Botanic Garden or UC Riverside.

Appendix 3: Species Observed

The following species were observed onsite during the 2007 survey period.

Vertebrate Animals	
Latin Name	**Common Name**
AMPHIBIA	**AMPHIBIANS**
SALAMANDRIDAE	**NEWTS**
Taricha torosa	California newt
PLETHODONTIDAE	**LUNGLESS SALAMANDERS**
Ensatina eschscholtzii	Ensatina
Aneides lugubris	Arboreal salamander
Batrachoseps pacificus	Pacific slender salamander
PELOBATIDAE	**SPADEFOOT TOADS**
** *Scaphiopus hammondii*	Western spadefoot
BUFONIDAE	**TRUE TOADS**
Bufo boreas	Western toad
Bufo woodhousei	Woodhouse toad
** *Bufo microscaphus*	Southwestern toad
Bufo punctatus	Red-spotted toad
HYLIDAE	**TREEFROGS**
Hyla cadaverina	California treefrog
Hyla regilla	Pacific treefrog
RANIDAE	**TRUE FROGS**
** *Rana aurora*	Red-legged frog
** *Rana pipiens*	Northern leopard frog
* *Rana catesbeiana*	Bullfrog
REPTILIA	**REPTILES**
EMYDIDAE	**BOX AND WATER TURTLES**
** *Clemmys marmorata*	Western pond turtle
TESTUDINIDAE	**LAND TORTOISES**
** *Gopherus agassizii (Xerobates agassizi)*	Desert tortoise
TRIONYCHIDAE	**SOFTSHELL TURTLES**
Trionyx spiniferus	Spiny softshell
GEKKONIDAE	**GECKOS**
Coleonyx variegatus	Western banded gecko
** *Coleonyx swaitaki*	Barefoot gecko
Phyllodactylus xanti	Leaf-toed gecko
IGUANIDAE	**IGUANID LIZARDS**
Dipsosaurus dorsalis	Desert iguana
Sauromalus obesus	Common chuckwalla
Callisaurus draconoides	Zebra-tailed lizard
** *Uma notata ssp. notata*	Colorado desert fringe-toed lizard
** *Uma inornata*	Coachella valley fringe-toed lizard
** *Uma scoparia*	Mojave fringe-toed lizard
Crotaphytus insularis	Desert collared lizard
Gambelia wislizenii	Long-nosed leopard lizard

The following species were observed onsite during the 2007 survey period.

Vertebrate Animals	
Latin Name	**Common Name**
Sceloporus magister	Desert spiny lizard
Sceloporus orcutti	Granite spiny lizard
Sceloporus occidentalis	Western fence lizard
Sceloporus grasiosus	Sagebrush lizard
Uta stansburiana	Side-blotched lizard
Urosaurus graciosus	Long-tailed brush lizard
Petrosaurus mearnsi	Banded rock lizard
** *Phrynosoma coronatum ssp. blainvillei*	San Diego horned lizard
Phrynosoma platyrhinos	Desert horned lizard
** *Phrynosoma mcallii*	Flat-tailed horned lizard
XANTUSIIDAE	**NIGHT LIZARDS**
Xantusia henshawi	Granite night lizard
Xantusia vigilis	Desert night lizard
SCINCIDAE	**SKINKS**
Eumeces skiltonianus	Western skink
Eumeces gilberti	Gilbert skink
TEIIDAE	**WHIPTAILS**
** *Cnemidophorus hyperythrus*	Orange-throated whiptail
** *Cnemidophorus tigris*	Western whiptail
ANGUIDAE	**ALLIGATOR LIZARDS**
Gerrhonotus multicarinatus	Southern alligator lizard
ANNIELLIDAE	**LEGLESS LIZARDS**
** *Aniella pulchra ssp. pulchra*	Silvery legless lizard
LEPTOTYPHLOPIDAE	**SLENDER BLIND SNAKES**
Leptotyphlops humilis	Western blind snake
BOIDAE	**BOAS AND PYTHONS**
** *Charina bottae ssp. umbratica*	Southern rubber boa
Lichanura trivirgata	Rosy boa
COLUBRIDAE	**COLUBRIDS**
** *Diadophis punctatus*	Ringneck snake
Phyllorhynchus decurtatus	Spotted leaf-nosed snake
Coluber constrictor	Racer
Masticophis flagellum	Coachwhip
Masticophis lateralis	California whipsnake
** *Salvadora hexalepis*	Western patch-nosed snake
Arizona elegans	Glossy snake
Pituophis melanoleucus	Gopher snake
Lampropeltis getulus	Common kingsnake
** *Lampropeltis zonata ssp. pulchra*	San Bernardino Mountain kingsnake
Rhinocheilus lecontei	Long-nosed snake
Thamnophis sirtalis	Common garter snake
Thamnophis elegans	Western terrestrial garter snake

Appendix 3: Species Observed

The following species were observed onsite during the 2007 survey period.

Vertebrate Animals	
Latin Name	**Common Name**
** *Thamnophis hammondii*	Two-striped garter snake
VIPERIDAE	**VIPERS**
Crotalus atrox	Western diamondback rattlesnake
** *Crotalus ruber*	Red diamond rattlesnake
Crotalus mitchellii	Speckled rattlesnake
Crotalus cerastes	Sidewinder
Crotalus viridis	Western rattlesnake
Crotalus scutulatus	Mojave rattlesnake
AVES	**BIRDS**
GAVIIDAE	**LOONS**
Gavia immer	Common loon
PODICIPEDIDAE	**GREBES**
Podilymbus podiceps	Pied-billed grebe
Podiceps nigricollis	Eared grebe
Aechmophorus occidentalis	Western grebe
Aechmophorus clarkii	Clark's grebe
PELECANIDAE	**PELICANS**
Pelecanus erythrorhynchos	American white pelican
** *Pelecanus occidentalis*	Brown pelican
PHALACROCORACIDAE	**CORMORANTS**
Phalacrocorax auritus	Double-crested cormorant
ARDEIDAE	**HERONS**
Botaurus lentiginosus	American bittern
Ardea herodias	Great blue heron
Casmerodius albus	Great egret
Egretta thula	Snowy egret
Bubulcus ibis	Cattle egret
Butorides striatus	Green-backed heron
** *Nycticorax nycticorax*	Black-crowned night heron
THRESKIORNITHIDAE	**IBISES AND SPOONBILLS**
** *Plegadis chihi*	White-faced ibis
ANATIDAE	**DUCKS, GEESE AND SWANS**
Anser albifrons	Greater white-fronted goose
Chen caerulescens	Snow goose
Chen rossii	Ross' goose
Branta canadensis	Canada goose
Anas crecca	Green-winged teal
Anas platyrhynchos	Mallard
Anas acuta	Northern pintail
Anas discors	Blue-winged teal
Anas cyanoptera	Cinnamon teal
Anas clypeata	Northern shoveler

The following species were observed onsite during the 2007 survey period.

Vertebrate Animals	
Latin Name	**Common Name**
Anas strepera	Gadwall
Anas americana	American wigeon
Aythya valisineria	Canvasback
Aythya americana	Redhead
Aythya collaris	Ring-necked duck
Aythya affinis	Lesser scaup
Bucephala clangula	Common goldeneye
Bucephala albeola	Bufflehead
Mergus merganser	Common merganser
Mergus serrator	Red-breasted merganser
Oxyura jamaicensis	Ruddy duck
RALLIDAE	**RAILS, GALLINULES, COOTS**
Rallus longirostris	Clapper rail
Rallus limicola	Virginia rail
Porzana carolina	Sora
Gallinula chloropus	Common moorhen
Fulica americana	American coot
CATHARTIDAE	**VULTURES**
Cathartes aura	Turkey vulture
ACCIPITRIDAE	**HAWKS, EAGLES, HARRIERS**
** *Pandion haliaetus*	Osprey
** *Elanus caeruleus*	Black-shouldered kite
** *Aquila chrysaetos*	Golden eagle
** *Haliaeetus leucocephalus*	Bald eagle
** *Circus cyaneus*	Northern harrier
** *Accipiter striatus*	Sharp-shinned hawk
** *Accipiter cooperii*	Cooper's hawk
Buteo lineatus	Red-shouldered hawk
** *Buteo swainsoni*	Swainson's hawk
Buteo jamaicensis	Red-tailed hawk
** *Buteo regalis*	Ferruginous hawk
Buteo lagopus	Rough-legged hawk
FALCONIDAE	**FALCONS**
Falco sparverius	American kestrel
** *Falco columbarius*	Merlin
** *Falco peregrinus*	Peregrine falcon
** *Falco mexicanus*	Prairie falcon
PHASIANIDAE	**GROUSE AND QUAIL**
Alectoris chukar	Chukar
Phasianus colchicus	Ring-necked pheasant
Callipepla gambelii	Gambel's quail
Callipepla californica	California quail

The following species were observed onsite during the 2007 survey period.

Vertebrate Animals	
Latin Name	**Common Name**
Oreortyx pictus	Mountain quail
CHARADRIIDAE	**PLOVERS**
Pluvialis squatarola	Black-bellied plover
** *Charadrius alexandrinus*	Snowy plover
Charadrius semipalmatus	Semipalmated plover
Charadrius vociferus	Killdeer
** *Charadrius montanus*	Mountain plover
RECURVIROSTRIDAE	**STILTS AND AVOCETS**
Himantopus mexicanus	Black-necked stilt
Recurvirostra americana	American avocet
SCOLOPACIDAE	**SANDPIPERS**
Tringa melanoleuca	Greater yellowlegs
Tringa flavipes	Lesser yellowlegs
Catoptrophorus semipalmatus	Willet
Actitis macularia	Spotted sandpiper
Numenius phaeopus	Whimbrel
Numenius americanus	Long-billed curlew
Limosa fedoa	Marbled godwit
Arenaria interpres	Ruddy turnstone
Arenaria melanocephala	Black turnstone
Calidris canutus	Red knot
Calidris alba	Sanderling
Calidris pusilla	Semipalmated sandpiper
Calidris mauri	Western sandpiper
Calidris minutilla	Least sandpiper
Calidris alpina	Dunlin
Limnodromus griseus	Short-billed dowitcher
Limnodromus scolopaceus	Long-billed dowitcher
Gallinago gallinago	Common snipe
Phalaropus tricolor	Wilson's phalarope
Phalaropus lobatus	Red-necked phalarope
LARIDAE	**GULLS AND TERNS**
Larus philadelphia	Bonaparte's gull
Larus delawarensis	Ring-billed gull
Larus californicus	California gull
Larus argentatus	Herring gull
Larus occidentalis	Western gull
Sterna caspia	Caspian tern
Sterna hirundo	Common tern
Sterna forsteri	Forster's tern
COLUMBIDAE	**PIGEONS AND DOVES**
Columba livia	Rock dove

Appendix 3: Species Observed

The following species were observed onsite during the 2007 survey period.

Vertebrate Animals	
Latin Name	**Common Name**
Columba fasciata	Band-tailed pigeon
* *Streptopelia chinensis*	Spotted dove
Zenaida asiatica	White-winged dove
Zenaida macroura	Mourning dove
Columbina passerina	Common ground-dove
CUCULIDAE	**CUCKOOS**
Geococcyx californianus	Greater roadrunner
TYTONIDAE	**BARN OWLS**
Tyto alba	Common barn-owl
STRIGIDAE	**TYPICAL OWLS**
Otus kennicottii	Western screech-owl
Bubo virginianus	Great horned owl
** *Speotyto cunicularia*	Burrowing owl
** *Asio otus*	Long-eared owl
CAMPRIMULGIDAE	**NIGHTJARS**
Chordeiles acutipennis	Lesser nighthawk
Chordeiles minor	Common nighthawk
Phalaenoptilus nuttallii	Common poorwill
APODIDAE	**SWIFTS**
Chaetura vauxi	Vaux's swift
Aeronautes saxatalis	White-throated swift
TROCHILIDAE	**HUMMINGBIRDS**
Archilochus alexandri	Black-chinned hummingbird
Calypte anna	Anna's hummingbird
Calypte costae	Costa's hummingbird
Selasphorus rufus	Rufous hummingbird
Selasphorus sasin	Allen's hummingbird
ALCEDINIDAE	**KINGFISHERS**
Ceryle alcyon	Belted kingfisher
PICIDAE	**WOODPECKERS**
Melanerpes formicivorus	Acorn woodpecker
Melanerpes lewis	Lewis' woodpecker
Sphyrapicus nuchalis	Red-naped sapsucker
Sphyrapicus thyroideus	Williamson's sapsucker
Picoides scalaris	Ladder-backed woodpecker
Picoides nuttallii	Nuttall's woodpecker
Picoides pubescens	Downy woodpecker
Picoides villosus	Hairy woodpecker
Picoides albolarvatus	White-headed woodpecker
Colaptes auratus	Northern flicker
TYRANNIDAE	**TYRANT FLYCATCHERS**
Contopus borealis	Olive-sided flycatcher

The following species were observed onsite during the 2007 survey period.

Vertebrate Animals	
Latin Name	**Common Name**
Contopus sordidulus	Western wood-pewee
Empidonax trailii	Willow flycatcher
Empidonax hammondii	Hammond's flycatcher
Empidonax oberholseri	Dusky flycatcher
Empidonax wrightii	Gray flycatcher
Empidonax difficilis	Western flycatcher
Sayornis nigricans	Black phoebe
Sayornis saya	Say's phoebe
Myiarchus cinerascens	Ash-throated flycatcher
Tyrannus vociferans	Cassin's kingbird
Tyrannus verticalis	Western kingbird
ALAUDIDAE	**LARKS**
Eremophila alpestris	Horned lark
HIRUNDINIDAE	**SWALLOWS**
Tachycineta bicolor	Tree swallow
Tachycineta thalassina	Violet-green swallow
Stelgidopteryx serripennis	Northern rough-winged swallow
Hirundo pyrrhonota	Cliff swallow
Hirundo rustica	Barn swallow
CORVIDAE	**CROWS AND JAYS**
Cyanocitta stellari	Stellar's jay
Aphelocoma coerulescens	Scrub jay
Gymnorhinus cyanocephalus	Pinyon jay
Nucifraga columbiana	Clark's nutcracker
Corvus brachyrhynchos	American crow
Corvus corax	Common raven
PARIDAE	**CHICKADEES AND TITMICE**
Parus gambeli	Mountain chickadee
Parus inornatus	Plain titmouse
REMIZIDAE	**VERDINS**
Auriparus flavipes	Verdin
AEGITHALIDAE	**BUSHTITS**
Psaltriparus minimus	Bushtit
SITTIDAE	**NUTHATCHES**
Sitta canadensis	Red-breasted nuthatch
Sitta carolinensis	White-breasted nuthatch
Sitta pygmaea	Pygmy nuthatch
CERTHIIDAE	**CREEPERS**
Certhia americana	Brown creeper
TROGLODYTIDAE	**WRENS**
Campylorhynchus brunneicapillus	Cactus wren
** *Campylorhynchus brunneicapillus*	Coastal cactus wren

The following species were observed onsite during the 2007 survey period.

Vertebrate Animals	
Latin Name	**Common Name**
Salpinctes obsoletus	Rock wren
Catherpes mexicanus	Canyon wren
Thryomanes bewickii	Bewick's wren
Troglodytes aedon	House wren
Cistothorus palustris	Marsh wren
CINCLIDAE	**DIPPERS**
Cinclus maxicanus	American dipper
MUSCICAPIDAE	**THRUSHES AND ALLIES**
Ixoreus naevius	Varied thrush
Regulus calendula	Ruby-crowned kinglet
Polioptila caerula	Blue-gray gnatcatcher
** *Polioptila melanura*	Black-tailed gnatcatcher
** *Polioptila californica*	California gnatcatcher
Sialia mexicana	Western bluebird
Sialia currucoides	Mountain bluebird
Myadestes townsendi	Townsend's solitaire
Catharus ustulatus	Swainson's thrush
Catharus guttatus	Hermit thrush
Turdus migratorius	American robin
Chamaea fasciata	Wrentit
MIMIDAE	**MOCKINGBIRDS AND THRASHERS**
Mimus polyglottos	Northern mockingbird
Oreoscoptes montanus	Sage thrasher
Toxostoma redivivum	California thrasher
** *Toxostoma crissale*	Crissal thrasher
** *Tosxostoma lecontei*	Le Conte's thrasher
MOTACILLIDAE	**WAGTAILS AND PIPITS**
Anthus spinoletta	American pipit
BOMBYCILLIDAE	**WAXWINGS**
Bombycilla cedrorum	Cedar waxwing
PTILOGONATIDAE	**SILKY FLYCATCHERS**
Phainopepla nitens	Phainopepla
LANIIDAE	**SHRIKES**
Lanius ludovicianus	Loggerhead shrike
STURNIDAE	**STARLINGS**
* *Sturnus vulgaris*	European starling
VIREONIDAE	**VIREOS**
** *Vireo bellii*	Bell's vireo
** *Vireo vicinior*	Gray vireo
Vireo solitarius	Solitary vireo
Vireo huttoni	Hutton's vireo
Vireo gilvus	Warbling vireo

The following species were observed onsite during the 2007 survey period.

