Table 5.8-2 – Continued
Special Status Plant Species Potentially Occurring Within the Project Region

Species	Status[1]			Likelihood for Occurrence
	USFWS	CDFG	CNPS	
Dudleya abramsii ssp. *affinis* San Bernardino Mountains dudleya	—	—	1B	Moderate; marginally suitable habitat
Erigeron breweri var. *jacinteus* San Jacinto Mountains daisy	—	—	4	None; below known elevation range
Erigeron parishii Parish's daisy	FT	—	1B	None; no suitable habitat (carbonate soils)
Erigeron unicaulis Limestone daisy	—	—	2	None; outside known geographic range (local reports erroneous)
Eriogonum foliosum Leafy buckwheat	—	—	1B	High; suitable habitat
Eriogonum kennedyi var. *austromontanum* Southern mountain buckwheat	FT	—	1B	Low; suitable habitat (see text)
Eriogonum ovalifolium var. *vineum* Cushenbury buckwheat	FE	—	1B	None; no suitable habitat (carbonate soils)
Eriophyllum lanatum var. obovatum Southern Sierra wooly sunflower	—	—	4	Low; margin of known geographic range
Fimbristylis thermalis Hot springs fimbristylis	—	—	4	None; no suitable habitat (alkaline meadows, hot springs)
Galium jepsonii Jepson's bedstraw	—	—	4	High; suitable habitat
Galium johnsttonii Johnston's bedstraw	—	—	4	High; suitable habitat
Gentiana fremontii Moss gentian	—	—	2	None; below known elevation range
Gilia leptantha ssp. *leptantha* San Bernardino Mountains gilia	—	—	1B	Low (see text)
Helianthus nuttalli ssp. *parishii* Los Angeles sunflower	—	—	1A	None; presumed extinct, above known elevation range
Heuchura hirsutissima Shaggy-haired alum root	—	—	1B	Low; limited suitable habitat
Heuchura parishii Parish's alumroot	—	—	1B	Low; limited suitable habitat
Horkelia wilderae Barton Flats horkelia	—	—	1B	None; outside known geographic range, endemic to Barton Flats area
Hulsea vestita ssp. *parryi* Parry's sunflower	—	—	4	None; outside known geographic range (only occurs on desert-facing slopes)
Hulsea vestita ssp. *pygmaea* Pygmy hulsea	—	—	1B	None; below elevation range
Ivesia argyrocoma Silver-haired ivesia	—	—	1B	Observed
Juncus duranii Duran's rush	—	—	4	High; suitable habitat
Lesquerella kingii var. *bernardina* San Bernardino Mountains bladderpod	FE	—	1B	None; no suitable habitat (carbonate soils)

Table 5.8-2 – Continued
Special Status Plant Species Potentially Occurring Within the Project Region

Species	Status[1]			Likelihood for Occurrence
	USFWS	CDFG	CNPS	
Lewisia brachycalyx Short-sepaled lewisia	—	—	2	Moderate; limited suitable habitat
Lilium humbodtii ssp. *ocellatum* *Ocellated Humboldt lily*	—	—	4	None; above known elevation range
Lillium parryi Lemon lily	—	—	1B	Low; limited suitable habitat
Linanthus killipii Baldwin Lake linanthus	—	—	1B	High; suitable habitat
Malaxiis monohyllos ssp. *brachypoda* Adder's mouth	—	—	2	None; below known elevation range
Mimulus exiguus San Bernardino Mountain monkeyflower	—	—	1B	High; suitable habitat
Mimulus purpureus var. *purpureus* Purple monkeyflower	—	—	2	High; suitable habitat
Monardella macrantha ssp. *hallii* Hall's monardella	—	—	1B	None; outside known geographic range
Navarretia peninsularis Baja navarretia	—	—	1B	Low; limited suitable habitat
Oxytheca caryophylloides Chickweed oxytheca	—	—	4	High; suitable habitat
Oxytheca parishii var. *cienegensis* Cienega seca oxytheca	—	—	1B	None; outside known geographic range
Oxytheca parishii var. *goodmaniana* Cushenbury oxytheca	FE	—	1B	None; no suitable habitat (carbonate soils)
Oxytropis oreophila Mountain oxytrope	—	—	2	None; below known elevation range
Perideridia parishii ssp. *parishii* Parish's yampah	—	—	2	High; suitable habitat
Phacelia exilis Transverse Range phacelia	—	—	4	High; suitable habitat
Phacelia mohavensis Mojave phacelia	—	—	4	High; suitable habitat
Phlox dolichantha Bear Valley phlox	—	—	1B	High; suitable habitat
Poa atropurpurea San Bernardino bluegrass	FE	—	1B	High; suitable habitat
Poliomintha incana Frosted mint	—	—	1A	None; no suitable habitat (dunes and sandy flats), above known elevation range
Polystichum kruckebergii Krukeberg's sword fern	—	—	4	None; limited suitable habitat, outside known geographic distribution
Populus angustifolia Narrow-leaved cottonwood	—	—	2	None; outside known geographic range

Table 5.8-2 – Continued
Special Status Plant Species Potentially Occurring Within the Project Region

Species	Status[1]			Likelihood for Occurrence
	USFWS	CDFG	CNPS	
Pyrrocoma uniflora ssp. *gossypina* Bear Valley pyrrocoma	—	—	1B	High; suitable habitat
Rupertia rigida Parish's rupertia	—	—	4	High; suitable habitat
Scutellaria bolanderi ssp. *austromntanum* Southern mountain skullcap	—	—	1B	None, outside known geographic range, above known elevation range
Sedum niveum Davidson's stonecrop	—	—	4	None; no suitable habitat (rock ledges and cliffs)
Selaginella asprella Bluish spike-moss	—	—	4	Low; limited suitable habitat
Senecio bernardinus San Bernardino butterweed	—	—	1B	Low; limited suitable habitat
Senecio ionophyllus Tehachapi ragwort	—	—	4	Low; limited suitable habitat
Sidalcea hickmanii ssp. *parishii* Parish's checkerbloom	C	R	1B	Low; limited suitable habitat
Sidalcea pedata Bird's foot checkerbloom	FE	SE	1B	Low to moderate (see text); suitable habitat
Sphenopholis obtusata Prairie wedge grass	—	—	2	High; suitable habitat
Streptanthus bernardinus Laguna Mountains jewelflower	—	—	4	High; suitable habitat
Streptanthus campestris Southern jewelflower	—	—	1B	High; suitable habitat
Swertia neglecta Pine green-gentian	—	—	4	High; suitable habitat
Taraxacum californicum California dandelion	FE	—	1B	Low to moderate (see text); suitable habitat
Thelypodium stenopetalum Slender-petaled thelypodium	FE	—	1B	None; no suitable habitat (alkaline meadows)
Trichostema micranthum Small-flowered bluecurls	—	—	4	High; suitable habitat
Viola pinetorum ssp. *grisea* Grey-leaved violet	—	—	1B	Low; outside known geographic range

STATUS DEFINITIONS

USFWS

FE: Species designated as endangered under the federal Endangered Species Act. Endangered = "any species in danger of extinction throughout all or a significant portion of its range."

FT: Species designated as threatened under the Federal Endangered Species Act. Threatened = "species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."

FPE: Proposed for federal listing as Endangered.

FPT: Proposed for federal listing as Threatened.

C: Candidate for federal listing as Threatened or Endangered.

SOC: Species of Concern

CDFG

ST: Threatened = "a species that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by this Act" (California Endangered Species Act).

SE: Endangered = "a species is endangered when its prospects of survival and reproduction are in immediate jeopardy from one or more causes."

R: Rare

CNPS

1A Plants Presumed Extinct in California

1B Plants Rare, Threatened, or Endangered in California and Elsewhere

2 Plants Rare, Threatened, or Endangered in California But More Common Elsewhere

3 Plants About Which We Need More Information- A Review List

4 Plants of Limited Distribution - A Watch List

Table 5.8-3
Special Status Wildlife Species Potentially Occurring Within the Project Region

Species	Status[1]		Likelihood for Occurrence
	USFWS	CDFG	
Invertebrates			
Euchloe hyantis ssp. *andrewsi* Andrews' marble butterfly	SOC	—	Low; above known elevation range, limited suitable habitat
Amphibians			
Ensatina escholtzii croceater Yellow-blotched salamander	SOC	SSC	Low; limited marginally suitable habitat
Ensatina escholtzii klauberi Large-blotched salamander	SOC	SSC	None; above known elevation range, outside known geographic range
Rana muscosa Mountain yellow-legged frog	FPE	SSC	None; no suitable habitat
Scaphiopus hamondii Western spadefoot toad	SOC	SSC	None; above known elevation range
Taricha torosa torosa Coast range newt	SOC	SSC	None; no suitable habitat, above known elevation range
Reptiles			
Anniella pulchra pulchra Silvery legless lizard	SOC	SSC	Low; above known elevation range
Charina bottae umbricata Southern rubber boa	SOC	ST	Low; limited suitable habitat
Cnemidophorus tigris multiscutatus Coastal western whiptail	SOC	—	Moderate; suitable habitat
Coleonyx variegatus abbotti San Diego banded gecko	SOC	—	None; above known elevation range, no suitable habitat
Diadophis punctatus modestus San Bernardino ringneck snake	SOC	—	Low; limited suitable habitat
Lampropeltis zonata parvirubra San Bernardino Mountain kingsnake	SOC	—	Moderate; marginally suitable habitat
Lichanura trivirgata roseofusca Coastal rosy boa	SOC	—	None; above known elevation range
Phrynosoma coronatum ssp. *blainvillei* San Diego coast horned lizard	SOC	SSC/P	None; above known elevation, lack of suitable habitat
Sceloporus graciosus vendenbergianus Southern sagebrush lizard	SOC	—	Observed

Table 5.8-3 – Continued
Special Status Wildlife Species Potentially Occurring Within the Project Region

Species	Status[1]		Likelihood for Occurrence
	USFWS	CDFG	
Salvadora hexalepis virgultea Coast patch-nosed snake	SOC	SSC	None; lack of suitable habitat, above known elevation
Thamnophis hammondii hammondii Two-striped garter snake	—	SSC	None; no suitable habitat
Birds			
Accipiter cooperii Cooper's hawk	—	SSC	Nesting: Moderate Foraging: High
Accipiter gentilis Northern goshawk	SOC	SSC	Nesting: None Foraging: Moderate
Accipiter striatus Sharp-shinned hawk	—	SSC	Nesting: None Foraging: High in winter
Aimophila ruficeps canescens Southern California rufous-crowned sparrow	SOC	SSC	Nesting: None Foraging: None; above known elevation range
Amphispiza belli belli Bell's sage sparrow	SOC	SSC	Nesting: None Foraging: None; above known elevation range
Aquila chrysaetos Golden eagle	—	SSC	Nesting: None Foraging: High
Asio otus Long-eared owl	—	SSC	Nesting: Low Foraging: Moderate
Buteo regalis Ferruginous hawk	SOC	SSC	Nesting: None Foraging: Low in winter
Circus cyaneus Northern harrier	—	SSC	Nesting: None Foraging: Low
Cypseloides niger Black swift	—	SSC	Nesting: None Foraging: Moderate
Dendroica petechia Yellow warbler	—	SSC	Nesting: None Foraging: Moderate
Elanus leucereus White-tailed kite	—	FP	Nesting: Low Foraging: Low
Empidonax traillii extimus Southwestern willow flycatcher	FE	SE	Nesting: Low Foraging: Moderate; rare migrant
Eremophila alpestris actia California horned lark	—	SSC	Nesting: None Foraging: None; above known elevation range

Table 5.8-3 – Continued
Special Status Wildlife Species Potentially Occurring Within the Project Region

Species	Status[1]		Likelihood for Occurrence
	USFWS	CDFG	
Falco columbaris Merlin	—	SSC	Nesting: None Foraging: Low
Falco mexicanus Prairie falcon	—	SSC	Nesting: None Foraging: Low
Falco peregrinus anatum American Peregrine falcon	—	FE	Nesting: None Foraging : Low
Haliaeetus leucocephalus Bald eagle	FE	SE	Nesting: None Foraging: Observed in winter
Lanius ludovicianus Loggerhead shrike	SOC	SSC	Nesting: None Foraging: None; above known elevation range
Piranga flava Hepatic tanager	—	SSC	Nesting: Low Foraging: Low
Progne subis Purple martin	—	SSC	Nesting: Low Foraging: Low; local rarity
Strix occidentalis occidentalis California spotted owl	SOC	SSC	Nesting: Low/None observed during focused surveys Foraging: High/Observed in close proximity to Project site
Vireo vicinior Gray vireo	—	SSC	Nesting: None Foraging: Low
Mammals			
Antrozus pallidus Pallid bat	—	SSC	Roosting: Low Foraging: Low
Euderma maculatum Spotted bat	SOC	SSC	Roosting: None Foraging: Moderate
Eumops perotis californicus California mastiff bat	SOC	SSC	Roosting: None Foraging: Low
Glaucomys sabrinus californicus San Bernardino Mountain flying squirrel	SOC	SSC	Breeding: Low Foraging: High
Myotis ciliolabrum Small-footed myotis	SOC	—	Roosting: Low Foraging: High
Myotis evotis Long-eared myotis	SOC	—	Roosting: High Foraging: High
Myotis lucifugus Occult little brown bat	SOC	SSC	Roosting: High Foraging: High

Table 5.8-3 – Continued
Special Status Wildlife Species Potentially Occurring Within the Project Region

Species	Status[1]		Likelihood for Occurrence
	USFWS	CDFG	
Myotis thysanodes Fringed myotis	SOC	—	Roosting: Low Foraging: Moderate
Myotis volans Long-legged myotis	SOC	—	Roosting: Moderate Foraging: Moderate
Myotis yumanensis Yuma myotis	SOC	—	Roosting: Low Foraging: Moderate
Onychomys torridus ramona Southern grasshopper mouse	SOC	SSC	None; no suitable habitat
Perognathus alticola alticola White-eared pocket mouse	SOC	SSC	None; presumed extinct locally
Plecotus townsendii townsendii Pacific western big-eared bat	SOC	SSC	Roosting: None Foraging: Moderate

Status Definitions1
USFWS

FE: Species designated as Endangered under the Federal Endangered Species Act. Endangered = "any species in danger of extinction throughout all or a significant portion of its range."
FT: Species designated as Threatened under the Federal Endangered Species Act. Threatened = "species likely to become an Endangered species within the foreseeable future throughout all or a significant portion of its range."
FPE: Proposed for federal listing as Endangered.
FPT: Proposed for federal listing as Threatened.
SOC: Species of Concern

CDFG

SR: Rare = "a species is rare when, although not presently Threatened with extinction, it is in such small numbers throughout its range that it may become Endangered if its present environment worsens."
ST: Threatened = "a species that, although not presently Threatened with extinction, is likely to become an Endangered species in the foreseeable future in the absence of the special protection and management efforts required by this Act (California Endangered Species Act)."
SE: Endangered = "a species is endangered when its prospects of survival and reproduction are in immediate jeopardy from one or more causes."
SSC: Species of Special Concern.

FP: Fully Protected species are protected by special legislation and cannot be taken at any time.
P: Protected species are also protected by special legislation and can only be taken with a permit issued by the CDFG.

DEFINITIONS OF SPECIAL STATUS BIOLOGICAL RESOURCES

Special status habitats are vegetation communities, associations, or subassociations that support concentrations of special status plant or wildlife species, are of relatively limited distribution, or are of particular value to wildlife. Although special status habitats are not afforded legal protection unless they support protected species, potential impacts on them may increase concerns and mitigation suggestions by resources agencies.

A Federally Endangered species is one facing extinction throughout all or a significant portion of its geographic range. A Federally Threatened species is one likely to become endangered within the foreseeable future throughout all or a significant portion of its range. The presence of any federally Threatened or Endangered species on a Project site generally imposes severe constraints on development, particularly if development would result in "take" of the species or its habitat. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct. Harm in this sense can include any disturbance to habitats used by the species during any portion of its life history.

The reference to "proposed species" are those officially proposed by the USFWS for addition to the Federal Threatened and Endangered species list. Because proposed species may become listed as Threatened or Endangered prior to or during implementation of a proposed development project, they are treated in this EIR as though they are listed species.

The State of California considers an Endangered species as one whose prospects of survival and reproduction are in immediate jeopardy. Threatened species is a species in such small numbers throughout its range that it is likely to become an Endangered species in the near future in the absence of special protection or management. A rare species is one present in such small numbers throughout its range that it may become Endangered if its present environment worsens. Rare species applies to California native plants listed prior to the State Endangered Species Act. State Threatened and Endangered species are fully protected against take unless an incidental take permit is obtained from the wildlife agencies.

Federal Species of Concern are species (a "term of art" for former Category 2 candidates) with an informal designation by the USFWS for some declining species that are not federal candidates for listing at this time, but are noted in the CNDDB (CDFG 2002a). This list of species is not actively maintained by the USFWS.

California Species of Special Concern is an informal designation used by the CDFG for some declining wildlife species that are not state candidates. This designation does not provide legal protection, but signifies that these species are recognized as special status by the CDFG.

Species that are California Fully Protected and Protected include those protected by special legislation for various reasons, such as the mountain lion and white-tailed kite. Fully protected species may not be taken or possessed at any time. California Protected Species include those species that may not be taken or possessed at any

time except under special permit from the department issued pursuant to Sections 650 and 670.7 of the California Code of Regulations, or Section 2081 of the Fish and Game Code.

Special Plant and Special Animal are general terms that refer to all of the species the CNDDB is interested in tracking, regardless of their legal or protection status. This term includes species designated as any of the above terms but also includes species that may be considered biologically rare, restricted in distribution, declining throughout their range, are on the periphery of their range and are threatened with extirpation in California, are associated with special status habitats, or are considered by other state or federal agencies or private organizations to be sensitive or declining. Species of Local Concern are those that have no official status with the resource agencies, but are being watched because either there is a unique population in the region or the species is declining in the region.

The California Native Plant Society is a private organization that has developed an inventory of California's special status plant species. This inventory summarizes the distribution, rarity, and endangerment of California's vascular plants. This rare plant inventory is comprised of four lists. CNPS presumes that List 1A plant species are extinct in California because they have not been seen in the wild for many years. CNPS considers List 1B plants as rare, threatened, or endangered throughout their range. List 2 plant species are considered rare, threatened, or endangered in California but more common elsewhere. Plant species for which CNPS needs additional information are included on List 3. List 4 plant species are those of limited distribution in California whose susceptibility to threat appears low at this time.

SPECIAL STATUS VEGETATION TYPES

Pebble Plain

The pebble plain community found on the Project site is recognized as a special status vegetation type by local, state, and federal resources agencies. Pebble plain (also called pavement plain) is endemic to a 92-square-mile area in the San Bernardino Mountains at elevations between 6,000 and 7,500 feet above msl. Vegetation structure of pebble plain habitat 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. Several special status plants, including Threatened or Endangered species, are known to occur on pebble plain and are discussed in the *Special Status Plants* section.

Pebble plain on the Project site occurs as a distinct open patch within the surrounding open Jeffrey pine forest. Much of the pebble plain habitat on the Project site has been subjected to disturbance by unauthorized off-road vehicle use. The disturbance has reduced vegetation cover, disturbed the natural hydrologic pattern, and perhaps reduced habitat quality for special status plants. However, based on National Forest management efforts at other sites, vehicle disturbance apparently does not permanently alter habitat suitability of this vegetation type.

Montane Meadow

Small patches of meadow transitioning into upland grassland occur along the lakeshore south of State Route 38. The extent of the meadows could not be determined or mapped in 2002 due to dry conditions. Meadows in the Big Bear Valley may be perennially saturated (i.e., wet meadows) or may have seasonally saturated soils during wet years (i.e., vernal meadows). This vegetation type is generally dominated by sedges (*Carex* spp.), rushes (*Juncus* spp.), and grasses (*Poa* spp., *Elymus* spp.). Dry meadows and the margins of wet meadows may also support big sagebrush (*Artemisia tridentata*) and timberline sagebrush (*Artemisia rothrockii*).

Meadow habitat in the San Bernardino Mountains is not officially recognized as a special status vegetation type by the CDFG but it is known to support several locally endemic plants [e.g., bird's foot checkerbloom (*Sidalcea pedata*), San Bernardino bluegrass (*Poa atropurpurea*), and California dandelion (*Taraxacum californicum*)] and is therefore considered to be of local concern. Additionally, the San Bernardino National Forest recognizes montane meadow habitat as a rare ecological community of concern.

SPECIAL STATUS PLANTS

Eighty-one special status plant species are known to occur in the Project region, 50 of which occur or have the potential to occur on the Project site. A brief description of the special status plant species that were determined to have potential to occur on the Project site are outlined below and summarized in Table 5.8-2. As indicated in Table 5.8-2, four special status plant species have been observed on the Project site.

Coville's Dwarf Abronia (*Abronia nana* ssp. *covillei*). Coville's dwarf abronia is a CNPS List 4 species that typically blooms from May to August. This perennial herb occurs in carbonate, sandy soils in Joshua tree woodland, pinyon-juniper woodland, subalpine coniferous forest, and upper montane coniferous forest between 5,200 and 9,200 feet above msl. This species occurs in the Inyo, Mono, and San Bernardino counties. The Project site provides marginally suitable habitat for this species and the potential for occurrence is considered to be low.

Parish's Onion (*Allium parishii*). Parish's onion is a CNPS List 4 species that typically blooms from April to May. This perennial, bulbiferous herb occurs in rocky soils of Joshua tree woodland, Mojavean desert scrub, and pinyon-juniper woodland between 3,000 and 6,000 feet above msl. This species occurs in the Imperial, Riverside, and San Bernardino counties. The Project site provides suitable habitat for this species but is above the known elevation range for this species and the potential for occurrence is considered to be low.

Parish's Rock-Cress (*Arabis parishii*). Parish's rock cress is a CNPS List 1B species that typically blooms from April to May. This perennial herb occurs in rocky, quartzite and clay, or sometimes carbonate soils in pebble plains, pinyon-juniper woodlands, and upper montane coniferous forests from approximately 3,900 to 8,000 feet above msl. It is endemic to the San Bernardino Mountains. This species was observed

uncommonly in scattered patches throughout pebble plain and open Jeffrey pine forest on the Project site during botanical surveys conducted in 2002.

Rock Sandwort (*Arenaria lanuginosa* ssp. *saxosa*). Rock sandwort is a CNPS List 2 species that typically blooms from July to August. This perennial herb occurs in mesic, sandy soils of subalpine, coniferous forests, and upper montane coniferous forests from approximately 5,900 to 9,000 feet above msl. It is found only in the San Bernardino Mountains in the state of California but also occurs in Arizona, Baja California, and elsewhere. The Project site provides marginally suitable habitat for this species and the potential for occurrence is considered to be moderate.

Big Bear Valley Sandwort (*Arenaria ursina*). Big Bear Valley sandwort is a federally-listed Threatened and CNPS List 1B species that typically blooms from May to August. This perennial herb occurs in mesic, rocky soils of pebble plain, and pinyon-juniper woodland from approximately 6,400 to 6,900 feet above msl. This species is endemic to the San Bernardino Mountains. The Project site provides suitable habitat for this species and the potential for occurrence is considered to be high.

Crested Milk-Vetch (*Astragalus bicristatus*). Crested milk-vetch is a CNPS List 4 species that typically blooms from May to August. This perennial herb occurs in sandy or rocky soils of lower and upper montane coniferous forests from approximately 5,500 to 8,200 feet above msl. This species is found in the San Bernardino, San Gabriel, and San Jacinto mountains. The Project site provides suitable habitat for this species and the potential for occurrence is considered to be high.

Big Bear Valley Milk-Vetch (*Astragalus lentiginosus* var. *sierrae*). Big Bear Valley milk-vetch is a CNPS List 1B species that typically blooms from April to August. This perennial herb occurs in gravelly or rocky soils of desert scrub, meadows and seeps, pinyon-juniper woodland, and upper montane coniferous forest from approximately 5,800 to 8,500 feet above msl. It is found in the San Bernardino, San Gabriel, San Jacinto, and Santa Rosa mountains. The Project site provides suitable habitat for this species and the potential for occurrence is considered to be high.

Big Bear Valley Woollypod (*Astragalus leucolobus*). Big Bear Valley woollypod is a CNPS List 1B species that typically blooms from May to July. This perennial herb occurs in rocky soils of lower montane coniferous forest, pebble plain, pinyon-juniper woodland, and upper montane coniferous forests from approximately 5,600 to 8,000 feet above msl. It is found in the San Bernardino, San Gabriel, San Jacinto, and Santa Rosa mountains. This species was observed throughout the Project site during botanical surveys conducted in 2002.

Palmer's Mariposa Lily (*Calochortus palmeri* var. *palmeri*). Palmer's mariposa lily is a CNPS List 1B species that typically blooms between May and July. This perennial, bulbiferous herb occurs in mesic chaparral, lower montane coniferous forest, meadows, and seeps from approximately 3,200 to 7,200 feet above msl. It is a California endemic found in the South Coast and Transverse ranges in Kern, Los Angeles, Riverside, Santa Barbara, San Bernardino, San Luis Obispo, and Ventura counties. This species was not observed during the 2002 botanical surveys.

However, it has a moderate potential to occur on the project site given the availability of marginally suitable habitat in mesic portions of Jeffrey pine forest.

Ash-Gray Indian Paintbrush (*Castilleja cinerea*). Ash-gray Indian paintbrush is a federally-listed Threatened and CNPS List 1B species. It is a root parasite on other plants, often parasitizing the Federally-listed Threatened southern mountain buckwheat and Wright's matting buckwheat. It is a perennial herb, and typically blooms between May and August. It occurs in pebble plains, meadows, seeps, and open pinyon or Jeffrey pine forest from approximately 5,900 to 9,300 feet above msl and is endemic to the eastern San Bernardino Mountains (Big Bear Valley, Holcolmb Valley, Onyx Summit, Snow Valley, and Sugarloaf Ridge). This species was reported and mapped on the project site by Michael Brandman Associates (MBA) (MBA 2000) and the California Natural Diversity Data Base (CDFG 2001). Botanical surveys in 2002 identified populations of this species throughout approximately 11.8 acres of pebble plain and open Jeffrey pine forest in the western half of the project site where it appears to be parasitizing Wright's matting buckwheat (see Exhibit 3). Populations of this species were found to be more widespread than reported previously and would be expected to occur in higher concentrations within the mapped Wright's matting buckwheat areas during normal rainfall years.

San Bernardino Mountain Owl's Clover (*Castilleja applegateii* ssp. *martinii*). San Bernardino Mountain owl's clover is a CNPS List 1B species that typically blooms between June and August. This hemiparasitic, annual herb occurs in mesic chaparral, meadows and seeps, pebble plain, and upper montane coniferous forests from approximately 4,200 to 7,850 feet above msl. It is a California endemic found in Riverside and San Bernardino counties. This species was not observed during the 2002 botanical surveys. However, it has a high potential to occur on the project site given the availability of suitable habitat throughout the project site, especially within pebble plains and open Jeffrey pine forest where Wright's matting buckwheat occurs.

Male Fern (*Dryopteris filix-mas*). Male fern is a CNPS List 2 species that is typically fertile from July to September. This rhizomatous, perennial herb occurs in granitic, rocky soils of upper montane coniferous forests from approximately 7,800 to 10,200 feet above msl. This species is known from only two locations in the White Mountains and Holcomb Valley in Inyo and San Bernardino counties respectively. The project site provides suitable habitat; however, the project site is outside the known range of this local rarity and the potential for occurrence is considered to be low.

San Bernardino Mountains Dudleya (*Dudleya abramsii* ssp. *affinis*). The San Bernardino Mountains dudleya is a CNPS List 1B species that typically blooms from April to June. This perennial herb occurs in granitic, quartzite, or carbonate soils of pebble plain, pinyon-juniper woodland, and upper montane coniferous forest from approximately 5,800 to 8,500 feet above msl. This species is endemic to the San Bernardino Mountains. The project site provides marginally suitable habitat for this species and the potential for occurrence is considered to be moderate.

Leafy Buckwheat (*Eriogonum foliosum*). Leafy buckwheat is a CNPS List 1B species that typically blooms from July to October. This annual herb occurs in sandy soils of chaparral, lower montane coniferous forest, and pinyon-juniper woodland from

approximately 3,900 to 7,200 feet above msl. This species is found in scattered locations from Big Bear Valley south to Baja California. The project site provides suitable habitat for this species and the potential for occurrence is considered to be high.