Vertebrate Animals	
Latin Name	**Common Name**
EMBERIZIDAE	**SPARROWS, WARBLERS, TANAGERS**
Vermivora celata	Orange-crowned warbler
Vermivora ruficapilla	Nashville warbler
Vermivora luciae	Lucy's warbler
** *Dendroica petechia*	Yellow warbler
Dendroica coronata	Yellow-rumped warbler
Dendroica nigrescens	Black-throated gray warbler
Dendroica occidentalis	Hermit warbler
Dendroica townsendi	Townsend's warbler
Oporornis tolmiei	MacGillivray's warbler
Geothlypis trichas	Common yellowthroat
Wilsonia pusilla	Wilson's warbler
** *Icteria virens*	Yellow-breasted chat
** *Piranga rubra*	Summer tanager
Piranga ludoviciana	Western tanager
Pheucticus melanocephalus	Black-headed grosbeak
Guiraca caerulea	Blue grosbeak
Passerina amoena	Lazuli bunting
Pipilo chlorurus	Green-tailed towhee
Pipilo erythrophthalmus	Rufous-sided towhee
Pipilo crissalis	California towhee
Pipilo aberti	Abert's towhee
Aimophila ruficeps	Rufous-crowned sparrow
Spizella passerina	Chipping sparrow
Spizella breweri	Brewer's sparrow
Spizella atrogularis	Black-chinned sparrow
Pooecetes gramineus	Vesper sparrow
Chondestes grammacus	Lark sparrow
Amphispiza bilineata	Black-throated sparrow
Amphispiza belli	Sage sparrow
Passerculus sandwichensis	Savannah sparrow
Passerella iliaca	Fox sparrow
Melospiza melodia	Song sparrow
Melospiza lincolnii	Lincoln's sparrow
Zonotrichia atricapilla	Golden-crowned sparrow
Zonotrichia leucophrys	White-crowned sparrow
Junco hyemalis	Dark-eyed junco
Agelaius phoeniceus	Red-winged blackbird
** *Agelaius tricolor*	Tricolored blackbird
Sturnella neglecta	Western meadowlark
Xanthocephalus xanthocephalus	Yellow-headed blackbird

The following species were observed onsite during the 2007 survey period.

Vertebrate Animals	
Latin Name	**Common Name**
Euphagus cyanocephalus	Brewer's blackbird
Quiscalus mexicanus	Great-tailed grackle
Molothrus ater	Brown-headed cowbird
Icterus cucullatus	Hooded oriole
Icterus galbula	Northern oriole
Icterus parisorum	Scott's oriole
FRINGILLIDAE	**FINCHES**
Carpodacus purpureus	Purple finch
Carpodacus cassinii	Cassin's finch
Carpodacus mexicanus	House finch
Carduelis pinus	Pine siskin
Carduelis psaltria	Lesser goldfinch
Carduelis lawrencei	Lawrence's goldfinch
Carduelis tristis	American goldfinch
PASSERIDAE	**WEAVERS**
* *Passer domesticus*	House sparrow
MAMMALIA	**MAMMALS**
DIDELPHIDAE	**OPOSSUMS**
Didelphis marsupialis	Common opossum
VESPERTILIONIDAE	**EVENING BATS**
Pipistrellus hesperus	Western pipistrelle
LEPORIDAE	**HARES AND RABBITS**
Lepus californicus	Black-tailed hare
Sylvilagus audubonii	Audubon cottontail
Sylvilagus bachmani	Brush rabbit
Sylvilagus sp.	Cottontail
SCIURIDAE	**SQUIRRELS**
** *Citellus mohavensis*	Mohave ground squirrel
** *Citellus tereticaudis ssp. chlorus*	Coachella Valley ground squirrel
** *Glaucomys sabrinus*	Northern flying squirrel
Otospermophilus beecheyi	Beechey ground squirrel
Ammospermophilus leucurus	Antelope ground squirrel
** *Ammospermophilus nelsoni*	San Joaquin antelope ground squirrel
Eutamias merriami	Merriam chipmunk
Sciurus griseus	Western gray squirrel
GEOMYIDAE	**POCKET GOPHERS**
Thomomys bottae	Botta pocket gopher
HETEROMYIDAE	**POCKET MICE**
Perognathus sp.	Pocket mouse
Perognathus longimembris	Little pocket mouse
** *Perognathus longimembris ssp. brevinasus*	Los Angeles pocket mouse
Perognathus formosus	Long-tailed pocket mouse

Appendix 3: Species Observed

The following species were observed onsite during the 2007 survey period.

Vertebrate Animals	
Latin Name	**Common Name**
Perognathus baileyi	Bailey pocket mouse
Perognathus fallax	San Diego pocket mouse
Perognathus californicus	California pocket mouse
Perognathus spinatus	Spiny pocket mouse
Dipodomys sp.	Kangaroo rat
Dipodomys heermanni	Heermann kangaroo rat
Dipodomys panamintinus	Panamint kangaroo rat
** *Dipodomys stephensi*	Stephens' kangaroo rat
Dipodomys ingens	Giant kangaroo rat
Dipodomys merriami	Merriam kangaroo rat
** *Dipodomys merriami ssp parvus*	Cismontsne Merriam kangaroo rat
Dipodomys nitratoides	San Joaquin kangaroo rat
Dipodomys agilis	Pacific kangaroo rat
Dipodomys deserti	Desert kangaroo rat
CASTORIDAE	**BEAVERS**
Castor canadensis	Beaver
CRICETIDAE	**RATS AND MICE**
Reithrodontomys megalotis	Western harvest mouse
Peromyscus crinitus	Canyon mouse
Peromyscus californicus	California mouse
Peromyscus eremicus	Cactus mouse
Peromyscus maniculatus	Deer mouse
Onychomys torridus	Southern grasshopper mouse
Neotoma sp.	Wood rat
Neotoma albigula	White-throated wood rat
Neotoma lepida	Desert wood rat
Neotoma fuscipes	Dusky-footed wood rat
Microtus pennsylvanicus	Meadow mouse
Microtus californicus	California meadow mouse
MURIDAE	**OLD WORLD RATS AND MICE**
* *Mus musculus*	House mouse
CANIDAE	**FOXES, WOLVES AND COYOTES**
Canis latrans	Coyote
Vulpes macrotis	Kit fox
Urocyon cinereoargenteus	Gray fox
URSIDAE	**BEARS**
* *Ursus americanus*	Black bear
PROCYONIDAE	**RACCOONS**
Bassariscus astutus	Ringtail
Procyon lotor	Raccoon
MUSTELIDAE	**WEASELS AND SKUNKS**
Mustela frenata	Long-tailed weasel

The following species were observed onsite during the 2007 survey period.

Vertebrate Animals	
Latin Name	**Common Name**
** *Taxidea taxus*	American badger
Spilogale putorius	Spotted skunk
Mephitis mephitis	Striped skunk
FELIDAE	**CATS**
Felis concolor	Mountain lion
Lynx rufus	Bobcat
EQUIDAE	**HORSES, BURROS AND ZEBRAS**
* *Equus astinus*	Feral donkey
CERVIDAE	**ELKS, MOOSE, CARIBOU, DEER**
Odocoileus hemionus	Mule deer
BOVIDAE	**SHEEP AND GOATS**
Ovis canadensis	Bighorn
Alien species indicated by asterisk, special status species indicated by two asterisks. This list includes only species observed on the site. Others may have been overlooked or unidentifiable due to season.	

B.8 - Revised Vegetation and Special Status Plants Survey (Scott White Biological Consulting, February 2009)

MOON CAMP PROPERTY, FAWNSKIN AREA: VEGETATION AND SPECIAL STATUS PLANTS

October 2007
(Revised 2 February 2009)

Prepared for:
Michael Brandman Associates
621 E. Carnegie Dr., Suite 100
San Bernardino, CA 92408

Prepared by:
Scott D. White
SCOTT WHITE BIOLOGICAL CONSULTING
201 North First Ave., No. 102
Upland, CA 91786

Project site location: USGS Fawnskin 7½-minute topographic map, Township 2 North, Range 1 West, portion of Section 13.
APN: 0304-082-04, 0304-091-12, 0304-091-13, 0304-091-21
Owner: RCK Properties, Tim Wood
Applicant: Urban Environs, Redlands, Calif.
Principal Investigator: Scott D. White, Scott White Biological consulting (above).

CERTIFICATION: I hereby certify that the statements furnished in this report and in the attached exhibits present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief. Field work conducted for this assessment was performed by me and under my direct suprevision. I certify that I have no0t signed a non-disclosure or consultant confidentiality agreement with the project applicant or applicant's representative and that I have no financial interest in the project.

DATE: 2 Feb 2009 SIGNED: Scott D White
Scott D. White, Report Author

Additional field work performed by:

DATE: 2 Feb 2009 SIGNED: Justin Wood
Justin Wood

MOON CAMP PROPERTY, FAWNSKIN AREA: VEGETATION AND SPECIAL STATUS PLANTS

TABLE OF CONTENTS

MAPS, APPENDICES, AND ATTACHMENTS

MOON CAMP PROPERTY, FAWNSKIN AREA: VEGETATION AND SPECIAL STATUS PLANTS

Scott D. White
SCOTT WHITE BIOLOGICAL CONSULTING
2 February 2009

II: SUMMARY

This report describes results of field surveys for special status plants at the former Moon Camp site in Fawnskin (unincorporated San Bernardino County, California). The project site is about 62 acres. Several listed threatened or endangered plants occur in specialized habitat types in Big Bear Valley and have been found on the site during previous field surveys. The present field work was completed in 2007, a year of very low rainfall. Thus, these surveys cannot support a conclusion that special status plants may be absent from the site. Despite the poor rainfall, one listed threatened species (ash-gray Indian paintbrush) and apparent genetic intergrades of another listed plant (southern mountain buckwheat) with a common relative were both found on the site. Several other special status plants also were found. The proposed project would directly affect ash-gray Indian paintbrush by taking plants and occupied habitat. It also would indirectly affect ash-gray Indian paintbrush, southern mountain buckwheat intergrades, and pebble plain habitat through a variety of off-site or "edge" effects described in Section VII. of this report. The project also would remove numerous trees subject to regulation under the San Bernardino County Native Plant Protection Policy. Further, the project would necessitate alterations to drainageways that may be subject to state or federal regulation as streambeds, wetlands, or waters of the US. We recommend consulting with local, state, and federal agencies as needed to ensure compliance with these laws and policies. We also recommend follow-up botanical surveys to determine presence or absence of other special status meadow species. In order to mitigate take of federally listed plants, we recommend funding off-site habitat preservation and management at a 3:1 ratio for direct effects and at 1:1 ratio for indirect effects.

III: PROJECT AND PROPERTY DESCRIPTION

The San Bernardino County Planning Department is reviewing an application for residential development on the former Moon Camp site in Fawnskin. The project site is on the north shore of Big Bear Lake, in the eastern part of Fawnskin, in unincorporated San Bernardino County. It is about 62 acres, on both sides of State Highway 38, between Oriole Lane and Polique Canyon Road (on the Fawnskin USGS 7½' quadrangle map, in the north half of Section 13, Township 2N and Range 1W). The project site slopes from north to south. Elevation ranges from about 6750 feet near the lakeshore to about 6,960 feet in the northeastern portion of the site.

The project site is within the Big Bear Lake watershed, mapped and described in the Open Space element to San Bernardino County's General Plan (County of San Bernardino 1991), as follows: "This area includes the entire watershed area of Big Bear Lake, and contains a number of specialized habitat areas, which support a large number of endangered plants and animals (as well as commonly occurring mountain species). Habitat values here should be maintained, potentially by controlling development to prevent damage to important habitat areas."

This report addresses special status plant communities and plant species occurring or potentially occurring on the property and incorporates prior botanical work done at the same property, cited below.

IV. FOCUSED STUDY / SPECIES OF CONCERN

There are four federally listed threatened or endangered plant species nearly endemic to meadows and three endemic to "pebble plain" and similar upland habitats in the Big Bear Valley of the northern San Bernardino Mountains (USDI Fish and Wildlife Service 1984, 1998). In addition, there are numerous other special status plant species occurring in these or other habitats in the Big Bear Valley (Appendix 2). This report focuses primarily on the following listed threatened or endangered plants:

Meadow species:

- San Bernardino bluegrass (*Poa atropurpurea*)
- Bird-foot checkerbloom (*Sidalcea pedata*)
- California dandelion (*Taraxacum californicum*)
- Slender-petaled thelypodium (*Thelypodium stenopetalum*)

Pebble plain species:

- Bear Valley sandwort (*Arenaria ursina*)
- Ash-gray Indian paintbrush (*Castilleja cinerea*)
- Southern mountain buckwheat (*Eriogonum kennedyi* var. *austromontanum*)

Several special status plants including ash-gray Indian paintbrush have been reported from the project site in prior botanical surveys (Michael Brandman Associates 2000; White & Leatherman BioServices 2002). White and Leatherman (2002) also mapped the extent of suitable habitat for ash-gray Indian paintbrush, based on the extent of its host plant, Wright's matting buckwheat. Bear Valley sandwort is reported from the site in the California Natural Diversity Data Base (California Department of Fish and Game 2007). None of the listed meadow species are known from the site.

V. METHODS

Scott D. White reviewed available literature to identify special status plants or plant communities known from the project site and vicinity. Literature sources included previous biological reports addressing the site (Michael Brandman Associates 2000; White & Leatherman BioServices 2002), the California Natural Diversity Data Base (California Department of Fish and Game 2007a, USGS Fawnskin, Big Bear City, Big Bear Lake, Butler Peak, Keller Peak, and Moonridge 7½' topo quads), California Native Plant Society's *Inventory of Rare and Endangered Vascular Plants of California* (Tibor 2001), the CNPS *Electronic Inventory* (2007, for the same quads) and compendia of special status species published by the US Fish and Wildlife Service (2006) and California Department of Fish and Game (2007b). All species identified by this literature review, and others known from the general region, are included in Appendix 1 or 2 (attached). Appendix 1 lists those species not considered for this report due to elevational or geographic ranges, or specialized habitat requirements not found on the site. Appendix 2 lists special status species known from comparable habitats in the region and summarizes their natural history, conservation status, and occurrence probability on-site.

Scott D. White and Justin Wood (of Scott White Biological Consulting) visited the site on 30 April, 7 June, and 8 August 2007 to view special status habitats (pebble plains), compare present conditions with prior conditions, confirm presence of special status plants described from the site in prior reports, and to survey for additional special status plants not found during earlier surveys. During these visits we focused our attention on pebble plains and lakeshore areas, which could support listed threatened or endangered species. We walked over all pebble plain habitat on all three

field dates, and the entire length of the lakeshore on the project site on 30 April and 7 June. All plant species observed were identified in the field or collected for later identification. Plants were identified using keys, descriptions, and illustrations in Hickman (1993), Munz (1974), Abrams (1923-1960), and other regional references. All species noted on the site are listed in Appendix 3.

In conformance with California Department of Fish and Game guidelines (2000), surveys were (a) conducted during flowering seasons for the special status plants known from the area, (b) floristic in nature, (c) consistent with conservation ethics, (d) systematically covered all habitat types on the site, and (e) well documented, by this report. However, due to very low rainfall in 2006-2007 (when current surveys were done) and 2001-02 (the year of previous White & Leatherman surveys), results of these field surveys should not be used to conclude "absence" for any special status plants not found.

White and Leatherman BioServices (2002) mapped pebble plain habitat and open upland habitat supporting Wright's matting buckwheat (*Eriogonum wrightii* ssp. *subscaposum*). That mapping is incorporated here as base maps for rare plant occurrences and habitat on the site.

VI. RESULTS

Utility of field surveys during 2007 was limited on this site and throughout southern California due to a very poor rainfall year. Previous botanical field work was completed during 2002, also a drought year. Many plant species are either annual (i.e., complete their life cycles in a single year and then die) or perennial herbs (i.e., die back to the ground level each year, and persist as underground bulbs or rootcrowns). In poor rainfall years, annual and perennial herbs may not be visible, though they may exist in the soil as inactive seed, bulbs, or rootcrowns. Most of the special status plants of the Big Bear area are perennial herbs (see text below), and we were not able to make conclusive determinations of "present" or "absent" based on these field surveys. Instead, we have used previous reports and our own judgement of habitat quality to estimate the probability that each special status plant might occur on the site.

VI. A. VEGETATION

VI. A. 1. Common Vegetation Types

Jeffrey pine forest: Most of the site above Highway 38 is covered by the Jeffrey pine series (Sawyer and Keeler-Wolf 1995). This vegetation also matches descriptions of Jeffrey pine forest (Holland 1986; McBride 1988), and montane coniferous forest (Munz 1959). Jeffrey pine forest covers most of the eastern half of the project site and occurs in patches interspersed with pebble plains (below) in the western half. Jeffrey pine (*Pinus jeffreyi*) is the dominant tree; white fir (*Abies concolor*), incense cedar (*Calocedrus decurrens*), western juniper (*Juniperus occidentalis*), singleleaf pinyon pine (*Pinus monophylla*), and black oak (*Quercus kellogii*) occur throughout Jeffrey pine forest, at lower densities. The understory is sparse, consisting of scattered shrubs including greenleaf manzanita (*Arctostaphylos patula*), mountain whitethorn (*Ceanothus cordulatus*), cupleaf ceanothus (*C. greggii*), deer brush (*C. integerrimus*), California mountain mahogany (*Cercocarpus betuloides*), and curl-leaf mountain mahogany (*C. ledifolius*). Herbaceous cover is generally low, consisting of grasses and forbes in scattered patches. Jeffrey pine forest occurs in mountains throughout most of California at elevations between about 5000 and 9000 feet. Many local and regional associations have been described (Sawyer and Keeler-Wolf 1995).

Some, but not all, of the Jeffrey pine forest on the Moon Camp site provides suitable habitat for listed threatened or endangered plant species. In particular, areas of fairly open forest cover where Wright's matting buckwheat occurs are suitable for ash-gray paintbrush, a federally listed threatened species occurring in pebble plains (below) and open Jeffrey pine forest. These areas are identified on

Figure 3. Other special status plants, but not listed species, could also occur throughout the remainder of mapped Jeffrey pine forest.

Lake Shoreline: In the western half of the property, the site's southern boundary is at the shore of Big Bear Lake. Most plants along the shore itself are herbaceous native and non-native species of periodically saturated soils, including willowherb (*Epilobium ciliatum*), wire-grass (*Juncus arcticus*), cursed buttercup (*Ranunculus sceleratus*), and several cinquefoil species (*Potentilla* spp.). Numerous seedling cottonwood trees (*Populus balsamifera* spp. *trichocarpa*) also occur there.

Just above the high-water level, there are small patches of various upland and wetland vegetation types. These patches are too small to map. Small areas of Jeffrey pine forest are interspersed with open wet meadows and grasslands and scattered patches of arroyo willow (*Salix lasiolepis*) and red willow (*Salix laevigata*). There are no alkaline meadows or dry meadows (below) along the lake shore. Small patches of wet meadows may provide suitable habitat for several special status plants (below), but we were unable to determine whether they are present or absent due to poor rainfall.