Southern Mountain Buckwheat (*Eriogonum kennedyi* var. *austromontanum*). Southern mountain buckwheat is a Federally-listed Threatened and CNPS List 1B species that typically blooms between June and August. It is a mat-forming, woody perennial endemic to pebble plain habitats in Big Bear and Holcomb valleys in the San Bernardino Mountains from approximately 5,800 to 7,500 feet above msl. This species often serves as a host plant for the hemi-parasitic ash-gray Indian paintbrush and is also a food plant for the recently described, locally-endemic San Bernardino blue butterfly (*Euphilotes bernardino bernardino*). It is very similar to the more common Wright's matting buckwheat that is common on the project site. Southern mountain buckwheat was not seen during the 2002 botanical surveys and it has not been reported on the project site by other botanists (MBA 2000; CDFG 2001). However, it is considered to have a low potential to occur given that suitable habitat occurs within pebble plains on the project site.

Southern Sierra Woolly Sunflower (*Eriophyllum lanatum* var. *obovatum*). Southern Sierra woolly sunflower is a CNPS List 4 species that typically blooms from June to July. This perennial herb occurs in lower and upper montane coniferous forest from approximately 4,200 to 8,100 feet above msl. This species is found in the southern Sierra Nevada and western San Bernardino mountains. The project site provides suitable habitat for this species; however, the project site is on the margin of this species geographic range and the potential for occurrence is considered to be low.

Jepson's Bedstraw (*Galium jepsonii*). Jepson's bedstraw is a CNPS List 4 species that typically blooms from July to August. This rhizomatous, perennial herb occurs in granitic, rocky or gravelly soils in lower and upper montane coniferous forests from approximately 6,500 to 8,100 feet above msl. This species is found in the San Gabriel and San Bernardino mountains. The project site provides suitable habitat for this species and the potential for occurrence is considered to be high.

Johnston's Bedstraw (*Galium johnstonii*). Johnston's bedstraw is a CNPS List 4 species that typically blooms from June to July. This perennial herb occurs in chaparral, lower montane coniferous forest, pinyon-juniper woodland, and riparian woodland from approximately 5,300 to 7,500 feet above msl. This species is found in the San Gabriel and San Bernardino mountains. The project site provides suitable habitat for this species and the potential for occurrence is considered to be high.

San Bernardino Mountains Gilia (*Gilia leptantha* ssp. *leptantha*). San Bernardino Mountains gilia is a List 1B species that typically blooms from June to August. This annual herb occurs in sandy or gravelly soils of lower montane coniferous forests from approximately 5,000 to 7,700 feet above msl. This species is endemic to the upper Santa Ana River watershed in the San Bernardino Mountains. The project site provides suitable habitat for this species; however, it has not been recorded in the Big Bear valley and the potential for occurrence is considered to be low.

Shaggy-Haired Alumroot (*Heuchera hirsutissima*). Shaggy-haired alumroot is a CNPS List 1B species that typically blooms from May to July. This rhizomatous, perennial herb occurs in rocky soils of subalpine coniferous forest, and upper montane coniferous forest above approximately 7,200 feet above msl. This species is endemic to the San Jacinto and Santa Rosa mountains with one uncomfirmed record for the San Bernardino Mountains. The project site provides limited suitable habitat for this species and the potential for occurrence is considered to be low.

Parish's Alumroot (*Heuchera parishii*). Parish's alumroot is a CNPS List 1B species that typically blooms from June to July. It is a rhizomatous perennial herb that occurs in rocky soils of alpine boulder and rock fields, lower montane coniferous forest, subalpine coniferous forest, and upper montane coniferous forest above approximately 4,800 feet above msl. This species is endemic to the San Bernardino Mountains. The project site provides limited suitable habitat for this species and the potential for occurrence is considered to be low.

Silver-Haired Ivesia (*Ivesia argyrocoma*). Silver-haired ivesia is a CNPS List 1B species that typically blooms between June and August. This perennial herb occurs in alkaline meadows and seeps, pebble plains, and upper montane coniferous forest from approximately 4,900 to 8,800 feet above msl. It occurs in the San Bernardino Mountains and a disjunct population occurs in the mountains of Baja California. This species was reported on the project site by MBA (MBA 2000) and was observed throughout mapped pebble plain habitat on the project site during the 2002 botanical surveys.

Duran's Rush (*Juncus duranii*). Duran's rush is a CNPS List 4 species that typically blooms from July to August. It is a rhizomatous, perennial herb that occurs in mexic soils of lower montane coniferous forest, meadows and seeps, and upper montane coniferous forest from approximately 5,800 feet to 9,000 feet above msl. This species is found in the San Bernardino, San Gabriel, and San Jacinto mountains. The project site provides suitable habitat for this species and the potential for occurrence is considered to be high.

Short-Sepaled Lewisia (*Lewisia brachycalyx*). Short-sepaled lewisia is a CNPS List 2 species that typically blooms from May to June. It is a perennial herb that occurs in mesic meadows and seeps, and lower montane coniferous forest from 4,500 to 7,500 feet above msl. This species is endemic to the San Bernardino Mountains. The project site provides limited suitable habitat for this species and the potential for occurrence is considered to be moderate.

Lemon Lily (*Lilium parryi*). Lemon lily is CNPS List 1B species that typically blooms from July to August. It is a bulbiferous, perennial herb that occurs in lower and upper montane coniferous forests, meadows and seeps, and riparian scrub above approximately 4,000 feet above msl. This species is found in the mountain ranges of southern California and southeastern Arizona. The project site provides marginally suitable habitat for this species and the potential for occurrence is considered to be low.

Baldwin Lake Linanthus (*Linanthus killipii*). The Baldwin Lake linanthus is a CNPS List 1B species that blooms from May to July. It is an annual herb that occurs in

alkaline meadows and seeps, pebble plain, pinyon-juniper woodland, and upper montane coniferous forest from approximately 5,500 to 7,800 feet above msl. This species is endemic to the San Bernardino Mountains. The project site provides suitable habitat for this species and the potential for occurrence is considered to be high.

San Bernardino Mountain Monkeyflower (*Mimulus exiguus*). The San Bernardino Mountain monkeyflower is a CNPS List 1B species that typically blooms from June to July. It is an annual herb that occurs in mesic, clay soils of meadows and seeps, pebble plain, and upper montane coniferous forest between approximately 5,800 and 7,500 feet above msl. This species is found in the San Bernardino Mountains and high mountains of Baja California. The project site provides suitable habitat for this species and the potential for occurrence is considered to be high.

Purple Monkeyflower (*Mimulus purpureus* var. *purpureus*). Purple monkeyflower is a CNPS List 2 species that typically blooms from May to July. It is an annual herb that occurs in meadows and seeps, pebble plain, and upper montane coniferous forest from approximately 6,100 to 7,500 feet above msl. This species is found in the San Bernardino Mountains and high mountains of Baja California. The project site provides suitable habitat for this species and the potential for occurrence is considered to be high.

Baja Navarretia (*Navarretia peninsularis*). Baja navarretia is a CNPS List 1B species that blooms from July to September. It is an annual herb that occurs in mesic, sandy soils in chaparral and lower montane coniferous forests between approximately 4,800 and 7,500 feet above msl. This species is found in the mountains of central and southern California and north Baja California. The project site provides limited suitable habitat for this species and the potential for occurrence is considered to be low.

Chickweed Oxytheca (*Oxytheca caryophylloides*). Chickweed oxytheca is a CNPS List 4 species that typically blooms from July to September. It is an annual herb that occurs in sandy soils of lower montane coniferous forest from approximately 3,900 to 8,500 feet above msl. This species is found in the southern Sierra Nevada, Transverse Ranges, and San Jacinto Mountains. The project site provides suitable habitat for this species and the potential for occurrence is considered to be high.

Cienega Seca Oxytheca (*Oxytheca parishii* var. *cienegensis*). The cienega seca oxytheca is a CNPS List 1B species that typically blooms from June to September. It is an annual herb that occurs in sandy, granitic soils in upper montane coniferous forest from approximately 7,000 to 8,000 feet above msl. This species is found along Coon Creek and Cienega Seca Creek in San Bernardino County. The project site provides suitable habitat for this species; however, the project site is well outside the known geographic range for this species and the potential for occurrence is considered to be low.

Parish's Yampah (*Perideridia parishii* ssp. *parishii*). Parish's yampah is a CNPS List 2 species that typically blooms from June to August. It is a perennial herb that occurs in lower and upper montane coniferous forests, and meadows and seeps above approximately 6,500 feet above msl. This species is found in the San

Bernardino Mountains and in disjunct populations in Arizona and New Mexico. The project site provides suitable habitat for this species and the potential to occur is considered to be high.

Transverse Range Phacelia (*Phacelia exilis*). The Transverse Range phacelia is a CNPS List 4 species that typically blooms from May to August. It is an annual herb that occurs in sandy or gravelly soils in lower and upper montane coniferous forests, and meadows and seeps from approximately 3,500 to 8,500 feet above msl. This species is found in the southern Sierra Nevada and Transverse Ranges. The project site provides suitable habitat for this species and the potential to occur is considered to be high.

Mojave Phacelia (*Phacelia mohavensis*). The Mojave phacelia is a CNPS List 4 species that typically blooms from April to August. It is an annual herb that occurs in sandy or gravelly soils of cismontane woodland, lower montane coniferous forest, meadows and seeps, and pinyon-juniper woodland from approximately 4,500 to 8,100 feet above msl. This species is found in the San Gabriel and San Bernardino mountains. The project site provides suitable habitat for this species and the potential to occur is considered to be high.

Bear Valley Phlox (*Phlox dolichantha*). The Bear Valley phlox is a CNPS List 1B species that blooms from June to July. It is a perennial herb that occurs in pebble plain, and upper montane coniferous forest from approximately 6,500 to 8,800 feet above msl. This species is endemic to the San Bernardino Mountains. The project site provides suitable habitat for this species and the potential to occur is considered to be high.

San Bernardino Bluegrass (*Poa atropurpurea*). San Bernardino bluegrass is a Federally-listed Endangered and CNPS List 1B species that typically blooms from May to June. It is a rhizomatous, perennial herb that occurs in mesic meadows and seeps between approximately 4,800 and 7,200 feet above msl. This species is found in the San Bernardino and Laguna mountains (San Diego). The project site provides suitable habitat for this species and the potential to occur is considered to be high.

Bear Valley Pyrrocoma (*Pyrrocoma uniflora* ssp. *gosssypina*). Bear Valley pyrrocoma is a CNPS List 1B species that typically blooms from July to August. It is a perennial herb that occurs in meadows and seeps, and pebble plain from approximately 5,200 to 7,600 feet above msl. This species is endemic to the San Bernardino Mountains. The project site provides suitable habitat for this species and the potential to occur is considered to be high.

Parish's Rupertia (*Rupertia rigida*). Parish's rupertia is a CNPS List 4 species that typically blooms from June to July. It is a perennial herb that occurs in chaparral, cismontane woodland, and lower montane coniferous forest below approximately 8,100 feet above msl. This species is found in the San Bernardino Mountains, Peninsular Ranges, and Baja California. The project site provides suitable habitat for this species and the potential to occur is considered to be high.

Bluish Spike-Moss (*Selaginella asprella*). Bluish spike-moss is a CNPS List 4 species that typically blooms in July. It is a rhizomatous, perennial herb that occurs in granitic, rocky soils of cismontane woodland, lower and upper montane coniferous forests, pinyon-juniper woodland, and subalpine coniferous forest between approximately 5,200 to 8,800 feet above msl. This species occurs throughout southern California mountain ranges and Baja California. The project site provides limited suitable habitat for this species and the potential for occurrence is considered to be low.

San Bernardino Butterweed (*Senecio bernardinus*). San Bernardino butterweed is a CNPS List 1B species that typically blooms from May to July. It is a perennial herb that occurs in meadows and seeps, pebble plain, and upper montane coniferous forest between approximately 5,800 to 7,500 feet above msl. This species is endemic to the San Bernardino Mountains and is known from fewer than twenty occurrences. The project site provides limited suitable habitat for this species and the potential for occurrence is considered to be low.

Parish's Checkerbloom (*Sidalcea hickmanii* ssp. *parishii*). Parish's checkerbloom is a Federal Candidate for listing as Threatened or Endangered, State Rare, and CNPS List 1B species that typically blooms from June to July. It is a perennial herb that occurs in chaparral, cismontane woodland, and lower montane coniferous forest between 3,200 and 8,200 feet above msl. This species is found mainly in the San Bernardino Mountains and in a few localities in the Santa Ynez Mountains. The project site provides limited suitable habitat for this species and potential for occurrence is considered to be low.

Bird's Foot Checkerbloom (*Sidalcea pedata*). Bird's foot checkerbloom is a Federally- and State-listed Endangered and CNPS 1B species that typically blooms from May to July. It is a perennial herb that occurs in meadows and seeps, and pebble plain between approximately 5,200 and 8,100 feet above msl. This species is endemic to the San Bernardino Mountains. The project site provides marginally suitable habitat for this species and the potential to occur is considered to be low to moderate.

Prairie Wedge Grass (*Sphenopholis obtusata*). Prairie wedge grass is a CNPS List 2 species that typically blooms from April to July. It is a perennial herb that occurs in mesic soils of cismontane woodland, meadows and seeps between approximately 1,000 and 6,550 feet above msl. This species is found in a few widely scattered locations in Amador, Fresno, Inyo, Mono, Riverside, and San Bernardino counties in California. The project site provides suitable habitat for this species and the potential to occur is considered to be high.

Laguna Mountains Jewelflower (*Streptanthus bernardinus*). The Laguna Mountains jewelflower is a CNPS List 4 species that typically blooms from June to July. It is a perennial herb that occurs in chaparral, and lower montane coniferous forest between approximately 3,900 and 8,100 feet above msl. This species is found in the Transverse and Peninsular ranges and Baja California. The project site provides suitable habitat for this species and the potential to occur is considered to be high.

Southern Jewelflower (*Streptanthus campestris*). The southern jewelflower is CNPS List 1B species that typically blooms from May to July. It is a perennial herb that occurs in rocky soils of chaparral, lower montane coniferous forest, and pinyon-juniper woodland from approximately 2,900 to 7,500 feet above msl. This species is known from fewer than twenty occurrences in Riverside, San Bernardino, and San Diego counties, and Baja California. The project site provides suitable habitat for this species and the potential to occur is considered to be high.

Pine Green-Gentian (*Swertia neglecta*). Pine green-gentian is a CNPS List 4 species that typically blooms from May to July. It is a perennial herb that occurs in lower and upper montane coniferous forests, and pinyon-juniper woodlands from approximately 4,500 to 8,100 feet above msl. This species is found in the South Coastal and Transverse ranges within Los Angeles, San Bernardino, and Ventura counties. The project site provides suitable habitat for this species and the potential to occur is considered to be high.

California Dandelion (*Taraxacum californicum*). The California dandelion is a Federally-listed Endangered and CNPS List 1B species that typically blooms from May to July. It is a perennial herb that occurs in mesic meadows and seeps from approximately 6,300 to 7,800 feet above msl. This species is endemic to the San Bernardino Mountains. The project site provides suitable habitat for this species and the potential to occur is considered to be low to moderate.

Slender-Petaled Thelypodium (*Thelypodium stenopetalum*). Slender-petaled thelypodium is a Federally- and State-listed Endangered and CNPS List 1B species that typically blooms from June to July. It is a perennial herb that occurs in mesic, alkaline meadows and seeps from approximately 6,200 to 7,200 feet above msl. This species is endemic to the San Bernardino Mountains with less than eight known populations in the Big Bear and Holcomb valleys. The project site contains marginally suitable habitat for this species and the potential to occur is considered to be low.

Small-Flowered Bluecurls (*Trichostema micranthum*). Small-flowered bluecurls is a CNPS List 4 species that typically blooms from July to September. It is an annual herb that occurs mesic soils in lower montane coniferous forest, and meadows and seeps from 6,500 to 7,500 feet above msl. This species is found in the San Bernardino Mountains and Baja California. The project site provides suitable habitat for this species and the potential to occur is considered to be high.

Grey-Leaved Violet (*Viola pinetorum* ssp. *grisea*). Grey-leaved violet is a CNPS List 1B species that typically blooms in April. It is a perennial herb that occurs in meadows and seeps, subalpine coniferous forest, and upper montane coniferous forest from approximately 4,800 to 11,100 feet above msl. This species is known from ten occurrences in Fresno, Kern, San Bernardino, and Tulare counties. There is disagreement about the range of this species. The project site provides suitable habitat for this species; however, the project site is outside the known geographic range for this species and the potential to occur is considered to be low.

SPECIAL STATUS WILDLIFE

Fifty-three special status wildlife species are known to occur within the region, 39 of which have the potential to occur within the Project site. Focused surveys for the bald eagle, California spotted owl, southwestern willow flycatcher, and southern rubber boa were conducted in the winter, spring, summer and fall of 2002. A brief description of the special status wildlife species that were determined to have the potential to occur on the Project site is provided below and summarized in Table 5.8-3. As indicated in Table 5.8-3, one special status wildlife species (Southern sagebrush lizard) has been observed on the Project site.

Invertebrates

Andrew's Marble Butterfly (*Euchloe hyantis* ssp. *andrewsi*). Andrew's marble butterfly is a Federal Species of Concern. This species is found at elevations above 5,000 feet above msl near Lake Arrowhead and Big Bear Lake, and in other locations across the San Bernardino Mountains crest and north slopes. It is found primarily in pine and mixed conifer forests. The larval host plants for this subspecies are the Laguna Mountains jewelflower and *Arabis holboellii*. The Project site provides limited suitable habitat for this species; however, the Project site is above the known elevation range. The potential for this butterfly species to occur is considered to be low.

Amphibians

Yellow-Blotched Salamander (*Ensatina escholtziii croceater*). The yellow-blotched salamander is a Federal Species of Concern and State Species of Special Concern. This species is found at elevations up to 8,000 feet above msl among rotting logs and leaf litter in mixed stands of oaks and conifers. The Project site provides limited, marginally suitable habitat and the potential for it to occur is considered to be low.

Reptiles

Silvery Legless Lizard (*Anniella pulchra pulchra)*. The silvery legless lizard is a Federal Species of Concern and a State Species of Special Concern. The silvery legless lizard inhabits areas with moist sandy soil, including dry washes, woodlands, riparian, and scrub communities at elevations ranging from sea level to about 5,000 feet above msl. The Project site provides a limited amount of potentially suitable habitat for this species; however, the Project site is above the known elevation range for this species and its potential to occur is considered to be low.

Southern Rubber Boa (*Charina bottae umbbricata*). The southern rubber boa is a Federal Species of Concern and State-listed Threatened species found in the San Bernardino and San Jacinto mountains at elevations between 4,900 and 7,900 feet above msl. The majority of the localities for this species are in a 10-mile long strip of the San Bernardino Mountains between Twin Peaks in the west to Green Valley in the east. Known locations for this species occur on the north-facing slopes immediately south of Big Bear Lake. This species usually occurs in moist woodlands and coniferous forests with deep, well developed soils. It is a burrower and also commonly makes use of rock out crops for hibernation. Large downed logs and a

well-developed litter layer are considered important for cover and for maintaining soil moisture. Surveys for this species were conducted in the spring and summer of 2002. No southern rubber boas were encountered during surveys. Given the lack of historical records in the immediate vicinity of the Project site, and the negative results of two independent focused survey techniques, the southern rubber boa is not expected to occur on the Project site.

Coastal Western Whiptail (*Cnemidophorus tigris multiscutatus*). The coastal western whiptail is a Federal Species of Concern. It is a moderately large, slender lizard typically found in open scrub, chaparral, and woodland communities in semi-arid areas or where vegetation is sparse, from below sea level to 7,000 feet above msl. This species is restricted to the western coast of North America from Ventura County south through the northern two-thirds of the Baja California peninsula. The Project site provides suitable habitat for this species; however, it is at the maximum elevation for this species and its potential to occur is considered to be moderate.

San Bernardino Ringneck Snake *(Diadophis punctatus modestus*). The San Bernardino ringneck snake is a Federal Species of Concern and is considered locally rare in southwestern California. It inhabits scrub, chaparral, native grassland, and woodland communities. This species is difficult to detect due to its secretive behavior. It occurs in elevations from sea level to 7,000 feet above msl (Stebbins 1985). The Project site provides limited suitable habitat for this species and its potential to occur is considered to be low.

San Bernardino Mountain Kingsnake (*Lampropeltis zonata parvirubra*). The San Bernardino mountain kingsnake is a Federal Species of Concern that occurs in the San Jacinto, San Bernardino, and San Gabriel mountains. This species typically occurs in open stands of ponderosa pine, Jeffrey pine, Coulter pine, and/or black oak at elevations ranging from 4,500 to 6,500 feet above msl. This species occurs at higher elevations, but is less common. Partially shaded rock outcrops appear to be an important microhabitat element for refugia and basking sites. The Project site provides marginally suitable habitat for this species and its potential to occur is considered to be moderate.

Southern Sagebrush Lizard (*Sceloporus graciosus vandenbergianus*). The southern sagebrush lizard is a Federal Species of Concern that occurs in open coniferous forests and shrubland above 3,000 feet above msl. Its known range extends from Mount Pinos south to Baja California. This species inhabits mixed conifer forest, black oak woodlands, montane chaparral, and pinyon-juniper woodlands. This species was observed frequently on the Project site.

Birds

Cooper's Hawk (*Accipiter cooperii*). The Cooper's hawk is a State Species of Special Concern. Both resident and migratory populations exist in San Bernardino County. Wintering Cooper's hawks are often seen in wooded urban areas and native woodland communities. Preferred nesting habitats include riparian forests, mountain canyons, and oak woodlands. Cooper's hawks in the region prey on small birds and rodents that live in woodland and, occasionally, scrub and chaparral communities.

Breeding residents have been observed in the vicinity of Big Bear Lake. The Project site provides suitable foraging habitat, but a limited amount of nesting habitat for this raptor. Therefore, its overall potential to occur is considered to be high, although the potential for nesting is moderate.

Northern Goshawk (*Accipiter gentilis*). The northern goshawk is a Federal Species of Concern and State Species of Special Concern. Rare in southern California, goshawks have been observed during the breeding season only on Mount Abel, Mount Pinos, and in the San Bernardino and San Jacinto mountains. Breeding has not been documented in the San Bernardino Mountains, although goshawks have been observed near Big Bear Lake. Goshawks occur in a variety of coniferous forest communities, including ponderosa and Jeffrey pine, mixed conifer, white fire and lodgepole pine. Large snags and downed logs are believed to be important habitat elements because they increase the abundance of small- to medium sized birds and mammals composing this species prey base. Limited suitable foraging habitat is present on the Project site and the potential for this species is considered moderate for foraging, but no potential for nesting.

Sharp-shinned Hawk (*Accipiter striatus*). The sharp-shinned hawk is a State Species of Special Concern. This raptor is a fairly common winter visitor throughout southern California. It prefers woodland communities, but can also be found in virtually any habitat as it passes through the area during migration. The sharp-shinned hawk is a fairly common winter visitor in the Big Bear Lake vicinity, and its potential to occur for foraging is considered to be high. However, the Project site provides no nesting habitat for this raptor.

Golden Eagle (*Aquila chryysaetos*). The golden eagle is a State Species of Special Concern. This raptor is uncommon, but widely distributed throughout foothill, lower montane, and desert montane habitats in southern California. Golden eagles nest primarily on cliffs and hunt for rabbits and other small mammals in open habitats such as grasslands, oak savannas, and open shrublands. No nesting habitat is present on the Project site; however, the potential for foraging on the Project site is considered high.

Long-eared Owl (*Asio otus)*. The long-eared owl is a State Species of Special Concern. It breeds and roosts in riparian forests and woodlands or other dense forest habitats. This owl forages at night in open habitats including marshes, grasslands, and agricultural fields. It occurs throughout North America but is an increasingly rare breeder in southern California. The Project site provides moderate suitable foraging habitat and limited nesting habitat, for this species.

Ferruginous Hawk (*Buteo regalis*). The ferruginous hawk is a Federal Species of Concern and a State Species of Special Concern. Ferruginous hawks occur from mid-fall through early spring in coastal southern California. They forage over grasslands and the ecotone between scrub and grasslands. The Project site provides a limited amount of suitable foraging habitat, but no nesting habitat, for this species. Therefore, its potential to occur on the Project site is considered to be low for foraging, with no potential for nesting.

Northern Harrier (*Circus cyaneus*). The northern harrier is a State Species of Special Concern. It is a regular winter migrant that occasionally breeds along the coast of southern California. Foraging habitat consists of marsh, grassland, and scrub habitats. The Project site provides limited suitable foraging habitat, but no nesting habitat, for this raptor. Therefore, its potential to forage on the Project site is considered to be low.

Black Swift (*Cypseloides niger*). The black swift is a State Species of Special Concern. It is known to breed in the San Gabriel Mountains, Mill Creek Canyon in the San Bernardino Mountains, and the San Jacinto Mountains. This species occurs in mountain and foothill canyons where it nests in rocky cliffs behind waterfalls. No suitable nesting habitat is present on the Project site; however, this Project site could provide suitable foraging habitat and the potential for this species to forage on the Project site is considered moderate.

Yellow Warbler (*Dendroica petechia*). The western yellow-warbler is a California Species of Special Concern. This subspecies of yellow warbler that breeds in southern California is the western yellow warbler (*D.p. brewsteri*). This subspecies occurs in coastal areas from northwestern Washington south to western Baja California. In southern California, yellow warblers breed locally in riparian woodlands. The yellow warbler is an abundant migrant and would be expected to occur in spring and fall during migration. No suitable nesting habitat is present on the Project site; however, the potential for foraging migrants on the Project site is considered moderate.

White-Tailed Kite (*Elanus leucereus*). The white-tailed kite is a California Fully Protected species. This raptor typically nests in oaks, willows, and sycamores, and forages within adjacent grassland and scrub habitats. White-tailed kites show strong site fidelity to nest groves and trees. The most abundant prey species for this raptor includes the California vole, western harvest mouse, and house mouse. The project site provides limited suitable foraging and nesting habitat for this raptor. Therefore, its potential to occur on the Project site is considered to be low for nesting and foraging.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*). The southwestern willow flycatcher is a Federally- and State-listed Endangered species. This subspecies has declined drastically due to a loss of breeding habitat and nest parasitism by brown-headed cowbirds. This species occurs in riparian habitats along rivers, streams, or other wetlands where dense growths of willows (*Salix* sp.), baccharis (*Baccharis* sp.), arrowweed (*Pluchea* sp.), tamarisk (*Tamarix* sp.), or other plants are present, often with a scattered overstory of cottonwood (*Populus* sp.). The potential for this species to occur on the Project site as a foraging migrant is considered to be high, but its potential to nest on the Project site is considered low. Surveys for this species were conducted in the spring and summer of 2002. No breeding or individual southwestern willow flycatchers were detected during the surveys. Willows along the shoreline are patchy and lack the dense growth or willow thicket favored by this species as territorial or breeding habitat. Therefore, breeding southwestern willow flycatchers are not expected to occur on the Project site.

Merlin (*Falco columbaris*). The merlin is a State Species of Special Concern. In California, the merlin prefers vast open space areas such as estuaries, grasslands, and deserts where it hunts small flocking birds such as sandpipers, larks, sparrows, and pipits. The merlin is a very rare winter visitor to the Big Bear Lake area. The Project site provides suitable foraging habitat and perching locations, but no nesting habitat, for this raptor. Therefore, its potential to occur for foraging is considered to be low, and there is no potential for nesting.

Prairie Falcon (*Falco mexicanus*). The prairie falcon is a State Species of Special Concern. It is now a rare visitor to the coastal plain of southern California. Foraging habitat for this species consists of open habitats such as deserts, grasslands, rangelands, and marshes. For nesting, this large falcon uses ledges of cliff faces. The Project site provides suitable foraging habitat for this raptor, but no potentially suitable nesting habitat. Therefore, its potential to occur is considered to be low for foraging only.

American Peregrine Falcon (*Falco peregrinus*). The peregrine falcon is a State-listed Endangered species that, due to recent population gains, has been recently delisted as Endangered by the USFWS. No such delisting has been proposed by the state. Peregrine falcons prey almost exclusively on birds and use a variety of habitats, particularly wetlands and coastal areas, and nest on cliffs or building ledges. The Project site provides limited suitable foraging habitat for the peregrine falcon, but no potentially suitable nesting habitat. Therefore, its potential to occur on the Project site is considered to be low for foraging only.

Osprey (*Pandion haliaetus*). The osprey is a California Species of Special Concern. It is an uncommon winter visitor in southern California, but nesting has been documented at Lake Casitas near Ventura and Lake San Antonio in Monterey County (Garrett and Dunn 1981) and may occur elsewhere. The osprey would be expected to occur on the project site during spring migration or post-breeding wandering. The Project site provides roosting and foraging habitat for the osprey, but no potentially suitable nesting habitat. Therefore, its potential to occur on the Project site is considered to be low for foraging only.

Bald Eagle (*Haliaeetus leucocephalus*). The bald eagle is a State- and Federally-listed Endangered species. This raptor typically overwinters in small numbers in southern California near lakes and reservoirs where they feed on fish, coots, and waterfowl. The largest known wintering population in southern California is at Big Bear Lake in the San Bernardino Mountains, where twenty to thirty eagles typically congregate from November to March. This species is known to be present on the Project site in winter but is not expected to nest on the Project site. Surveys and records searches were conducted on the Project site in the winter of 2002 to determine bald eagle use of perch trees and favored roosting locations (refer to Appendix 15.6, *Biological Resources Information*). The surveys found that the site is used extensively by bald eagles. Bald eagle perch and roost locations were recorded and individual trees were marked with numbered tags. Tree locations are shown on Exhibit 5.8-1. The records search confirmed extensive use of the Project site by bald eagles and found that the most commonly recorded use of a single tree was also on the Project site.

Hepatic Tanager (*Piranga flava*). The hepatic tanager is a State Species of Special Concern. In southern California, this species is known to breed only in the San Bernardino Mountains. Breeding habitat consists of mature pinyon pine woodland with a mixture of taller conifers such as white fir or Jeffrey pine. Johnson and Garrett suggest this species may also occur in pine and deciduous oak woodlands on warm, arid slopes. The Project site provides limited suitable foraging and nesting habitat for this species and potential for occurrence is considered to be low for foraging and nesting.

Purple Martin (*Progne subis*). The purple martin is a State Species of Special Concern that historically occurred throughout all of the major mountain ranges in southern California. Many historic localities are no longer occupied and there are no known active localities in the San Bernardino Mountains. This species is a secondary cavity nester of hardwood and conifer forests. The Project site provides suitable habitat for this species; however, given the lack of records in the vicinity, the potential for occurrence is considered to be low for foraging and nesting.

California Spotted Owl (*Strix occidentalis occidentalis*). The California spotted owl is a Federal Species of Concern and State Species of Special Concern. This species occurs in all of the major mountain ranges in southern California, although some ranges support very few pairs. It is found at elevations ranging from below 1,000 feet to 8,500 feet above msl in mature forests typically with a dense, multi-layered canopy. Its prey base consists of woodrats (i.e., *Neotoma* spp.) and other rodents. Surveys were conducted for this species on the Project site in the spring and summer of 2002 (refer to Appendix 15.6, *Biological Resources Information*). Although one male spotted owl was detected approximately one mile to the northwest of the Project site, no nesting pairs or individuals were observed on the Project site. Therefore, no nesting pairs presently occur on the Project site; however, individuals have a high potential to forage on the Project site.

Gray Vireo (*Vireo vicinior*). The gray vireo is a State Species of Special Concern. This species is a summer resident in a few highly localized areas on the coastal mountain ranges in southern California. It occurs on dry, desert-facing slopes in the San Gabriel, San Bernardino, and San Jacinto mountains. This species prefers stands of dense, mature chaparral dominated by chamise or redshank or on brushy slopes in pinyon-juniper woodlands. The Project provides limited, marginal habitat for this species. The potential for occurrence is considered to be low for foraging but there is no potential for breeding on the Project site.

Mammals

Pallid Bat (*Antrozus pallidus*). The pallid bat is a California Species of Special Concern that most commonly occurs in mixed oak and grassland habitats. This large bat roosts in rock crevices and in cavities of trees, especially oaks. The Project site provides potentially suitable roosting and foraging habitat for this species and it has a low potential to occur.

Spotted Bat (*Euderma maculatum*). The spotted bat is a Federal Species of Concern and State Species of Special Concern. Little is known about its distribution. Spotted bats forage in a wide variety of habitats but roost strictly in cliffs. The Project

site would provide foraging habitat for this species and it has a moderate potential to occur for foraging; however, no suitable roosting habitat is present.

California Mastiff Bat (*Eumops perotis californicus*). The California mastiff bat, the largest bat in the United States, is a Federal Species of Concern and a California Species of Special Concern. This species is a very wide-ranging and high-flying insectivore that typically forages in open areas with high cliffs. It roosts in crevices in small colonies. The Project site would provide limited foraging habitat for this species and it has a low potential to occur for foraging; however, no suitable roosting habitat is present.

San Bernardino Mountain Flying Squirrel (*Glaucomys sabrinus californicus*). The San Bernardino Mountain flying squirrel is a Federal Species of Concern and State Species of Special Concern. It occurs in the San Bernardino Mountains between 5,200 and 8,500 feet above msl. This species prefers mid- to upper-elevation, dense, mature coniferous forest habitats, particularly those containing white fir. They use cavities in large trees, snags, and logs for cover. The Project site provides suitable foraging habitat for this species and the potential for occurrence is considered high; however, the potential for this species to breed on the Project site is considered to be low as this species prefers to breed in relatively dense coniferous forests in proximity to riparian areas.

Small-footed Myotis (*Myotis ciliolabrum*). The small-footed myotis is a Federal Species of Concern that occurs throughout much of the western United States, occupying a variety of habitats. This species feeds among trees or over brush, and roosts in cavities of cliffs, trees, or rocks and within caves or mine shafts. The Project site provide potentially suitable roosting and foraging habitat for this species and the potential for occurrence is considered to be low for roosting and high for foraging.

Long-eared Myotis (*Myotis evotis*). The long-eared myotis is a Federal Species of Concern that is restricted to high-elevation habitats. It is known to occur in Coon Creek in the San Bernardino National Forest. This species can occur in a variety of habitats, but are usually associated with coniferous forests where they roost under exfoliating tree bark. The Project site provides potentially suitable roosting and foraging habitat for this species and the potential for occurrence is considered to be high for foraging and roosting.

Occult Little Brown Bat (*Myotis lucifugus*). The occult little brown bat is a Federal Species of Concern and State Species of Special Concern that is restricted to high-elevation habitats. This species occurs in pine forests at elevations ranging from 6,000 to 9,000 feet above msl. It roosts in buildings, trees, and cliffs and feeds over water or open sites. The Project site provides suitable roosting and foraging habitat and the potential for this species to occur is considered to be high for foraging and roosting.

Fringed Myotis (*Myotis thysanodes*). The fringed myotis is a Federal Species of Concern that is restricted to high-elevation habitats. This species has been observed on Arrastre Creek on the San Bernardino National Forest. It occurs in a wide variety of habitats but is most commonly found in dry pine or mixed conifer

forests and pinyon-juniper woodlands where it will roost in caves, buildings, mine shafts, rock crevices in cliff faces, trees, and bridges. Hibernation has only been documented in buildings and mines. The Project site provides marginally suitable roosting and foraging habitat for this species and potential for occurrence is considered to be moderate for foraging and low for roosting.

Long-legged Myotis (*Myotis volans*). The long-legged myotis is a Federal Species of Concern that is restricted to high-elevation habitats. This species has been observed on Arrastre Creek on the San Bernardino National Forest. It is primarily a bat of coniferous forests but also occurs seasonally in riparian and desert habitats. It uses abandoned buildings, cliff crevices, exfoliating tree bark, and hollows within snags as summer day roosts; caves and mine tunnels for hibernation. The Project site provides marginally suitable foraging and roosting habitat for this species and its potential to occur on the Project site is considered to be moderate for foraging and roosting.

Yuma Myotis (*Myotis yumanensis*). The Yuma myotis is a Federal Species of Concern and a relatively small bat that occurs statewide. This species is closely associated with water and wooded canyon bottoms throughout its range. Caves and old buildings are preferred roosting habitats, with roosts numbering up to 2,000 individuals. The Project site provides potentially suitable foraging habitat for this species and the potential for this species to forage on the Project site is considered to be moderate; however, this species is not expected to roost on the Project site.

Pacific Western Big-eared Bat (*Plecotus townsendii pallescens*). The Pacific western big-eared bat occurs throughout California and is a Federal Species of Concern and State Species of Special Concern. In the southern portion of the state, the subspecies, *P.T. pallescens*, occupies a variety of communities, including oak woodlands, arid deserts, grasslands, and high-elevation forests and meadows. Known roosting sites in California include mines, caves, and buildings. The Project site would provide foraging habitat for this species and it has a moderate potential to forage on the Project site; however, no suitable roosting habitat is present.

ON-GOING REGIONAL AND LOCAL HABITAT CONSERVATION PROGRAMS

Carbonate Plant Critical Habitat/San Bernardino Mountains Carbonate Habitat Management Strategy

On January 23, 2003, the USFWS designated critical habitat for five Federally-listed plants on 13,180 acres of land in the San Bernardino Mountains. The five plants are Cushenbury milk-vetch (*Astragalus albens*), Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*), San Bernardino Mountains bladderpod (*Lesqueralla kingii* ssp. *bernardina*), Cushenbery oxytheca (*Oxytheca parishii* var. *goodmaniana*), and Parish's daisy (*Erigeron parishii*). Critical habitat for these species covers 11,980 acres between the western edge of White Mountain and the eastern edge of Rattlesnake Canyon, 685 acres northeast of Big Bear Lake, and 515 acres of San Bernardino National Forest lands on Sugarlump Ridge south of Bear Valley. The project site is not located in any areas designated as critical habitat for these five carbonate plants. In addition, a Carbonate Habitat Management Strategy is currently being developed to address the long-term conservation of carbonate habitat in the

San Bernardino Mountains. The strategy identifies potential and occupied carbonate habitat and actions to conserve carbonate plants. Plant surveys on the project site have not identified any carbonate habitat on the project site that may be subject to conservation measures outlined in the Carbonate Habitat Management Strategy.

County of San Bernardino General Plan

The County of San Bernardino General Plan contains goals and policies/actions designed to preserve biological resources that apply to development within the County's jurisdiction. The general plan contains a list of Rare, Endangered and Threatened species that occur in San Bernardino County, adverse effects on which result in a mandatory finding of significant effect pursuant to State CEQA Guidelines, Section 15065 if individuals are adversely affected by County land use map changes and discretionary land use approvals, thereby requiring the preparation of an Environmental Impact Report (EIR). Listed plant species identified within the General Plan with potential to occur on the Project site include Parish's checkerbloom and bird's foot checkerbloom. Listed wildlife species identified within the General Plan with potential to occur on the Project site include the southern rubber boa and bald eagle. This *Biological Resources Assessment*, contained in Appendix 15.6, has been prepared as supporting documentation for the proposed Project EIR, which satisfies the requirements of the County of San Bernardino General Plan.

County of San Bernardino Biotic Resources Overlay District

The Project site lies within a County of San Bernardino Biotic Resources (BR) Overlay District. The purpose of the BR Overlay District is to "implement General Plan policies regarding the protection and conservation of beneficial rare and endangered plants and animal resources and their habitats which have been identified within unincorporated areas of the county" (Article 2, 85.030201). The County General Plan implements the intent of the BR Overlay District by requiring all proposed land uses with a minimum of 25 percent of the total proposed development area within the BR Overlay District to prepare a biological technical report identifying impacts to biological resources and mitigation measures designed to reduce or eliminate Project related impacts. The *Biological Resources Assessment* is intended to satisfy the requirements of the BR Overlay District.

Plant Protection and Management Ordinance – County of San Bernardino Development Code

The County of San Bernardino requires under Chapter 8, Division 9 of the County Development Code (Plant Protection and Management) that development on all private and public lands within the unincorporated areas of San Bernardino County is subject to specific requirements. Removal of any native plant from unincorporated areas of San Bernardino requires the approval of a removal permit. Additionally, the following sections of the ordinance would apply to native plants on the Project site:

89.0110(b) The provisions of this Division shall not authorize the removal of perch trees within identified American Bald eagle habitat.

89.0115(c) The reviewing authority may require certification from an appropriate tree expert or native plant expert that such tree removals are appropriate, supportive of a healthy environment and are in compliance with the provisions of this chapter.

89.0205 Any coniferous tree or portion thereof, including stumps, shall be treated in accordance with one of the methods specified in Sections 89.0205 and 89.0210 within fifteen (15) days after such a tree or portion of such a tree has been cut.

Migratory Bird Treaty Act (MBTA)

The MBTA established in 1918 the federal prohibition, unless permitted by regulations, to pursue, hunt, take, capture, or kill any migratory bird species or any part, nest, or egg of any such migratory bird species covered by the act. Impacts to any bird (or its nest) listed by the MBTA are considered punishable by fines and/or imprisonment. Additionally, impacts to nesting MBTA-listed species are considered a significant impact by CEQA per guideline section.

IMPACTS

The determination of impacts in this analysis is based on a comparison of maps depicting Project grading limits and maps of on-site biological resources. All construction activities, including staging and equipment areas, are assumed to be contained within the limits of grading. Both direct and indirect impacts on biological resources have been evaluated. Direct impacts are those that involve the initial loss of habitats due to grading and construction. Indirect impacts are those that would be related to disturbance from construction activities (e.g., noise, dust) and use of the Project site.

Biological impacts associated with the proposed Project were evaluated with respect to the following special status biological issues:

- Federally- or State-listed Endangered or Threatened species of plant or wildlife;
- Non-listed species that meet the criteria in the definition of Rare, Threatened, or Endangered in the California Environmental Quality Act (CEQA) Guidelines;
- Streambeds, lakebeds, wetlands, and their associated vegetation;
- Habitats suitable to support a Federally- or State-listed Endangered or Threatened species of plant or wildlife;
- Species designated as California Species of Special Concern or Federal Species of Concern;
- Habitat, other than wetlands, considered special status by regulatory agencies (USFWS, CDFG) or resource conservation organizations; and

- Other species or issues of concern to regulatory agencies or conservation organizations.

The actual and potential occurrence of these resources within the Project site was correlated with the significance criteria noted below to determine whether the impacts of the proposed Project on these resources would be considered significant.

SIGNIFICANCE CRITERIA

Appendix G of the CEQA Guidelines contains the Initial Study Environmental Checklist Form which includes questions relating to biological resources. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this Section. Accordingly, a Project may create a significant environmental impact if one or more of the following occurs:

- If the Project has a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Game and Wildlife Service (refer to Impact Statement 5.8-1).

- If the Project has a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Game and Wildlife Service (refer to Impact Statement 5.8-2).

- If the Project has a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means (refer to impact Statement 5.8-3).

- If the Project interferes substantially with the movement of any native or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedes the use of native wildlife nursery sites (refer to Impact Statement 5.8-4).

- If the Project conflicts with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (refer to Impact Statement 5.8-5).

- If the Project conflicts with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan (refer to Section 10.0, *Effects Found Not to be Significant*).

Section 15065(a), *Mandatory Findings of Significance*, of the CEQA Guidelines states that a Project may have a significant effect on the environment if "…the Project has the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or

animal community, reduce the number or restrict the range of an endangered, rare or threatened species…".

An evaluation of whether an impact on biological resources would be substantial must consider both the resource itself and how that resource fits into a regional or local context. Substantial impacts would be those that would substantially diminish, or result in the loss of, an important biological resource or those that would obviously conflict with local, State or Federal resource conservation plans, goals, or regulations. Impacts are sometimes locally adverse but not significant because, although they would result in an adverse alteration of existing conditions, they would not substantially diminish or result in the permanent loss of an important resource on a population- or region-wide basis.

Section 15380 of CEQA indicates that a lead agency can consider a non-listed species to be Rare or Endangered for the purposes of CEQA if the species can be shown to meet the criteria in the definition of Rare or Endangered. For the purposes of this discussion, the current scientific knowledge on the population size and distribution for each special status species was considered according to the definitions for Rare and Endangered listed in Section 15380 of CEQA.

The actual and potential occurrence of these resources within the Project vicinity was correlated with the previously identified significance criteria to determine whether the impacts of the proposed Project on these resources would be significant.

Additionally, the proposed Project must be consistent with County adopted Standard Conditions of Approval (SCA). Thus, this section identifies the SCAs that would offset the biological impact of clearing existing vegetation types for individual lot development. The majority of the SCAs would be enforced by the County of San Bernardino during the entitlement process and are discussed to demonstrate Project consistency with local and regional policies and plans applicable to the proposed Project. SCAs applicable to the proposed Project include, but are not limited to the following:

SCA-1 Tree replanting will be required on a 2 to 1 basis as per San Bernardino County Plant Protection and Management Ordinance along road cuts and fills. Spacing between planted trees should be no closer than 20 feet. Low volume, fire resistant shrubs and ground cover are also recommended for planting on roadside slopes. A Professional Forester or ISA Certified Arborist with experience in the San Bernardino Mountains should review the landscaping plan before submittal to the County.

SCA-2 The landscape plan shall include tree protection guidelines which state that all construction activities should be limited to the late summer or early fall period. Heavy equipment shall be confined to skid trails, building sites, driveway pads, and parking areas. Heavy vehicle grading over 2 inches, operation, service, storage, placement of fill six inches or deeper, waste disposal, and construction of concrete or asphalt pads shall not take place within the dripline of remaining trees. Utility construction and foundation footings should

also remain outside the dripline (if not possible, consult a professional arborist regarding if roots should be cut, tree removed, or if other preventative measures are possible). All measures should be taken to prevent damage to roots and provide subsequent treatment if injury occurs.

SCA-3 Logs shall be removed from the site within 15 days to reduce the potential for bark beetle infestations. California Forest Practice Rules allow chipping, debarking, sealing with clear plastic for 4 to 6 months, or lopping of limbs from stems greater than 3 inches in diameter and scattering so that all material has maximum exposure to solar radiation. Spraying of individual pine trees with carbaryl insecticide prior to construction is considered advantageous.

Potential impacts are grouped below according to topic. The mitigation measures at the end of this section directly correspond with the numbered impact statements.

SPECIAL STATUS BIOLOGICAL RESOURCES

5.8-1 *Project implementation would affect species identified as special status. Implementation of recommended mitigation measures would reduce impacts to a less than significant level to biological species, with the exception of the Bald Eagle. Impacts to the Bald Eagle are concluded as significant and unavoidable.*

A total of 62.56 acres of native and non-native vegetation types, including developed areas, would be impacted by the proposed project. These areas are discussed below, summarized in Table 5.8-4, *Vegetation Types Impacted* and illustrated on Exhibit 5.8-3, *Biological Resources – Project Impacts*.

Table 5.8-4
Vegetation Types Impacted

Vegetation Type	Existing Acreage	Impacted Acreage
Jeffrey Pine Forest	54.91	54.91
Pebble Plain	0.69	0.69
Lake Shoreline	4.14	4.14
Developed	2.82	2.82
Total	**62.56**	**62.56**

Vegetation Types

Pebble Plains. A total of 0.69 acre of pebble plain habitat would be impacted by Project implementation. Approximately 379 acres of pebble plain are known to exist in the San Bernardino Mountains, 60 percent (227 acres) of which occurs on public

lands. Development of the Project site would remove 0.18 percent of the remaining acreage of pebble plain known to occur on both public and private lands. Although the proposed Project would impact a small area of pebble plain habitat relative to the amount of this vegetation type within the San Bernardino Mountains, Mitigation Measure 5.8-1~~g~~a ~~is recommended to~~ would ensure that impacts are reduced to less than significant levels.

Montane Meadows. Botanical surveys during 2002 were limited on the Project site and throughout southern California due to a very low rainfall year. Many plant species indicative of the montane meadow vegetation type 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 on a site as an inactive seed, bulb, or rootcrown. Therefore, the extent of montane meadow on the Project site could not be determined during the 2002 botanical survey. However, implementation of Mitigation Measure 5.8-1a would reduce impacts to this vegetation type to a less than significant level.

Plants

Project implementation would result in impacts on four special status plant species known to occur on the Project site, including one Federally-listed Threatened and CNPS List 1B species, ash-gray Indian paintbrush; and three CNPS List 1B species, Parish's rock cress, Big Bear Valley woollypod, and silver-haired ivesia. Additionally, Project implementation may result in impacts to special status species potentially occurring on the Project site, including six Threatened or Endangered species and 20 CNPS Lists 1B and 2 species. Project implementation also has the potential to impact potentially suitable habitat for 15 CNPS List 4 species.

SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR ON THE PROJECT SITE

One Federally-listed Threatened and CNPS List 1B species, ash-gray Indian paintbrush; and three CNPS List 1B species, Parish's rock cress, Big Bear Valley woollypod, and silver-haired ivesia, were observed on the Project site during the 2002 botanical surveys. Populations of ash-gray Indian paintbrush and Parish's rock cress were found to be widespread throughout an approximately 11.8 acre area of open Jeffrey pine forest with an herbaceous layer of Wright's matting buckwheat in the western half of the Project site. The approximately 0.64 acre of pebble plain habitat was included in this area. Silver haired ivesia was found to be concentrated entirely within the mapped pebble plain habitat. Bear Valley woollypod was found in patches scattered throughout Jeffrey pine forest habitat on the Project site. It is expected that population sizes for these species on the Project site would be larger during a normal rainfall year (i.e., at least 40 percent of average annual precipitation).

Impacts on these species would be considered significant according to CEQA Guideline Section 15065. However, implementation of mitigation measure 5.8-1a would reduce impacts to a less than significant level.

SPECIAL STATUS PLANT SPECIES POTENTIALLY OCCURRING ON THE PROJECT SITE

Botanical surveys during 2002 were limited on the Project site and throughout southern California due to a very low rainfall 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 on a site as an inactive seed, bulb, or rootcrown. Most of the special status plants of the Big Bear area are perennial herbs, making a conclusive determination of "presence" or "absence" based on field surveys difficult during low rainfall years. However, previous reports of presence and determination of habitat quality can be used to estimate the probability that a special status plant species might occur on the Project site.

There is potential for several special status plants on the Project site that were not detectable this spring due to dry conditions. Special status plants potentially occurring on the Project site include the six listed Threatened or Endangered species (bird's foot checkerbloom, San Bernardino bluegrass, California dandelion, Big Bear Valley sandwort, southern mountain buckwheat, and slender-petalled thelypodium); one CNPS List 1B and state-listed Rare species and Candidate for federal listing as Threatened or Endangered (Parish's checkerbloom); and 26 CNPS List 1B or 2 species as follows:

- rock sandwort
- Big Bear Valley milk vetch
- Palmer's mariposa lily
- San Bernardino Mountain owl's clover
- male fern
- San Bernardino Mountains dudleya
- leafy buckwheat
- San Bernardino Mountain gilia
- shaggy-haired alum root
- Parish's alumroot
- short-sepaled lewisia
- lemon lily
- Baldwin Lake linanthus
- San Bernardino Mountain monkeyflower
- purple monkeyflower
- Baja navarretia
- Parish's yampah
- Bear Valley phlox
- Bear Valley pyrrocoma
- San Bernardino butterweed
- prairie wedge grass
- southern jewelflower
- grey-leaved violet

Surveys during a normal rainfall year would be required to determine presence or absence and the extent of these species on the Project site. The loss of potential

habitat for these species would be considered significant according to CEQA Guideline Section 15065. However, implementation of mitigation measure 5.8-1a would reduce impacts to a less than significant level.

There is potential for fifteen CNPS List 4 species on the Project site. The plants in the CNPS List 4 category are of limited distribution or infrequent throughout a broad area in California, and their vulnerability or susceptibility to threat appears relatively low at this time. CNPS is actively monitoring populations of the List 4 species and they will be transferred to a more appropriate list if the degree of endangerment or rarity of these species should change. The CNPS List 4 species present on the Project site do not meet the definitions of Rare, Threatened, or Endangered according to CEQA Guideline Section 15065. However, they are addressed in the *Biological Resources Assessment*, refer to Appendix 15.6, given the number of species potentially present on the Project site. No significant impacts to CNPS List 4 species are anticipated at present.

Wildlife

The proposed Project would result in the loss of potential habitat for several special status wildlife species potentially present on the Project site. For those species expected to occur, potential impacts were evaluated for the habitat that the species is expected to occupy.

Invertebrates. Project implementation may result in impacts on one special status invertebrate species, the Andrews' marble butterfly. Although not observed during general wildlife surveys, the Andrews' marble butterfly has potential to occur on the Project site. Potential habitat for this species is present among plants in the pebble plain habitat on the Project site. However, the Project site contains a minimal amount of habitat relative to the availability of habitat for this species throughout the San Bernardino Mountains. Thus, impacts are considered less than significant.

Amphibians. Project implementation may result in impacts on special status amphibian species. No Federally- or State-listed amphibian species have potential to occur on the Project site. One species that is a Federal Species of Concern and state Species of Special Concern, the yellow-blotched salamander, has potential to occur on the Project site. Potential habitat for this species occurs on the Project site in mesic areas with rotting logs and leaf litter. The loss of potential habitat for this species would be considered less than significant due to the limited amount of habitat loss relative to the availability of habitat for this species in the region.

Reptiles. Project implementation may result in impacts on special status reptile species. One Federal Species of Concern, the southern sagebrush lizard, has been observed on the Project site. Four additional species that are federal Species of Concern and/or State Species of Special Concern have potential to occur on the Project site. These species are the silvery legless lizard, coastal western whiptail, San Bernardino ringneck snake, and San Bernardino Mountain kingsnake. The loss of potential habitat for these species would be considered less than significant due to the limited amount of habitat loss relative to the availability of habitat for these species in the region.

Intensive surveys for the State-listed Threatened southern rubber boa were conducted on the Project site in the spring and summer of 2002. Given the negative results of two independent focused survey techniques and the lack of historical records in the immediate vicinity of the Project site, the survey report concluded that this species is not expected to occur on the Project site. Therefore, no impacts to this species are anticipated.

Birds

Project implementation may result in impacts on special status bird species. Two Federally- and/or State-listed Endangered species have potential to occur on the Project site, the American peregrine falcon and bald eagle. One Fully Protected species, the white-tailed kite, has potential to occur on the Project site. In addition, 16 Federal Species of Concern and/or State Species of Special Concern have potential to occur on the Project site and are discussed below.

Bald Eagle. The bald eagle rarely nests in southern California. However, small wintering populations of bald eagle often occur in scattered montane locations in the region. Big Bear Lake supports the largest wintering population of bald eagle in southern California and may include as many as 30 individuals in peak years. The bald eagle was observed using several trees on the project site for perch and roost locations. A records search also demonstrated that some of the most utilized perch and roost trees on the north shore of the lake are located on the project site. Given the limited distribution of wintering populations of bald eagles in southern California, removal of these trees and/or construction of uses in proximity to trees such that there would be a loss of perching or roosting habitat value for wintering bald eagles would be considered a significant impact. Implementation of mitigation measures 5.8-1b and 5.8-1c would reduce impacts to this species. However, impacts would remain significant following implementation of the recommended mitigation measures.

Cooper's Hawk, Northern Goshawk, Sharp-shinned Hawk, Golden Eagle, Long-eared Owl, Ferruginous Hawk, Northern Harrier, White-tailed Kite, Merlin, American Peregrine Falcon, Osprey, Prairie Falcon, and California Spotted Owl. Project implementation would reduce the amount of foraging habitat for these species. This impact would contribute to the cumulative loss of foraging habitat for these raptor species. However, the loss of potential foraging habitat for these species would be considered adverse, but less than significant due to the limited amount of habitat loss relative to the availability of foraging habitat for these species in the San Bernardino Mountains and National Forest.

The Cooper's hawk, long-eared owl, white-tailed kite, and California spotted owl also have potential to nest on the project site. If an active raptor nest (common or special status species) were found on the project site, the loss of the nest would be considered a violation of the California Fish and Game Code Sections 3503, 3503.5, and 3513. The loss of any active raptor nest occurring on the project site would be considered significant. The potential impact on these species would be reduced to a less than significant level with the implementation of mitigation measure 5.8-1d.

Black Swift, Yellow Warbler, Hepatic Tanager, Purple Martin, and Gray Vireo. Project implementation would reduce the amount of foraging habitat for these species. In addition, the hepatic tanager and purple martin have potential to nest on the project site and implementation of the project may impact active nests. The loss of potential habitat for these species would be considered adverse, but less than significant due to the limited amount of habitat loss relative to the availability of habitat for these species in the San Bernardino Mountains and National Forest. However, impacts to individual nests would result in a violation of the MBTA and would be considered a significant impact. However, implementation of mitigation measure 5.8-1e would reduce impacts to a less than significant level.