VI. A. 2. Special-status Vegetation

Pebble Plain: Pebble plain occurs in a single patch at the crest of a hill, in the western portion of the site north of Highway 38 (Figure 3). Pebble plain (also called pavement plain) was described by Derby and Wilson (1978, 1979). A detailed discussion was prepared by the San Bernardino National Forest (1990) and brief descriptions appear in Holland (1986) and Sawyer and Keeler-Wolf (1995) . The substrate consists of clay soil with quartzite pebbles and gravel that are continually pushed to the surface, evidently through frost action (Holland 1986). Vegetation structure on these sites is similar to the mat-forming structure of alpine sites at much higher elevations. Vegetation consists largely of well-spaced cushion-forming perennials and a variety of tiny annuals. Bunchgrasses and some succulents may also occur. At least two species, both listed as endangered, are strictly endemic to Big Bear pebble plain habitats: Bear Valley sandwort and southern mountain buckwheat (Derby and Wilson 1978). Several other special status plants, including other listed threatened or endangered species, also occur on pebble plain habitat.

On the Moon Camp site, much of the pebble plain habitat has been disturbed by vehicles. This disturbance has reduced vegetation cover, disturbed the natural hydrologic pattern, and perhaps reduced habitat quality for special status plants (San Bernardino National Forest 1990). Based on National Forest management efforts at other sites, vehicle disturbance apparently does not permanently alter habitat suitability for these species. For example, the Forest Service has fenced degraded pebble plains in the Sugarloaf area and found that plant diversity returns after a few years.

Our habitat map (Figure 3) indicates pebble plains themselves, and also indicates adjacent open forest with high cover of Wright's matting buckwheat, where we observed suitable habitat for species which tend to occur in both pebble plains and adjacent open forest habitat.

Pebble plains of the Big Bear area (above) are classified as "southern montane black sagebrush pebble plains" by CDFG (2002), "a series or association considered rare and worthy of consideration" by the California Natural Diversity Data Base. Pebble plains on the project site support at least one listed threatened plant, possibly two other listed species, and three other special status plants.

Wet Meadow: Small patches of meadow occur along the lakeshore, south of Highway 38. They grade into upland grasslands, and we could not delineate their extent due to dry conditions. Meadows in the Big Bear Valley may be perennially saturated (i.e., "wet meadows") or may have

saturated soils only seasonally or during wet years (called "dry meadows," "xeric meadows," or "vernal meadows"). Meadows of the San Bernardino Mountains were described by Krantz (1994). They are generally dominated by sedges (*Carex* spp.), rushes (*Juncus* spp.) and grasses (*Poa* spp., *Elymus* spp.). Dry meadows and the margins of wet meadows support sagebrush (*Artemisia tridentata, A. rothrockii*). These meadows themselves are not ranked as special status communities by CDFG (2002) but several locally endemic plants occur in them and they therefore are recognized locally as important habitats (Krantz, no date). Three listed threatened or endangered plants of wet meadow habitats could occur on the Moon Camp site, though only with low or moderate probabilities: bird's foot checkerbloom (*Sidalcea pedata*), San Bernardino bluegrass (*Poa atropurpurea*), and California dandelion (*Taraxacum californicum*). Other special status or listed species of pebble plains and their margins could also occur in meadow margins (e.g., ash-gray paintbrush).

VI. B. Special status plants

Plant or animal species identified by state or federal agencies or by private conservation organizations may be assigned special conservation status due to declining numbers, vulnerability to habitat change, or restricted distributions. Some species are listed as threatened or endangered under state or federal Endangered Species Acts. Other special status plants are included in the California Native Plant Society's *Inventory* or other compilations listed in the Methods section (above) and summarized in Appendix 2. Big Bear Valley has a high proportion of rare and locally endemic species (Krantz, no date; Krantz 1994). Each special status plant species is addressed in Appendix 1 or 2 (habitat and range, agency status and probability of occurring on the site). Species observed on the site and listed or candidate species potentially occurring on the site are also described below.

VI. B. 1. Listed threatened or endangered plants occurring on the site:

Ash-gray Indian paintbrush (*Castilleja cinerea*): Ash-gray Indian paintbrush is a federally-listed threatened species and is on CNPS's List 1B. It is a root parasite on other plants, often parasitizing the listed threatened southern Mountain buckwheat (below) or a similar but common mat-forming buckwheat (*E. wrightii* ssp. *subscaposum*). It is a perennial herb, and typically blooms between May and August. It occurs in pebble plains, meadows and seeps, and open pinyon or Jeffrey pine forest between about 5,900 and 10,000 feet elevation. It is endemic to the eastern San Bernardino Mountains (Big Bear Valley, Holcolmb Valley, Onyx Summit, Snow Valley, and Sugarloaf Ridge). It was reported and mapped on the project site by Michael Brandman Associates (2000) and in the California Natural Diversity Data Base (2007). White & Leatherman BioServices (2002) found that it was more widespread than reported earlier, occurring in the pebble plains and open pine forests (Figure 3), where it appears to be parasitizing *Eriogonum wrightii* ssp. *subscaposum.* We confirmed these occurrences and noted no substantial changes to densities or distribution in 2007.

Southern mountain buckwheat (*Eriogonum kennedyi* var. *austromontanum*): Southern mountain buckwheat is federally listed as threatened and is on CNPS's List 1B. It is a mat-forming woody perennial, generally flowering late in the season (between about June and August). It is endemic to pebble plains habitats in Big Bear and Holcomb valleys in the San Bernardino Mountains, between about 5800 and 7500 feet elevation. It often serves as a host plant for the hemi-parasitic *Castilleja cinerea* (above) and also is a food plant for a newly described locally-endemic San Bernardino blue butterfly. It is very similar to a more common plant, Wright's matting buckwheat (*E. wrightii* ssp. *subscaposum*), which is common on the project site. The two species are distinguished by presence or absence of branching in their inflorescences (Hickman 1993; Reveal 1989, 2005). We examined flowers and remains of dried inflorescences of mat-forming buckwheats throughout the project site

on each site visit. Most of them were either unidentifiable (due to absence of inflorescences) or were identified as Wright's matting buckwheat, based on their branching inflorescences. But on the mapped pebble plain (Figure 3), during the 8 August site visit, about 10-20% of the matting buckwheat plants had mostly (but not exclusively) unbranched inflorescences. Reveal (2005) noted that the two plants intergrade to some extent in Big Bear Valley and A. Sanders (pers. comm.) has made similar observations. We conclude that some of the matting buckwheats on pebble plains at the Moon Camp site are intergradations between the endangered southern mountain buckwheat and the common Wright's matting buckwheat.

VI. B. 2. Special status plants occurring on the site but not listed as threatened or endangered:

Parish's rock-cress (*Arabis parishii*): Parish's rock cress is CNPS's List 1B. It is a perennial herb that typically blooms in April or May. It occurs in pebble plains and other sites with heavy or rocky soils, including carbonate soils, within pinyon woodlands and montane forests between about 3,900 and 8,000 feet elevation. It is endemic to the San Bernardino Mountains. Suitable habitat occurs on the project site in areas shown as ash-gray paintbrush habitat on Figure 3. It has been reported from the site (CNDDB 2001). White & Leatherman BioServices (2002) observed it uncommonly, scattered throughout pebble plain and adjacent open forest habitat. We confirmed these occurrences and noted no substantial changes to densities or distribution in 2007.

Big Bear Valley woollypod (*Astragalus leucolobus*): Big Bear Valley woollypod is on CNPS's List 1B. It is a perennial herb that typically blooms between May and July. It occurs in rocky soils of montane conifer forests and woodlands and pebble plains, between about 5,600 and 8,000 feet elevation. It is endemic to the high mountains of southern California (San Bernardino, San Gabriel, San Jacinto, and Santa Rosa Mountains). Suitable habitat is found throughout the site. White & Leatherman BioServices (2002) observed it occasionally throughout the project site. We confirmed these occurrences and noted that it was especially common on pebble plains in 2007.

Heckard's paintbrush (*Castilleja montigena, C. applegateii* ssp. *martinii*): Heckard's paintbrush is on CNPS's List 4. It is a perennial herb, typically flowering between May and August. It occurs in montane forests between about 6400 and 9200 feet elevation. It is endemic to the San Bernardino Mountains, where it is common in forest habitats throughout the mountain range. It was originally described by Lawrence Heckard (1980), but Heckard regarded it as a minor variant of *Castilleja applegateii* and not as a distinct species in his Jepson Manual treatment of the genus (1993). It occurs occasionally in Jeffery pine forest on the Moon Camp site.

Silver-Haired ivesia (*Ivesia argyrocoma*): Silver-haired ivesia is on CNPS's List 1B. It is a perennial herb that typically blooms between June and August. It occurs in alkaline meadows and seeps, pebble plains, and montane forest between about 4900 and 8800 feet elevation. It occurs in the San Bernardino Mountains and a disjunct site in the mountains of Baja California. It has been reported from the project site by Michael Brandman Associates (2000) and White and Leatherman BioServices (2002), and we observed it throughout areas shown as ash-gray paintbrush habitat on Figure 3.

VI. B. 3. Listed and candidate threatened or endangered plants potentially occurring on the site:

Bear Valley sandwort (*Arenaria ursina*): Bear valley sandwort is federally-listed as threatened and is on CNPS's List 1B. It is a perennial herb and typically blooms between May and August. It occurs on pebble plains and sometimes on carbonate soils, between about 6,400 and 6,900 feet elevation. It is endemic to Big Bear Valley in the San Bernardino Mountains. It has been reported from the Moon Camp site (CNDDB 2007), but we did not find it on the site in 2007 and it was not noted there by Michael Brandman Associates (2000) or White & Leatherman BioServices (2002).

Due to poor rainfall in 2001-02 and 2006-07, we cannot evaluate whether Bear Valley sandwort was absent during these field surveys due to its disappearance from the site or due to drought-induced dormancy. Suitable habitat occurs in pebble plains on the project site, and we conclude that it has a high probability of occurring.

San Bernardino bluegrass (*Poa atropurpurea*): San Bernardino bluegrass is a federally-listed Endangered species and is on CNPS's List 1B. It is a rhizomatous perennial grass that typically flowers between May and June. It occurs in mesic meadows and seeps between about 4,400 and 8,100 feet elevation. It is known only from the San Bernardino Mountains and Laguna mountains (San Diego County). Marginally suitable habitat occurs along the lakeshore areas on the project site. We did not find it during our field surveys, but we also could not find it at a known occurrence in the area, perhaps due to drought-induced dormancy. Based on habitat, we conclude there is a low probability that it may occur there.

Bird's foot checkerbloom (*Sidalcea pedata*): Bird's foot checkerbloom is a federally- and state-listed endangered species and is on CNPS's List 1B. It is a perennial herb that typically blooms between May and July. It occurs in meadows and seeps, between about 5,200 and 8,100 feet elevation. It is endemic to the San Bernardino Mountains. Marginally suitable habitat occurs near the lakeshore, though we did not find bird's foot checkerbloom during our field surveys, and it has not been reported there in prior surveys. Based on habitat, we conclude there is a low probability that it may occur.

California dandelion (*Taraxacum californicum*): California dandelion is a federally-listed endangered species and is on CNPS's List 1B. It is a perennial herb that typically blooms between May and July. It is endemic to the San Bernardino Mountains, occurring only in and around Big Bear Valley, in meadows and seeps between about 6,300 and 7,800 feet elevation. Marginally suitable habitat occurs in meadow areas near the lakeshore, though the species was not noted during our field surveys or reported in prior surveys. Based on habitat, we conclude there is a low to moderate probability that it may occur on the site.

VI. B. 4. Special status plants potentially occurring but not listed as threatened or endangered:

Other special status plant species judged as moderate or greater probability of occurring on the site, but not seen during field surveys and not listed as threatened or endangered are listed below. See also Appendix 2.

Rock sandwort (*Arenaria lanuginosa* ssp. *saxosa*): Moderate probability (meadow, lakeshore)
Crested milk vetch (*Astragalus bicristatus*): High probability (rocky areas)
Big Bear Valley milk vetch (*Astragalus lentiginosus* var. *sierrae*): High probability, open forest
Palmer's mariposa lily (*Calochortus palmeri* var. *palmeri*): Moderate probability, meadow
Western sedge (*Carex occidentalis*): Moderate probability, meadow
San Bernardino Mountain owl's clover (*Castilleja lasiorhyncha*): Moderate probability, meadow
San Bernardino Mountains dudleya (*Dudleya abramsii* ssp. *affinis*): Moderate probability, pebble plains
Southern Sierra woolly sunflower (*Eriophyllum lanatum* var. *obovatum*): High probability, forest
Jepson's bedstraw (*Galium jepsonii*): High probability, forest
Johnston's bedstraw (*Galium johnstonii*): Low to moderate probability, forest
Parry's sunflower (*Hulsea vestita* ssp. *parryi*): Low to moderate probability (open slopes)
Duran's rush (*Juncus duranii*): Moderate probability, meadow
Short-sepaled lewisia (*Lewisia brachycalyx*): Moderate probability, meadow
Baldwin Lake linanthus (*Linanthus killipii*): High probability on pebble plains

San Bernardino Mountain monkeyflower (*Mimulus exiguus*): High probability, meadow margin, etc.
Purple monkeyflower (*Mimulus purpureus*): High probability, meadow margin, etc.
Chickweed oxytheca (*Oxytheca caryophylloides*): High probability, open forest
Parish's yampah (*Perideridia parishii* ssp. *parishii*): Low to moderate probability, meadow
Transverse Range phacelia: (*Phacelia exilis*): High probability, meadow margin, etc.
Mojave phacelia (*Phacelia mohavensis*): High probability, meadow margin, etc.
Bear Valley phlox (*Phlox dolichantha*): High probability, throughout
Bear Valley pyrrocoma (*Pyrrocoma uniflora* ssp. *gossypina*): Low - moderate probability, meadow
Parish's rupertia (*Rupertia rigida*): High probability, throughout
Tehachapi ragwort (*Senecio ionophyllus*): Moderate probability, throughout
Laguna Mountains jewelflower (*Streptanthus bernardinus*): Moderate probability, forest
Southern jewelflower (*Streptanthus campestris*): High probability, forest
Pine green-gentian (*Swertia neglecta*): High probability, forest
Small-flowered bluecurls (*Trichostema micranthum*): High probability, meadow

VI. C. PROTECTED PLANTS

The San Bernardino County Plant Protection and Management policy (2007) regulates removal of native trees greater than 6 inches diameter at breast height (dbh). Jeffrey pines and other native forest trees greater than 6 inches dbh occur throughout the site.

VII. IMPACTS

VII. A. Impacts to Special Status Plants and Habitat

Project construction would result in grading new roads, driveways and building pads throughout most of the property, removing much of the native vegetation, including special status plants and habitat, and disturbing soils throughout most of the site. Even where special status plants are not removed by grading, most future land uses on individual lots (e.g., landscaping) would not be subject to environmental review and would cause further loss of these plants and habitats. Indirect project impacts (i.e., impacts outside the proposed residential lots and limits of grading) would affect rare plant habitat in a proposed set-aside area and, if it occurs, off-site to the north. Thus, project impacts would eliminate or degrade sensitive habitat types (pebble plain) and occupied rare plant habitat (Figure 3, Figure 5). Pebble plains and open forest patches on the site are occupied by at least one threatened or endangered plant (ash-gray Indian paintbrush); genetic intergrades of another listed plant (southern mountain buckwheat) with a common related species; and four other special status plants (Parish's rock-cress, Heckard's paintbrush, Bear Valley woollypod and silver-haired ivesia). Development would eliminate or substantially reduce numbers of all five plants. Although these habitats are somewhat degraded by vehicles and invasive plants (see Section VI. A. above and "edge effects," below), adverse impacts to listed species would meet the CEQA threshold for mandatory findings of significance.

Construction could also eliminate or substantially reduce numbers of five other listed threatened or endangered plants that could occur on the site but were not found there, including Bear Valley sandwort, southern mountain buckwheat, bird-foot checkerbloom, San Bernardino bluegrass, and California dandelion. The maximum possible extent of these impacts, if all four plants occur, would be loss of Bear Valley sandwort and southern mountain buckwheat in pebble plains areas discussed above, and possible loss of bird-foot checkerbloom, San Bernardino bluegrass, and California dandelion from small meadow areas bordering the lakeshore. These impacts would meet the CEQA threshold for mandatory findings of significance if any of these listed plants occur on the site.

Impacts to special status plants not listed as threatened or endangered (Section IV. B. 4.) generally would not meet the CEQA threshold for mandatory findings of significance.

Adverse project impacts to pebble plains and rare plants occurring (or potentially occurring) on pebble plains are somewhat reduced by the project's design, which designates an open space lot on the pebble plain area and part of the occupied ash-gray Indian paintbrush habitat (Figure 3). However, the long-term conservation value of the proposed open space lot would be minimal without designating buffer areas and providing for active on-site land management to prevent indirect "edge effects" of existing and proposed new adjacent land uses.

The term "edge effect" describes the effects of developed land uses on adjacent natural habitat areas (e.g., habitat adjacent to new development or in set-aside areas surrounded by development). To date, most analyses of edge effects on habitat reserves have focused on sensitive wildlife species. The following discussion of edge effects on rare plants is based on an analysis by the Conservation Biology Institute (2000) addressing San Fernando Valley spineflower, an endemic southern California species threatened by development and surrounding land uses in Los Angeles and Ventura Counties. Rare plants near developed lands tend to die out due to a variety of edge effects, including:

- Exclusion by invasive weedy plants introduced deliberately or accidently into developed landscapes.
- Trampling or soil damage caused by foot traffic, vehicles, bicycles, or other recreation.
- Altered hydrology caused by irrigation overspray, road runoff, or water diversions installed for erosion control.
- Direct damage by pets and feral animals (e.g., digging by dogs and cats).
- Indirect effects of non-native animals, such as elimination of native pollinators by invasive Argentine ants.
- Vegetation clearing, especially for fuel modification to reduce fire hazards to adjacent homes.
- Pollution from oversprayed or runoff landscaping chemicals (insecticides, herbicides, fertilizers).

Conservation planners design "buffer areas" to separate managed sensitive species or habitat reserve areas from the indirect effects of adjacent land uses. The Conservation Biology Institute (2000) modeled "buffer areas" for then-proposed San Fernando Valley spineflower preserve areas in Ventura County. In their analysis, buffer areas were defined as preserved land surrounding the rare plants, where land uses were strictly limited to activities consistent with reserve management. For example, buffer areas function to separate rare plant habitat from adverse effects of weeds propagating along trails or through fuel modification zones. Thus, roads, trails, or fuel modification land uses are not consistent with buffer function. The Conservation Biology Institute analysis (2000) estimated that buffer widths of 200 feet would be "highly likely to be effective" in buffering San Fernando Valley spineflower occurrences from a series of adverse edge effects from adjacent land uses, and "moderately effective" against two adverse edge effects (invasive animals and increased fire frequency). In their analysis, a wider hypothetical buffer (300 ft.) would not increase estimated effectiveness against fire and invasive animals. We therefore use 200 feet as the best available estimate of the range of adverse edge effects on special status plant occurrences.

The proposed project could also cause "edge effects" to proposed open space on-site and to adjacent vacant land to the north and east as new residents increase activity and disturbance to surrounding native habitat, through the effects listed above.

Most land surrounding the Moon Camp site is in private ownership, except in the northeastern

corner where National Forest land is adjacent to the north and east. None of the surrounding private land is managed or proposed for management as a conservation area. Most adjacent private land on all sides has been developed. There is a pebble plain area on National Forest land on the ridge north of the Moon Camp site, but it is more than 200 feet from the project site and thus should be sufficiently buffered from project-related edge effects. We conclude that the proposed project's off-site edge effects would not meet the CEQA threshold for mandatory findings of significance.

Much of the Moon Camp project site, including the proposed open space lot on-site, is now subject to edge effects of adjacent residential development and roads, especially Highway 38 (Figure 4). The proposed project would eliminate or further degrade most remaining occupied rare plant habitat (above) and would indirectly affect nearly all of the proposed open space lot by introducing new edge effects closer to the open space area (Figure 5). The small portion of the proposed open space lot not within 200 feet of proposed new development is already within 200 feet of Highway 38 and thus subject to existing edge effects (Figures 4 and 5).

VII. B. Impacts to Protected Plants

Tract Map approval and subsequent construction would cause substantial reduction in Jeffrey pine forest tree canopy cover throughout most of the site. This impact would not necessarily be regarded as significant under CEQA, but could conflict with San Bernardino County's general plan and would require permitting under the County's Native Plant Protection policy.

VII. C. Impacts to Jurisdictional Streambeds

Road construction and other elements of the project would alter ephemeral channels, and possibly to meadows or other lakeshore habitat that may meet state or federal jurisdictional criteria as streambeds, wetlands, or waters of the United States. These impacts would not necessarily be regarded as significant under CEQA, but could require permitting under Section 1603 of the California Fish and Game Code or Section 404 of the federal Clean Water Act through the California Department of Fish and Game or US Army Corps of Engineers, respectively.

VIII. RECOMMENDED AGENCY CONSULTATION OR FURTHER STUDIES

1. To minimize loss of forest canopy on the property, we recommend mapping and inventorying trees on the site, and designing roads and building sites to minimize the number of overstory trees to be removed. Once those trees that must be removed are identified, we recommend applying to San Bernardino County for applicable permits under the County's native plant protection policy.

2. We recommend preparing a delineation of jurisdictional streambeds, wetlands, and waters of the United States to determine whether Section 1603 of the California Fish and Game Code or Section 404 of the federal Clean Water Act are applicable on the property. The delineation report should address channels crossing the site and the lakeshore area described in this report.

3. The project would take at least one federally listed plant (ash-gray Indian paintbrush) and its occupied habitat through direct impacts (occurrences within proposed roadways or residential lots) and possibly two other federally listed plants (Bear Valley sandwort and southern mountain buckwheat) through indirect impacts to the proposed open space lot. If project development requires permitting or funding through any federal agency (e.g., the Army Corps of Engineers under Section 404 of the federal Clean Water Act) then that agency must consult with the US Fish and Wildlife Service under Section 7 of the federal Endangered Species Act.

4. Field surveys to date have occurred in very dry years and have been unable to determine presence or absence of several listed threatened or endangered plants and numerous other special status plants. We recommend further botanical surveys for these species (Sections V. B. III. and V.

B. IV., above) , to be conduced in accordance with California Department of Fish and Game (2000) guidelines. These follow-up surveys should be done in a year when precipitation is at least 40% of average for the area over the "rainfall year" period (1 July - 30 June).

IX. MITIGATION AND MONITORING RECOMMENDATIONS

IX. A. MITIGATION RECOMMENDATIONS

Under CEQA Guidelines, if a project would "reduce the number or restrict the range of a threatened or endangered species," then a lead agency must find that the project would have a significant effect. Without mitigation, the proposed development would meet this criterion for mandatory findings of significance, due to adverse impacts to the threatened ash-gray Indian paintbrush, and potential adverse impacts to listed plants not found on the site. CEQA defines mitigation as (a) avoiding the impact altogether by not taking a certain action or parts of an action, (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation, (c) rectifying the impact by repairing, rehabilitating, or restoring the impacted environment, (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, or (e) compensating for the impact by replacing or providing substitute resources or environments. Potential application of these five types of mitigation to the proposed project are addressed below:

Avoidance or Minimization: Avoiding or minimizing impacts to the occupied listed plant habitat would necessitate either abandoning the project or redesigning it to eliminate or minimize grading or other disturbance (including long-term edge effects of new development) to soils and hydrology on the occupied habitat and throughout a substantial buffer area. These measures would substantially reduce project feasibility and, even if implemented, long term persistence of the listed plants would be doubtful due to isolation caused by existing and proposed development.

Rectifying the impact or reducing it over time: Both these types of mitigation apply only to temporary disturbances (e.g., pipeline construction, in which the disturbed ground may be revegetated following construction). These measures are not applicable for the proposed Moon Camp project.

Compensating for the impact: Compensation is widely used as mitigation for impacts to threatened or endangered species, both as mitigation for CEQA analysis and as Habitat Conservation Plans (HCPs) negotiated with the US Fish and Wildlife Service under the federal Endangered Species Act, if protection of sufficient off-site habitat can be achieved. Typically, mitigation ratios are about 3:1 (i.e., 3 acres of habitat purchased or protected for each acre lost to development).

Off-site protection is a viable measure for impacts to ash-gray Indian paintbrush and other regionally endemic threatened or endangered plants potentially occurring on the site. The San Bernardino National Forest actively manages other sites to preserve pebble plain endemic plants, including ash-gray paintbrush. Numerous other privately-owned sites in the Big Bear Valley support pebble plains where disturbances would be more manageable due to adjacent land uses and relative isolation from developed areas. The California Wildlife Foundation has established a fund, administered by the California Department of Fish and Game, for eventual purchase or protection of pebble plain habitat in the Big Bear area.

We recommend the following measures to mitigate significant or potentially significant adverse impacts to listed threatened or endangered plants:

1. We recommend compensating for anticipated loss of a federally-listed threatened plant (ash-gray Indian paintbrush), loss of pebble plain habitat, and potential impacts to other listed species (Bear Valley sandwort, southern mountain buckwheat) by contributing to the funding of purchase

and management of off-site habitat through the California Wildlife Foundation fund, described above, at a level sufficient to purchase or protect 3 acres of habitat for each acre of pebble plain habitat and ash-gray Indian paintbrush habitat to be developed, and at 1:1 ratio for habitat to be indirectly degraded by edge effects of the proposed development (see Figure 5).

2. If follow-up surveys (Section VIII., above) determine that no other listed plants occur, then we make no further mitigation recommendation. If the surveys determine that one or more listed species occurs in the meadow area, then we recommend delineating the extent of suitable or occupied habitat, evaluating direct or indirect project impacts, and compensating as stated above for impacts to rare plant habitat (i.e., 3:1 for direct impacts, 1:1 for indirect impacts or edge effects).

IX. B. MITIGATION MONITORING RECOMMENDATIONS

California law requires monitoring of mitigation measures imposed under CEQA. We recommend monitoring mitigation measures recommended here to verify compliance with conditions of approval. We recommend that the applicant maintain files of all correspondence with agencies, contractors, or other entities pertaining to compliance with the recommendations above (Section VIII and IX.A.), and provide copies of pertinent correspondence to the County upon completion or resolution of each recommendation.

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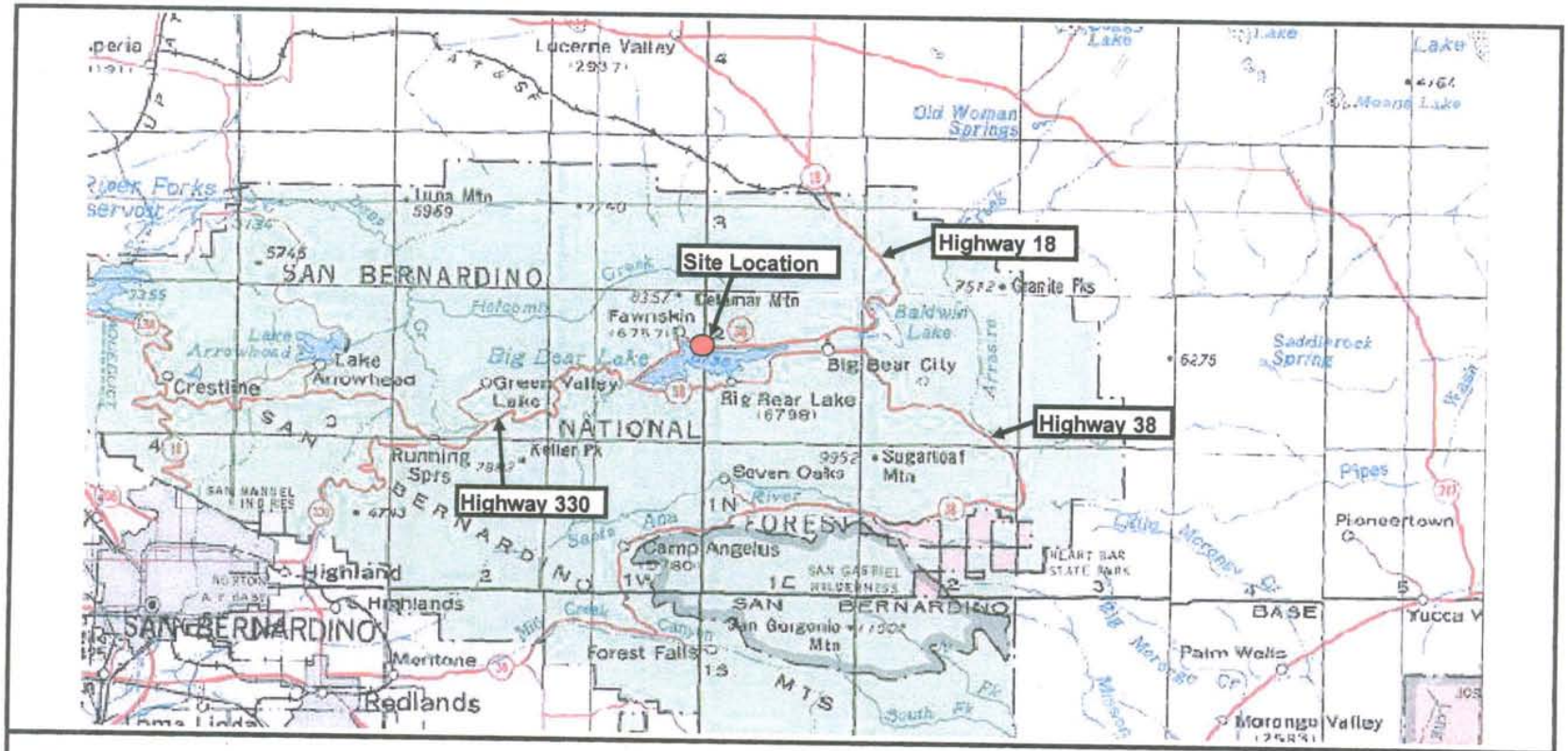
Figure 1:
Vicinity Map