Mammals

Project implementation may result in impacts on special status mammal species. No Federally- and/or State-listed species have potential to occur on the Project site. However, 11 Federal Species of Concern and/or State Species of Special Concern have potential to occur on the Project site and are discussed below.

Pallid Bat, Spotted Bat, California Mastiff Bat, Small-Footed Myotis, Long-Eared Myotis, Occult Little Brown Bat, Fringed Myotis, Long-Legged Myotis, Yuma Myotis, and Pacific Western Big-Eared Bat

The proposed Project provides suitable foraging habitat for these bat species. Project implementation would reduce the amount of foraging habitat for these species. The pallid bat, small-footed myotis, long-eared myotis, Occult little brown bat, fringed myotis, long-legged myotis, and Yuma myotis, also have potential to roost on the Project site. This impact would contribute to the cumulative loss of foraging and roosting habitat for these bat species. However, the loss of potential habitat for these species would be considered adverse, but less than significant, due to the limited amount of habitat loss relative to the availability of foraging and roosting habitat for these species in the San Bernardino Mountains and National Forest.

San Bernardino Mountain Flying Squirrel. The Project site provides suitable foraging and breeding habitat for this species. Project implementation would impact habitat for this species. However, the loss of potential habitat would be considered adverse, but less than significant, due to the limited amount of habitat loss relative to the availability of habitat for this species in the San Bernardino Mountains and National Forest.

SENSITIVE NATURAL COMMUNITIES/HABITATS

5.8-2 *The proposed Project would impact portions of the Project site that are habitat for referenced sensitive species. Implementation of recommended mitigation measures would reduce impacts to a less than significant level.*

DIRECT IMPACTS

Flora and Vegetation Type Impacts

A total of 61.87 acres of native and non-native vegetation types, including developed areas, would be impacted by the proposed Project. These areas are discussed below, summarized in Table 5.8-4 and illustrated on Exhibit 5.8-2.

Jeffrey Pine Forest

A total of 54.91 acres of Jeffrey pine forest, including 17.38 acres of open Jeffrey pine forest, would be impacted by Project implementation. Approximately 58,526 acres of Jeffrey pine forest occurs in the San Bernardino National Forest and 141,604 acres in the Cleveland, San Bernardino, Angeles and Los Padres National Forests collectively. Impacts on this vegetation type would be considered less than significant since this vegetation type is common throughout the San Bernardino Mountains and other mountain ranges in the region.

Lake Shoreline

A total of 4.14 acres of lake shoreline would be impacted by Project implementation. Man-made lakes are essentially distinct ecosystems, with an aquatic fauna and flora that bears little resemblance to what naturally occurs in the streams that formed them. Impacts on this vegetation type would be considered less than significant since Big Bear Lake is a man-made reservoir created by the construction of Bear Valley Dam. Montane meadow habitat may occur within the lake shoreline vegetation type. Impacts to montane meadow are discussed above under *Special Status Biological Resources Impacts*.

Pebble Plains

A total of 0.69 acre of pebble plain habitat would be impacted by Project implementation. Impacts to pebble plain habitat are discussed above under *Special Status Biological Resources Impacts*.

Developed

A total of 2.82 acres of disturbed vegetation in developed areas would be impacted by Project implementation. Impacts on this vegetation type would not be considered significant since this vegetation type is considered to have a low biological value.

WILDLIFE IMPACTS/INDIRECT IMPACTS

Wildlife Impacts

To assess impacts on wildlife, the total impact on a given vegetation type that provides habitat for wildlife was evaluated. Exhibit 5.8-3, *Biological Resources - Project Impacts*, illustrates the vegetation types (i.e., wildlife habitat) that would be impacted as a result of Project implementation. The following discussion of wildlife impacts focuses on the common species occurring on the Project site. Impacts on special status wildlife species are addressed above under *Special Status Biological Resources Impacts*.

Source: BonTerra Consulting, July 2003.

RBF CONSULTING
PLANNING ■ DESIGN ■ CONSTRUCTION
12/05 JN 10-101901

MOON CAMP TT #16136
ENVIRONMENTAL IMPACT REPORT

Biological Resources - Project Impacts

Exhibit 5.8-3

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The loss of habitat, loss of wildlife, wildlife displacement, and habitat fragmentation that would result from construction of the proposed Project would not be considered significant because these impacts would not substantially diminish habitat for wildlife in the region nor reduce any specific wildlife populations in the region to below self-sustaining numbers.

INDIRECT IMPACTS

Indirect impacts are those related to disturbance by construction (such as noise, dust, and urban pollutants) and long-term use of the Project site and its effect on the adjacent habitat areas. The indirect impact discussion below includes a general assessment of the potential indirect affects (noise, dust and urban pollutants, lighting, human activity, and non-native species introduction), of the construction and operation of the proposed Project. Particular focus is placed on the indirect effects on the natural open space area on the Project site collectively referred to as edge effects.

Edge effects occur where development, including roads, takes place adjacent to natural open space areas. Edge effects threaten the ecological integrity, recreational experience, aesthetic quality, public investment, and safety operations of preserved or undeveloped natural areas located adjacent to developed areas. When development is configured in a manner that creates a high ratio of development edge to natural open space, there is an increase in the potential impacts caused by human use (indirect impacts). These indirect effects that address both the short-term construction and long-term use of the Project site are outlined below.

Noise Impacts

Noise levels on the Project site would increase over present levels during and upon completion of construction of the proposed Project. During construction, temporary noise impacts have the potential to disrupt foraging, nesting, roosting, and denning activities for a variety of wildlife species. Upon completion of construction, noise levels on the Project site would increase as a result of increased human activity associated with residential uses. Both short and long-term noise impacts could potentially disrupt the foraging and roosting potential of the site for the bald eagle. Any interruption of the foraging and/or roosting behavior of the bald eagle would be considered a significant impact.

Short-term construction noise impacts on the bald eagle could be avoided by prohibiting grading and construction activities when wintering populations are present (between November and March). However, given restrictions on construction resulting from mitigation for direct impacts (i.e., 5.8-1d and 5.8-1e) construction activities would be limited strictly to the month of October. Consequently, no feasible mitigation could be determined at this time. Therefore, both short- and long-term residential noise impacts on the bald eagle would be considered an unavoidable significant impact of the proposed project.

Increased Dust and Urban Pollutants

Grading activities would disturb soils and result in the accumulation of dust on the surface of the leaves of trees, shrubs, and herbs in the natural open space areas adjacent to the Project site. The respiratory function of the plants in these areas would be impaired when dust accumulation is excessive. These impacts are considered adverse, though less than significant.

Additional impacts on biological resources in the area may occur as a result of changes in water quality. Urban runoff from the proposed Project containing petroleum residues and the potential for improper disposal of petroleum and chemical products from construction equipment (temporary) or infrastructure areas (i.e., vehicles, improper disposal of chemicals) (permanent) could affect water quality on-site and off-site, including Big Bear Lake. This, in turn, could affect populations of aquatic species. Water quality could also be affected by runoff of nutrients from landscape features of the proposed Project. Mitigation would require that the applicant apply for coverage under the State Water Resources Control Board's General Permit for Storm Water Discharge Associated with Construction Activity and comply with all of the provisions of the permit, including the development of a Storm Water Pollution Prevention Plan (which includes provisions for the implementation of Best Management Practices and erosion control measures).

Night Lighting

Lighting of the residential units would inadvertently result in an indirect effect on the behavioral patterns of nocturnal and crepuscular (i.e., active at dawn and dusk) wildlife that are present along the boundaries of the natural areas of the project site. Of particular concern is the effect on small ground-dwelling animals that use the darkness to hide from predators, and on owls, which are specialized night foragers. In addition, the increase in night lighting could discourage nesting and roosting along the lake shore. Most notably, lighting associated with the proposed project could disrupt roosting behavior of the bald eagle on the project site. This increased lighting, in conjunction with the increased noise and habitat loss, would be considered potentially significant. Implementation of mitigation measures 5.8-2a and 5.8-2b would reduce this impact to a less than significant level.

Human Activity

The increase in human activity (i.e., noise, foot traffic) would increase the disturbance of natural open space adjacent to the project site. Human disturbance could disrupt normal foraging and breeding behavior of wildlife remaining in adjacent areas, diminishing the value of these open space habitat areas. Most notably, residential activity associated with the proposed project could disrupt foraging and roosting behavior of the bald eagle on the project site. Implementation of mitigation measures 5.8-2a, 5.8-2b and 5.8-2c would reduce impacts to less than significant levels.

Non-Native Species Introduction

The native habitat types within the natural open space areas adjacent to the project site would be subject to greater pressure from non-native plant species within the developed portions of the project site. Areas that have undergone disturbance generally contain a high number of non-native grasses and forbs that can successfully out-compete the native plants in the region. This will be especially true after initial project grading of the project site. Should non-native plants establish themselves in these areas prior to the establishment of native plant species or non-native/non-invasive plant species in the landscape areas, the non-natives may become invasive in the natural open space areas. Left uncontrolled, these "weeds" may begin encroaching into the adjacent natural areas. These impacts could become significant if uncontrolled. Implementation of mitigation measure 5.8-2d would reduce impacts to a less than significant level.

JURISDICTIONAL WATERS

5.8-3 *Development of the proposed Project ~~does not have~~has the potential to impact jurisdictional waters. Analysis has concluded that potentially significant impacts would be reduced to a less than significant level~~impact would occur in this regard after regulatory compliance~~ with implementation of the recommended mitigation measures.*

Any development proposal that involves impacting the drainages, streams, or wetlands on the site through filling, stockpiling, conversion to a storm drain, channelization, bank stabilization, road or utility line crossings, or any other modification would require permits from the Corps, the RWQCB, and the CDFG before any development could commence on the Project site. Both permanent and temporary impacts are regulated and would trigger the need for permits. Processing of the RWQCB 401 and CDFG 1602 agreement can occur concurrently with the Corps 404 permit process and can utilize the same information and analysis. The Corps will not issue its authorization until the RWQCB completes the Section 401 Water Quality Certification. Applications to both the RWQCB and the CDFG require submittal of a valid California Environmental Quality Act (CEQA) document along with the application.

Mitigation may be required by the regulatory agencies during the permit process. Compensatory mitigation for the loss of jurisdictional function and values is a fundamental component of the applicant regulatory programs. Mitigation can take several forms. It can consist of (1) avoidance or minimization of impacts, (2) compensation in the form or habitat creation, restoration and enhancement, or (3) compensation through participation in a mitigation bank. The first type of mitigation is preferred by the agencies. For any project that impacts jurisdictional areas, it is also preferred by the agencies that compensation through the creation of habitat be performed on-site and in-kind (i.e., riparian woodland for riparian woodland). Conceptual mitigation will be discussed during the Pre-Application Field Meeting with the regulatory agencies. However, the exact requirements of any special permit conditions and mitigation established for this project would be dictated by the regulatory agencies following the review of the formally submitted project applications.

WATERS OF THE U.S. (WETLAND) DETERMINATION

As previously noted, in order to be considered a wetland, an area must exhibit all three of the wetland parameters (i.e., vegetation, soil and hydrology) per the evaluation criteria in the Wetland Delineation Manual. Based on the results of the field investigations, it was determined that not all three parameters were present within the drainages (hydric soils nor riparian vegetation were present). As a result, no Corps wetlands were identified on the Project site and no impacts would occur in this regard.

WATERS OF THE U.S. (NON-WETLAND) DETERMINATION

Based on the results of the field observations and data collection, RBF identified 0.15-acre of Corps jurisdictional "waters of the U.S." within the proposed Project site. The drainages are ephemeral; Big Bear Lake, although not included in the acreage calculation, is also considered jurisdictional by the Corps. Utilizing the most current development plans, it was determined that ~~roadway~~ the proposed improvements would impact approximately 0.2~~0~~4-acre of Corps jurisdiction. Discharges include approximately 0.04-acres to ephemeral drainages and approximately 0.20-acres of impact as a result of fill material associated with the proposed marina.

CALIFORNIA DEPARTMENT OF FISH AND GAME (1602~~3~~) JURISDICTION

Based on the results of the field observations and data collection, RBF identified 0.15-acre of CDFG jurisdictional streambed~~waters~~. Utilizing the most current development plans, it was determined that ~~roadway~~ the proposed improvements would impact 4.38~~0.04~~ acres of CDFG jurisdiction (includes streambed, shoreline, and lake impacts) (refer to Exhibit 5.8-2, *Jurisdictional Map)*.

OVERVIEW OF REGULATORY APPROVAL PROCESS

The following is a summary of the various permits, agreements, and certifications required prior to construction activities taking place within the jurisdictional areas.

Army Corps of Engineers

The Corps regulates discharges of dredged fill materials into "waters of the United States" under Section 404 of the Clean Water Act (CWA). Since improvements associated with the proposed Project would result in the discharge of material within the jurisdiction of the Corps, a 404 permit would be required.

California Department of Fish and Game

~~As noted above, the drainage within the proposed Project area meets the CDFG's definition as streambed and thus would be regulated by the CDFG. An agreement from the Department would be required. The CDFG agreement requires a fee and approximately 45 days processing time.~~ As noted above, areas within the Project site meet the CDFG's definition as streambed and lakebed. Since improvements associated with the proposed project would impact CDFG Jurisdiction, a 1602 Streambed Alteration Agreement (SAA) must be obtained prior to construction. A

processing fee and CEQA ~~c~~Compliance is necessary in order for the Agreement to be issued.

Regional Water Quality Control Board

The RWQCB requires that a CEQA compliance certification be obtained before starting the RWQCB process. Processing time should not exceed 60 days following submission of a complete application (determination of what constitutes a complete application is made by the RWQCB). Additionally, the RWQCB requires that water quality concerns related to urban storm water runoff be addressed. Any 401 Certification application submitted to the RWQCB should incorporate the use of Best Management Practices (BMPs) for the treatment of pollutants carried by storm water runoff in order to be considered a complete application. For the 404 permit to be approved, a 401 water certification would be required. A fee is required as part of the application submittal. Also refer to Section 5.11, *Hydrology and Drainage.*

~~Overall, impacts to the jurisdictional water present on the Project site would be reduced to a less than significant level through cojpliance with the regulatory process (i.e., 404 permit, CDFG agreement, 401 certification.)~~ Implementation of the recommended mitigation measure (Mitigation Measure 5.3-8a) regarding a 3:1 replacement-to-impact ratio for all unavoidable impacts to jurisdictional areas would ensure that significant impacts to jurisdictional waters are reduced to a less than significant level. Compliance with the regulatory process (i.e., 404 permit, CDFG agreement, 401 certification) would ensure the enforcement and implementation of the recommended mitigation measure. It is also noted that additional mitigation requirements may be required through the permitting process depending on the quality of habitat impacted, project design and other factors.

WILDLIFE MOVEMENT

5.8-4 *Project implementation may interfere with the movement of a native resident or migratory wildlife species. Analysis has concluded that impacts are less than significant.*

The development of the project site would not impact wildlife corridors, by definition, but may affect local travel routes. Construction of the residential areas and realignment of Highway 38 would result in reduced connectivity between Big Bear Lake as a water source to the contiguous open spaces on and to the north of the project site. Additionally, construction of the proposed project would result in increased traffic on the project site by residents that would further impede movement of terrestrial wildlife currently crossing the site and Highway 38. Although this impact is considered locally adverse, it is not considered significant because the impact does not substantially affect a regionally important wildlife movement corridor.

REGIONAL AND LOCAL POLICIES/PLANS

5.8-5 *Project implementation would not conflict with adopted regional and/or local policies/plans pertaining to biological resources. Analysis has concluded that impacts are less than significant.*

ON-GOING REGIONAL AND LOCAL HABITAT CONSERVATION PROGRAMS

San Bernardino Valley Multi-Species Habitat Conservation Plan (MSHCP)

The Project site is not encompassed by the draft MSHCP and is not subject to its policies and provisions. Therefore, no conflicts with the policies of the MSHCP are anticipated.

County of San Bernardino General Plan

The project site is located in unincorporated San Bernardino County and is subject to the provisions and policies of the County of San Bernardino General Plan. The General Plan contains a list of species considered Rare, Threatened, or Endangered by the County. Projects potentially impacting County-listed species must prepare an EIR to determine the significance of impacts on these species. Two plant species identified within the General Plan, Parish's checkerbloom and bird's foot checkerbloom, have the potential to occur on the project site. Presence or absence of these species could not be determined on the project site during the 2002 botanical surveys due to a low rainfall year. Therefore, impacts on these species were assessed according to the presence of suitable habitat. Implementation of mitigation measure 5.8-1a would determine specific population impacts and reduce impacts to these species to less than significant levels.

County of San Bernardino Biotic Resources Overlay District

The intent of the BR Overlay District is to require the preparation of a biological technical report for projects within the BR Overlay District identifying impacts to biological resources and mitigation measures designed to reduce or eliminate Project-related impacts. This biological technical report is intended to satisfy the requirements of the BR Overlay District.

Plant Protection and Management Ordinance – County of San Bernardino Development Code

Title 8, Division 9 of the San Bernardino County Development Code contains policies and requirements applicable to the project site including Section 89.0110(a), 89.0115(c), and 89.0205.

Section 89.0110(b) states that the provisions of this Division shall not authorize the removal of perch trees within identified American Bald eagle habitat. Implementation of mitigation measures 5.8-1a and 5.8-1b would ensure the project's compliance with this section.

Section 89.0115(c) requires that the County "may require certification from an appropriate tree expert or native plant expert that such tree removals are appropriate, supportive of a healthy environment and are in compliance with the provisions of this chapter". The Forester's Report and the Botanical Survey Letter Report are intended to satisfy the requirements of this section (refer to Appendix 15.6, *Biological Resources Information*). The County shall make a determination based on the evidence presented herein and in the Forester's Report as to the

significance of the proposed Project impacts to native plants and compliance with the provisions of Division 9 of the County Development Code.

The intent of Section 89.0205 is to treat coniferous tree species such that they don't present a risk of fire, and spread tree insect pests and infection. Compliance with this Section would be enforced by the County standard conditions and requirements during construction of the proposed Project. Implementation of standard condition of approval 3 (SCA-3) would reduce impacts to less than significant levels.

Migratory Bird Treaty Act (MBTA)

Implementation of the proposed project may impact the nests of species covered by the MBTA, including the Cooper's hawk, purple martin, and hepatic tanager. However, implementation of mitigation measures 5.8-1d and 5.8-1e would reduce impacts to these species to a less than significant level.

CUMULATIVE

5.8-6 *Cumulative development in the Project area may impact the area's biological resources. Analysis has concluded that ~~with implementation of the specified mitigation and compliance with all applicable County, State and Federal regulations concerning biological resources, a less than significant impact would occur in this regard.~~project implementation incrementally adding to impacts on bald eagle habitat in the Big Bear Valley would result in a significant and unavoidable cumulative impact to the wintering bald eagle population on Big Bear Lake.*

The proposed project contains some of the most utilized bald eagle roosting and perching habitat in the Big Bear Valley. Construction of the proposed project would diminish the habitat value of the project site for the species. When viewed in conjunction with other past, present, and reasonably foreseeable developments planned for the Fawnskin/Big Bear Lake area, the loss of bald eagle perch and roosting trees on the project site would significantly impact bald eagle habitat on the north shore of Big Bear Lake. Thus, cumulative impacts to the bald eagle are considered significant. Mitigation measures reflective of recommendations developed by scientific studies in the Big Bear Valley, including Kimball Garrett's study on the effects of human activity on wintering bald eagles (1981), are provided as part of the proposed project. However, implementation of these mitigation measures would not reduce direct or cumulative impacts to bald eagle habitat to a level considered less than significant.

~~t~~The loss of Jeffrey pine forest, pebble plain habitat and other native vegetation, as well as the loss of wildlife habitat could be considered a negative cumulative effect. However, with implementation of the recommended mitigation measures cumulative impacts to the Jeffrey pine trees would be mitigated to a less than significant level. ~~The proposed project would impact 0.69 acres of pepple plain habitat, however, implementation of the recommended mitigation measures would ensure that impacts would be reduced to less than significant levels.~~Additionally, implementation of the recommended mitigation measures would reduce impacts to 0.69 acre of pebble plain habitat to a less than significant level.

Potential impacts would be site specific and an evaluation of potential impacts would be conducted on a project-by-project basis. This would be especially true of those developments located in areas that contain sensitive species and habitat. Each incremental development would be required to comply with all applicable County, State and Federal regulations concerning the preservation of biological resources. ~~In consideration of these regulations,~~ However, potential cumulative impacts upon ~~biological resources~~ wintering bald eagle populations would ~~not~~ be considered significant and unavoidable.

MITIGATION MEASURES

Potential impacts to Biological Resources from Project implementation would be addressed through a two-category mitigation program consisting of Standard Conditions of Approval and mitigation measures. The Standard Conditions of Approval are addressed in the impact discussions above. The mitigation measures within each category are described below.

SPECIAL STATUS BIOLOGICAL RESOURCES

SPECIAL STATUS PLANTS AND VEGETION TYPES

5.8-1a ~~Prior to vegetation clearing, grading, or other disturbance, the project site shall be surveyed during a year with precipitation at least 40 percent of average for the area to determine presence or absence of special status plant species and vegetation types. Surveys shall focus on listed special status vegetation types, and Threatened or Endangered, and CNPS List 1B and 2 species whose presence could not be determined during surveys due to lack of rainfall. The location and extent of special status species populations shall be mapped and the size of the populations accurately documented.~~

~~The project applicant shall pay compensation for the loss of special status botanical resources identified on the project site by the survey by funding the purchase and management of off-site habitat through contributions to a fund established by the California Wildlife Foundation on behalf of the CDFG. The California Wildlife Foundation is an independent 501(c)3 nonprofit corporation founded to assist the CDFG and other governmental agencies in the management of funds and mitigation banks designed to offset the impact of development on California's native flora and fauna. Off-site habitat containing the same species as those identified within resources impacted by the proposed project shall be purchased at a ratio agreed upon by the County of San Bernardino, San Bernardino National Forest, USFWS, and CDFG. The typical mitigation ratio is 3:1 (i.e., three acres of habitat purchased for preservation for each acre impacted by development).~~

~~If additional surveys during a year with precipitation at least 40 percent of average do not encounter additional special status plant resources, the project applicant is responsible for the mitigation of a minimum of 11.8-acres of pebble plain and open Jeffrey pine forest in the western half of~~

~~the project site that is known to be occupied by the federally-listed Threatened ash-gray Indian paintbrush (i.e., would be required to fund the purchase of 35.4 acres of offsite habitat from the California Wildlife Foundation if the agreed mitigation ratio is 3:1).~~

Prior to vegetation clearing, grading, or other disturbance, the project site shall be surveyed during a year with precipitation at least 40 percent of average for the area to determine presence or absence of special status plant species and vegetation types. Surveys shall focus on special status vegetation types, and Threatened or Endangered, and CNPS List 1B and 2 species whose presence could not be determined during surveys due to lack of rainfall. The location and extent of special status species populations shall be mapped and the size of the populations accurately documented. Pebble plain habitat acreages will be recalculated following the survey using criteria established by the Habitat Management Guide for Pebble Plain Habitat on the National Forest System (2002).

Should avoidance/retention on-site of the 4.91 acres of Pebble Plain habitat in permanent open space under a Conservation Easement Agreement not occur, the Project Applicant shall pay compensation for the loss of special status botanical resources identified on the project site during the survey by funding the purchase, establishment of a conservation easement, and management of off-site habitat within the conservation easement by an entity approved by the CDFG. Off-site habitat containing the same species as those identified within resources impacted by the proposed project shall be purchased at a ratio of 3:1 (i.e., three acres of habitat purchased for preservation for each acre impacted by development). Prior to the initiation of clearing or grading activities on the project site, the conservation easement will be established, the management entity will be approved by the CDFG, and a non-wasting endowment will be established for the monitoring and management of the preservation site by the management entity in perpetuity.

If additional surveys during a year with precipitation at least 40 percent of average do not encounter additional special status plant resources, the Project Applicant is responsible for mitigating impacts to a minimum of 11.8-acres of pebble plain and open Jeffrey pine forest in the western half of the project site that is known to be occupied by the Federally-listed Threatened ash-gray Indian paintbrush. As such, the applicant would be required to fund the purchase and maintenance of 35.4-acres of offsite pebble plain and open Jeffrey pine forest habitat that contains special status plant species, including Ash-gray Indian paintbrush and others known to occur on the site.

SPECIAL STATUS WILDLIFE

5.8-1b Trees identified on Exhibits 3 and 4 of the Bald Eagle Survey Report (Appendix E, see attached) as eagle perch locations shall be preserved in place upon project completion and shall not be removed under any circumstances. Any development that may occur within the project site

and in the individual lots must avoid impacts to these trees and their root structures. All construction or landscaping improvements, including irrigation, will be prohibited on or around the exposed root structures or within the dripline of these trees. These restrictions on development of the individual tentative tracts must be clearly presented and explained to any potential prospective developers and/or homeowners prior to assumption of title and close of escrow. This measure shall be identified as a Note on the Composite Development Plan.

5.8-1c Prior to vegetation clearing, grading, or other disturbance, the project site shall be surveyed to identify all large trees (i.e., greater than 20-inches in diameter at 4.5 feet from the ground) within 600 feet from the high water line. Trees identified on the project site as having a diameter in excess of 20-inches at four feet from the ground within 600 feet of the shoreline shall be documented and tagged. Any development that may occur within the project site and in the individual lots must avoid impacts to tagged trees and their root structures. All construction or landscaping improvements, including irrigation, will be prohibited on or around the exposed root structures or within the dripline of these trees. These restrictions on development of the individual tentative tracts must be clearly presented and explained to any potential prospective developers and/or homeowners prior to assumption of title and close of escrow. This measure shall be identified as a Note on the Composite Development Plan.

5.8-1d Seven days prior to the onset of construction activities, a qualified biologist shall survey within the limits of project disturbance for the presence of any active raptor nests. Any nest found during survey efforts shall be mapped on the construction plans. If no active nests are found, no further mitigation would be required. Results of the surveys shall be provided to the CDFG.

If nesting activity is present at any raptor nest site, the active site shall be protected until nesting activity has ended to ensure compliance with Section 3503.5 of the California Fish and Game Code. Nesting activity for raptors in the region of the project site normally occurs from February 1 to June 30. To protect any nest site, the following restrictions on construction are required between February 1 and June 30 (or until nests are no longer active as determined by a qualified biologist): (1) clearing limits shall be established a minimum of 300 feet in any direction from any occupied nest and (2) access and surveying shall not be allowed within 200 feet of any occupied nest. Any encroachment into the 300/200 foot buffer area around the known nest shall only be allowed if it is determined by a qualified biologist that the proposed activity shall not disturb the nest occupants. Construction during the nesting season can occur only at the sites if a qualified biologist has determined that fledglings have left the nest.

5.8-1e Vegetation removal, clearing, and grading on the project site shall be performed outside of the breeding and nesting season (between March

and September) to minimize the effects of these activities on breeding activities of migratory birds and other species.

5.8-1f The use of the boat dock for motorized boating shall be prohibited between the dates of December 1 and April 1. No motorized boats shall be allowed to launch or moor in the vicinity of the boat dock at any time during this period. This restriction shall be clearly displayed on signage at the entrance to the parking lot and on the boat dock visible from both land and water. This requirement shall also be published in the Homeowner's Association CC&Rs.

~~**SPECIAL STATUS VEGETION TYPES**~~

~~5.8-1g Exterior construction shall be prohibited between the dates of December 1 and April 1 (of each year). Significant impacts to pebble plain habitat can be mitigated to a less than significant level through off-site preservation. The project applicant shall pay compensation for the loss of special status botanical resources identified on the site, by the survey, by contributing to the funding of purchase and management of off-site habitat. The Applicant shall acquire habitat in the Big Bear Valley and dedicate to the CDFG or suitable conservation organization. The California Wildlife Foundation is an independent 501(c)3 nonprofit corporation founded to assist the CDFG and other governmental agencies in the management of funds and mitigation banks designed to offset the impact of development on California's native flora and fauna. Off-site habitat shall be purchased at a ratio agreed upon by the County of San Bernardino, San Bernardino National Forest, USFWS, and CDFG. The typical mitigation ratio is 3:1 (i.e., three acres of habitat purchased for preservation for each acre impacted by development. An area containing no less than 2.1 acres of pebble plain habitat in an area located adjacent to other open space areas within the project vicinity shall be preserved in perpetuity. The preserved areas shall be protected from future development through a conservation easement or other appropriate mechanism.~~

SENSITIVE NATURAL COMMUNITIES/HABITATS

WILDLIFE IMPACTS/INDIRECT IMPACTS

5.8-2a Street lamps on the project site shall not exceed 20 feet in height, shall be fully shielded to focus light onto the street surface and shall avoid any lighting spillover onto adjacent open space or properties. Furthermore, street lights shall utilize low color temperature lighting (e.g., red or orange).