Proposed Moon Camp Tenative Tract

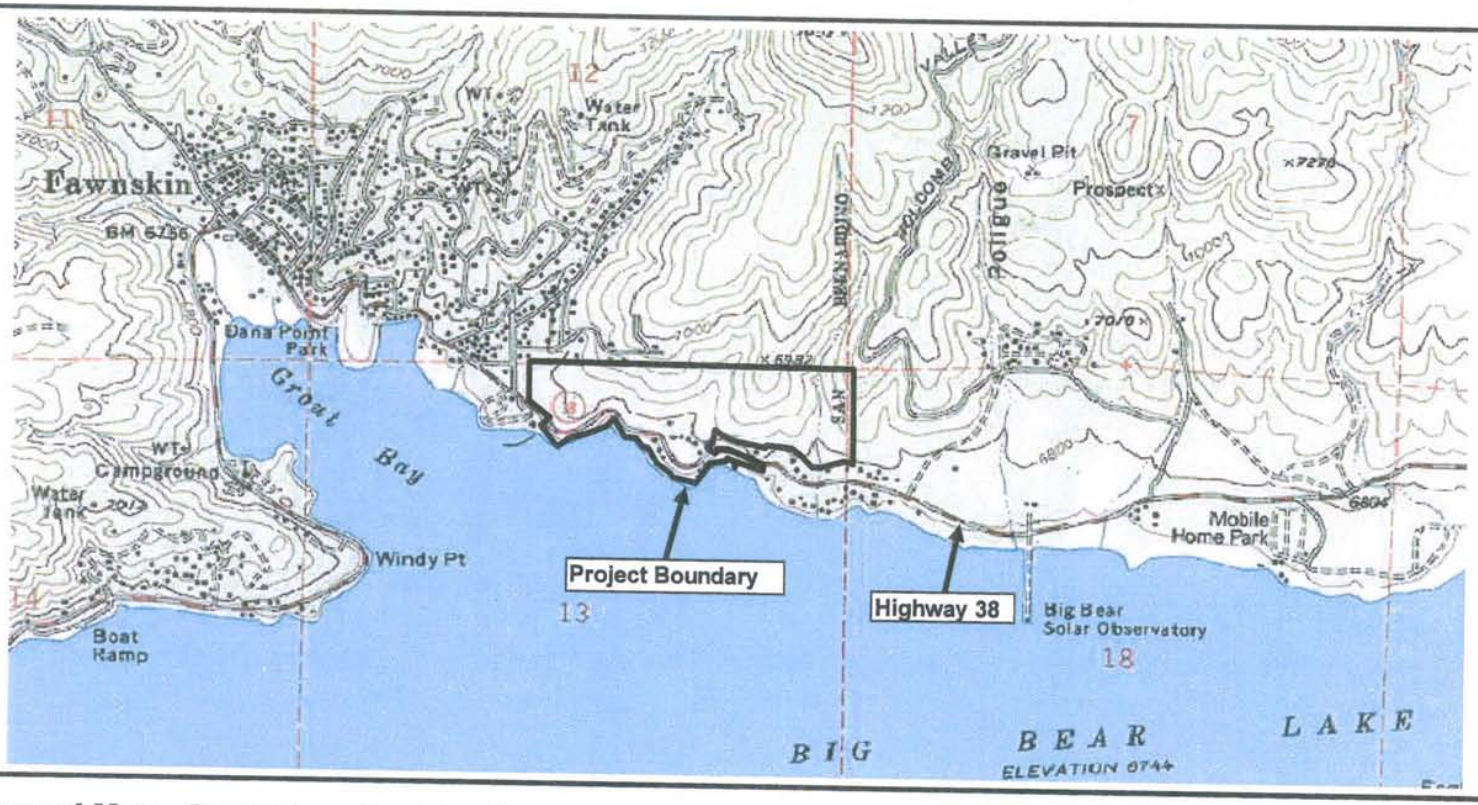
Figure 1: Vicinity Map

Scott White Biological Consulting

Map source: TOPO! 7½ minute topographic
JW: 15 Aug 2007

NORTH

Figure 2:
Project Site Map



Proposed Moon Camp Tenative Tract

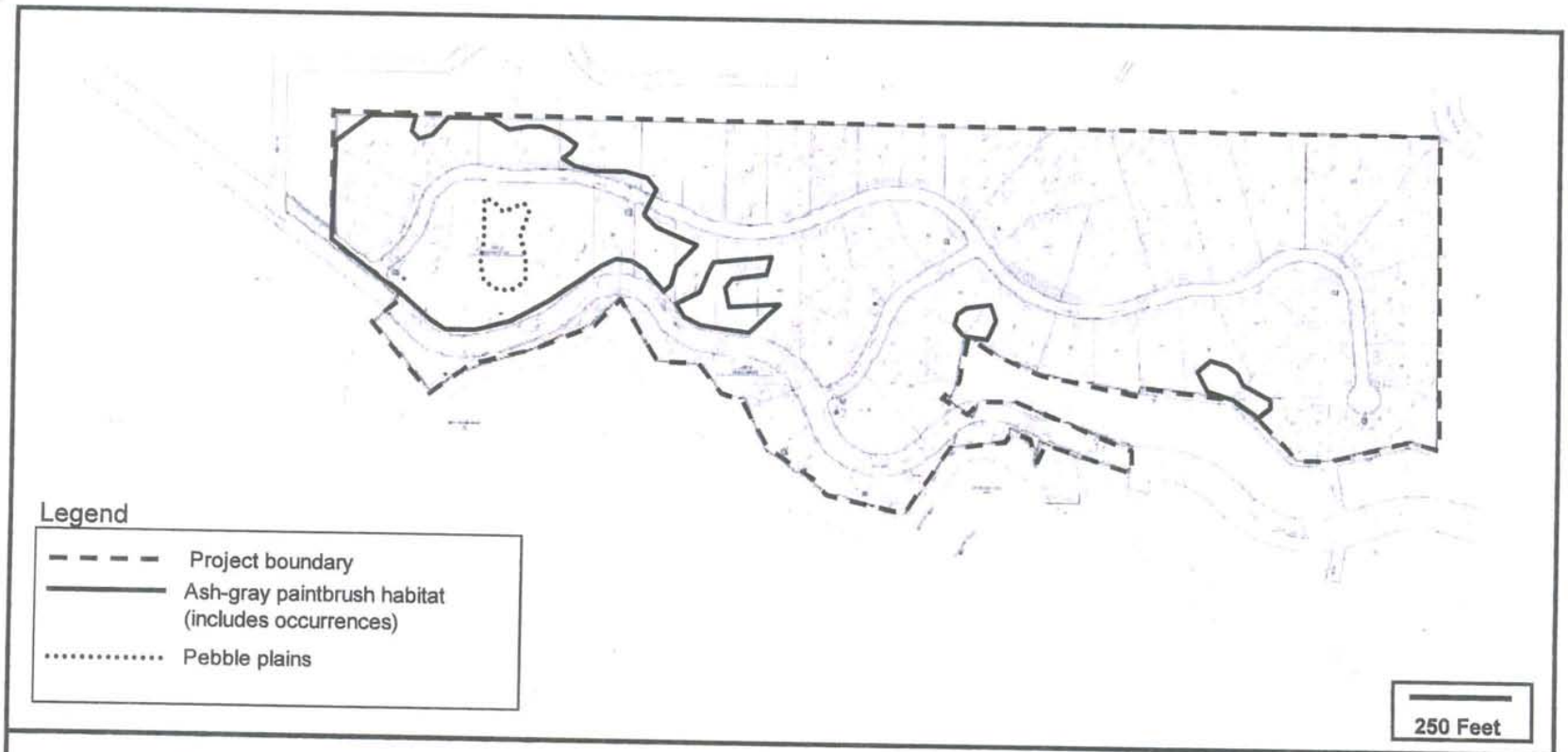
Figure 2: Site Map

Scott White Biological Consulting

Map source: TOPO! 7½ minute topographic, Fawnskin, CA
JW: 15 Aug 2007

NORTH

Figure 3:
Rare Plant Habitat



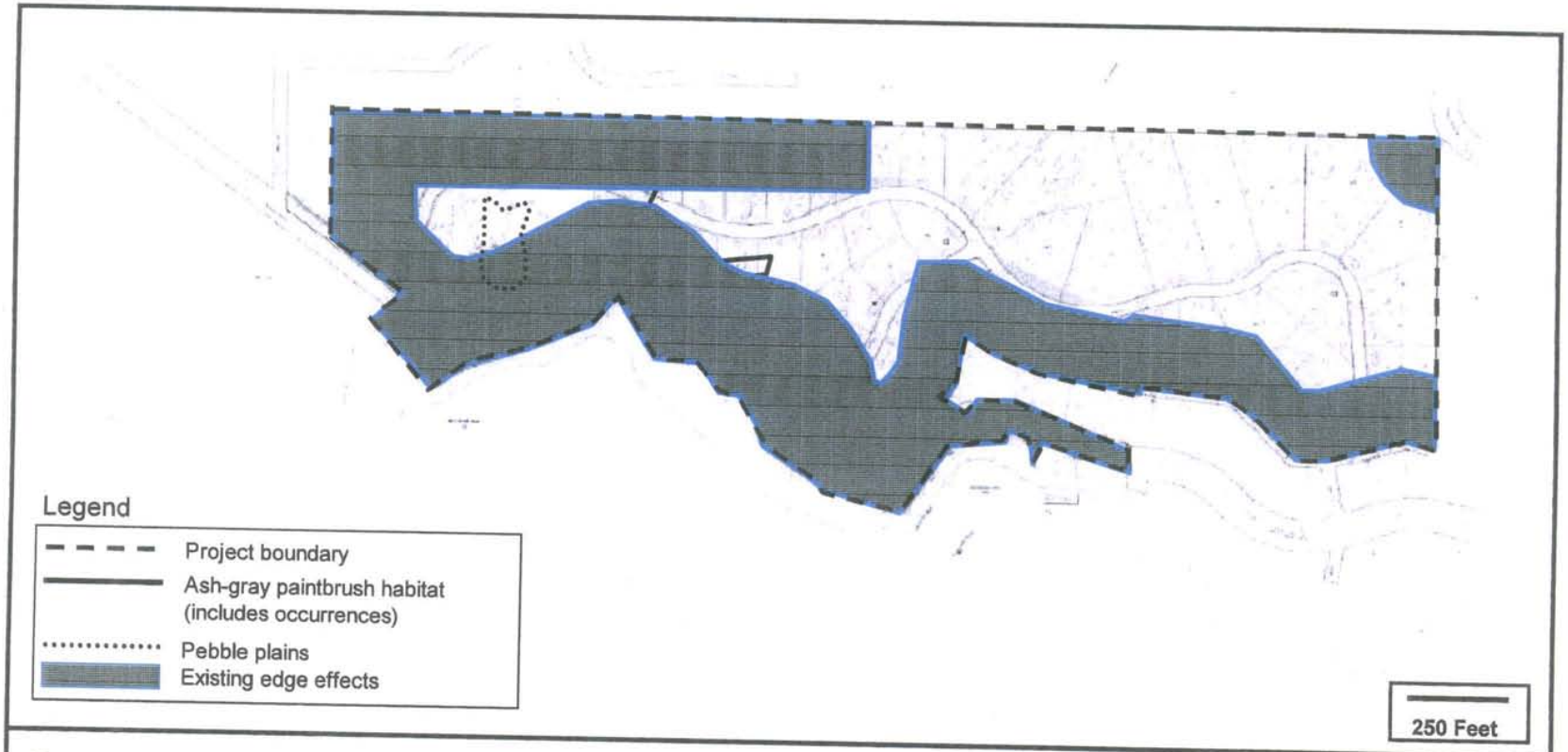
Proposed Moon Camp Tenative Tract

Figure 3: Rare Plant Habitat

Scott White Biological Consulting

Map source: Michael Brandman Associates
JW: 15 Aug 2007

Figure 4:
Edge Effect Map



Proposed Moon Camp Tenative Tract

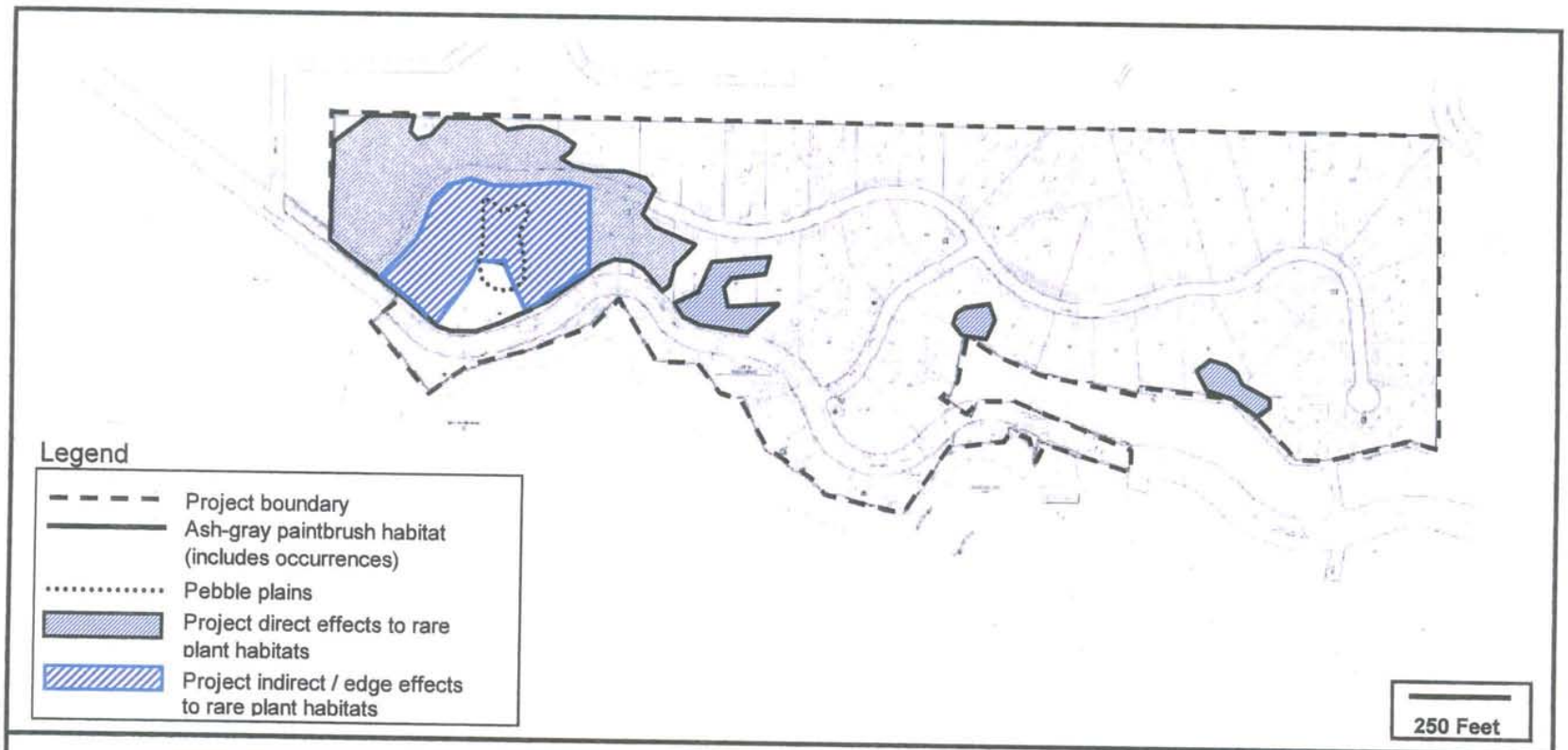
Figure 4: Existing Edge Effects

Scott White Biological Consulting

Map source: Michael Brandman Associates

JW: 15 Aug 2007

Figure 5:
Project Effects



Proposed Moon Camp Tenative Tract

Figure 5: Project Effects

Scott White Biological Consulting

Map source: Michael Brandman Associates
JW: 15 Aug 2007

Appendix 1:
Special Status Species Not Addressed

Appendix 1: Special status plants of the Bear Valley region not addressed due to habitat or range.

Common name	Latin name	Reason for exclusion
White-margined everlasting	Antennaria marginata	Outside geogr. range (only local occurrences in Barton Flats area)
Pinyon rock-cress	Arabis dispar	Outside geogr. range (only local occurrences on desert-facing slopes)
Shockley's rock-cress	Arabis shockleyi	Outside geogr. range (only local occurrences on desert-facing slopes)
Cushenbury milk-vetch	Astragalus albens	No suitable habitat (carbonate)
Triple-ribbed milk-vetch	Astragalus tricarinatus	No habitat (desert shrubland), well above elev. range (below about 4000 ft.), Cushenbury Cyn report erroneous
Parish's small-scale	Atriplex parishii	No suitable habitat (alkali sink)
Fremont barberry	Berberis fremontii	No local occurrences (presumed extinct in Cushenbury area)
Scalloped moonwort	Botrychium crenulatum	No suitable habitat (marshes, bogs)
Plummer's mariposa lily	Calochortus plummerae	Above elev. range (below about 5500 ft.)
Alkali mariposa lily	Calochortus striatus	No habitat (desert alkaline meadows, seeps) above elev. range (below about 5300 ft.)
Parish's daisy	Erigeron parishii	No suitable habitat (carbonate)
Cushenbury buckwheat	Eriogonum ovalifolium var. vineum	No suitable habitat (carbonate)
Moss gentian	Gentiana fremontii	Well below elev. range (occurs in San Gorgonio Wilderness)
Los Angeles sunflower	Helianthus nuttallii ssp. parishii	Well above elev. range (below about 4000 ft. elev.)
Barton Flats horkelia	Horkelia wilderae	Outside geogr. range (endemic to Barton Flats area)
California satintail	Imperata brevifolia	Well above elev. range (below about 3000 ft.)
San Bernardino Mtn. bladderpod	Lesquerella kingii ssp. bernardinus	No habitat (carbonate)
Adder's mouth	Malaxis monophyllos ssp. brachypoda	Well below elev. range (occurs in San Gorgonio Wilderness)
Cienega Seca oxythexca	*Oxytheca parishii* var. *cienegensis*	Outside geogr. range (known only from Cienega Seca and Pipes Cyn areas)
Cushenbury oxytheca	Oxytheca parishii var. goodmaniana	No habitat (carbonate)

Appendix 1: Special status plants of the Bear Valley region not addressed due to habitat or range.

Common name	Latin name	Reason for exclusion
Frosted mint	Poliomintha incana	No suitable habitat (desert dunes and sandy flats)
Narrow-leaved cottonwood	Populus angustifolia	No San Bernardino Mountain occurrences (local reports unverified)
Latimer's woodland gilia	Saltugilia latimeri	No habitat (desert shrubland,pinyon woodland); above elev. range (below about 6200 ft.)
Slender-petaled thelypodium	Thelypodium stenopetalum	No habitat (alkaline meadows)

Appendix 2:
Special Status Species

APPENDIX 2: Special status plants of the Big Bear Valley and surrounding mountains.

Special Status Plants	Habitat and Distribution	Flower season	Conservation Status	Occurrence Probability
Abronia nana ssp. *covillei* Coville's dwarf abronia	Perennial herb; carbonate and sandy soils within pinon-juniper woodlands; San Bernardino Mts. and mountains of E Mojave, about 5200 - 10,200 ft.	May - August	Fed: none Calif: S3.2 CNPS List 4.2	Low (marginally suitable habitat)
Allium parishii Parish's onion	Bulb; open shrubland & woodland, gen. sandy bajadas or mtn slopes, often carbonate soil, about 3000 - 5500 ft. elev.; N San Bern Mtns and Moj Des Mtns, to W Ariz.	Apr - May	Fed: none Calif: S3.3? CNPS List 4.3	Minimal (above elev. range)
Arabis parishii Parish's rock cress	Perennial herb; pebble plains, occas. on carbonate soil; open dry sites in conifer forest; about 5800 - 9500 ft. elev.; San Bernardino Mtns. endemic	April - May	Fed: none Calif: S2.1 CNPS List 1B. 2	Occurs (2007 survey; NDDB report)
Arenaria lanuginosa ssp. *saxosa* (*A. confusa*) Rock sandwort	Perennial herb; sandy soils, streams or meadows; about 5900 to 8600 ft. elev.; San Bernardino Mtns, W US and N Baja Calif.	July - Aug	Fed: none Calif: S1.3 CNPS List 2.3	Moderate (moderately suitable habitat)
Arenaria ursina Bear Valley sandwort	Perennial herb, pebble plains, occas. on carbonate soils, about 5900 - 9500 ft. elev.; San Bernardino Mtns. endemic	June - July	Fed: **THR** Calif: S 2.1 CNPS: List 1B.2	Occurs? (NDDB record #23)
Aster bernardinus (*Symphyotrichum defoliatum*) San Bernardino aster	Perennial herb; wetlands and margins, near sea level to about 6700 ft. elev.; formerly widespread, Kern Co to San Diego Co, but most sites extirpated	July - Nov	Fed: none Calif: S 3.2 CNPS List 1B.2	Low (field surveys; upper margin of elev. range)
Astragalus bicristatus Crested milk vetch	Perennial herb; rocky slopes, montane conifer forest; about 5500 - 9000 ft. elev.; San Bernardino, San Gabriel, and San Jacinto Mtns	May - August	Fed: none Calif: S3.3 CNPS List 4.3	High (suitable habitat occurs)
Astragalus lentiginosus var. *sierrae* Big Bear Valley milk vetch	Perennial herb; open rocky soils or compacted areas in pine forest; about 5900 - 8500 ft. elev.; San Bernardino Mtns endemic	April - August	Fed: none Calif: S1? CNPS List 1B.2	High (suitable habitat occurs)
Astragalus leucolobus Bear Valley woollypod	Perennial herb; open or disturbed soils, pine forests and sagebrush scrub, about 5600-8800 ft. elev.; San Gabriel Mtns to Santa Rosa Mtns	May - July	Fed: none Calif: S 2.2 CNPS List 1B.2	Occurs
Calochortus palmeri vars. *palmeri* and *munzii* Palmer's & Munz's mariposa lilies	Bulb; meadows or seasonally moist sites; about 3300 - 7200 ft. elev.; var. *palmeri* occurs S Coast & Transverse Ranges, reported but not verified San Jacinto Mtns; var. *munzii* endemic to San Jacintos, reported but not verified in San Bernardinos	May - July	Fed: none CNPS List 1B.2 var *palmeri*: Calif: S 2.1 var. *munzii*: Calif: S 1.2	Moderate (marginally suitable habitat)

APPENDIX 2: Special status plants of the Big Bear Valley and surrounding mountains.