5.8-2b Outdoor lighting for proposed homes on the individual tentative tracts shall not exceed 1,000 lumens. Furthermore, residential outdoor lighting shall not exceed 20 feet in height and must be shielded and focused downward to avoid lighting spillover onto adjacent open space or properties. These restrictions on outdoor lighting of the individual

tentative tracts must be clearly presented and explained to any potential prospective developers and/or homeowners prior to assumption of title and close of escrow. This requirement shall also be published in the Homeowner's Association CC&Rs.

5.8-2c To limit the amount of human disturbance ~~to~~ on adjacent natural open space areas, signs shall be posted along the northeastern and eastern perimeter of the project site where the property boundary abuts open space ~~directing people to keep out of the adjacent natural open space areas and to keep dogs leashed in areas adjacent to natural open space areas. This requirement shall be published in the Homeowner Association CC&Rs~~ with the following statement: "Sensitive plant and wildlife habitat. Please use designated trails and keep pets on a leash at all times."

In addition, a requirement stating that residents shall keep out of adjacent open space areas to the north with the exception of designated trails will be published in the Homeowner Association CC&Rs and a map of designated hiking trails will be provided to all residents.

5.8-2d Prior to ~~the issuance of individual building permits, landscaping designs~~ recordation of the final map, a landscaping plan for the entire tract shall be prepared (inclusive of a plant palette) with native trees and plant species, and, shall be submitted to the County of San Bernardino for review and approval by a qualified biologist. The review shall determine that no non-native or invasive plant species are to be used in the proposed landscaping. The biologist should suggest appropriate native plant substitutes. A note shall be placed on the Composite Development Plan indicating that all proposed landscaping (including landscaping on individual lots) shall conform with the overall approved tract map landscaping plan. A requirement shall be included stating that residents shall include a restriction of the use of tree and plant species to only native trees/plants approved per the overall tract map landscaping plan, the Homeowner Association CC&Rs shall also restrict (individual lot owners) to use only native tree and plant species approved per the overall tract map landscaping plan.

5.8-2e ~~Garages with automatic door openers shall be required. No exterior construction shall occur between December 1 and April 1, when bald eagles are present~~. Garages with automatic door openers shall be required. No exterior construction, grading or vegetation clearing shall be permitted between December 1 and April 1, which is the wintering period for bald eagles (i.e., the season when bald eagles are present in the Big Bear area).

Also refer to mitigation measures 5.8-1a to 5.8-1f.

JURISDICTIONAL WATERS

5.8-3 ~~No mitigation measures are recommended.~~ Per the direction of the California Department of Fish and Game, all unavoidable impacts to State and Federal jurisdictional lakes, streams, and associated habitat shall be compensated for with the creation and/or restoration of in-kind habitat on-site and/or off-site at a minimum 3:1 replacement-to-impact ratio. Additional requirements may be required through the permitting process depending on the quality of habitat impacted, project design and other factors.

WILDLIFE MOVEMENT

5.8-4 No mitigation measures are recommended.

REGIONAL AND LOCAL POLICIES/PLANS

5.8-5 No mitigation measures are recommended.

CUMULATIVE

5.8-6 No mitigation measures are recommended.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Significant and unavoidable impacts related to Biological Resources have been identified for impacts to Bald Eagle populations. If the County of San Bernardino approves the project, the County shall be required to cite their findings in accordance with Section 15091 of CEQA and prepare a Statement of Overriding Considerations in accordance with section 15093 of CEQA.

No additional significant impacts related to Biological Resources have been identified following implementation of mitigation measures and/or compliance with applicable standards, requirements and/or policies by the County of San Bernardino.

5.9 CULTURAL RESOURCES

The purpose of this Section is to identify the potential for cultural resources to occur on the property and to assess the significance of such resources. This Section is based upon the *Historical/Archaeological Resources Survey Report* and the *Paleontological Resources Report* for the Moon Camp Residential Subdivision prepared by CRM in April 2002. Information pertaining to the reports are included in Appendix 15.7. The analysis in this Section has been prepared in accordance with Section 15064.5 of CEQA which considers potential impacts to prehistoric, historic and paleontological resources.

EXISTING CONDITIONS

HISTORICAL RESOURCES

PREHISTORIC CONTEXT

The project area lies in the heart of the homeland of the Serrano Indians, whose traditional territory is centered at the San Bernardino Mountains, but also includes the southern rim of the Mojave Desert, extending from today's Victorville eastward to Twentynine Palms. The name "Serrano" was derived from a Spanish term meaning "mountaineer" or "highlander."

Prior to European contact, the Serranos were primarily gatherers and hunters, and occasional fishers, who settled mostly where flowing water emerged from the mountains. Because of the variation in their habitat, the vegetable staples of the Serrano included both plant foods common in the mountains, such as acorns and piñon nuts, and those common in the desert, such as honey mesquite, yucca roots, mesquite, and cactus fruits. Game animals, including deer, mountain sheep, antelope, birds, rabbits and other small rodents, were hunted with tools and techniques quite similar to those employed by other southern California Indians. Technologically, the Serrano were also similar to their neighbors. Shell, wood, bone, stone, and plant fibers were used in making a variety of implements, such as lavishly decorated baskets, pottery, rabbit-skin blankets, and musical instruments.

The Serrano were loosely organized into exogamous clans, led by hereditary heads, and the clans in turn were affiliated with one of two exogamous moieties. The exact nature of the clans, their structure, function, and number are not known. The Bear Valley, in which Big Bear Lake is located, has been identified to be the territory of the *Yuhaviatam* or *Kuchaviatam* clan, which occupied a village in the vicinity named *Yuhaviat*, meaning "pine place." Some researchers suggest that the Bear Valley was shared between the *Yuhavetum* (*Yuhaviatam*) clan and the *Pervetum* clan.

Although contact with Europeans may have occurred as early as 1771 or 1772, Spanish influence on Serrano lifeways was negligible until 1819, when an *assistencia* under the San Gabriel Mission was established in present-day Redlands, on the edge of Serrano territory. Between then and the end of the mission era in 1834, most of the Serranos in the San Bernardino Mountains were removed to the nearby missions. At present, most Serrano descendants are found on the San

Manuel and the Morongo Indian Reservations, where they participate in ceremonial and political affairs with other Native American groups on an inter-reservation basis.

HISTORIC CONTEXT

In 1772, a small force of Spanish soldiers under the command of Pedro Fages became the first Europeans to set foot in the San Bernardino Mountains, followed shortly afterwards by Francisco Garcés, the famed explorer, in 1776. During the next 70 years, however, the Spanish/Mexican colonization activities in Alta California, which concentrated predominantly in the coastal regions, left little physical impact on the San Bernardino Mountains. Aside from occasional explorations and punitive expeditions against Indian livestock raiders, the mountainous hinterland of California remained largely beyond the attention of the missionaries, the *rancheros*, and the provincial authorities. The name "San Bernardino" was bestowed on the region at least by 1819, when a mission rancho bearing that name was established in the valley lying to the south under the supervision of Mission San Gabriel.

After the American annexation of California in 1848, the rich resources offered by the mountains brought drastic changes to the San Bernardino Mountains, spurred by the influxes of settlers from the eastern United States. Beginning in the early 1850s, the dense forest was turned into the scene—and victim—of a booming lumber industry, which brought the first wagon roads and industrial establishments into the San Bernardino Mountains. In 1860, the discovery of gold in the Bear and Holcomb Valleys ushered in a miniature gold rush, and with it a number of mining towns with several thousand residents. Around the same time, the lush mountain range also attracted cattlemen, sheepmen, and their herds, and within the next two decades gained the reputation of being the best summer grazing land in southern California. Then in 1884-1885, an even more valuable resource in arid southern California, water, became the focus of development in the San Bernardino Mountains when the Bear Valley Land and Water Company created the Big Bear Lake reservoir to ensure the success and prosperity of the Redlands colony.

By the 1890s, excessive logging and sheep grazing in the San Bernardino Mountains had given rise to a forest conservation movement among residents of the San Bernardino Valley to protect the watershed. In 1893, the movement succeeded in 1893, in persuading the U.S. government to create the San Bernardino Forest Reserve, later renamed the San Bernardino National Forest, and over the next few decades effectively brought an end to logging and sheep grazing in the San Bernardino Mountains. In the meantime, the favorable climate, enticing scenery, and the string of man-made lakes gradually propelled the resort industry to the forefront of development burgeoning from the first commercial resort established on the shore of Big Bear Lake in 1888. In 1915, the budding industry received a major boost from the completion of the automobile highway known as Rim of the World Drive. Since then, the San Bernardino Mountains have grown into—and remain—one of southern California's most popular tourism attractions.

The community of Fawnskin, the largest settlement on the north shore of Big Bear Lake, was founded in 1916, at the onset of a great building boom in Bear Valley. In that year, two Los Angeles businessmen, William Cline and Clinton E. Miller, purchased some 700 acres at this location with plans to develop a major resort

surrounded by expensive summer homes. Initially named Grout after Grout Bay, which it overlooks, the community was soon renamed Fawnskin after nearby Fawnskin Valley, which had been known by that name since 1891. The Fawnskin post office was established in 1918, and Cline and Miller's resort was completed the next year. By then, Fawnskin had already grown into a community of more than 100 summer homes, with a string of other resort camps lining the lakeshore to its east. Among these resorts were Moon Camp and Wilsted's Camp, both located in the immediate vicinity of the current project area, as further discussed below.[1]

Records Search

The Archaeological Information Center (AIC) at the San Bernardino County Museum, Redlands, provided the records search service for this study. The AIC is the official cultural resource records repository for San Bernardino County, and a part of the California Historical Resource Information System, established and maintained under the auspices of the Office of Historic Preservation.

During the records search, Robin Laska, AIC Assistant Coordinator, checked the Center's electronic database for previously identified historical/archaeological resources in or near the project area, and existing cultural resources reports pertaining to the vicinity. Previously identified historical/archaeological resources include properties designated as California Historical Landmarks, Points of Historical Interest, or San Bernardino County Historical Landmarks, as well as those listed in the National Register of Historic Places, the California Register of Historical Resources, or the California Historical Resource Information System.

Historical Research

Historical background research for this study was conducted by CRM on the basis of published literature in local and regional history and historic maps of the project vicinity. Among maps consulted for the research were the U.S. General Land Office's (GLO) land survey plat maps dated 1858 and 1896, and the U.S. Geological Survey's (USGS) topographic maps dated 1899 and 1954. These maps are collected at the Science Library of the University of California, Riverside, and the California Desert District of the U.S. Bureau of Land Management, also located in Riverside.

Field Survey

On March 21, 2002, CRM archaeologists carried out the intensive-level, on-foot field survey of the project area. During the survey, Moreno and Ballester walked the entire project area along parallel north-south transects spaced 15 meters (ca. 50 feet) apart. In this way, the ground surface was systematically inspected for any evidence of human activities dating to the prehistoric or historic periods (i.e., 50 years ago or older). Special attention was paid to animal burrow backdirt, rock outcrops, and unusual natural features. Later, CRM archaeologists revisited the property on April 2, 2002 to complete site recordation of a historic-period refuse scatter discovered during the survey (see “Field Survey Results,” below).

[1] For further discussion of the history of Fawnskin and the San Bernardino Mountains, see Robinson (1989) and LaFuze (1971).

RESULTS AND FINDINGS

RECORDS SEARCH RESULTS

According to records on file at the Archaeological Information Center, a portion of the project area, near its western end, was previously surveyed for cultural resources in 1987, and two prehistoric—i.e., Native American—artifacts were discovered during that survey. The two artifacts which included a groundstone fragment and a chipped stone tool were recorded as an isolate (P36-60758). Since they were found in a deep wash, it was suspected that these artifacts did not occur *in situ* but were rather washed to that location from upper slopes. No other cultural resources studies had taken place in the project area prior to this study, and no other cultural resources had been identified within the project boundaries.

Outside the project area but within a one-mile radius, ten other previous studies have been reported to the AIC. As a result of these and other studies in the vicinity, two archaeological sites have been recorded within the one-mile scope of the records search, and four other possible cultural resources have been reported and, since they have not been formally recorded, designated by the AIC as pending sites. One of the two recorded sites, CA-SBR-4400, consisted of a scatter of chipped stone flakes, and has since been destroyed. The other site, CA-SBR-9937H, was the Miller School House in Fawnskin, a one-room schoolhouse originally built in 1925. The four pending sites were described mainly as scattered chipped stone flakes, projectile point fragments, and/or ceramic sherds, but also included a purported Native American burial ground from the 19th century.

The majority of these previously identified cultural resources were found far enough from the project area not to be a concern for this study. However, P36-60758, is located in the western portion of the project area and the purported Native American burial ground may have been in close proximity to the eastern end of the project area, based on what little information was available at the AIC. These two potential cultural resources, therefore, were among the focal points of the field survey efforts.

HISTORICAL RESEARCH RESULTS

Historical sources consulted for this study indicate that development activities in and around the project area began in the 1910s-1920s, coinciding roughly with the birth of the nearby resort town of Fawnskin. Prior to that, the only man-made feature known to be present in the vicinity of the project area was a road “from San Bernardino to Pine Lake Post Office,” the latter being located in the present-day City of Big Bear Lake. The road skirted around the southern side of the project area, just outside the project boundary, over land that has since been inundated by the lake after construction of the current Big Bear Dam raised its water level in 1911-1912.

In 1915, the completion of Rim of the World Drive, the automobile highway that made the mountain resorts accessible to the “flatlanders”, ushered in a period of phenomenal growth in Bear Valley. Between 1913 and 1921, the number of resorts in the valley mushroomed from 2 to 52. Although the vast majority of them were concentrated on the south shore of the lake, by 1928 at least nine commercial camps or lodges were in operation along the north shore to the east of Fawnskin. Two of

these, Wilsted's Camp and Moon Camp, were evidently located in the immediate vicinity of the project area, and possibly within the project boundaries.

In the 1940s, a large number of buildings was noted in the project area, clustered mostly around the two curves in the highway. While the exact nature of these buildings is not identified in sources consulted during this research, their presence probably attests to the heyday of the resort camps around Big Bear Lake, especially in the midst of the post-WWII prosperity. During the 1950s and the early 1960s, however, rapid advances in modern transportation technology and the resulting shift in American lifestyle began to erode the popularity of such resort camps. Perhaps reflecting that trend, by 1969-1971, the buildings that once occupied the western portion of the project area had disappeared. Since then, all buildings on the property have been removed.

In summary, the results of historical background research suggest that the project area may have hosted one or possibly two of the early resort camps that helped transform Big Bear Lake into the popular playground it is today, and both date to at least the 1920s. The search for possible remains of these camps, thus, formed another focal point of the archaeological field investigations.

FIELD SURVEY RESULTS

No prehistoric sites, features, or artifacts were encountered during the field survey. A diligent effort was made to search for any surface manifestation of the reported Native American burial ground, but none was found. Nor could either of the two prehistoric artifacts noted in the project area in 1987 (P36-60758) be located during the survey. Remnants of picnic sites were observed on the northern side of North Shore Drive, but all were determined to be of recent origin.

In the southeastern portion of the project area, the field survey revealed the presence of a historic-period refuse scatter, which was recorded as an archaeological site and subsequently designated CA-SBR-10635H. The artifact deposit at this location has been heavily disturbed by apparent bottle-hunting activities, and presumably many of the more valuable artifacts have been removed. The remaining artifacts include rusted cans, glass fragments, ceramic sherds, pieces of wood or metal, and other historic-period artifacts mixed with modern trash. Among the more notable items are nine cone-top beer cans, seven solder drop cans, two broken glass bottles, two fragments of an aqua glass insulator, and an old battery. Some of the artifacts, such as the cone-top and solder drop hole-in-cap cans, generally date to the 1930s-1940s, while others, such as the punch-top steel can, may have come from as late as the 1950s-1960s.

Most of the artifacts were found in two concentrations, each centered around a large pit dug recently by bottle hunters. Several more looters' pits have been dug in and around the two larger pits. In all, the pit measures approximately 61 feet along the north-south axis and 49 feet along the east-west axis within the project area, but the refuse scatter extends farther east beyond the project boundaries. In fact, CA-SBR-10635H can be seen as the edge of a much larger refuse deposit located mostly on the adjacent property, around an old structure foundation at that location.

PALEONTOLOGICAL RESOURCES

SETTING

The project area is located in the San Bernardino Mountains, which comprise a portion of the Transverse Ranges geomorphic province, the only east-west trending province in the State of California. This portion of the Transverse Ranges province is bounded by the Peninsular Ranges province on the south, the Little San Bernardino Mountain portion of the Transverse Ranges province to the east, the Mojave Desert province on the north, and the San Gabriel Mountain portion of the Transverse Ranges province to the west (refer to Footnote 1).

The project area lies upon the lower slopes of Delmar Mountain, on the north shore of Big Bear Lake. North Shore Drive (State Route 38) passes through the property. In aerial photographs taken in 1953, 1965, and 1979, the property is shown to be covered by an open forest with ground commonly visible between the trees (aerial photo 1953; 1965; 1979). The 1965 aerial photograph shows nearby Grout Bay to be a mud flat with a wide, exposed shoreline area along the southern edge of the project area.

The portion of the project area north of State Route 38 is wooded to openly wooded, with most of the ground covered by a dense to moderate duff zone composed mainly of pine needles, pine cones, and oak leaves. Surface exposures were limited to roads, steep slopes, canyon bottoms, and a few open meadow-like areas. Large pines, oaks, and cedars make up the bulk of the trees. Also present are buck brush, pinyon pines, sage, cacti, and grasses. The soil is a gravelly sand with scattered to locally dense areas of cobble or small boulder clasts in the surface float. The clasts are mainly quartzite, with only a few scattered granitic clasts. Based on the soil borings and some road cuts, the surface rocky float is probably the result of lag deposits. In other words, the larger rocks are concentrated at the surface as the smaller materials, such as sand, silt, and clay, are eroded away. This side of the highway contains at least three old dirt roads.

The area south of State Route 38 is fenced along the highway, and is accessible through what appears to have been an old, partially graveled driveway. This area has a few scattered large pines, some willows near the shoreline, and is well covered by grasses and weeds. The most open area lies within portions of the access road that are not graveled. The surface soils are a gravelly sand with minor cobble float and only a few scattered small boulders. All but one of the larger rocks are quartzite. Since some buildings are known to have occupied this area in the past, it is possible that the boulders were brought in. The surface level is slightly above the beach during full stands of the lake. Soil borings found that the rock material within the saturated zone is disintegrating, which would suggest that any fossil bone material within this zone would also be disintegrating. The saturated zone should be at or above the lake level, as water tables are usually drawn upward by capillary action to roughly parallel the surface contours of the ground.

The San Bernardino Mountains have been uplifted along the southern edge by the San Andreas Fault and by several steeply reverse dipping faults on the north. These mountains are composed mainly of gneisses, schists, plutonic rocks, and several

kinds of hybrid rocks. They also contain sequences of quartzite and marble from which Paleozoic fossils have been found. The plutonic rocks are mainly of diorite to quartz monzonite to granite in composition and are considered to be Jurassic and/or Cretaceous in age. Both the plutonic and metamorphic rocks are intruded by dikes of aplite, pegmatite, lamprophyre, amphibolite, and fine grained basaltic to rhyolitic rocks. Some Quaternary sedimentary deposits can be found filling canyons and some late Tertiary-Quaternary sedimentary rocks are present along the San Andreas Fault along the south and southwest margins of the range.

The north shoreline of Big Bear Lake includes a strip of Qc, described as the Cabazon fanglomerate of Quaternary age. It is comprised mainly of an unsorted angular to subangular quartzite-rich fanglomerate. The rocks just to the north of the fanglomerates are mapped as the Cactus Granite of Jurassic age.

Another geologic map of the surrounding area shows an east-west fault within the bedrock outcrops just north of the project area. The bedrock is mapped as Precambrian metasedimentary rocks, mainly quartzite, marble, and schist. The rocks between the bedrock and the north shore of Big Bear Lake are shown as Quaternary Alluvium. Except for the fault, geologic mapping shows the same geology for the project area.

A more detailed geologic map of the project area shows most of the property to be designated as “aa” and the upper portions as “rf2m.” The aa is described as alluvium and colluvium that are considered to be deposits on active surfaces. The rf2m is described as dissected, inactive fan gravels still adjacent to the source, considered to be deposits on relict surfaces. While previous mapping shows the rock constituent to be mainly marble, a recent geotechnical study in the same mapped material and near the project area found a large amount of quartzite, rather than marble, to be present. The presence of predominantly quartzite rock material within a gravelly sand at this location was confirmed during the field survey. The surface soils appear to become sandier toward the lake.

The water table was found to be shallow, at 7 to 20 feet, and the rock material within the saturated zone was found to be highly decomposed. The ground water zone, as well as the top of the water table, appears to fluctuate with the lake level. This continued wetting and drying of the rocks material within the ground water zone may be responsible for the noted decomposition of the rock. At depth, all three soil borings encountered sandy clays indicative of ponded sediments. These clays suggest that sometime in the geologic past there was a natural lake occupying the portion of the valley where the man-made Big Bear Lake is now located.

Big Bear Lake is a man-made feature that was built by damming up the headwaters of one of the tributaries of the Santa Ana River as it ran through Big Bear Valley. When the alluvial deposits that once lined the sides and bottom of the Valley were flooded, more recent alluvial deposits began to prograde into the lake. The project area was once on the higher portion of the Valley, in an area of active sedimentation. Such an area would not be a favorable location for the preservation of vertebrate fossil remains, as any animal dying there would have been subject to carnivore feeding and destruction by the movement of coarse rocky material moving down-slope toward the canyon bottom. The decomposing nature of the rock within the

saturated zone would suggest that any fossil material that might have survived within these rocks when they were deposited would have been destroyed along with the rock as they decomposed.

RECORDS SEARCH

The records search service was provided by the Regional Paleontologic Locality Inventory located at the San Bernardino County Museum in Redlands and the Natural History Museum of Los Angeles County in Los Angeles. These institutions maintain files of regional paleontological site records as well as supporting maps and documents. The records search results are used to identify previously performed paleontological resource assessments and known paleontological localities near the project area. In addition, a literature search was conducted using materials in the CRM library and the personal library of the author, including unpublished reports produced from surveys of other properties in the vicinity.

FIELD SURVEY

On March 22, 2002, CRM geologist/paleontologist conducted the field assessment of the project area. The survey was carried out by walking two east-west traverses, north of State Route 38, spaced approximately 50 meters apart and two east-west traverses, south of the highway, spaced approximately 10 meter apart. The results of the survey are incorporated into the sections below.

RESULTS AND FINDINGS

EXISTING DATA SUMMARY

The paleontology record searches conducted by the San Bernardino Museum and Natural History Museum of Los Angeles County indicate that no paleontological localities have been discovered within the boundaries of the project area, or within a one-mile radius of the project area. However, one paleontological locality, approximately five miles to the east, has been previously reported to have produced vertebrate fossils from sediments that could be present in the deeper levels of the current project area. Based on the recent nature of the upper sediments, the San Bernardino County Museum assigns the project area a “low potential to contain significant nonrenewable paleontologic resources,” and states that “no mitigation program is recommended at this time.” The Natural History Museum of Los Angeles County concurs that the upper deposits have low sensitivity for paleontological resources, but points out that excavations in the deeper deposits in the portion of the property north of State Route 38 “may well encounter significant fossil remains.”

The field survey confirmed the presence of recent alluvium on the ground surface. As expected, no fossil remains were found to be present in the project area during the field survey.

IMPACTS

SIGNIFICANCE CRITERIA

The purpose of this study is to identify any potential cultural resources within or adjacent to the project area, and to assist the County of San Bernardino Land Use Services Department in determining whether such resources meet the official definitions of "historical resources," as provided in the California Public Resource Code, in particular CEQA.

According to Public Resources Code Section 5020.1(j), historical resource includes, but is not limited to, "any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California." More specifically, the California Environmental Quality Act (CEQA) Guidelines (Section 15064.5(a) (1-3)) state that the term "historical resources" applies to such resources listed in or determined to be eligible for listing in California Register of Historical Resources, included in a local register of historical resources, or determined to be historically significant by the Lead Agency.

Regarding the proper criteria of historical significance, the CEQA Guidelines (Section 15064.5 (a) (1-3)) mandate that "a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources". A resource may be listed in the California Register if it meets any of the following criteria:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- Is associated with the lives of persons important in our past.
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
- Has yielded, or may be likely to yield, information important in prehistory or history (Public Resources Code Section 5024.2 (c)).

According to Appendix G, the Initial Study Checklist, of the CEQA Guidelines, a project would typically have a significant impact on cultural resources if the project would cause one or more of the following to occur.

- Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5 (refer to Impact Statement 5.9-1);
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5 (refer to Impact Statement 5.9-1);

- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature (refer to Impact Statement 5.9-2); and/or

- Disturb any human remains, including those interred outside of formal cemeteries (refer to Section 5.9-3).

ARCHAEOLOGICAL/HISTORICAL RESOURCES

5.9-1 *The proposed Project may cause a significant impact to unknown archaeological and/or historic resources visible on-site. Implementation of recommended mitigation measures would reduce impacts to a less than significant level.*

Site CA-SBR-10635H, as stated above, consists of a historic-period refuse scatter. Since many of the artifacts at the site can be dated to the pre-WWII period, it is possible, and probable, that the items were deposited in connection with the early 20th century resort camps known to be in operation in the vicinity. Due to the limited number and types of the artifacts observed, there is insufficient evidence to establish this association conclusively, or association with any persons or events of recognized historic significance. Furthermore, the site constitutes a minor component of a larger historic-period refuse deposit located outside the project area, and its limited information potential is further diminished by extensive disturbances and the intrusion of modern trash. Based on these considerations, the *Historical/ Archeological Resources Survey Report* concludes that Site CA-SBR-10635H, as recorded during this study, does not appear to meet any of the criteria for listing in the California Register, and thus does not qualify as a "historical resource."

Although the field survey effort included a detailed reconnaissance of the site, the potential does exist for subsurface resources to occur and that cannot be visibly detected. This potential impact can be considered significant thus requiring field monitoring mitigation by an archaeologist, qualified and approved by the County during grading and other associated clearing activities. Implementation of mitigation would reduce the significance of potential impacts to a less than significant level.

PALEONTOLOGICAL RESOURCES

5.9-2 *The proposed Project may cause a significant impact to unknown paleontological resources on-site. Implementation of recommended mitigation measures would reduce impacts to a less than significant level.*

The field survey results, supported by literature and subsurface testing, indicate that the project area contains sediments deposited during Holocene time. Vertebrate fossils have been found in these same age sediments approximately five miles east of this location. Geologic studies suggest that these vertebrate fossil remains were found in sediments probably associated with a natural Holocene lake (Baldwin Lake) and not in alluvial sediments associated with alluvial fan deposits.

Previous geologic studies have recorded sands and some gravels at depths greater than five feet in the area north of State Route 38. Based on those findings, and in view of the recent alluvium covering the surface to a depth of five feet and the

ground water saturation situation south of the highway, the *Paleontological Resources Survey Report* concludes that there is a moderate potential for the presence of vertebrate fossils within the project area, north of State Route 38, at depths greater than five feet. Although the field survey effort included a detailed reconnaissance of the site, the potential does exist for subsurface resources to occur that cannot be visibly detected. This potential impact can be considered significant thus requiring field monitoring mitigation by a geologist/paleontologist, qualified and approved by the County, during grading and other associated clearing activities. Implementation of mitigation would reduce the significance of potential impacts to a less than significant level.

BURIAL SITES

5.9-3 *The proposed Project may cause a significant impact to Native American burial sites which could occur on-site. Implementation of the specified mitigation measures would reduce impacts to a less than significant level.*

According to the *Historical/Archeological Resources Survey Report*, records indicate that a Native American burial ground may have been in close proximity to the eastern end of the project area. A diligent field survey effort was conducted to find any surface manifestation of the reported burial ground, however, none was found. Despite the findings of the field survey effort, the potential does exist for human remains to occur and that cannot be visibly detected. This potential impact can be considered significant and would require that all proper notification actions be taken in the event that human remains are discovered during construction/earth-moving activities. Implementation of mitigation would reduce the significance of potential impacts to a less than significant level.

CUMULATIVE

5.9-4 *Cumulative development may adversely affect cultural resources in the north shore area. Resources are evaluated and mitigated on a project-by-project basis.*

The Moon Camp project is located within the north shore of Big Bear Lake. There is limited potential for future development in the project vicinity, assuming that existing US Forest Service owned lands remain undisturbed and undeveloped. Although there is a limited development potential in the north shore area, potential impacts to cultural resources would be evaluated on a site specific, project-by-project basis to ensure that impacts are reduced to less than significant levels. This would be especially true of those developments located in areas considered to have a high sensitivity for cultural (archaeological, paleontological and historical) resources. Each incremental development would be required to comply with all applicable State and Federal regulations concerning preservation, salvage, or handling of cultural resources. In consideration of these requirement and limited amounts of developable land, potential cumulative impacts upon cultural resources would not be considered significant.

MITIGATION MEASURES

The following mitigation measures directly correspond to the identified impact statements in the Impacts discussion.

ARCHAEOLOGICAL/HISTORICAL RESOURCES

5.9-1 Project-related grading, grubbing, trenching, excavations, and/or other earth-moving activities in the project area shall be monitored by a qualified archaeologist. In the event that a material of potential cultural significance is uncovered during such activities on the project site, all earth-moving activities in the project area shall cease and the archeologist shall evaluate the quality and significance of the material. Earth-moving activities shall not continue in the area where a material of potential cultural significance is uncovered until resources have been completely removed by the archaeologist and recorded as appropriate.

PALEONTOLOGICAL RESOURCES

5.9-2a Grading shall be monitored during excavation in areas identified as likely to contain paleontologic resources by a qualified paleontological monitor. Monitoring shall be accomplished for any undisturbed subsurface older alluvium, which might be present in the subsurface. The monitor shall be equipped to salvage fossils as they are unearthed to avoid construction delays and to remove samples of sediments which are likely to contain the remains of small fossil invertebrates and vertebrates. The monitor must be empowered to temporarily halt or divert grading equipment to allow for removal of abundant or large specimens.

5.9-2b Recovered specimens shall be prepared to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates.

5.9-2c Identification and curation of specimens into a museum repository with permanent retrievable storage shall occur for paleontological resources.

5.9-2d A report of findings shall be prepared with an appended itemized inventory of specimens. The report shall include pertinent discussion of the significance of all recovered resources where appropriate. The report and inventory when submitted to the appropriate Lead Agency, shall signify completion of the program to mitigate impacts to paleontologic resources.

BURIAL SITES

5.9-3 In the event human remains are discovered during grading/ construction activities, work shall cease in the immediate area of the discovery and the Project Applicant shall comply with the requirements and procedures set forth in Section 5097.98 of the Public Resources Code, including notification of the County Coroner, notification of the Native American

Heritage Commission, and consultation with the individual identified by the Native American Heritage Commission to be the "most likely descendent."

CUMULATIVE

5.9-4 No mitigation measures are recommended.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No significant impacts related to Cultural Resources have been identified following implementation of mitigation measures referenced in this Section.

5.10 GEOLOGY AND SOILS

The purpose of this Section is to describe the geologic, soil and seismic setting of the project area, identify potential impacts associated with the proposed project, and recommend mitigation measures to reduce the significance of impacts. Information in this Section is based on a geotechnical report for the site prepared by Geologist D. Scott Magorien (dated August, 2002), which includes a site investigation and liquefaction testing program.

The scope of work performed by Mr. Magorien as part of the geology, soils and seismicity portion for the Moon Camp EIR included the following:

- Compile and review relevant reports and maps that address geotechnical, geologic and hydrogeologic conditions for the project and surrounding area. A list of the reports, maps and other relevant data reviewed for this study are presented in the References section of Appendix 15.8.

- A field investigation for this study that included:

  - Reconnaissance-level geologic mapping performed on February 26 and June 20, 2002.

  - Excavation and logging of seven (7) backhoe/test pits on June 20, 2002 to assess near surface soil conditions and bedrock lithology and structure.

  - Drilling, logging and sampling three (3) exploratory rotary wash borings on June 11 and 12, 2002 for the purpose of assessing the presence of potentially liquefiable soils in the vicinity of the lake. During the drilling, Standard Penetration Tests (SPT) were performed every five (5) feet, and samples from each test placed in plastic bags for later soil classification. Applicable well drilling permits were obtained from the County of San Bernardino prior to actual drilling of each of the borings.

- Contacted various individuals who have relevant information concerning the geologic and hydrologic conditions in the area.

Information pertaining to the investigation are provided in this section and Appendix 15.8.

EXISTING CONDITIONS

GEOLOGIC SETTING

The Moon Camp project area is situated within the central portion of the Southern California physiographic province known as the Transverse Ranges Geomorphic Province. This province consists of an east-west trending set of mountain ranges, which include from east to west, San Bernardino, San Gabriel and Santa Inez

mountains. This alignment of youthful mountains owes its existence to ongoing tectonic activity associated with the San Andres Fault system. The geomorphology of the San Bernardino Mountains attests to the youthful nature of this uplifted structural block which is bordered on the north by the North Frontal Fault System, and on the south by the San Andreas fault.

Big Bear Valley is one of a series of east-west trending valleys in the eastern San Bernardino Mountains, believed to have formed largely by both high angle and low angle faults in the region. The valley is considered to be a bedrock enclosed basin filled with more than 500 feet of lucustrine and alluvial sediments derived from the surrounding mountainous areas.

Big Bear Lake, which borders the project area on the south, was created by construction of a dam in 1884 across Bear Creek. In 1912, an 80-foot high multiple-arch dam was constructed to replace the lower older dam. In the late 1980's the Big Bear Lake Dam underwent a seismic retrofit, which included improvement of the foundation conditions beneath the downstream side of the dam. When full, the lake has an area of 2,960 acres, a volume of about 72,200 acre-feet, and a water surface elevation of 6,745 feet.

Topographically, the project area occupies the southernmost margin of a lobe-shaped, south-facing hillside that descends into Big Bear Lake. Natural slopes within the area display surface gradients ranging from 2:1 (horizontal to vertical) along the eastern margin of the site, to approximately 4:1 within the central and western portions, to more gentle gradients near the shoreline of Big Bear Lake. The highest point within the project area is at an elevation of 6,962 feet above mean sea level. Maximum relief between the northern margin of the property and the high water line (i.e., 6,745 feet msl) is approximately 215 feet.

There are two prominent, southerly flowing drainages transecting the project area. Surface gradients within these ephemecal drainage courses average approximately 0.08 foot/foot.

The two major geologic units that comprise the project area include older alluvium of Pliocene-late Miocene age (i.e., 1.5 to 5 million years old), and lesser amounts of Holocene age (present to 11,000 years ago) alluvium that occupies the bottom of the major active stream channels. The older alluvial deposits comprise approximately 90 percent of the project area and extend to the northern shoreline of Big Bear Lake.

Based on a review of published relevant geologic, geotechnical data, as well as the findings from exploratory drilling, excavation of test pits and reconnaissance-level geologic mapping, there appears to be only limited geologic hazards on the property as it relates to site development. Possible geologic/geotechnical constraints to proposed residential development include potential instability of large cut slopes, soil erosion within the two major drainages that transect the property, and possible earthquake-induced seiche along the near shore portions of the site. Although the project area is located within the seismically active region of southern California, there are no documented active or potentially active faults transecting or projecting towards the project area.

GEOLOGIC MATERIALS

Surficial materials within the site consist of topsoil, slopewash materials and recent stream-laid alluvial deposits within the active stream channels. Older alluvial deposits underlie the entire site at relatively shallow depths. The distribution of the more significant deposits is shown on Exhibit 5.10-1, *Geologic Map*. The designations shown below, in parenthesis, correspond to those shown on the geologic map.

TOP SOIL (NOT DESIGNATED ON GEOLOGIC MAP)

Native topsoil which blankets much of the site consists mainly of sandy loam with angular gravel to cobble-size fragments of quartzite derived from older bedrock formations. These soils are typically dry, porous, loose, contain varying amounts of organic material, and range in thickness from approximately eight to ten inches deep. These soils are considered to be moderately erodible in their natural condition and considered too gravelly and cobbley for use as topsoil for landscaping.

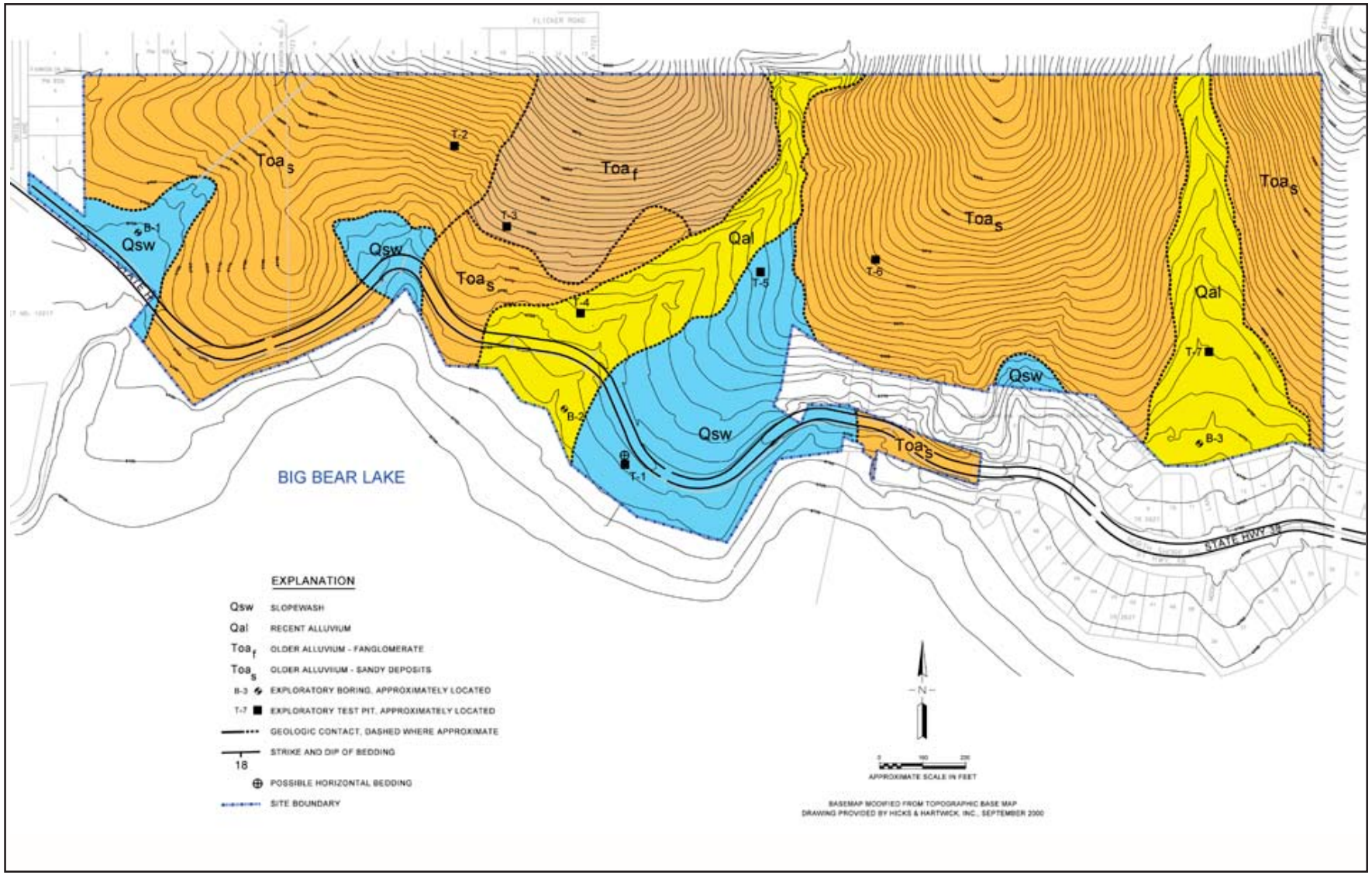
SLOPEWASH (Qsw)

Slopewash deposits consist of the downslope accumulation of eroded topsoil and sediments derived from the underlying older alluvial materials. Slopewash typically contains abundant organic debris and is moderately to highly compressible.

Slopewash occurs within broad drainage swales, and as widespread blanket deposits on the more gentle, natural slope in the south central portion of the area. The compositions of these soil-like deposits reflect the composition of the older alluvial soils from which they are derived. Where observed in the exploratory test pits, slopewash deposits consist largely of an admixture of silty sand, angular gravel to cobble-size fragments of hard, crystalline bedrock. These soils range in thickness from 1 to 4 ½ feet, and are commonly dark brown to dark yellowish-brown in color, loose to medium dense, dry to slightly moist, porous, and contain varying amounts of roots and rootlets, and are considered moderately to highly compressible. Erodibility in their natural state is considered to be slight to moderate.

ALLUVIAL (Qal)

Alluvial deposits occupy the bottom of two major and one minor drainage channels that transect the project area (refer to Exhibit 5.10-1, *Geologic Map*). These Holocene age, soil-like materials have been deposited, eroded and re-deposited by intermittently flowing streams within these drainages. Where encountered in exploratory borings B-2 and B-3, and exploratory test pit TP-7, these soils consist of crudely stratified layers and lenses of silty sand with varying amounts of angular gravel to cobble-size fragments of quartzite and marble. The alluvial soils are dark brown to dark yellowish-brown in color, comprised of fine to medium grain sand, dry to slightly moist, loose and moderately porous and contain numerous roots and rootlets. Where noted in the two borings and the test pit, the thickness of the alluvial soils in the study area ranges from about 3.5 to 17 feet (±). Exploratory boring B-1 encountered only surficial slopewash-type deposits (as described above).



Source: D. Scott Magorien, CEG, Geologic Map, August 2002.

Exhibit 5.10-1

RBF CONSULTING

PLANNING ■ DESIGN ■ CONSTRUCTION

12/05 JN 10-101901

MOON CAMP TT #16136
ENVIRONMENTAL IMPACT REPORT

Geologic Map

Prior to this investigation, RGS Geosciences' (2001) geologic feasibility study indicated that these alluvial soils near the shoreline of Big Bear Lake are potentially susceptible to seismically-induced liquefaction. Each of these drainages was targeted, as close to the shoreline as considered practical, for exploratory drilling and standard penetration testing (SPT) in three (3) exploratory borings. These borings have been designated B-1, B-2 and B-3, the locations of which are shown on Exhibit 5.10-1, *Geologic Map*.

The primary approach used in this study to assess liquefaction potential of the alluvial soils was based on an empirically based approach as presented by Seed and Idriss (1982). For this approach, SPT blowcounts (e.g. drive energy of a 140 pound weight falling a distance of 18 inches), as well as other seismic and overburden pressures at the point(s) of interest are needed for the assessment. For this study, SPT blowcounts were obtained at approximately every five feet in each of the three rotary-wash borings.

Based on the results of the SPT and visual observations of the soil samples, the recent (i.e., Holocene age) alluvial soils below a depth of approximately eight feet are not considered prone to settlement or seismically-induced liquefaction. The upper eight feet are considered compressible, and are highly erodible. Given the gravelly/ cobbley nature of the near surface alluvium, and the elevation as it relates to high water level in the lake (elevation 6,745 feet msl), the likelihood of seismically induced liquefaction of these sediments along, or inland, of the lakefront is considered remote.

OLDER ALLUVIUM (Toa_s Toa_f)

The entire project area is underlain to significant depths (greater than 400 feet) by what is referred to as Older Alluvium of Plio-Miocene age. These ancient deposits represent what remains of an extensive accumulation of alluvial (stream-laid) soil materials that had been eroded from adjacent bedrock highlands north of the project area. According to geologic mapping by the U.S. Geologic Survey, these alluvial deposits rest unconformably above granitic bedrock of Cretaceous age. Although well dissected, these deposits form an increasingly thickening wedge from north to south. According to water well logs (Geoscience Support Services, Inc., 2000), these sediments are over 400 feet thick near the shoreline and serve as the principal groundwater reservoir beneath the site.

Exposures of the older alluvial deposits are limited to small areas on the road cuts along State Route 38, and on several 12- to 18-foot high road cuts on Polique Canyon Road that leads into Holcomb Valley. No evidence of significant surficial or gross instability was observed either within the project area or along the roadway cuts. Many of these road cuts were quite steep, having inclinations exceeding 45˚. However, the lower portions of these cut slopes were commonly covered with a tallu apron displaying an inclination of approximately 33˚.

In order to evaluate the near-surface lithologic makeup and bedding plane structure of these sedimentary deposits for the purpose of preliminarily assessing slope stability issues, six (6) exploratory backhoe pits were excavated within the property using a rubber-tired, Case 580 extend-a-hoe equipped with a 3 foot wide bucket.

Each of the pits was situated within an area characterized by a certain type of topographic terrain and/or near a proposed cut slope, and varied in depth from approximately two to six feet below ground surface. All the pits were geologically logged and backfilled with the excavated materials. The location of each pit is shown on Exhibit 5.10-1, *Geologic Map*.

The main lithologic character of these ancient soils is represented by layers of clayey sand (labeled Toa_s on the geologic map) that contains varying amounts (up to about 10 percent) of angular, gravel to cobble-size fragments of quartzite derived from older bedrock that now forms discontinuous exposures along the ridgeline to the north of the project area. These older alluvial soils are commonly dark yellowish-brown to strong brown in color, are very dense (i.e., over-consolidated), contain medium to coarse-grained sand particles, and are thinly to thickly bedded. Based on observations within exploratory test pit excavations, these soils were difficult to excavate below a depth of several feet.

Near the north-central portion of the study area the older alluvium is represented by fanglomerate-type deposits. These materials labeled Toa_f (on the geologic map) represent the eroded remnants of an ancient alluvial fan, consisting largely of angular to subangular cobble to gravel size quartzite fragments with approximately 30 percent sitly sand. Similarly to the underlying clayey sand deposits, the fanglomerate is light brownish-yellow, dense, and is difficult to excavate past a depth of about three feet. These deposits appear to have limited area extent, and form a relatively thin verneer atop the more extensive, older clayey sand (Toa_s) deposits.

Overall, there does not appear to be any major geotechnical-related constraints associated with the older alluvial deposits, except perhaps where clay deposits prove to be moderately or highly expansive and where significant cut slopes are planned, as discussed in the Impacts section which follows.

GEOLOGIC STRUCTURE

The geologic structure within the project area is defined by the orientation of bedding planes within the older alluvium (Toa_s). Where observed in the exploratory test pits TP-2 and TP-5, located within the northern portion of the study area, bedding planes exposed near the bottom of each pit varied in strike between North 65˚ West (N65W), and east-west (EW), and dip to the south and southwest at 10˚ and 18˚. In test pit TP-1, located near the shoreline of Big Bear Lake, bedding within the older alluvium appeared to be essentially horizontal. If these bedding plane attitudes are representative of the upland and shoreline areas of the project site, it would appear that the older alluvium has been folded into a roughly east-west trending synclinal fold, the southern limb of which has been eroded away during the formation of Bear Valley. If true, this folding is judged to have occurred over a period of hundreds of thousands of years as a result of San Andreas tectonics. Conversely, this apparent variation in the dip of bedding planes could be a result of ancient faulting associated with uplift of the San Bernardino Mountains. However, no evidence of faulting, active or otherwise, has been documented within or adjacent to the project area.

If these bedding planes observed in the exploratory test pits are representative of the orientation of bedding within areas of the site, south-facing cut slopes associated

with construction for the new alignment for State Route 38, as well as internal streets north of the new highway, could present concerns related to slope stability. If bedding planes near the shoreline area, south of realigned State Route 38, are essentially horizontal (as depicted in test pit TP-1), no such gross slope stability problem would be anticipated. However, where significant cut slopes are planned, a site-specific subsurface investigation should be performed in order to evaluate the nature and extent of bedding planes and the presence of any weak clay layers.

MINERAL RESOURCES

There are no economic metallic or non-metallic ore deposits within or directly adjacent to the project area. The potential for oil and/or gas deposits beneath the site is considered remote.

GEOLOGIC HAZARDS

The primary geologic hazards within the project area are those associated with possible slope instability for new slopes, soil erosion, strong ground motion from earthquakes, and potential seiche along the shoreline.

The project area is situated within the County of San Bernardino Geologic Hazard (GH) Overlay District. For information purposes only, the GH Overlay District was created to provide greater safety by establishing review procedures and setbacks for areas that are subject to potential geologic problems such as ground shaking from earthquakes, liquefaction and subsidence.

FAULTING AND SEISMICITY

Hazards associated with earthquakes include primary hazards, such as ground shaking and surface rupture; and secondary hazards, such as liquefaction, seismically-induced settlement, landsliding, tsunamis, and seiches.

In accordance with the California Department of Conservation Division of Mines and Geology, a fault is a fracture in the crust of the earth along which rocks on one side have moved relative to those on the other side. Most faults are the result of repeated displacements over a long period of time. An inactive fault is a fault that has not experienced earthquake activity within the last three million years. In comparison, an active fault is one which has experienced earthquake activity in the past 11,000 years. A fault which has moved within the last two to three million years, but not proven by direct evidence to have moved within the last 11,000 years, is considered potentially active. No active or potentially active faults are located within or project towards the Project area.

The Project area, like most of Southern California is part of a seismically active region. The Alquist-Priolo Act of 1972 (now the Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code 2621-2624, Division 2 Chapter 7.5) regulates development near active faults so as to mitigate the hazard of surface fault-rupture. Under the Act, the State Geologist is required to delineate “special study zones along known active faults in California”. The Act also requires that, prior to approval of a project, a geologic study be conducted to define and delineate any hazards from

surface rupture. A registered geologist by the State of California, within or retained by the lead agency for the project must prepare this geologic report. A 50-foot setback from any known trace of an active fault is required. The project area is not currently known to be located within an Alquist-Priolo Fault Rupture Hazard Zone, according to the California Division of Mines and Geology.

The Modified Mercalli intensity scale was developed in 1931 and measures the intensity of an earthquake's effects in a given locality, and is perhaps much more meaningful to the layman, as compared to the Richter Scale, because it is based on actual observations of earthquake effects at specific places. On the Modified Mercalli intensity scale, values range from I to XII. The most commonly used adaptation covers the range of intensity from the conditions of "I –not felt except by very few, favorably situate," to "XII – damage total, lines of sight disturbed, objects thrown into the air". While an earthquake has only one magnitude, it can have many intensities, which decrease with distance from the epicenter.

Ground shaking accompanying earthquakes on nearby faults can be expected to be felt within the Project site. However, the intensity of ground shaking would depend upon the magnitude of the earthquake, the distance to the epicenter, and the geology of the area between the epicenter and the property.

A listing of active faults considered capable of producing strong ground motion at the Project site, their distances from the Project site, and the maximum expected earthquake along each fault is presented in Table 5.10-1, *Summary of Fault and Generalized Earthquake Information for the Moon Camp Project Site*. Also presented are generalized evaluations of maximum ground shaking on site for the maximum earthquakes, and generalized predictions of the likelihood of such events occurring.

Table 5.10-1
Summary of Fault and Generalized Earthquake Information for the Moon Camp Project Site

Name	Miles (direction from site)	Maximum Magnitude	Expected Level of Ground Shaking	Likelihood
North Frontal (Western Segmane)	6.5 (north)	7.0	High	Moderate
Helendale	8.0 (east)	7.3	High	Moderate
San Andreas	14 (south)	7.3	High	High
Pinto Mountain	18 (southeast)	7.0	Moderate	Moderate
San Jacinto	25 (southwest)	6.7	Moderate	High

The most severe ground shaking would be expected to accompany a large earthquake on the North Frontal Fault. An earthquake magnitude of 7.0 on this fault could produce Modified Mercallli intensities in the range of VIII to X within the property, and a maximum horizontal ground acceleration between .060 and 1.22 (Hilltop Geotechnical 2001). Damage from ground rupture on-site is extremely unlikely because no known active faults cross the property.

Secondary earthquake hazards, which include liquefaction, ground lurching, lateral spreading, seismically induced settlement, tsunamis, and earthquake induced landsliding, are discussed in the following sections.

Liquefaction

Seismic ground shaking of relatively loose, granular soils that are saturated or submerged can cause the soils to liquefy and temporarily behave as a dense fluid. Liquefaction is caused by a sudden temporary increase in pore water pressure due to seismic densification or other displacement of submerged granular soils. Liquefaction more often occurs in earthquake prone areas underlain by young alluvium where the groundwater table is higher than 50 feet below the ground surface.

The borings conducted for this EIR were drilled in accordance with the "Guidelines for Evaluating and Mitigating Seismic Hazards in California, 1997" published by the Division of Mines and Geology (DMG) of the Department of Conservation. These guidelines are otherwise known as SP 117 (Special Publication 117). The procedures for analyzing liquefaction potential at the site conform to the "Recommended Procedures for Implementation of DMG Special Publication 117" produced by the Southern California Earthquake Center (SCEC) in 1999. Rotary wash drilling techniques were used to advance the borings for this site and Standard Penetration Tests (SPTs) were conducted in general accordance with ASTM D1586. A standard sampler driven by automatic hammer was used to perform the SPTs. Previous measurements by the drilling company rated the hammer energy at 75 to 80 percent. The SCEC recommends the use of the 1985 simplified procedures by Seed and others to analyze liquefaction potential. Typically, the methodology is to determine a corrected blowcount $(N_1)_{60}$ and use a recommended relationship between the corrected SPT blow count and the equivalent uniform cyclic stress ratio necessary to trigger liquefaction during a 7½-magnitude earthquake. For $(N_1)_{60}$ greater than 30, the potential for earthquake-induced liquefaction is practically non existent. Field SPT values were corrected for sampler type, drill rod lengths, hammer type and release system, and overburden stresses to generate the corrected value $(N_1)_{60}$. SPT data for this project show generally high blowcount. Consequently, corrected SPT blowcounts yielded $(N_1)_{60}$ values that were greater than 30.

Based on the results of the SPT data obtained from the exploratory borings, as well as observations within the exploratory test pits, there are no conditions within the project area that could promote liquefaction. Although shallow groundwater is present beneath the shoreline portions of the property, the lithologic character of the older alluvial materials that underlie the entire shoreline area of the project is such that the potential for liquefaction is considered nonexistent.

The only possible exception could be small areas directly at the lake-shoreline interface and the mouth of the major alluvial channels. However, only one of these areas lies within the project area. Given the nature of the lithologic conditions and high SPT blowcounts encountered in exploratory boring B-3 near the mouth of this channel, the lateral extent of any loose, saturated alluvial soils would be very limited. The likelihood of liquefaction-induced impacts in this area is considered low.

Ground Lurching

Certain soils have been observed to move in a wave-like manner in response to intense seismic ground shaking, forming ridges or cracks on the ground surface. Areas underlain by thick accumulations of colluvium and alluvium appear to be more susceptible to ground lurching than bedrock. Under strong seismic ground motion conditions, lurching can be expected within loose, cohesionless solids, or in clay-rich soils with high moisture content. Generally, only lightly loaded structures such as pavement, fences, pipelines and walkways are damaged by ground lurching; more heavily loaded structures appear to resist such deformation. Ground lurching may occur where deposits of loose alluvium exist on the project site, such as within the two major alluviated channels that transect the project area.

Lateral Spreading

Lateral spreading involves the lateral displacement of surficial blocks of sediment as a result of liquefaction in a subsurface layer. As previously stated the liquefaction potential within the project area, however, is considered to be nonexistent.

Seismically Induced Ground Settlement

Strong ground shaking can cause settlement by allowing sediment particles to become more tightly packed, thereby reducing pore space. Unconsolidated, loosely packed alluvial deposits are especially susceptible to this phenomenon. Poorly compacted artificial fills may also experience seismically induced settlement. Unconsolidated soils such as modern alluvial soils within the two active stream channels are subject to seismically induced ground settlement.

Tsunamis

A tsunami is a seismic sea-wave caused by sea-bottom deformations that are associated with earthquakes beneath the ocean floor. The hazard from tsunamis is considered non-existent, given the large distance from the Pacific Ocean.

Seiching

Seiching involves an enclosed body of water oscillating due to groundshaking, usually following an earthquake. Lakes and water towers are typical bodies of water affected by seiching. Because of the proximity of the subject site to Big Bear Lake, the site is susceptible to damage from seiching. The largest amplitude of ground motion associated with a seismic event in this area is anticipated to be related to a major earthquake along the North Frontal Fault zone.