Special Status Plants	Habitat and Distribution	Flower season	Conservation Status	Occurrence Probability
Carex occidentalis Western sedge	Rhizomatous perennial; meadows & seeps; San Bernardino Mtns, White Mtns, scattered in western states; about 6200 - 10,300 ft. elev.	June - Aug	Fed: none Calif: S2S3 CNPS List 2.3	Moderate (marginal habitat)
Castilleja cinerea Ash-gray Indian paintbrush	Perennial herb; pebble plains, dry meadows, about 5900 to 9100 ft. elev.; partially parasitic usually on matting buckwheats; San Bernardino Mtns endemic	May - August	Fed: THR Calif: S2.2 CNPS List 1B.2	Occurs (field survey and CNDDB report)
Castilleja lasiorhyncha (*Orthocarpus lasiorhynchus*) San Bernardino Mountain owl's clover	Annual; meadows, streamsides, seeps, etc., about 4200-7800 ft. elev.; San Bernardino Mtns. and (historically) San Jacinto Mtns.; reports from San Diego Co. unconfirmed	June - Aug	Fed: none Calif: S2.2 CNPS List 1B.2	Moderate (marginal habitat)
Castilleja applegateii ssp. *martinii* × *C. angustifolia* (=*C. montigena, C. martinii* var. *ewanii*) Heckard's paintbrush	Perennial herb; conifer forest; San Bernardino Mountains endemic (treated as a species by CNPS but considered a hybrid by Chuang & Heckard in Jepson Manual)	March - July	Fed: none Calif: S3.3 CNPS List 4.3	Occurs (Jeffrey pine forest)
Dryopteris filix-mas Male fern	Perennial herb; widespread in N hemisphere, esp. at high latitudes; only two reports in Calif., incl. Holcomb Valley	July - Sept.	Fed: none Calif: S 1.3 CNPS List 2.3	Low (local rarity)
Dudleya abramsii ssp. *affinis* San Bernardino Mts. dudleya	Perennial herb, pebble plains & rock outcrops (often carbonate); pinyon woodland, open pine forests, about 5200-8500 ft. elev.; San Bernardino Mtns endemic	April - June	Fed: none Calif: S 2.2 CNPS: List 1B.2	Moderate (marginal habitat)
Eriogonum foliosum (*E. evanidum*) Leafy buckwheat	Annual; sandy soil, woodlands or shrublands; about 3900-7200 ft. elev.; scattered locations, Big Bear Valley to N Baja Calif.; may be extinct in Calif.	July - Oct.	Fed: none Calif: SH CNPS List 1B.2	Minimal (presumed extinct, local rarity)
Eriogonum kennedyi var. *austromontanum* Southern mountain buckwheat	Matting woody perennial; pebble plains and similar soils, about 5800 - 7800 ft. elev.; nearly endemic to Big Bear area, also reported at Mt. Pinos	July - August	Fed: **THR** Calif: S2.2 CNPS: List 1B.2	Apparent introgression w/ Wright's buckwheat (see text)
Eriogonum microthecum var. *lacus-ursi* Bear Lake buckwheat	Subshrub; montane forests and shrublands; only known occurrence at Big Bear Lake shore ca. 7200 ft. elev.	July - Sept	Fed: none Calif: S 1 CNPS List 1B.1	Minimal (field survey)
Eriophyllum lanatum var. *obovatum* Southern Sierra woolly sunflower	Perennial herb; open montane coniferous forests, 4200-8200 ft. elev.; S Sierra Nevada and western San Bernardino Mtns	June - July	Fed: none Calif: S3.3 CNPS: List 4.3	High (suitable habitat occurs)

APPENDIX 2: Special status plants of the Big Bear Valley and surrounding mountains.

Special Status Plants	Habitat and Distribution	Flower season	Conservation Status	Occurrence Probability
Galium jepsonii (*G. angustifolium* var. *subglabrum*) Jepson's bedstraw	Perennial herb; sandy or gravelly soils, montane conifer forest, 6500-8100 ft. elev.; San Gabriel and San Bernardino Mtns	July - August	Fed: none Calif: S3.3 CNPS: List 4.3	High (suitable habitat occurs)
Galium johnstonii (*G. angustifolium* var. *pinetorum*) Johnston's bedstraw	Perennial herb, dry slopes, chaparral, lower montane forest, pinyon and juniper woodland; about 4000-7600 ft. elev.; San Bernardino, San Gabriel, maybe San Jacinto mtns	June - July	Fed: none Calif: S3.3 CNPS: List 4.3	Low-moderate (suitable habitat occurs; margin of elev. range)
Gilia leptantha ssp. *leptantha* San Bernardino Mtn. gilia	Annual; sandy or gravelly soils, open pine forest; endemic to upper Santa Ana Riv. watershed, San Bernardino Mtns., about 5000 to 7700 ft. elev.	June - Aug	Fed: none Calif: S2.3 CNPS: List 1B.3	Low (probably outside geogr. range)
Heuchera hirsutissima Shaggy-haired alum root *Heuchera parishii* Parish's alumroot	Perennial herbs; rocky outcrops, cliffs, slopes; montane forest or alpine boulderfields; above about 4800 ft. elev.; *H. hirsutissima* is endemic to San Jacinto and Santa Rosa Mtns (unconfirmed from San Bernardino Mtns); *H. parishii* endemic to San Bernardino Mtns	May - July	Fed: none Calif: S2.3 CNPS: List 1B.3	Low (poorly suitable habitat)
Hulsea vestita ssp. *parryi* Parry's sunflower	Perennial herb; gen. conifer forests, on loose eroding soil and talus; San Bernardino Mtns and Little San Bern. Mtns; about 5500-9500 ft. elev.	April - August	Fed: none Calif: S 3.3 CNPS: List 4.3	Low-moderate (marginal habitat)
Ivesia argyrocoma Silver-haired ivesia	Perennial herb; pebble plains, seasonal meadows, drainages; about 4900-8800 ft. elev.; San Bernardino Mtns and a long-disjunct site in Baja Calif mtns	June - August	Fed: none Calif: S2.2 CNPS: List 1B.2	Occurs (field survey & NDDB record)
Juncus duranii Duran's rush	Perennial herb; meadows, seeps, etc., montane forest, about 5800-9000 ft. elev.; San Bernardino, San Gabriel, and San Jacinto Mtns	July - August	Fed: none USFS: none Calif: S 3.3 CNPS: List 4.3	Low (masrginal habitat occurs)
Lewisia brachycalyx Short-sepaled lewisia	Perennial herb; wet meadows, mesic forest openings, about 4500-7600 ft. elev.; San Bernardino Mtns to Baja Calif, Utah, New Mexico	May - June	Fed: none Calif: S3.2 CNPS: List 2.2	Low-Moderate (marginal habitat)
Lilium parryi Lemon lily	Bulb; meadows and streambanks, about 4200 - 8600 ft. elev.; mtns of S Calif. and SE Arizona	July - August	Fed: none Calif: S2.1 CNPS: List 1B.2	Low (marginal habitat)
Linanthus killipii Baldwin Lake linanthus	Annual; pebble plains, alkaline meadows, forest openings, about 5500-7900 ft. elev.; San Bernardino Mtns endemic	May - July	Fed: none Calif: S 2.1 CNPS: List 1B.2	High (suitable habitat occurs)

APPENDIX 2: Special status plants of the Big Bear Valley and surrounding mountains.

Special Status Plants	Habitat and Distribution	Flower season	Conservation Status	Occurrence Probability
Mimulus exiguus San Bernardino Mountain monkeyflower	Annual; open, seasonally moist meadows, seeps, drainages, about 5900 - 7600 ft. elev.; San Bernardino Mtns. and high mtns of Baja Calif.	June - July	Fed: none Calif: S 2.2 CNPS: List 1B.2	High (suitable habitat occurs)
Mimulus purpureus Purple monkeyflower	Annual; meadow edges, forests, drainages, seeps, about 6200 - 7600 ft. elev.; San Bernardino Mtns and high mtns of Baja Calif.	May - July	Fed: none Calif: S 2.2 CNPS: List 1B.2	High (suitable habitat occurs)
Navarretia peninsularis Baja navarretia	Annual herb; open, seasonally wet places in coniferous forests, about 4900 -7600 ft. elev.; mtns of central and S Calif. and N Baja Calif.	June - August	Fed: none Calif: S2.2 CNPS: List 1B.2	Low (small patches of marginal habitat)
Oxytheca caryophylloides Chickweed oxytheca	Annual; sandy soils in conifer forests, 3900-8500 ft. elev.; S Sierra Nevada, Transverse Ranges, San Jacinto Mtns	July - Sept.	Fed: none Calif: S3.3 CNPS: List 4.3	High (suitable habitat occurs)
Perideridia parishii ssp. *parishii* Parish's yampah	Perennial herb; meadows, moist areas in conifer forest, about 4800 - 9900 ft. elev.; San Bernardino Mtns and (disjunct) AZ, Nevada, New Mexico	June - August	Fed: none Calif: S2.2? CNPS: List 2.2	Low - moderate (marginal habitat)
Phacelia exilis (*P. mohavensis* var. *exilis*) Transverse Range phacelia	Annual; sandy or gravelly soils, forest openings, meadows, pebble plains, about 3600 - 8900 ft. elev.; S Sierra Nevada and Transverse Ranges	May - August	Fed: none Calif: S 3.3 CNPS: List 4.3	High (suitable habitat occurs)
Phacelia mohavensis Mojave phacelia	Annual; sandy or gravelly soil; dry meadows and streambeds gen. within pine forest, about 4500-8100 ft. elev.; San Gabriel & San Bernardino Mtns.	April - August	Fed: none Calif: S 3.3 CNPS: List 4.3	High (suitable habitat occurs)
Phlox dolichantha Bear Valley phlox	Perennial herb; montane forest and pebble plains; about 6000 - 9800 ft. elev.; San Bernardino Mtns endemic	May - July	Fed: none Calif: S 2.2 CNPS: List 1B.2	High (suitable habitat occurs)
Poa atropurpurea San Bernardino bluegrass	Open, flat meadows, about 6700 - 7500 ft. elev. in the San Bernardinos; endemic to San Bernardino Mtns and San Diego Co. (Palomar and Laguna Mtns where it ranges down to about 4400 ft. elev.)	May - June	Fed: **END** Calif: S2.2 CNPS: List 1B.2	Low (habitat marginal at best)
Potentilla glandulosa ssp. *ewanii* Ewan's cinquefoil	Perennial herb; mesic conifer forest, about 6200-7900 ft. elev.; nearly endemic to San Gabriel Mtns., but also reported from Fawnskin area, San Bernardino Mtns.	June - July	Fed: none Calif: S 1.3 CNPS List 1B.3	Low (field survey)
Pyrrocoma uniflora ssp. *gossypina* (*Haplopappus uniflorus* ssp. *gossypinus*) Bear Valley pyrrocoma	Perennial herb; meadows (usually alkaline), pebble plains, about 5200 - 7600 ft. elev.; San Bernardino Mts endemic	July - August	Fed: none Calif: S2.2 CNPS: List 1B.2	Low - moderate (marginally suitable habitat occurs)

APPENDIX 2: Special status plants of the Big Bear Valley and surrounding mountains.

Special Status Plants	Habitat and Distribution	Flower season	Conservation Status	Occurrence Probability
Rupertia rigida (*Psoralea rigida*) Parish's rupertia	Perennial herb; chaparral, forests, and woodlands, about 2300-8200 ft. elev.; San Bernardino Mtns, Peninsular Ranges, Baja Calif.	June - July	Fed: none Calif: S3.3 CNPS: List 4.3	High (suitable habitat occurs)
Selaginella asprella Bluish spike-moss	Herb; rocks, crevices, & rocky soils, dry sites in conifer forests, about 5200-8800 ft. elev.; scattered mtn. ranges of cent. & S Calif., Baja Calif.	July	Fed: none Calif: S3.3 CNPS: List 4.3	Low (marginal habitat)
Senecio bernardinus (*Packera bernardinoa*) San Bernardino butterweed	Perennial herb; dry meadows (incl. alkaline), about 5900-7600 ft. elev.; San Bernardino Mtns endemic	May - July	Fed: none Calif: S 2.2 CNPS: List 1B.2	Low (marginally suitable habitat)
Senecio ionophyllus Tehachapi ragwort	Perennial herb; crevices, rocky places in dry conifer forest, about 4800-8900 ft. elev.; S Sierra Nevada, San Gabriel and San Bernardino Mtns	June - July	Fed: none Calif: S3.3 CNPS: List 4.3	Moderate (suitable habitat)
Sidalcea hickmanii ssp. *parishii* Parish's checkerbloom	Perennial herb; chaparral, oak shrubland or woodland, pine forest; San Bernardino Mtns. and a few Santa Barbara Co. sites, about 3200 - 6000 ft. elev.	June - August	Fed: none CA: **Rare** S 1.2 CNPS: List 1B.2	Minimal (marginal habitat, above elev. range)
Sidalcea pedata Bird's foot checkerbloom	Perennial herb; meadows (freshwater or alkaline clay), sometimes streambanks, about 5200-8200 ft. elev.; San Bernardino Mtns endemic	May - July	Fed: **END** Calif: **END**, 1.1 CNPS: List 1B.1	Low (habitat marginal at best)
Sphenopholis obtusata Prairie wedge grass	Perennial grass; riparian woodlands, meadows, streambanks; about 1000 - 6600 ft. elev.; few scattered locns in Calif. but widespread in N America	April - July	Fed: none Calif: S2.2 CNPS: List 2.2	Low (upper margin elev. range; poor habitat)
Streptanthus bernardinus Laguna Mountains jewelflower	Perennial herb; chaparral, hardwood & conifer forest, about 3900-8100 ft. elev.; mtns of S Calif. (gen. W half of San Bernardino Mtns)	June - July	Fed: none Calif: S 3.3 CNPS: List 4.3	Moderate (margin of geogr. range)
Streptanthus campestris Southern jewelflower	Perennial herb; shrublands, forests, woodlands, often rocky sites, about 2900 -7600 ft. elev.; Transverse and Peninsular Ranges, Baja Calif.	May - July	Fed: none Calif: S 2.3 CNPS: List 1B.3	High (suitable habitat occurs)
Swertia neglecta (*Frasera neglecta*) Pine green-gentian	Perennial herb; conifer forests and pinyon woodland., about 4600-8200 ft. elev.; S Coastal Ranges and Transverse Ranges	May - July	Fed: none Calif: S 3.3 CNPS: List 4.3	High (suitable habitat occurs)
Taraxacum californicum California dandelion	Perennial herb; wet meadows, about 5300 - 9200 ft. elev.; San Bernardino Mtns endemic	May - Aug	Fed: **END** Calif: S2.1 CNPS: List 1B.2	Low - moderate (suitable habitat occurs)

APPENDIX 2: Special status plants of the Big Bear Valley and surrounding mountains.

Special Status Plants	Habitat and Distribution	Flower season	Conservation Status	Occurrence Probability
Thelypodium stenopetalum Slender-petaled thelypodium	Perennial herb; meadows (mesic, usually alkaline clay), about 5200 - 8200 ft. elev.; endemic to Big Bear and Holcomb Valleys	May - Aug	Fed: **END** Calif: **END**, 1.1 CNPS: List 1B.1	Minimal (no alkaline meadow habitat)
Trichostema micranthum Small-flowered bluecurls	Annual; dry margins of lakes, meadows, and streams, 5000-7600 ft. elev., San Bernardino Mtns and Baja Calif.	July - Sept.	Fed: none Calif: S3.3 CNPS: List 4.3	High (suitable habitat occurs)
Viola pinetorum ssp. *grisea* Grey-leaved violet	Perennial herb; montane forests, about 4900 -11,200 ft. elev.; S Sierra Nevada and reported San Bernardino Mtns (CNPS but no other source)	April - July	Fed: none Calif: S 1.3 CNPS: List 1B.3	Low (suitable habitat occurs; may be outside geogr. range)

General references: CDFG 2007a, 2007b; CNPS 2007; Hickman (ed.) 1993; Munz 1974; Sanders et al. 1995; Tibor 2001, US Fish and Wildlife Service 2006.

Conservation Status

Federal designations: (federal Endangered Species Act, US Fish and Wildlife Service). Until 1996, FWS maintained a list of "category 2 candidates," described as species of concern, but with insufficient data to support listing. This list is no longer maintained and FWS has no "SOC" category.

- END: Federally listed, endangered.
- THR: Federally listed, threatened.
- Candidate: Sufficient data are available to support federal listing, but not yet listed.
- Proposed: Formally proposed for federal status shown.

State designations: (California Endangered Species Act, California Dept. of Fish and Game)

- END: State listed, endangered.
- THR: State listed, threatened.
- RARE: State listed as rare (applied only to certain plants).
- CSC: California species of special concern. Considered vulnerable to extinction due to declining numbers, limited geographic ranges, or ongoing threats.
- FP: Fully protected. May not be taken or possessed without permit from CDFG.

CDF&G Natural Diversity Data Base Designations: Applied to special status plants and sensitive plant communities; where correct category is uncertain, CDF&G uses two categories or question marks.

- S1: Fewer than 6 occurrences or fewer than 1000 individuals or less than 2000 acres.
- S1.1: Very threatened
- S1.2: Threatened
- S1.3: No current threats known
- S2: 6-20 occurrences or 1000-3000 individuals or 2000-10,000 acres (decimal suffixes same as above).
- S3: 21-100 occurrences or 3000-10,000 individuals or 10,000-50,000 acres (decimal suffixes same as above).
- S4: Apparently secure in California; this rank is clearly lower than S3 but factors exist to cause some concern, i.e., there is some threat or somewhat narrow habitat. No threat rank.
- S5: Demonstrably secure or ineradicable in California. No threat rank.
- SH: All California occurrences "historical" (i.e., no records in > 20 years).

APPENDIX 2: Special status plants of the Big Bear Valley and surrounding mountains.

California Native Plant Society (CNPS) designations. Note: According to CNPS (Tibor, ed., 2001 p. 54-55), plants on Lists 1A, 1B, and 2 meet definitions as threatened or endangered and "are eligible" for state listing. That interpretation of the state Endangered Species Act is not in general use.

List 1A: Plants presumed extinct in California.
List lB: Plants rare and endangered in California and throughout their range.
List 2: Plants rare, threatened or endangered in California but more common elsewhere in their range.
List 3: Plants about which we need more information; a review list.
List 4: Plants of limited distribution; a watch list.

CNPS Threat Rank:

.1 Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 Fairly endangered in California (20-80% occurrences threatened)
.3 Not very endangered in California (<20% of occurrences threatened or no current threats known)

Watch Lists: Several public and private conservation organizations maintain lists of wildlife species of concern. See CDFG 2007 introductory section for further explanations and references.
ABC: American Bird Conservancy Green List
Audubon: National Audubon Society Watch List
IUCN: World Conservation Union Species Survival Commission Red List

Definitions of occurrence probability: Estimated occurrence probabilities based literature sources cited earlier and field surveys and habitat analyses reported here.

Occurs: Observed on the site by qualified biologists.
Expected: Not observed or recorded on the site, but very likely present during at least a portion of the year.
High: Habitat is a type often utilized by the species and the site is within the known range of the species.
Moderate: Site is within the known range of the species and habitat on the site is a type occasionally used.
Low: Site is within the species' known range but habitat is rarely used, or the species was not found during focused surveys covering less than 100% of potential habitat or completed in marginal seasons.
Minimal: No suitable habitat on the site; or well outside the species' known elevational or geographic ranges; or a focused study covering 100% of all suitable habitat, completed during the appropriate season and during a year of appropriate rainfall, did not detect the species.
Unknown: No focused surveys have been performed in the region, and the species' distribution and habitat are poorly known.