Other Geologic Hazards

Landslides. No landslides are known to exist within the upgradient of the site. Field reconnaissance did not disclose the presence of older, existing landslides within or near the subject property. Aerial photographic analyses performed as part of this study also did not disclose any existing landslides or slumps in the project area.

IMPACTS

SIGNIFICANCE CRITERIA

Appendix G of the California Environmental Quality Act (CEQA) Guidelines contains the Initial Study Environmental Checklist form used during preparation of the project Initial Study as contained in Appendix 15.1 of this EIR. The Initial Study includes questions relating to geology, soils and mineral resources. The issues presented in the Initial Study Checklist have been utilized as thresholds for significance in this Section. Accordingly, a project may create a significant environmental impact if one or more of the following occurs:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (refer to Section 10.0, *Effects Found Not to be Significant*);
  - Strong seismic ground shaking (refer to Impact Statement 5.10-3);
  - Seismic-related ground failure, including liquefaction (refer to Section 10.0, *Effects Found Not to be Significant*);
  - Landslides (refer to Section 1.0, *Effects Found Not to be Significant).*

- Result in substantial soil erosion or the loss of topsoil (refer to Impact Statement 5.10-2);

- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse (refer to Impact Statement 5.10-1);

- Be located on expansive soils, as defined in Table 18-1 B of the Uniform Building Code (1994), creating substantial risks to life or property (refer to Impact Statement 5.10-5); and/or

- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater (refer to Section 10.0, *Effects Found Not to be Significant*).

Potential impacts associated with the project area's topography, soils, and the region's seismic activities are identified below. Mitigation measures are provided to reduce the significance of impacts.

The level of geotechnical and landform information contained herein is adequate to analyze the potential project effects on earth resources and landforms, and to determine appropriate mitigation measures. For certain items, the project geotechnical engineer should perform further testing and review of on-site conditions as part of the final design work. This additional work will further refine details for site

design, but is not anticipated to alter the conclusions of significance contained herein. In accordance with CEQA case law, this later additional refinement is not a deferral of mitigation. Rather, it is a design refinement, consistent with the commitment to mitigation included in this EIR.

The conceptual grading plan prepared by Hicks and Hartwick, Inc. (dated 6/6/01) indicates the creation of numerous, southerly-facing, 2:1 (horizontal to vertical) cut and fill slopes adjacent to the realigned portion of State Route 38 and the two (2) roadways internal to the development. Based on the nature of bedding planes observed within the older alluvial deposits in test pits TP-2 and TP-5, southerly-facing cut slopes north of the realigned section of State Route 38 may be grossly unstable. If so, the lots adjacent to these cut slopes could be significantly impacted.

There are also a number of other short- and long-term impacts to the current physical/geological setting that can be generally expected from grading and development activities. These are described in the following impacts sections.

Based on the results of the data obtained from the exploratory boring and test pits, liquefaction is not considered to be a significant impact due to the nonexistent potential within the project site.

The most significant potential impacts to site development would be caused by changes in existing topography, erosion of surficial soil deposits, ground shaking from nearby seismic sources, and potential seiche along the shoreline properties. Impacts to the existing groundwater conditions beneath the site may include increased amounts of recharge to the underlying aquifer(s) as a result of widespread landscape irrigation or leaky buried water transmission lines. As stated in Section 5.11, *Hydrology and Drainage*, of this, EIR, if groundwater from on-site water wells are to provide the water supply to the project area, additional studies will be necessary to assess the impacts to the underlying aquifer as a result of groundwater withdrawals.

SLOPE STABILITY

5.10-1 *Development of the proposed Project could result in slope failures. Implementation of the recommended mitigation measures and compliance with the County Development Code and Uniform Building Code would reduce impacts to less than significant levels.*

Given the apparent southerly inclination of bedding planes within the older alluvial deposits, proposed of south-facing, manufactured cut slopes could be grossly unstable. If weak clay layers within the older alluvium were found to be dipping out-of-slope, in what is referred to as “daylighted bedding”, slope failures could occur and encroach into adjacent lots.

Methods to mitigate such conditions could include to construction of 2:1 (horizontal to vertical) buttressed slopes using on-site native soil materials, or constructing geotextile-reinforced soil buttresses where cut slopes are planned. Either of these methods, as well as a number of other forms of proven slope reinforcement methods would reduce this impact to a less than significant level.

SOIL EROSION

5.10-2 *Development of the proposed Project could result in accelerated soil erosion. Project compliance with the County Development Code, the Uniform Building Code and the recommended mitigation measures would reduce impacts to a less than significant level.*

The younger alluvial deposits within the two major stream channels are highly erodible. Adverse surface drainage could promote accelerated soil erosion which could undermine proposed structures and lead to increased sedimentation within Big Bear Lake. This impact would be considered significant if not mitigated.

Mitigation measures, such providing adequate surface drainage away from these soils or covering them with a roadway, would reduce this impact to a less than significant level.

GROUND SHAKING

5.10-3 *Development of the proposed Project may increase the number of people/structures exposed to effects associated with seismically induced ground shaking. Implementation of the recommended mitigation measures and compliance with the County Development Code and the Uniform Building Code would reduce potential impacts to less than significant.*

Given the highly seismic character of the Southern California Region, moderate to severe ground shaking can be expected within the project area due to moderate to large earthquakes on the nearby North Frontal, Helendale, or San Andreas fault zones. This impact would be considered significant if not mitigated. In order to reduce this impact a less than significant level, all structures for human occupancy should be constructed in accordance with seismic design standards set forth in the latest edition of the Uniform Building Code.

SEICHE

5.10-4 *Development of the proposed Project may expose people/structures to seiching as a result of significant ground motion related to an earthquake. Project compliance with recommended mitigation measures would reduce impacts to less than significant levels.*

Seiche-induced run-up along the shoreline properties adjacent to Big Bear Lake could conceivably occur due to significant ground motion from a major earthquake. The amount of potential run-up would be dependant on the inclination of the near-shore environment and the height of the lake level at the time of the seismic event. Assuming the lake would be at its highest level during such an event, mitigation measures involving at least 5 feet of “free-board” above the high-water line for all residential structures would reduce this impact to a less than significant level.

EXPANSIVE SOILS

5.10-5 *Development of the proposed Project may create substantial risks to life or property as a result of expansive soils. Implementation of the recommended mitigation measure would reduce impacts to less than significant levels.*

Currently, there is insufficient information concerning the expansive nature of the alluvial soils beneath the project site. This impact will need to be evaluated in ~~additional~~ design level geotechnical analysis/studies~~.~~, which include ~~1)~~ a quantitative geotechnical analysis~~,~~ ~~2), a design level geotechnical engineering report,~~ and ~~3)~~ a design-level engineering geology report. Implementation of the recommended mitigation measures ~~of~~ from the design-level geotechnical engineering report ~~the recommended mitigation measure and conclusions rendered in the referenced reports~~ would reduce impacts to less than significant levels.

CUMULATIVE

5.10-6 *The proposed Project, combined with future development, may result in increased short-term impacts such as erosion and sedimentation, and long-term seismic impacts within the area. Mitigation is incorporated on a project-by-project basis to reduce impacts to a less than significant level in areas deemed suitable for development.*

Soils and geologic conditions in the Project vicinity may vary by location. Short-term cumulative impacts such as erosion and sedimentation would occur. The only cumulative long-term impact related to geology is the exposure of people and the property in the vicinity of the North Frontal Fault System to the potential for seismically induced ground shaking. Implementation of the cumulative projects would incrementally increase the number of people and structures potentially subject to a seismic event. Such exposure can be minimized by adhering to UBC standards and requirements. The cumulative effects of increased seismic risk would be addressed on a project-by-project basis in order to determine the need for project specific mitigation.

MITIGATION MEASURES

This section directly corresponds to the identified Impact Statements in the impacts subsection.

SLOPE STABILITY

5.10-1 The stability of ~~S~~south facing cut slopes shall be analyzed as part of the design-level geotechnical investigation. ~~u~~Utilize~~e~~ing 2:1 buttressed slopes using on site native soil materials, or ~~by~~ constructing geotextile-reinforced soil buttresses ~~where~~for planned unstable cut slopes ~~are planned~~ are typical engineering designs for stabilizing slopes. Either of these methods, or other methods must be approved by the San Bernardino County Department of Building and Safety~~Geologist for slope reinforcement may be utilized~~.

SOIL EROSION

5.10-2a Due to the potential for erosion associated with younger alluvial deposits within the two major on-site stream channels, increased surface drainage quantities associated with development on-site shall be directed away from the stream channels.

5.10-2b Prior to the issuance of Grading Permits, the Project Applicant shall prepare a Soil Erosion and Sedimentation Plan for submittal and approval by the County Building and Safety Department.

GROUND SHAKING

5.10-3 Engineering design for all structures and roadways shall be based on the current California Uniform Building Code at the time of project development. Construction plans shall be in accordance with seismic design standards set forth by the County's Development Code and Uniform Building Code.

SEICHE

5.10-4 Residential structures shall be located in areas which provide a minimum of five feet of freeboard above the high water line for any structures.

EXPANSIVE SOILS

5.10-5 Prior to grading permit issuance, ~~geologic analysis/studies shall be required including 1) a~~ a quantitative geotechnical analysis and~~of liquefaction, 2) a~~ design-level geotechnical engineering report shall be required and submitted to the County of San Bernardino Department of Building and Safety for their approval. ~~and 3) a design level engineering geology report.~~

CUMULATIVE

5.10-6 No mitigation measures are recommended.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

No significant impacts related to Geology and Soils have been identified following implementation of mitigation measures and/or compliance with applicable standards, policies and/or County of San Bernardino Development Code and standards set forth in the Uniform Building Code.

5.11 HYDROLOGY AND DRAINAGE

This Section analyzes potential impacts on existing drainage patterns and flood control facilities in the Project area, as well as the potential effects on the groundwater and water quality in Big Bear Lake. Mitigation measures are recommended to reduce potential impacts to a less than significant level. Information in this Section is based on the Hydrology and Water Quality Report for the Project site prepared by RBF Consulting (June 2002), hydrological data made available by Hicks & Hartwick, Inc., the Geohydrologic Investigation of the Moon Camp Area (GSS 2000 report), prepared by Geoscience Support Services, Inc. (GSS) (July 2000), the Focused Geohydrologic Evaluation of the Maximum Perennial Yield of the North Shore and Grout Creek Hydrologic Subunit Tributary Subareas (GSS 2003 report), prepared by GSS (December 2003) and the Delineation of Jurisdictional Waters, prepared by RBF Consulting (July 2004).

EXISTING CONDITIONS

The purpose of this existing conditions evaluation is to establish a baseline for comparison of the pre-project and the post-project conditions. Baseline conditions investigated include: land use, hydrology, floodplain mapping, groundwater and surface water quality.

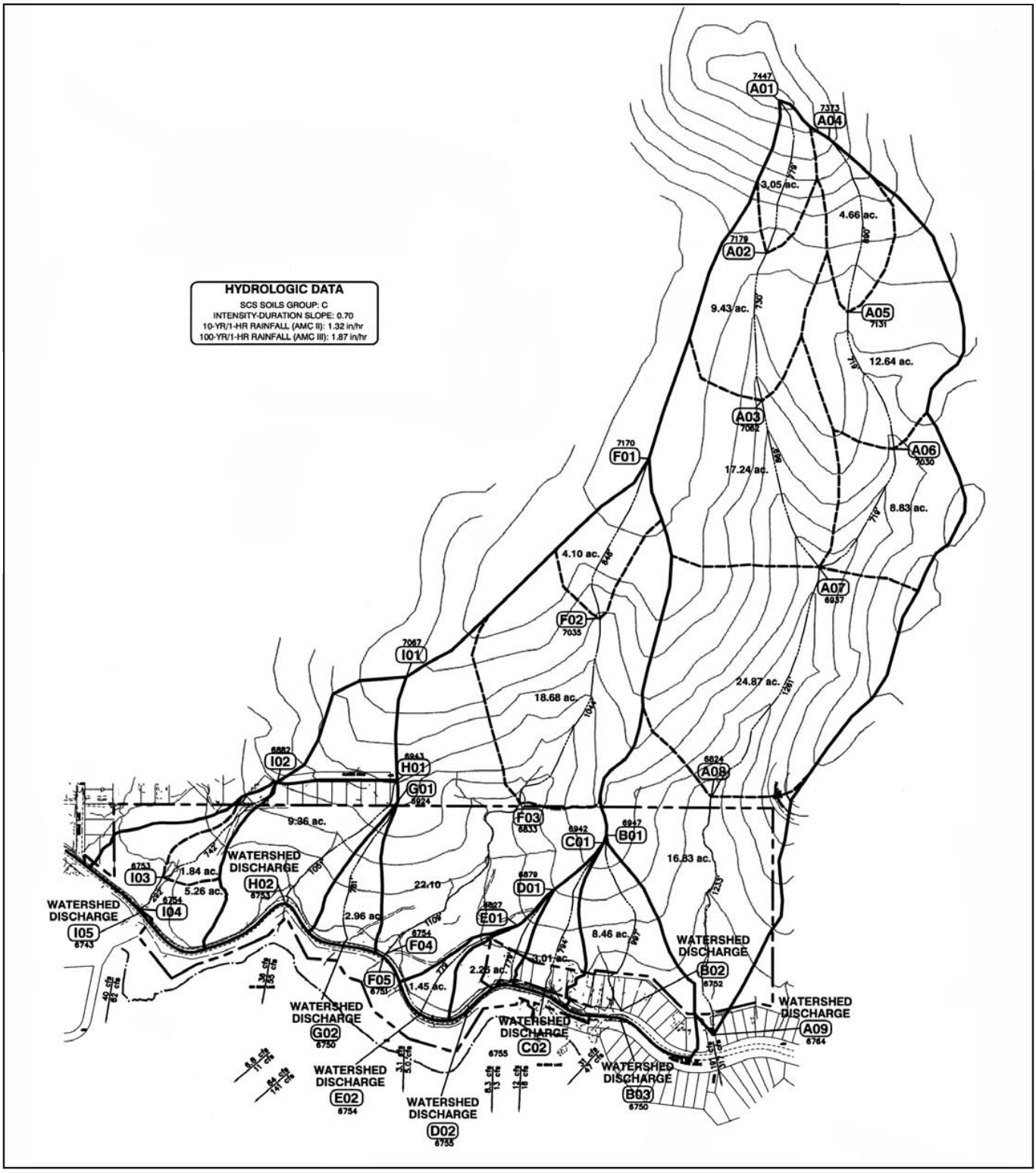
The watershed tributary to the site can be separated into nine drainage areas consisting of approximately 177 acres. Flows enter Big Bear Lake via cross culverts under State Route 38 and direct sheet flow over State Route 38. The drainage areas are labeled A through I. Area A, located on the eastern end of the site, contains a natural channel passing through the proposed development site. It is the largest drainage area consisting of 98 acres.

HYDROLOGY

Hicks & Hartwick, Inc. conducted a hydrology analysis that provides the basis for the existing condition hydrology for the Project site. Hydrologic calculations utilized to evaluate surface runoff from the 10-year and 100-year hypothetical design storm frequencies of tributary drainage areas were performed using Advances Engineering Software 1983-1994 (AES). The computer software (AES) creates an inactive watershed system to compute hydraulic and hydrological information for a given watershed. The watershed subarea boundaries were delineated in their *Preliminary Drainage Study*. Hydrologic parameters used in the analysis, such as rainfall and soil classification, are presented in the *San Bernardino County Hydrology Manual* dated May 1983. Exhibit 5.11-1, *Existing Condition Hydrology Map*, illustrates the hydrology for the existing condition.

EXISTING WATERSHED DESCRIPTION

The historic drainage pattern for the area follows the natural topography, north to south with the flow outleting to Big Bear Lake.



Source: Hicks & Hartwick, Inc., Preliminary Drainage Study.

Not to Scale

RBF CONSULTING

PLANNING ■ DESIGN ■ CONSTRUCTION

12/05 JN 10-101901

MOON CAMP TT #16136
ENVIRONMENTAL IMPACT REPORT

Existing Condition Hydrology Map

Exhibit 5.11-1

The maximum elevation differential of the watershed is approximately 213 feet (from elevation 2,960 at the northeast boundary to 2,747 feet at the lakefront). The site has slopes of five to 40 percent. Due to on-site drainage patterns, the project site was divided into nine areas (A through I). Area "A" is on the eastern portion of the watershed and area "I" is on the western portion. Table 5.11-1, *Drainage Area Breakdown*, provides further detail on the nine existing drainage areas and subareas.

Table 5.11-1
Drainage Area Breakdown

Drainage Area	Area (acres)	Number of Subareas
A	95.4	8
B	8.5	1
C	3.0	1
D	2.3	1
E	1.5	1
F	44.9	3
G	3.0	1
H	9.4	1
I	11.4	3

All soil types are classified into four hydrologic groups (A, B, C and D). Soil type A has low runoff potential and consists primarily of sand and gravel. Soil type B has a moderate infiltration rate and consists mostly of sandy-loam soils. Soil type C has a slow infiltration rate and consists primarily of silty-loam soils. Soil type D has a high runoff potential and consists of clay soils.

Area "A" is composed of 8 subareas. Currently all land in area "A" is natural. There is a natural channel running down the center of watershed "A". Approximately 50 percent of the land on the north end of sub-watershed "A" is composed of soil type "D", while the remainder is composed of soil type "C". Area "B" is composed of one subarea. Area "B's" land use consists of 1.0 dwelling unit per acre (DU/AC). Areas "C", "D", and "H" are all composed of one subarea. Within these subareas, the land use consists of 1.0 DU/2.5 AC. Areas "E" and "G" are also composed of one subarea each. These subareas exist as natural lands. Area "F" is composed of three subareas. The entire drainage area is comprised of natural lands. Area "I" is composed of three subareas. In the upper drainage area, the land use consists of 4.0 DU/AC. In the second drainage area, the land use consists of 1.0 DU/2.5 AC. The downstream drainage area in subarea "I" consists of natural lands.

RBF observed that the existing culverts which cross State Route 38 were either plugged with sediment, had crushed inlets, or both. These deficiencies result in little to no capacity in the existing culverts. The deficiencies cause ponding and overtopping of State Route 38.

RATIONAL METHOD

Hicks & Hartwick performed the hydrologic calculations to determine the 10-year and 100-year peak flow rates using the *San Bernardino County Hydrology Manual* dated May 1983. The Rational Method is an empirical computation procedure used for developing a peak runoff rate (discharge) for storms of a specific recurrence interval. The design discharges were computed by generating a hydrologic "link-node" model, which divides the area into drainage subareas. These subareas are tributary to a concentration point or hydrologic "node" point determined by the existing terrain and street layout. The assumptions/guidelines applied for use of the Rational Method are included in Appendix 15.9, *Hydrology Data*.

EXISTING CONDITION SURFACE WATER HYDROLOGY

To establish the baseline hydrologic conditions for the Project, both 10-year and 100-year frequency storm were analyzed by Hicks & Hartwick. The flows for the 10-year storm are used to determine local storm drain sizing, while the 100-year analysis is used for larger master plan facilities and floodplain mapping. The predominant hydrologic soil classification of the natural watershed is soil type "C" and "D", which corresponds to a high runoff potential, with the soil having slow infiltration rates consistent with clay soils. Table 5.11-2, *Existing Conditions Peak Flowrates*, summarizes the results of the existing condition analysis utilizing the 1983-1994 Advanced Engineering Software.

FLOODPLAIN MAPPING

The County of San Bernardino is a participant in the National Flood Insurance Program (NFIP). Communities participating in the NFIP must adopt and enforce minimum floodplain management standards, including identification of flood hazards and flooding risks. Participation in the NFIP allows communities to purchase low cost insurance protection against losses from flooding. The published Flood Insurance Rate Maps (FIRMs) for the Project site are included on Community Panel Number 060270 7295B. The FIRMs indicated that there are no existing flood hazards within the Project site.

JURISTICTIONAL WATERS

RBF Consulting conducted a Delineation of Jurisdictional Waters (July 2004). The findings of their Study are summarized below.

WATERS OF THE U.S. (WETLAND) DETERMINATION

In order to be considered a wetland, an area must exhibit all three of the wetland parameters (i.e., vegetation, soil and hydrology) per the evaluation criteria in the Wetland Delineation Manual. Based on the results of the field investigations, it was determined that not all three parameters were present within the drainages (neither hydric soils nor riparian vegetation were present). As a result, RBF identified no Corps wetlands on the proposed Project site.

Table 5.11-2
Existing Conditions Peak Flowrates

Subarea	Area (acres)	Total Area (AC)	Tc (min)	Total 10-Yr. Peak Q (cfs)	Total 100-Yr. Peak Q (cfs)
Watershed A					
A1 – A2	3	3	16.6	7.8	12.2
A2 – A3	9.4	12.5	17.4	30.3	48.4
A3 – A7	17.2	29.7	18.3	69.0	111.0
A4 – A5	4.7	4.7	18.4	11.0	17.4
A5 – A6	12.6	17.3	19.2	39.4	62.5
A6 – A7	8.8	26.1	20.0	57.4	91.6
A7 – A8	24.9	79.0	19.6	170.1	227.3
A8 – A9	16.8	95.9	21.2	191.5	317.3
Watershed B					
B1 – B2	8.5	8.5	10.3	31.1	47.3
Watershed C					
C1 – C2	3.0	3.0	9.4	11.7	17.9
Watershed D					
D1 – D2	2.3	2.3	10.0	8.3	12.8
Watershed E					
E1 – E2	1.5	1.5	19.9	3.1	5
Watershed F					
F1 – F2	4.1	4.1	20.0	8.6	14.1
F2 – F3	18.7	22.8	21.1	45.6	75.2
F3 – F4	22.1	44.9	22.5	84.4	141.1
Watershed G					
G1 – G2	3.0	3.0	18.1	6.7	10.9
Watershed H					
H1 – H2	9.4	9.4	9.6	35.7	54.6
Watershed I					
I1 – I2	4.3	4.3	9.4	17.3	25.7
I2 – I3	1.8	6.1	10.2	22.9	34.7
I3 – I4	5.3	11.4	10.7	40.2	61.9

WATERS OF THE U.S. (NON-WETLAND) DETERMINATION

~~The unnamed drainages within the Project site exhibited evidence of flow (i.e., sediment/silt deposition) sufficient to document the Ordinary High Water Mark (OHWM) (i.e., channel bed and bank lines), thus meeting the criteria for jurisdictional waters.~~ Evidence of an Ordinary High Water Mark (OHWM) was observed within the on-site ephemeral drainages, primarily indicated by sediment deposits. It should also be noted that Big Bear Lake adjoins the project site to the south. Based on discussions with the Big Bear Municipal Water District, the current water level of Big Bear Lake (as of June 28, 2004) is 6,727.8-feet above mean sea level (msl). The high water mark is reported to be 6,743.2 feet above msl. Refer to ~~Appendix 15.10, *Jurisdictional Delineation*, and~~ Exhibit 5.8-2, *Jurisdictional Map*, for an illustration of jurisdictional boundaries.

Based on the results of the field observations and data collection, RBF identified 0.15-acre of Corps jurisdictional "waters of the U.S." within the proposed project site. ~~The drainages are ephemeral.~~ In addition to on-site ephemeral drainages, the Corps considers Big Bear Lake jurisdictional. The Corps' jurisdictional limits are delineated at the high water line, which is reported to be at 6,743.20-foot elevation (and below).

CALIFORNIA DEPARTMENT OF FISH AND GAME (1602~~3~~) JURISDICTION

Based on the results of the field observations and data collection, RBF identified 0.15-acre of CDFG jurisdictional streambed~~waters~~ located within the boundaries of the Project site (refer to Exhibit 5.8-2, *Jurisdictional Map)*. As with the Corps, Big Bear Lake would be considered jurisdictional by the CDFG, including the approximate 4.14-acre lake shoreline. Utilizing the most current development plans, it was determined that the proposed improvements would impact 4.38-acres of CDFG jurisdiction (includes streambed, shoreline, and lake impacts). Refer to Section 5.8, *Biological Resources*, for further discussion regarding jurisdictional waters.

GROUNDWATER

The Big Bear Lake Watershed has been divided into seven hydrologic subunits based on surface water drainage divides. Two of the hydrologic subunits, the North Shore and Grout Creek Subunits, extend across most of the northern portion of Big Bear Lake. Although the subunits can be categorized as independent surface drainage catchments, their large size and/or elongated east-west extent warrant further subdivision to distinguish available groundwater resources in the eastern portion from available groundwater resources in the western portion.

As stated above, ~~T~~the groundwater conditions cited in this EIR are based on two separate reports prepared by Geoscience Support Services, Inc. (GSS). The GSS 2000 report includes data on the groundwater quality, on-site well operations (Wells-FP-2 and FP-3) and groundwater supply potential. ~~in 2000 and a~~ The GSS 2003 report ~~Focused Geohydrologic Evaluation of the Maximum Perennial Yield for the North Shore and Grout Creek Hydrologic Subareas, prepared in 2003~~ includes current data on groundwater supplies in the North Shore and Grout Creek Hydrologic Subunits. The findings in the GSS 2003 report regarding groundwater supplies are

assumed to supercede the 2000 findings. The GSS 2003 report presents a focused geohydrologic evaluation of the maximum perennial yield of the North Shore and Grout Creek Subunits that includes dividing each subunit into smaller tributary subareas. However, the data regarding groundwater quality and well operations in the GSS 2000 report are still applicable and cited in this section. It is also noted that the wells analyzed in the GSS 2000 report are not included in the GSS 2003 report, as they are non-operational. Well FP-2 is located on the Moon Camp project site.

Although the project area is located entirely within tributary subarea A of the North Shore Hydrologic Subunit, potential groundwater resources are analyzed for both the North Shore and the Grout Creek Hydrologic Subunits as they are both considered potential sources to supply water to the project.

~~According to the 2000 report, the entire project site is within subunit A of the North Shore subarea of Big Bear Lake. The western one-third lies within the Grout Creek subarea. The North Shore subarea is similar in several respects to the Grout Creek subarea. For example, a considerable amount of the water bearing (older alluvial) material present is above the known groundwater surface. Only a band of these materials adjacent to Big Bear Lake are continuously saturated.~~

~~According to a recent geohydrologic investigation of the Moon Camp Area by Geoscience Support Services (GSS, 2000), the older alluvial deposits represent the main water-bearing formation beneath the site. Groundwater level data from two U.S. Forest Service wells located within the project area suggest that Big Bear Lake provides recharge to the aquifer beneath the project area. Additional groundwater recharge emanates from gravity drainage from the higher elevations north of the Moon Camp area.~~

~~Based on studies by GSS (2000), the main water-bearing zones within the older alluvial deposits consist of intermixed and interlayered sand and gravels. However, lithologic data from the two U.S. Forest Service wells indicate that these sand and gravel aquifers are not continuous over wide areas and tend to follow subsurface channels (GSS, 2000). In mid-2000, groundwater beneath the southern margin of the site was approximately 5 to 10 feet below the level in the lake. More recent groundwater level observations from the three exploratory borings drilled for the liquefaction analysis appears to be similar with respect to the level of the lake.~~

~~The results from GSS 2000 geohydrologic investigation indicate the recoverable amount of groundwater in the Moon Camp area is estimated at 230 acre-feet per year. Based on the nature of the aquifer materials, thickness of the aquifer and the discharge rate of existing wells in the Moon Camp area is estimated at 230 acre-feet per year. Based on the nature of the aquifer materials, thickness of the aquifer and the discharge rate of existing wells in the Moon Camp area, the potential to develop a 100 gallon per minute (gpm) water well supply is considered by GSS (2000) to be good. Chemical analyses of the groundwater from the two on-site water wells indicate that the groundwater is of superior quality. However, the iron concentration (0.69 mg/l) in one well exceeds the state maximum concentration limit for iron (0.3 mg/l) (GSS, 2000).~~

Maximum perennial yield was evaluated in the context of the total average annual ground water recharge within the North Shore and Grout Creek Subunits. Ground water recharge is the total amount of water that reaches the aquifer (i.e., ground water reservoir) through natural processes, such as deep percolation of precipitation falling on the land surface and infiltration beneath flowing stream channels. In the development of ground water resources for municipal supply, however, not all of the natural recharge that any given aquifer receives on an average annual basis can be developed.

Maximum perennial yield is distinguished from average annual ground water recharge through the following definition:

> *The maximum quantity of ground water perennially available if all possible methods and sources are developed for recharging the basin. The quantity depends on the amount of water economically, legally, and politically available to the organization or agency managing the basin (Todd, 1980).*

By definition, the maximum perennial yield is some portion (i.e. subset) of the total amount of ground water recharge that the aquifers receive from precipitation on an average annual basis. Not all of the water that reaches the aquifer can be developed for beneficial use because either it is not economically feasible, or there is no legal right to the water, or political constraints prevent or inhibit development.