Appendix 3:
Species List

Appendix 3: Species list

Latin Name	**Common Name**		
CUPRESSACEAE	CYPRESS FAMILY		
Calocedrus decurrens	Incense cedar	Occas. / forest	
Juniperus occidentalis	Western juniper	Comm. / forest	
PINACEAE	PINE FAMILY		
Abies concolor	White fir	Occas. / forest	
Pinus jeffreyi	Jeffrey pine	Comm. / forest	
Pinus monophylla	Pinyon pine	Occas. /forest	
APIACEAE	CELERY FAMILY		
Lomatium nevadense	Nevada lomatium	Uncomm. / forest	11669
Tauschia parishii	Parish tauschia	Scarce / open places	11668
ASTERACEAE	ASTER FAMILY		
Achillia millefolium	California yarrow	Comm. / esp. mesic sites	
Agoseris retrorsa	Spear-leaved agoseris	Occas. / throughout	
Antennaria dimorpha	Low everlasting	Comm. / pebble plains	
Artemisia dracunculus	Tarragon	Occas. / esp. near road, lakeshore	
Artemisia ludoviciana	Western mugwort	Occas. / open places, washes	
Artemisia tridentata	Great Basin sagebrush	Comm. / open forest	
Aster frondosus	Short-rayed alkali aster	Occas.-comm. / near shore	
Chrysothamnus nauseosus	Common rabbitbrush	Occas. / throughout	
Chrysothamnus viscidiflorus	Curlleaf rabbitbrush	Occas.-comm. / throughout	
Cirsium occidentale var. californicum	California thistle	Uncomm. / open sites	
* *Cirsium vulgare*	Bull thistle	Occas. / near shore	
Erigeron breweri	Brewer's daisy	Occas. / forest	
Erigeron divergens	Diffuse daisy	Comm. / gen. open places	11667
Eriophyllum confertiflorum	Golden yarrow	Comm. / ± throughout	
Gnaphalium canescens	Perennial cudweed	Uncomm. / gen. open places	
* *Gnaphalium luteo-album*	Pearly everlasting	Occas. / roadside, shoreline	
Hymenopappus filifolius	Columbia cutleaf	Uncomm. / open forest	
* *Lactuca serriola*	Prickly lettuce	Occas. / mostly roadside	
Lessingia filaginifolia (Corethrogyne filaginifolia)	Chaparral aster	Occas. / open forest	
Madia elegans	Elegant tarplant	Occas. / forest	
* *Senecio vulgaris*	Common groundsel	Uncomm. / gen. roadside	
Solidago californica	Calif. goldenrod	Occas. / mesic sites	
* *Sonchus oleraceus*	Common sow thistle	Occas. / near shore	
* *Taraxacum officinale*	Common dandelion	Occas. / roadside, shoreline	
Tetradymia comosa	Hairy horsebrush	Occas. / open forest	
* *Tragopogon dubius*	Oyster plant, salsify	Occas. / roadside, forest	
BORAGINACEAE	BORAGE FAMILY		
Cryptantha micrantha	Purple root cryptantha	Occas. / open places	
Cryptantha simulans	Popcorn flower	Scarce / open places	11670
BRASSICACEAE	MUSTARD FAMILY		
Arabis holboellii (?)	Holboell's rock-cress	Occas. / open forest	
** *Arabis parishii*	Parish's rock-cress	Occas. / pebble plains	11665
Caulanthus major	Slender wild-cabbage	Occas. / forest	
Descurainia incisa (D. richardsonii)	Mountain tansy mustard	Uncomm. / near road	

Alien species indicated by asterisk, special status species indicated by two asterisks. This list includes only species observed on the site. Others may have been overlooked or unidentifiable due to season. Plants were identified using keys, descriptions, and illustrations in Abrams (1923-1951), Hickman (1993), Munz (1974), and other regional references. Taxonomy and nomenclature generally follow Hickman. Some plants were collected as vouchers (see collection numbers at right) and will be donated to the Herbaria at Rancho Santa Ana Botanic Garden or UC Riverside.

Appendix 3: Species list

BRASSICACEAE, cont.			
Descurainia pinnata	Tansy mustard	Occas. / mostly open forest	
Erysiumum capitatum	Douglas wallflower	Occas. / ±throughout	
* *Lepidium virginicum v. pubescens*	Wild peppergrass	Occas. / mostly roadside, shoreline	
* *Sisymbrium altissimum*	Tumble mustard	Occas. / roadside	
CACTACEAE	CACTUS FAMILY		
Opuntia basilaris var. basilaris	Common beavertail cactus	Uncomm. / open forest	
CAPRIFOLIACEAE	HONEYSUCKLE FAMILY		
Symphoricarpos rotundifolius var. parishii	Parish snowberry	Occas. / shaded forest	
CARYOPHYLLACEAE	CARNATION FAMILY		
Silene verecunda ssp. platyota	Cuyamaca campion	Occas. / forest	
CHENOPODIACEAE	GOOSEFOOT FAMILY		
* *Chenopodium album (?)*	Common goosefoot	Occas. / throughout	
* *Salsola tragus*	Russian thistle, tumbleweed	Occas. / mostly roadside	
CONVOLVULACEAE	MORNING GLORY FAMILY		
Calystegia malacophylla ssp. fulcrata (C. fulcrata)	Morning glory	Occas. / throughout	
ERICACEAE	MANZANITA FAMILY		
Arctostaphylos patula	Greenleaf manzanita	Occas.-comm. / forest	
EUPHORBIACEAE	SPURGE FAMILY		
Chamaesyce albomarginata	Rattlesnake spurge	Occas. / open forest	
Euphorbia palmeri	Wood spurge	Occas. / uplands	
FABACEAE	PEA FAMILY		
Amorpha californica	Calif. false indigo	Occas. / mesic forest	
** *Astragalus leucolobus*	Bear Valley woollypod	Comm. / pebble plains	11705
Astragalus douglasii	Douglas rattleweed	Uncomm. / open places	
Lotus argyraeus	Silver lotus	Occas. / open forest	
Lotus nevadensis	Nevada lotus	Comm. / open places	
Lupinus cf. breweri	Silver mat lupine	Comm. / pebble plains, etc.	
Lupinus excubitus var. austromontanus	Southern mountain lupine	Occas. / ±throughout	11666
Lupinus lepidus v. confertus	Prairie lupine	Occas. / lakeshore	
* *Medicago lupulina*	Black medick	Uncomm. / near lakeshore	
* *Melilotus alba*	White sweet-clover	Occas.-comm. / roadsides, shore	
FAGACEAE	OAK FAMILY		
Quercus kelloggii	California black oak	Comm. / forest	
GERANIACEAE	GERANIUM FAMILY		
* *Erodium cicutarium*	Red-stemmed filaree	Occas.-comm. / roadsides, etc.	
HYDROPHYLLACEAE	WATERLEAF FAMILY		
Eridictyon trichocalyx	Yerba santa	Occas. / open forest	
Phacelia distans (?)	Common phacelia	Uncomm. / open forest	
Phacelia imbricata	Broad-sepaled phacelia	Uncomm. / open forest	
LAMIACEAE	MINT FAMILY		
Monardella linoides (?) (or M. odoratissima)	Flax-leaved monardella	Occas. / forest	
Scutellaria siphocampyloides (S. austinae)	Austin's skullcap	Uncomm. / mesic forest	
LOASACEAE	STICK-LEAF FAMILY		
Mentzelia sp.	Unid. stick-leaf	Uncomm. / uplands	11674
MALVACEAE	MALLOW FAMILY		
* *Malva parviflora*	Cheeseweed	Occas. / mostly lakeshore	
ONAGRACEAE	EVENING PRIMROSE FAMILY		
Clarkia sp.	Unid. annual clarkia	Uncomm. / shaded forest	

Appendix 3: Species list

ONAGRACEAE (cont.)			
Epilobium brachycarpum (E. paniculatum)	Summer cottonweed	Occas.-comm. upland margins	
Epilobium ciliatum	Willow-herb	Occas. / mostly lakeshore	
Gaypohytum sp.	Unid. gayophytum	Comm. / open forest	
POLEMONIACEAE	PHLOX FAMILY		
Gilia latiflora (?)	Broad-flowered gilia	Uncomm. / open forest	
Gilia modocensis	Modoc gilia	Occas. /open places	11,659
Eriastrum densifolium ssp. densifolium	Mojave woolly-star	Occas. / open forest	
Eriastrum sapphirinum	Sapphire woollystar	Occas. / open forest	
Linanthus breviculus	Mojave linanthus	Comm. / open forest	
Phlox gracilis	Slender phlox	Comm. / open places	11660
POLYGONACEAE	BUCKWHEAT FAMILY		
Eriogonum davidsonii (=E. molestum var. davidsonii)	Davidson buckwheat	Occas. / open forest	
** *Eriogonum kennedyi var. austromontanum*	Southern mountain buckwheat	Uncomm., pebble plain, intergrade w/ E. wrightii?	11760
Eriogonum wrightii ssp. subscaposum	Wright's buckwheat	Comm. & characteristic / pebble plains	
Eriogonum umbellatum v. munzii	Munz sulfur buckwheat	Occas. / open forest	
* *Polygonum arenastrum*	Common knotweed	Occas. / roadside, lake shore	
* *Rumex crispus*	Curly dock	Occas. / mostly lakeshore	
Rumex salicifolius	Willow dock	Uncomm. / near lakeshore	
PORTULACACEAE	PURSLANE FAMILY		
Lewisia rediviva	Bitter root	Occas.-comm. / pebble plains	
RANUNCULACEAE	BUTTERCUP FAMILY		
Delphinium parishii (?)	Parish larkspur	Occas. / forest	
* *Ranunculus sceleratus*	Cursed buttercup	Occas. / lakeshore	11656
RHAMNACEAE	BUCKTHORN FAMILY		
Ceanothus cordulatus	Mountain whitethorn	Occas. / open forest	
Ceanothus greggii	Cupleaf ceanothus	Uncomm. / open forest	
Ceanothus integerrimus	Deerbrush	Occas. / forest	
ROSACEAE	ROSE FAMILY		
Amelanchier utahensis	Service berry	Comm. / ± throughout	
Cercocarpus betuloides	Birch-leaf mountain mahogan	Uncomm.	
Cercocarpus ledifolius	Curlleaf mountain mahogany	Comm. / ± throughout	
Horkelia rydbergii (H. bolanderi s. parryi)	Transverse range horkelia	Occas. / mostly near lake	
** *Ivesia argyrocoma*	Silver-haired ivesia	locally comm. / pebble pl.	11658
Potentilla anserina	Silverweed	Comm. / lakeshore	
Potentilla biennis	Biennial cinquefoil	Comm. / lakeshore	11671
Potentilla gracilis	Slender cinquefoil	Occas. / mesic places	
Potentilla wheeleri	Wheeler cinquefoil	Scarce / near lakeshore	11673
RUBIACEAE	COFFEE FAMILY		
* *Galium aparine*	Goose grass	Uncomm. / shaded forest	
Galium parishii	Parish bedstraw	Occas. / forest	
SALICACEAE	WILLOW FAMILY		
Populus balsamifera trichocarpa	Black cottonwood	Seedlings only / lakeshore	
Salix laevigata (?)	Red willow	Uncomm. / lakeshore	
Salix lasiolepis (?)	Arroyo willow	Comm. / lakeshore	
SCROPHULARIACEAE	SNAPDRAGON FAMILY		
** *Castilleja cinera*	Ash-gray paintbrush	Localized / pebble plains	11657
** *Castilleja montigena (C. applegatei ssp. martinii)*	Heckerd's paintbrush	Occas. / forest	

Appendix 3: Species list

SCROPHULARIACEAE, cont.			
Collinsis parviflora	Small-flowered blue-eyed Mar	Comm., patchy / peb. pl.	11661
Limosella acaulis	Mudwort	Comm.-abund. / wet lakeshoi	11655
Mimulus guttatus	Seep monkeyflower	Occas. / lakeshore	
Pedicularis semibarbata	Pine-woods lousewort	Occas. / forest	11664
Penstemon eatonii	Eaton firecracker	Occas. / forest	
* *Verbascum thapsus*	Common muellin	Occas. / throughout	
SOLANACEAE	NIGHTSHADE FAMILY		
Solanum xanti	Chaparral nightshade	Uncomm. / forest	
STERCULIACEAE	CACAO FAMILY		
Fremontodendron californicum	Flannel bush	Occas.-comm. / open forest	
TAMARICACEAE	TAMARISK FAMILY		
Tamarix ramosissima	Mediterranean tamarisk	Occas. / lakeshore	
URTICACEAE	NETTLE FAMILY		
Urtica dioica ssp. holosericea	Stinging nettle	Occas. / lakeshore	
VIOLACEAE	VIOLET FAMILY		
Viola douglasii	Douglas violet	Occas. / pebble plains	11663
Viola purpurea	Mountain violet	Occas. / throughout	11662
VISCACEAE	MISTLETOE FAMILY		
Arceuthobium campylopodum	Dwarf mistletoe	Uncomm. / on yellow pines	
CYPERACEAE	SEDGE FAMILY		
Carex athrostachya	Slender-beaked sedge	Occas. / near lake	
Carex sp.	Unid. sedge	Uncomm. / near lakeshore	11671
JUNCACEAE	RUSH FAMILY		
Juncus arcticus (incl. vars. balticus and mexicanus)	Wire-grass	Occas.-comm. / mesic areas	
LILIACEAE	LILY FAMILY		
Allium parryi	Parry's onion	Occas. / mostly pebble plains	
Calochortus kennedyi	Kennedy's mariposa lily	Uncomm. / open forest	
POACEAE	GRASS FAMILY		
Agrostis sp.	Unid. bentgrass	Occas. / lakeshore	
Alopecurus aequalis	Short-awn foxtail	Comm., patchy / near shore	
Bromus carinatus	California brome	Occas. / uplands, ±throughout	
Bromus orcuttianus (?)	Orcutt brome	Uncomm. / mesic forest	
* *Bromus tectorum*	Cheat grass	Comm. / ± throughout	
Elymus elymoides (Sitanion hystrix v. hystrix)	Bottlebrush squirreltail	Occas. / ±throughout	
Elymus glaucus	Blue wild-rye	Occas. / ± throughout	
Hordeum jubatum	Foxtail barley	Uncomm. / mostly near lake	
* *Koeleria macrantha*	Junegrass	Occas. / mesic forest, uplands	
Melica stricta	Nodding melic	Uncomm. patchy, uplands	
Muhlenbergia rigens	Deergrass	Occas. / throughout	
Poa fendleriana	Fendler bluegrass	Occas.-comm. / forest	
Poa secunda	Nodding bluegrass	Comm. / ± throughout	
* *Polypogon monspeliensis*	Rabbitfoot grass	Occas.-comm. / near shore	
Pucinellia nuttalliana	Alkali grass	Uncomm. / low-lying mesic site	
Stipa coronata ssp. depauperata (Achnatherum parishii)	Parish needlegrass	Occas. / mostly open forest	
Stipa lettermannii	Letterman's needlegrass	Occas. / forest	
Vulpia microstachys (Festuca microstachys, F. reflexa, F. pacifica, F. confusa)	Annual fescue	Uncomm. patchy / upland	

Attachment 1:
California Natural Diversity Data Base Query Results

California Department of Fish and Game
Natural Diversity Database
Selected Elements by Scientific Name - Portrait
USGS 7½' quads: Fawnskin, Big Bear City, Big Bear Lake, Butler Pk, Keller Peak, and Moonridge

Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1 ***Accipiter cooperii*** Cooper's hawk	ABNKC12040			G5	S3	SC
2 ***Antennaria marginata*** white-margined everlasting	PDAST0H1G0			G4G5	S1.3	2.3
3 ***Arabis dispar*** pinyon rock cress	PDBRA060F0			G3	S2.3	2.3
4 ***Arabis parishii*** Parish's rock cress	PDBRA061C0			G2	S2.1	1B.2
5 ***Arabis shockleyi*** Shockley's rock cress	PDBRA061V0			G3	S2.2	2.2
6 ***Arenaria lanuginosa ssp. saxosa*** rock sandwort	PDCAR040E4			G5T5	S1.3	2.3
7 ***Arenaria ursina*** Big Bear Valley sandwort	PDCAR040R0	Threatened		G2	S2.1	1B.2
8 ***Astragalus albens*** Cushenbury milk-vetch	PDFAB0F0A0	Endangered		G1	S1.1	1B.1
9 ***Astragalus lentiginosus var. sierrae*** Big Bear Valley milk-vetch	PDFAB0FB9L			G5T1	S1?	1B.2
10 ***Astragalus leucolobus*** Big Bear Valley woollypod	PDFAB0F4T0			G2	S2.2	1B.2
11 ***Astragalus tricarinatus*** triple-ribbed milk-vetch	PDFAB0F920	Endangered		G1	S1.2	1B.2
12 ***Atriplex parishii*** Parish's brittlescale	PDCHE041D0			G1G2	S1.1	1B.1
13 ***Botrychium crenulatum*** scalloped moonwort	PPOPH010L0			G3	S2.2	2.2
14 ***Calochortus palmeri var. palmeri*** Palmer's mariposa lily	PMLIL0D122			G2T2	S2.1	1B.2
15 ***Calochortus plummerae*** Plummer's mariposa lily	PMLIL0D150			G3	S3.2	1B.2
16 ***Calochortus striatus*** alkali mariposa lily	PMLIL0D190			G2	S2.2	1B.2
17 ***Castilleja cinerea*** ash-gray Indian paintbrush	PDSCR0D0H0	Threatened		G2	S2.2	1B.2
18 ***Castilleja lasiorhyncha*** San Bernardino Mountains owl's-clover	PDSCR0D410			G2	S2.2	1B.2
19 ***Chaetodipus fallax pallidus*** pallid San Diego pocket mouse	AMAFD05032			G5T3	S3	SC
20 ***Charina trivirgata*** rosy boa	ARADA02010			G4G5	S3S4	
21 ***Charina umbratica*** southern rubber boa	ARADA01011		Threatened	G5T2T3	S2S3	
22 ***Corynorhinus townsendii*** Townsend's big-eared bat	AMACC08010			G4T3T4	S2S3	SC
23 ***Dryopteris filix-mas*** male fern	PPDRY0A0B0			G5	S1.3	2.3

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
24	***Dudleya abramsii ssp. affinis*** San Bernardino Mountains dudleya	PDCRA04013			G3T2	S2.2	1B.2
25	***Empidonax traillii extimus*** southwestern willow flycatcher	ABPAE33043	Endangered	Endangered	G5T1T2	S1	
26	***Erigeron parishii*** Parish's daisy	PDAST3M310	Threatened		G2	S2.1	1B.1
27	***Eriogonum kennedyi var. austromontanum*** southern mountain buckwheat	PDPGN083B2	Threatened		G4T2	S2.2	1B.2
28	***Eriogonum microthecum var. lacus-ursi*** Bear Lake buckwheat	PDPGN083WF			G5T1	S1.1	1B.1
29	***Eriogonum ovalifolium var. vineum*** Cushenbury buckwheat	PDPGN084F8	Endangered		G5T1	S1.1	1B.1
30	***Euchloe hyantis andrewsi*** Andrew's marble butterfly	IILEPA5032			G3G4T1	S1	
31	***Gasterosteus aculeatus williamsoni*** unarmored threespine stickleback	AFCPA03011	Endangered	Endangered	G5T1	S1	
32	***Gentiana fremontii*** moss gentian	PDGEN060Y0			G4	S2.3	2.3
33	***Gila orcuttii*** arroyo chub	AFCJB13120			G2	S2	SC
34	***Gilia leptantha ssp. leptantha*** San Bernardino gilia	PDPLM040W1			G4T2	S2.3	1B.3
35	***Glaucomys sabrinus californicus*** San Bernardino flying squirrel	AMAFB09021			G5T2T3	S2S3	SC
36	***Haliaeetus leucocephalus*** bald eagle	ABNKC10010	Threatened	Endangered	G5	S2	
37	***Helianthus nuttallii ssp. parishii*** Los Angeles sunflower	PDAST4N102			G5TH	S1.1	1A
38	***Heuchera parishii*** Parish's alumroot	PDSAX0E0S0			G2	S2.3	1B.3
39	***Horkelia wilderae*** Barton Flats horkelia	PDROS0W0J0			G1	S1.1	1B.1
40	***Hydroporus simplex*** simple hydroporus diving beetle	IICOL55050			G1?	S1?	
41	***Icteria virens*** yellow-breasted chat	ABPBX24010			G5	S3	SC
42	***Ivesia argyrocoma*** silver-haired ivesia	PDROS0X020			G2	S2.2	1B.2
43	***Lampropeltis zonata (parvirubra)*** California mountain kingsnake (San Bernardino population)	ARADB19062			G4G5	S2?	SC
44	***Lesquerella kingii ssp. bernardina*** San Bernardino Mountains bladderpod	PDBRA1N0W1	Endangered		G5T1	S1.1	1B.1
45	***Lewisia brachycalyx*** short-sepaled lewisia	PDPOR04010			G4G5	S3.2	2.2
46	***Lilium parryi*** lemon lily	PMLIL1A0J0			G3	S2.1	1B.2

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
47	***Linanthus killipii*** Baldwin Lake linanthus	PDPLM090N0			G2	S2.1	1B.2
48	***Malaxis monophyllos ssp. brachypoda*** adder's-mouth	PMORC1R010			G4?T4	S1.1	2.1
49	***Mimulus exiguus*** San Bernardino Mountains monkeyflower	PDSCR1B140			G2	S2.2	1B.2
50	***Mimulus purpureus*** purple monkeyflower	PDSCR1B2B0			G2	S2.2	1B.2
51	***Myotis evotis*** long-eared myotis	AMACC01070			G5	S4?	
52	***Myotis thysanodes*** fringed myotis	AMACC01090			G4G5	S4	
53	***Myotis volans*** long-legged myotis	AMACC01110			G5	S4?	
54	***Navarretia peninsularis*** Baja navarretia	PDPLM0C0L0			G3?	S2.2	1B.2
55	***Neotamias speciosus speciosus*** Lodgepole chipmunk	AMAFB02172			G4T2T3	S2S3	
56	***Oxytheca parishii var. cienegensis*** Cienega Seca oxytheca	PDPGN0J042			G4?T1	S1.3	1B.3
57	***Oxytheca parishii var. goodmaniana*** Cushenbury oxytheca	PDPGN0J043	Endangered		G4?T1	S1.1	1B.1
58	***Pebble Plains***	CTT47000CA			G1	S1.1	
59	***Perideridia parishii ssp. parishii*** Parish's yampah	PDAPI1N0C2			G4T3T4	S2.2?	2.2
60	***Phlox dolichantha*** Big Bear Valley phlox	PDPLM0D0P0			G2	S2.2	1B.2
61	***Phrynosoma coronatum (blainvillii*** Coast (San Diego) horned lizard	ARACF12021			G4G5	S3S4	SC
62	***Piranga rubra*** summer tanager	ABPBX45030			G5	S2	SC
63	***Poa atropurpurea*** San Bernardino blue grass	PMPOA4Z0A0	Endangered		G2	S2.2	1B.2
64	***Poliomintha incana*** frosted mint	PDLAM1L020			G5	SH	1A
65	***Populus angustifolia*** narrow-leaved cottonwood	PDSAL01020			G5	S2S3	2.2
66	***Potentilla glandulosa ssp. ewanii*** Ewan's cinquefoil	PDROS1B0S3			G5T1	S1.3	1B.3
67	***Psychomastax deserticola*** desert monkey grasshopper	IIORT15010			G1G2	S1S2	
68	***Pyrrocoma uniflora var. gossypina*** Bear Valley pyrrocoma	PDASTDT0K1			G5T2	S2.2	1B.2
69	***Rana muscosa*** mountain yellow-legged frog	AAABH01140	Endangered		G2	S2	SC

	Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
70	***Saltugilia latimeri*** Latimer's woodland-gilia	PDPLM0H010			G2	S2.2	1B.2
71	***Senecio bernardinus*** San Bernardino ragwort	PDAST8H0E0			G2	S2.2	1B.2
72	***Sidalcea hickmanii ssp. parishii*** Parish's checkerbloom	PDMAL110A3	Candidate	Rare	G3T1	S1.2	1B.2
73	***Sidalcea pedata*** bird-foot checkerbloom	PDMAL110L0	Endangered	Endangered	G1	S1.1	1B.1
74	***Southern California Threespine Stickleback Stream***	CARE2320CA			G?	S?	
75	***Sphenopholis obtusata*** prairie wedge grass	PMPOA5T030			G5	S2.2	2.2
76	***Streptanthus campestris*** southern jewel-flower	PDBRA2G0B0			G2	S2.3	1B.3
77	***Symphyotrichum defoliatum*** San Bernardino aster	PDASTE80C0			G3	S3.2	1B.2
78	***Taraxacum californicum*** California dandelion	PDAST93050	Endangered		G2	S2.1	1B.2
79	***Thamnophis hammondii*** two-striped garter snake	ARADB36160			G3	S2	SC
80	***Thelypodium stenopetalum*** slender-petaled thelypodium	PDBRA2N0F0	Endangered	Endangered	G1	S1.1	1B.1

Attachment 2:
California Natural Diversity Data Base Forms

California Native Species Field Survey Form

Mail to:
Natural Diversity Database
California Dept. of Fish & Game
1416 Ninth Street, 12th Floor
Sacramento, CA 95814

For office use only

Source Code		Quad Code	
Elm Code		Occ #	
Copy to		Map Index #	

Date of Field Work (*Month – Day – Year*) *April 30 2007*

Scientific Name : *Arenaria ursina*

Common Name :

Species Found?	Yes	No	*If not, why?*	*Total Number of Individuals:*
		XX	Drought? Vehicle disturbance?	

Is this an existing NDDB occurrence?	Yes	*Occurrence #*	No		**Is this a Subsequent Visit?**	Yes	No	*#s of individuals since last visit* More ?	Fewer ?	Same ?
	XX	23			Also not seen in 2002, also a drought year	XX				xx

Collected?	no	*Coll. #,Museum/Herbarium:*
	xx	

Reporter: Scott D. White
Address: Scott White Biological Consulting, 201 North First Ave., No. 102, Upland, Calif. 91786
Phone: (909) 949-2686
E-mail: scottbioservices@earthlink.net

Plant Phenology Information

dormant %	*sterile* %	*senescent* %
budding %	*flowering* %	*fruiting* %

Animal Information

Age Structure:	# of adults	# of juveniles	# of unknown		
Wintering	*Foraging*	*Breeding*	*Roosting*	*Burrow site*	*Other*

Location: (*please attach map*)
San Bernardino Mtns., just north of Big Bear Lake near community of Fawnskin at former "Moon Camp" site.

County:	**Quad Name:**	**Landowner:**	
San Bernardino Co.	Fawnskin	private	
Elevation: 6800-6900 ft	*Township* 2N	*Range* 1W	*Section (s)* 13 (N half)
Latitude: Ca. 34°16' N	*Longitude:* Ca. 116°56' W		
UTM Data *Zone*	*Datum*	*Source*	*Accuracy*
X coordinate (E)	*Y coordinate (N)*		

Habitat Description: (*plant communities, dominants, associates, substrates/soils, aspects/slope*)
Pebble plain surrounded by arid Jeffrey pine forest.
Other rare species? Arabis parishii, Astragalus leucolobus, Ivesia argyrocoma, Castilleja cinerea, "C. montigena,"

Site Information

Current/surrounding land use: Vacant, short distance S of residential development, short distance N of well-used highway
Visible Disturbances; possible threats: Significant vehicle damage to habitat; site proposed for development

Overall site quality: ??	*Excellent*	*Good*	*Fair*	*Poor*

Comments:

Determination method:	*Photographs:*	Slides	Prints	Digital
[] *Keyed in a site reference:*	*Organism*			
[] *Compared with other specimen*	*Habitat*			
[] *Compared with photo/sketch*	*Diagnostic Features*			
[] *By knowledgeable individual*	*Other*			
[] *Other method:*	*Permission to duplicate*	yes []	no []	

California Native Species Field Survey Form

Mail to:
Natural Diversity Database
California Dept. of Fish & Game
1416 Ninth Street, 12th Floor
Sacramento, CA 95814

For office use only

Source Code		Quad Code	
Elm Code		Occ #	
Copy to		Map Index #	

Date of Field Work (*Month – Day – Year*) *April 30 2007*

Scientific Name : *Arabis parishii*

Common Name :

Species Found?	Yes	No	*If not, why?*	*Total Number of Individuals:*
	xx			Uncommon on pebble plains

Is this an existing NDDB occurrence?	Yes	*Occurrence #*	No		**Is this a Subsequent Visit?**	Yes	No	*#s of individuals since last visit*		
	xx	32			Not seen in 2002			*More ?*	*Fewer ?*	*Same ?*
								xx		

Collected?	Yes	*Coll. #,Museum/Herbarium:*
	xx	11665 / RSA

Reporter:	Scott D. White
Address:	Scott White Biological Consulting 201 North First Ave., No. 102 Upland, Calif. 91786
Phone: **E-mail:**	(909) 949-2686 / scottbioservices@earthlink.net

Plant Phenology Information

dormant %	*sterile* %	*senescent* %
budding %	*flowering* xx %	*fruiting* %

Animal Information

Age Structure:	*# of adults*	*# of juveniles*	*# of unknown*		
Wintering	*Foraging*	*Breeding*	*Roosting*	*Burrow site*	*Other*

Location: *(please attach map)*
San Bernardino Mtns., just north of Big Bear Lake near community of Fawnskin at former "Moon Camp" site

County:	**Quad Name:**	**Landowner:**	
San Bernardino Co.	Fawnskin	private	
Elevation:	*Township* / *Range* / *Section (s)*	*Latitude:*	*Longitude:*
6800-6900 ft	2N / 1W / 13 (N half)	Ca. 34°16' N	Ca. 116°56' W
UTM Data *Zone* / *Datum* / *Source* / *Accuracy*		*X coordinate (E)*	*Y coordinate (N)*

Habitat Description: *(plant communities, dominants, associates, substrates/soils, aspects/slope)*
Pebble plain surrounded by arid Jeffrey pine forest.
Other rare species? Arabis parishii, Astragalus leucolobus, Ivesia argyrocoma, Castilleja cinerea, "C. montigena,"

Site Information

Current/surrounding land use: Vacant, short distance S of residential development, short distance N of well-used highway
Visible Disturbances; possible threats: Significant vehicle damage to habitat; site proposed for development

Overall site quality: ?? / *Excellent* / *Good* / *Fair* / *Poor*

Comments:

Determination method:	*Photographs:*	Slides	Prints	Digital
[x] *Keyed in a site reference:*	*Organism*			
[x] *Compared with other specimen*	*Habitat*			
[] *Compared with photo/sketch*	*Diagnostic Features*			
[x] *By knowledgeable individual*	*Other*			
[] *Other method:*	*Permission to duplicate*	yes []	no []	

California Native Species Field Survey Form

Mail to:
Natural Diversity Database
California Dept. of Fish & Game
1416 Ninth Street, 12th Floor
Sacramento, CA 95814

For office use only
Source Code _____ Quad Code _____
Elm Code _____ Occ # _____
Copy to _____ Map Index # _____

Date of Field Work (*Month – Day – Year*) *April 30 2007*

Scientific Name : *Ivesia argyrocoma*
Common Name :

Species Found?	Yes	No	If not, why?	Total Number of Individuals:
	xx			Common on pebble plains

Is this an existing NDDB occurrence?	Yes	Occurrence #	No		Is this a Subsequent Visit?	Yes	No	#s of individuals since last visit: More ?	Fewer ?	Same ?
	xx	24			Also noted in 02	xx				xx

Collected?	Yes	Coll. #,Museum/Herbarium:
	xx	11658 / RSA

Reporter: Scott D. White
Address: Scott White Biological Consulting
201 North First Ave., No. 102
Upland, Calif. 91786
Phone: (909) 949-2686 / scottbioservices@earthlink.net
E-mail: scottbioservices@earthlink.net

Plant Phenology Information

dormant	sterile	senescent
%	%	%
budding	flowering	fruiting
%	%	%

Animal Information

Age Structure:	# of adults	# of juveniles	# of unknown

Wintering	Foraging	Breeding	Roosting	Burrow site	Other

Location: (*please attach map*)
San Bernardino Mtns., just north of Big Bear Lake near community of Fawnskin at former "Moon Camp" site

County:	Quad Name:	Landowner:
San Bernardino Co.	Fawnskin	private

Elevation:	Township	Range	Section (s)	Latitude:	Longitude:
6800-6900 ft	2N	1W	13 (N half)	Ca. 34°16' N	Ca. 116°56' W

UTM Data	Zone	Datum	Source	Accuracy	X coordinate (E)	Y coordinate (N)

Habitat Description: (*plant communities, dominants, associates, substrates/soils, aspects/slope*)
Pebble plain surrounded by arid Jeffrey pine forest.
Other rare species? Arabis parishii, Astragalus leucolobus, Ivesia argyrocoma, Castilleja cinerea, "C. montigena,"

Site Information

Current/surrounding land use: Vacant, short distance S of residential development, short distance N of well-used highway
Visible Disturbances; possible threats: Significant vehicle damage to habitat; site proposed for development

Overall site quality: ??	Excellent	Good	Fair	Poor

Comments:

Determination method:	Photographs:	Slides	Prints	Digital
[x] Keyed in a site reference:	Organism			
[] Compared with other specimen	Habitat			
[] Compared with photo/sketch	Diagnostic Features			
[x] By knowledgeable individual	Other			
[] Other method:	Permission to duplicate	yes []	no []	

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Copy to _____ Map Index # _____

Date of Field Work (*Month – Day – Year*) *April 30 2007*

Scientific Name : *Astragalus leucolobus*
Common Name :

Species Found?	Yes	No	*If not, why?*	*Total Number of Individuals:*
	xx			Occasional to common on pebble plains

Is this an existing NDDB occurrence?	Yes	*Occurrence #*	No		***Is this a Subsequent Visit?***	Yes	No	*#s of individuals since last visit*		
			xx		Also noted in 02	xx		*More ?*	*Fewer ?*	*Same ?* xx

Collected?	Yes	*Coll. #,Museum/Herbarium:*
	xx	11705

Reporter:	Scott D. White
Address:	Scott White Biological Consulting 201 North First Ave., No. 102 Upland, Calif. 91786
Phone: / ***E-mail:***	(909) 949-2686 / scottbioservices@earthlink.net

Plant Phenology Information

dormant %	*sterile* %	*senescent* %
budding %	*flowering* %	*fruiting* %

Animal Information

Age Structure:	*# of adults*	*# of juveniles*	*# of unknown*		
Wintering	*Foraging*	*Breeding*	*Roosting*	*Burrow site*	*Other*

Location: (*please attach map*)
San Bernardino Mtns., just north of Big Bear Lake near community of Fawnskin at former "Moon Camp" site

County:	***Quad Name:***	***Landowner:***	
San Bernardino Co.	Fawnskin	private	
Elevation:	*Township* / *Range* / *Section (s)*	*Latitude:*	*Longitude:*
6800-6900 ft	2N / 1W / 13 (N half)	Ca. 34°16' N	Ca. 116°56' W
UTM Data *Zone* / *Datum* / *Source* / *Accuracy*		*X coordinate (E)*	*Y coordinate (N)*

Habitat Description: (*plant communities, dominants, associates, substrates/soils, aspects/slope*)
Pebble plain surrounded by arid Jeffrey pine forest.
Other rare species? Arabis parishii, Astragalus leucolobus, Ivesia argyrocoma, Castilleja cinerea, "C. montigena,"

Site Information

Current/surrounding land use: Vacant, short distance S of residential development, short distance N of well-used highway
Visible Disturbances; possible threats: Significant vehicle damage to habitat; site proposed for development

Overall site quality: ??	*Excellent*	*Good*	*Fair*	*Poor*
Comments:				

Determination method:	*Photographs:*	Slides	Prints	Digital
[x] *Keyed in a site reference:*	*Organism*			
[x] *Compared with other specimen*	*Habitat*			
[] *Compared with photo/sketch*	*Diagnostic Features*			
[x] *By knowledgeable individual*	*Other*			
[] *Other method:*	*Permission to duplicate*	yes []	no []	