Average annual ground water recharge estimates were assigned to smaller tributary subareas, which were determined from surface drainage divides within the larger hydrologic subunits. The North Shore Subunit was subdivided into six tributary subareas (A through F) and the Grout Creek Subunit was subdivided into four tributary subareas (A through D). The boundaries of the tributary subareas represent surface water drainage divides, which, for most of the tributary subareas also represent ground water flow divides. Exceptions include the margins of Big Bear Lake and in the southeast portion of the North Shore Subunit where the ground water within one subarea/subunit can be in hydraulic communication with adjacent subareas/subunits.

Average annual ground water recharge was estimated for each tributary subarea using a watershed hydrologic model and by estimating ground water underflow (conducted for the alluvial portion of the Grout Creek Subunit only). When possible, measured data was used as input for the analysis of ground water discharge. Measured data included:

- Long-term precipitation records from weather stations within the Big Bear Lake watershed,
- Evapotranspiration data from evaporation pans and weather stations within the watershed,
- Ground water levels, and
- Ground water production.

However, most of the input parameters that are required for a detailed evaluation of the average annual ground water recharge had to be estimated or assumed from data collected outside the Grout Creek and North Shore Subunits or outside the Big

Bear Lake Watershed due to lack of measured data in the area. Although the assumed values are published and are from reliable sources (i.e., the U.S. Environmental Protection Agency, United States Geological Survey, etc.), they are not specific to the area of interest. Numerous additional monitoring features can be developed to collect the data necessary to refine the ground water recharge estimates. However, priority should be given to the construction of monitoring wells and the development of a reliable ground water level baseline for the tributary subareas.

NORTH SHORE HYDROLOGIC SUBUNIT

Groundwater in the North Shore Hydrologic Subunit generally occurs in the unconsolidated alluvial deposits on the lower slopes of the surrounding mountains and in the fractures and weathered portions of the bedrock. Groundwater in the alluvium occurs at depths ranging from approximately 5 feet (ft) in the western portions of the Subunit and near the RV Park wells to approximately 50 ft near Division Well Nos. 6 and 7 (refer to Figure 2 in the GSS 2003 report for well location in the North Shore and Grout Creek Subunits).

Groundwater flows by gravity drainage from areas of high elevation (the mountain slopes) into areas of low elevation, ultimately collecting in the sediments beneath Big Bear Lake. Groundwater recharge likely occurs as deep percolation of runoff through the younger alluvium and fractures in the bedrock during periods of prolonged precipitation.

The primary sources of groundwater discharge from the North Shore Subunit are underflow and groundwater pumping from wells within the Subunit. The DWP currently operates four vertical production wells within the North Shore Subunit (RV Park Well Nos. 1 and 2 and Division Well Nos. 6 and 7). Combined average annual groundwater production from DWP wells between 1993 and 2002 is 282 acre-feet per year acre-ft/yr. Pumping data for the 20 private wells in the Subunit were not available. However, assuming that they are domestic sources and that an average single family home uses approximately 200 gallons per day per year (gpd/yr), it is estimated that production from these wells is approximately 4.5 acre-ft/yr.

Groundwater levels in the central portion of the North Shore Hydrologic Subunit, as measured in RV Park Well No. 1, have declined approximately 20 feet between 1996 and 2002. The groundwater level in this well is relatively stable, however, with most of the decline occurring after year 2000, a period of relatively dry climatic conditions. Groundwater levels in Division Well No. 6, located in the eastern portion of the Subunit, have declined approximately 80 ft between 1992 and 2003. Recent groundwater level declines in the eastern portion of the Subunit can also be correlated with dry climatic conditions, although the greater degree of decline is also a reflection of higher groundwater production in the area.

Estimates of Average Annual Groundwater Recharge (North Shore Subunit)

Estimates of average annual groundwater recharge were assigned to each tributary subarea using the watershed model. Required input parameters for the watershed model for which no measured data were available were obtained from the EPA

database of hydrologic parameters. Based on the watershed modeling results, the estimates of average annual groundwater recharge for the North Shore Hydrologic Subunit range from approximately 150 to 430 acre-ft/yr with a midpoint of approximately 290 acre-ft/yr. This range of recharge is approximately 2 to 7 percent of average annual precipitation for the Subunit, which is within the range of accepted recharge estimates for other groundwater basins in southern California (3 to 7 percent) determined by the Metropolitan Water District of Southern California (MWD). The midpoint of the range is approximately 4.5 percent of precipitation for the Subunit.

Estimates of average annual groundwater recharge for the six tributary subareas range from 27 acre-ft/yr (subarea E) to 73 acre-ft/yr (subarea B) (refer to Table 5.11-3, *Summary of Groundwater Recharge Results North Shore Tributary Subareas*). These groundwater recharge estimates represent the average of the watershed model output range, which is based on the average of typical and possible input values. The data suggests that the RV Park wells are producing groundwater at a rate (approximately 14 acre-ft/yr), which is well within their subarea's (subarea B) average annual groundwater recharge. Combined average annual groundwater production from Division Well Nos. 6 and 7 is exceeding that subarea's (subarea F) average annual groundwater recharge. However, it is important to note that these wells are in the alluvial portion of the subarea, which is in hydraulic continuity with the alluvial portions of the adjacent hydrologic subunit (i.e. the Division Subunit to the south). Accordingly, production from these wells should be evaluated in the context of the groundwater basin in this area and not the watershed tributary to the wells.

Maximum Perennial Yield (North Shore Subunit)

According to the GSS 2003 report, the midpoint of the estimated range of average annual groundwater recharge (approximately 290 acre-feet per year) is considered a good estimate of maximum perennial yield for the North Shore Hydrologic Subunit, given the available data.

The results of the ground water recharge analysis for the North Shore Subunit are as follows:

Table 5.11-3
Summary of Ground Water Recharge Results - North Shore Tributary Subareas

Tributary Subarea	Area (acres)	Annual Precipitation (inches)	Average Annual Ground Water Recharge – Low Estimate (acre-ft/yr)	Average Annual Ground Water Recharge – High Estimate (acre-ft/yr)	Average of Ground Water Recharge Estimate Range (acre-ft/yr)
A	247	27.87	14	44	29
B	720	25.45	36	110	73
C	828	23.01	37	107	72
D	558	21.45	22	63	43
E	392	20.01	15	39	27
F	814	18.27	23	66	44
TOTAL	3,559	136.06	147	429	288

GROUT CREEK HYDROLOGIC SUBUNIT

Groundwater within the Grout Creek Subunit occurs in both the bedrock and alluvium. The Cedar Dell slant wells (located in subarea C) are drilled into the Mesozoic granitic rock and typically produce approximately 20 gallons per minute, collectively. Groundwater in the alluvium occurs at depths ranging from approximately 20 to 90 ft and flows to the south toward Grout Bay (Big Bear Lake) at a gradient of 0.024 to 0.043 ft/ft. Pumping test and lithologic data from the Barbara Lee Lane Well and specific capacity data from Wells 12P01, 13C01, and Northshore Well Nos. 1, 2, and 3 were used to estimate aquifer transmissivity. Estimates range from 700 to 1,900 gpd/ft.

Groundwater recharge likely occurs within the Grout Creek streambed during periods of extended runoff, near the contact between the bedrock and alluvium and, to a lesser extent, as percolation of precipitation directly on the alluvium. Groundwater recharge also occurs through fractures in the bedrock formations.

The primary sources of groundwater discharge from the Grout Creek Subunit are underflow and groundwater pumping from wells within the Subunit. DWP currently operates two vertical production wells, two slant wells in bedrock, and one spring within the Grout Creek Subunit. Average annual groundwater production from DWP wells within the Subunit from 1989 to 2002 has been approximately 134 acre-ft/yr. With the exception of pumping from Barbara Lee Lane Well No. 1, all of the municipal groundwater production in the Grout Creek Hydrologic Subunit is from tributary subarea C. Pumping data for the 29 private wells in the Subunit were not available. However, assuming that they are domestic sources and that an average single family home uses about 200 gpd/yr, it is estimated that production from these wells is approximately 6.5 acre-ft/yr.

Estimates of Average Annual Groundwater Recharge (Grout Creek Subunit)

Groundwater level elevations in North Shore Well Nos. 1 and 3, both located at the discharge end of tributary subarea C, have been relatively stable between 1995 and 2003, with seasonal fluctuations and a minor decline during the relatively dry climatic cycle from 1999 to December 2003. The average annual groundwater recharge of the Grout Creek Subunit was estimated using the underflow method and the watershed model.

The underflow method indicated an average annual groundwater recharge estimate of approximately 200 acre-ft/yr. It should be noted, however, that the underflow calculation only accounts for outflow in the alluvial aquifer and does not account for outflow through the bedrock in the Subunit. It is assumed that some outflow occurs within the bedrock aquifer, which is one reason why the underflow estimate for the Grout Creek Subunit is lower than the perennial yield estimate from the watershed model (described below).

Based on the watershed modeling results, the average annual groundwater recharge for the Grout Creek Hydrologic Subunit (subareas A through D) is estimated to range from approximately 260 to 840 acre-ft/yr with a midpoint of approximately 550 acre-ft/yr (refer to Table 5.11-4, *Summary of Groundwater Recharge Results Grout Creek*

Tributary Subareas). This range of recharge is approximately 2 to 8 percent of average annual precipitation for the Subunit. The midpoint of the range is approximately 5 percent of precipitation for the Subunit. Assumed input parameters for the watershed model are based on the average of EPA' s suggested parameter ranges.

The relative disparity between the average annual recharge estimates obtained from the underflow analysis and watershed model is partly due to the estimated nature of the input parameters used in each analysis. In the case of the underflow analysis, the transmissivity parameter is estimated based on review of lithologic logs and pumping tests in wells within the Big Bear area that are perforated in similar aquifer materials. More representative values can be obtained via formal aquifer pumping tests using the wells in the Subunit. For the watershed model, 18 of the 20 required input parameters are estimated from the EPA' s database, which is not specific to the mountains of Southern California. Additionally, the underflow analysis does not account for all of the recharge within the bedrock. As data is collected in the future, the range of recharge will become less.

Estimates of average annual groundwater recharge for the four tributary subareas range from 66 acre-ft/yr (subarea D) to 217 acre-ft/yr (subarea C). These average annual recharge values represent the average of the watershed model output range, which is based on the average of typical and possible input values. These data suggest that average annual groundwater production from the Grout Creek Hydrologic Subunit (approximately 134 acre-ft/yr), which occurs almost entirely from tributary subarea C, is within the average annual recharge for both the tributary subarea and the hydrologic subunit.

Maximum Perennial Yield (Grout Creek Subunit)

The maximum perennial yield of the Grout Creek Hydrologic Subunit is within the range of average annual groundwater recharge specified by the watershed model, but is more likely to be in the lower end of the range than the upper end. As mentioned previously, by definition, maximum perennial yield is the amount of water that can be developed economically, legally and politically. In consideration of this, subareas A and B of the Grout Creek Subunit are remote and are located on land under the jurisdiction of the United States Forest Service (USFS). There is no established distribution system in subareas A and B of the Grout Creek Subunit. Furthermore, access to the area would likely require a lengthy negotiation process with the USFS. Given these factors, developing groundwater resources in these subareas is not currently practical.

At this time, it is recommended to use the sum of the midpoint recharge estimates for tributary subareas C and D (217 acre-ft plus 66 acre-ft; see Table 5.11-4) as the maximum perennial yield for the Grout Creek Subunit (total of 283 acre-ft/yr). It should be emphasized that as groundwater production is initiated in each subarea, it will be very important to monitor groundwater levels in dedicated non-pumping monitoring wells (i.e. " key wells") located in each tributary subarea from which groundwater is extracted. As was recommended for the North Shore Hydrologic Subunit, future management of the groundwater resources in each tributary subarea

should rely more on established groundwater level thresholds than the perennial yield estimates.

The results of the groundwater recharge analysis for the Grout Creek Subunit are as follows:

Table 5.11-4
Summary of Ground Water Recharge Results
Grout Creek Tributary Subareas

Tributary Subarea	Area (acres)	Annual Precipitation (inches)	Average Annual Ground Water Recharge – Low Estimate (acre-ft/yr)	Average Annual Ground Water Recharge – High Estimate (acre-ft/yr)	Average of Ground Water Recharge Estimate Range (acre-ft/yr)
A	1,074	33.44	74	249	161
B	850	29.01	50	160	105
C	1,668	29.93	104	331	217
D	592	26.74	32	99	66
Total (A to D)	4,184	119	260	839	549
Total (C and D only)	2,260	56.67	136	430	283
Tributary subareas A and B are excluded from the totals because they are not currently practicable to developed due to their remote locations and are located on land under the jurisdiction of the U.S. Forest Service.					

GROUNDWATER QUALITY

According to the GSS 2000 Report, groundwater samples collected from Well FP-2 located on the southern portion of the Moon Camp site in 1987 was submitted for a full Title 22 analysis. The chemical analysis indicated that the groundwater quality in the Moon Camp area is calcium bicarbonate and is generally of superior water quality as all concentrations were below maximum contaminant levels (MCLs), with the exception of iron with a concentration of 0.69 mg/L. The MCL for iron is 0.3 mg/L. However, the iron concentration of Well-FP-3 (located approximately 800 feet to the northeast of Well FP-2) was only 0.06 mg/L, which suggest that iron concentrations are possibly lower elsewhere.

STORM WATER QUALITY

Storm water quality is a significant concern in Southern California. This section discusses typical pollutants found in storm water runoff and discusses what sort of contaminants may be found in existing storm water runoff. Based on the Clean Water Act, a 303 (d) list has been developed, which includes Big Bear Lake. The 303(d) Clean Water Act section contains a list of impaired surface water bodies which identifies primary pollutants, sources of pollutants and a priority schedule for developing Total Maximum Daily Loads (TNDL) to reduce the amount of pollutants in the water body. For a specific discussion concerning the status of the 303(d) listing for Big Bear Lake refer to the Existing Storm Water Quality discussion below.

NONPOINT SOURCE POLLUTANTS

A net effect of urbanization can be to increase pollutant export over naturally occurring conditions. The impact of the higher export can be on the adjacent streams and also on the downstream receiving waters. However, an important consideration in evaluating storm water quality from the project is to assess if it impairs the beneficial use to the receiving waters. Nonpoint source pollutants have been characterized by the following major categories in order to assist in determining the pertinent data and its use. Receiving waters can assimilate a limited quantity of various constituent elements, but there are thresholds beyond which the measured amount becomes a pollutant and results in an undesirable impact. Background of these standard water quality categories provides understanding of typical urbanization impacts.

Sediment. Sediment is made up of tiny soil particles that are washed or blown into surface waters. It is the major pollutant by volume in surface water. Suspended soil particles can cause the water to look cloudy or turbid. The fine sediment particles also act as a vehicle to transport other pollutants including nutrients, trace metals, and hydrocarbons. Construction-sites are the largest source of sediment for urban areas under development. Another major source of sediment is streambank erosion, which may be accelerated by increases in peak rates and volumes of runoff due to urbanization.

Nutrients. Nutrients are a major concern for surface water quality, especially phosphorous and nitrogen, which can cause algal blooms and excessive vegetative growth. Of the two, phosphorus is usually the limiting nutrient that controls the growth of algae in lakes. The orthophosphorous form of phosphorus is readily available for plant growth. The ammonium form of nitrogen can also have severe effects on surface water quality. The ammonium is converted to nitrate and nitrite forms of nitrogen in a process called nitrification. This process consumes large amounts of oxygen which can impair the dissolved oxygen levels in water. The nitrate form of nitrogen is very soluble and is found naturally at low levels in water. When nitrogen fertilizer is applied to lawns or other areas in excess of plant needs, nitrates can leach below the root zone, eventually reaching ground water. Orthophosphate from auto emissions also contributes phosphorus in areas with heavy automobile traffic. As a general rule of thumb, nutrient export is greatest from development sites with the most impervious areas. Other problems resulting from excess nutrients are 1) surface algal scums, 2) water discolorations, 3) odors, 4) toxic releases, and 5) overgrowth of plants. Common measures for nutrients are total nitrogen, organic nitrogen, total Kjeldahl nitrogen (TKN), nitrate, ammonia, total phosphate, and total organic carbon (TOC).

Trace Metals. Trace metals are primarily a concern because of their toxic effects on aquatic life, and their potential to contaminate drinking water supplies. The most common trace metals found in urban runoff are lead, zinc, and copper. Fallout from automobile emissions is also a major source of lead in urban areas. A large fraction of the trace metals in urban runoff are attached to sediment and this effectively reduces the level, which is immediately available for biological uptake and subsequent bioaccumulation. Metals associated with the sediment settle out rapidly and accumulate in the soils. Also, urban runoff events typically occur over a shorter

duration, which reduces the amount of exposure and could be toxic to the aquatic environment. The toxicity of trace metals in runoff varies with the hardness of the receiving water. As total hardness of the water increases, the threshold concentration levels for adverse effects increases.

Oxygen-Demanding Substances. Aquatic life is dependent on the dissolved oxygen in the water. When organic matter is consumed by microorganisms dissolved oxygen (DO) is consumed in the process. A rainfall event can deposit large quantities of oxygen demanding substance in lakes and streams. The biochemical oxygen demand of typical urban runoff is on the same order of magnitude as the effluent from an effective secondary wastewater treatment plant. A problem from low DO results when the rate of oxygen-demanding material exceeds the rate of replenishment. Oxygen demand is estimated by direct measure of DO and indirect measures such as biochemical oxygen demand (BOD), chemical oxygen demand (COD), oils and greases, and total organic carbon (TOC).

Bacteria. Bacteria levels in undiluted urban runoff exceed public health standards for water contact recreation almost without exception. Studies have found that total coliform counts exceeded EPA water quality criteria at almost every site and almost every time it rained. The coliform bacteria that are detected may not be a health risk in themselves, but are often associated with human pathogens.

Oil and Grease. Oil and grease contain a wide variety of hydrocarbons some of which could be toxic to aquatic life in low concentrations. These materials initially float on water and create the familiar rainbow-colored film. Hydrocarbons have a strong affinity for sediment and quickly absorb within it. The major source of hydrocarbons in urban runoff is through leakage of crankcase oil and other lubricating agents from automobiles. Hydrocarbon levels are highest in the runoff from parking lots, roads, and service stations. Residential land uses generate less hydrocarbons export, although illegal disposal of waste oil into storm waters can be a local problem.

Other Toxic Chemicals. Priority pollutants are generally related to hazardous wastes or toxic chemicals and can be sometimes detected in storm water. Priority pollutant scans have been conducted in previous studies of urban runoff, which evaluated the presence of over 120 toxic chemicals and compounds. The scans rarely revealed toxins that exceeded the current safety criteria. The urban runoff scans were primarily conducted in suburban areas not expected to have many sources of toxic pollutants (with the possible exception of illegally disposed or applied household hazardous wastes). Measures of priority pollutants in storm water include - 1) phthalate (plasticizer compound), 2) phenols and creosols (wood preservatives), 3) pesticides and herbicides, 4) oils and greases, 5) metals.

PHYSICAL CHARACTERISTICS OF SURFACE WATER QUALITY

Standard parameters which can assess the quality of storm water provide a method of measuring impairment. A background of these typical characteristics assists in understanding water quality requirements. The quantity of a material in the environment and its characteristics determine the degree of availability as a pollutant in surface runoff. In an urban environment, the quantity of certain pollutants in the

environment is a function of the intensity of the land use. For instance, a high density of automobile traffic makes a number of potential pollutants (such as lead and hydrocarbons) more available. The availability of a material, such as a fertilizer, is a function of the quantity and the manner in which it is applied. Applying fertilizer in quantities that exceed plant needs leaves the excess nutrients available for loss to surface or ground water.

The physical properties and chemical constituents of water traditionally have served as the primary means for monitoring and evaluating water quality. Evaluating the condition of water through a water quality standard refers to its physical, chemical, or biological characteristics. Water quality parameters for storm water comprise a long list and are classified in many ways. In many cases, the concentration of an urban pollutant, rather that the annual load of that pollutant, is needed to assess a water quality problem. Some of the physical, chemical or biological characteristics that evaluate the quality of the surface runoff are:

Dissolved Oxygen. Dissolved oxygen in the water has a pronounced effect on the aquatic organisms and the chemical reactions that occur. It is one of the most important biological water quality characteristics in the aquatic environment. The dissolved oxygen concentration of a water body is determined by the solubility of oxygen, which is inversely related to water temperature, pressure, and biological activity. Dissolved oxygen is a transient property that can fluctuate rapidly in time and space. Dissolved oxygen represents the status of the water system at a particular point and time of sampling. The decomposition of organic debris in water is a slow process and the resulting changes in oxygen status respond slowly also. The oxygen demand is an indication of the pollutant load and includes measurements of biochemical oxygen demand or chemical oxygen demand.

Biochemical Oxygen Demand (BOD). The biochemical oxygen demand (BOD) is an index of the oxygen-demanding properties of the biodegradable material in the water. Samples are taken from the field and incubated in the laboratory after which the residual dissolved oxygen is measured. The BOD value commonly referenced is the standard 5-day values. These values are useful in assessing stream pollution loads and for comparison purposes.

Chemical Oxygen Demand. The chemical oxygen demand (COD) is a measure of the pollutant loading in terms of complete chemical oxidation using strong oxidizing agents. It can be determined quickly because it does not rely on bacteriological actions as with BOD. COD does not necessarily provide a good index of oxygen demanding properties in natural waters.

Total Dissolved Solids (TDS). TDS concentration is determined by evaporation of a filtered sample to obtain residue whose weight is divided by the sample volume. The TDS of natural waters varies widely. There are several reasons why TDS are an important indicator of water quality. Dissolved solids affect the ionic bonding strength related to other pollutants such as metals in the water. TDS are also a major determinant of aquatic habitat. TDS affect saturation concentration of dissolved oxygen and influence the ability of a water body to assimilate wastes. Eutrophication rates depend on total dissolved solids.

pH. The pH of water is the negative log, base 10, of the hydrogen ion (H^+) activity. A pH of 7 is neutral; a pH greater than 7 indicates alkaline water; a pH less than 7 represents acidic water. In natural water, carbon dioxide reactions are some of the most important in establishing pH. The pH at any one time is an indication of the balance of chemical equilibrium in water and affects the availability of certain chemicals or nutrients in water for uptake by plants. The pH of water directly affects fish and other aquatic life. Generally, toxic limits for pH values are less than 4.8 and greater than 9.2.

Alkalinity. Alkalinity is the opposite of acidity, representing the capacity of water to neutralize acid. Alkalinity is also linked to pH and is caused by the presence of carbonate, bicarbonate, and hydroxide, which are formed when carbon dioxide is dissolved. A high alkalinity is associated with a high pH and excessive solids. Most streams have alkalinities less than 200 mg/l. Typically, alkalinity of 100-200mg/l seem to support well-diversified aquatic life.

Specific Conductance. The specific conductivity of water, or its ability to conduct an electric current, is related to the total dissolved ionic solids. Long-term monitoring of a project's waters can develop a relationship between specific conductivity and TDS. Its measurement is quick and inexpensive and can be used to approximate TDS. Specific conductivities in excess of 2000 µohms/cm indicate a TDS level too high for most freshwater fish.

Turbidity. The clarity of water is an important indicator of water quality that relates to the ability of photosynthetic light to penetrate. Turbidity is an indicator of the property of water that causes light to become scattered or absorbed. Turbidity is caused by suspended clays and other organic particles. It can be used as an indicator of certain water quality constituents such as predicting the sediment concentrations.

Nitrogen (N). Sources of nitrogen in storm water are from the additions of organic matter or chemical additions to water bodies. Ammonia and nitrate are important nutrients for the growth of algae and other plants. Excessive nitrogen can lead to eutrophication since nitrification consumes dissolved oxygen in the water. Nitrogen occurs in many forms. Organic Nitrogen breaks down into ammonia, which eventually becomes oxidized to nitrate-nitrogen, a form available for plants. High concentrations of nitrate-nitrogen (N/N) in water can stimulate growth of algae and other aquatic plants, but if phosphorus (P) is present, only about 0.30 mg/l of nitrate-nitrogen is needed for algal blooms. Some fish life can be affected when nitrate-nitrogen exceeds 4.2 mg/l. There are a number of ways to measure the various forms of aquatic nitrogen. Typical measurements of nitrogen include Kjeldahl nitrogen (organic nitrogen plus ammonia); ammonia; nitrite plus nitrate; nitrite; and nitrogen in plants. The principal water quality criteria for nitrogen focus on nitrate and ammonia.

Phosphorus (P). Phosphorus is an important component of organic matter. In many water bodies, phosphorus is the limiting nutrient that prevents additional biological activity from occurring. The origin of this constituent in urban storm water discharge is generally from fertilizers and other industrial products. Orthophosphate is soluble and is considered to be the only biologically available form of phosphorus. Since phosphorus strongly associates with solid particles and is a significant part of organic

material, sediments influence concentration in water and are an important component of the phosphorus cycle in streams. Important methods of measurement include detecting orthophosphate and total phosphorus.

EXISTING STORM WATER QUALITY

Water quality monitoring has historically been conducted on Big Bear Lake. The monitoring has resulted in Big Bear Lake being listed on the Santa Ana Regional Water Quality Board Section 303(d) list for impaired water bodies. Table 5.11-5, *Big Bear Lake Pollutant List*, contains the 303(d) list of the pollutants found in Big Bear Lake and the source of the pollutant.

Table 5.11-5
Big Bear Lake Pollutant List

Pollutant Stressors	Source	Priority
Copper	Resource Extraction	High
Mercury	Resource Extraction	High
Metals	Resource Extraction	High
Noxious Aquatic Plants	Unknown Non-Point Source	High
Nutrients	Construction and Snow Skiing Activities	High
Sedimentation and Siltation	Construction, Snow Skiing Activities and Unknown Non-Point Source	High
Source: Draft 2002 Clean Water Act Section 303(D) List and TMDL Priority Schedule.		

The Project site lacks data on storm water runoff quality. In the absence of site-specific data, expected storm water quality can be qualitatively discussed by relating typical pollutants to specific land uses.

Currently, the site is vacant, consisting of primarily open space with trees and shrubs. The watershed is primarily open land with 83.7 percent of the watershed 100 percent pervious (natural area), 4.7 percent is 80 percent pervious (1 dwelling unit per acre), 9.2 percent is 70 percent pervious (2.5 dwelling units per acre) and 2.4 percent is 60 percent pervious (4 dwelling units per acre). The expected existing pollutants in the existing condition storm water runoff from the residential area are trash, nutrients, bacteria, oil and grease, and household hazardous wastes from the residential development. There is also oil and grease associated with automobile use on-site and on State Route 38. The natural areas that make up the majority of the site contribute suspended solids.

Currently, the site does not contain any structural Best Management Practices (BMP) which would potentially decrease the amount of pollutants in storm water runoff. It is likely that portions of potential pollutants are removed through the use of natural conveyance. Conveying flows overland through vegetation affords some infiltration and biofiltration of runoff and thus, potential pollutant removal. However, the residential areas are on the lakeshore end of the Project site, providing little natural

conveyance. A draw back to conveying flows overland is that it tends to create erosion problems and thus increase suspended solids in the runoff. Problems associated with suspended solids and erosion are evident on the Project Site as illustrated in Figure 5 of Appendix 15.9, *Hydrology Data*.

IMPACTS

SIGNIFICANCE CRITERIA

Appendix G of the California Environmental Quality Act (CEQA) Guidelines contains the Initial Study Environmental Checklist form used during preparation of the Project Initial Study, which is contained in Appendix 15.1, *Initial Study/Notice of Preparation*, of this EIR. The Initial Study includes questions relating to hydrology, drainage and water quality. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this Section. Accordingly, a project may create a significant environmental impact if it causes one or more of the following to occur:

- Violation of any water quality standards or waste discharge requirements (refer to Impact Statements 5.11-3 and 5.11-4);

- Substantial depletion of groundwater supplies or substantial interference with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted) (refer to Impact Statement, 5.11-2);

- Substantial alteration of the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site (refer to Impact Statement 5.11-1);

- Substantial alteration of the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site (refer to Impact Statement 5.11-1);

- Creation or contribution of runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provision of substantial additional sources of polluted runoff (refer to Impact Statement 5.11-1);

- Otherwise substantial degradation of water quality (refer to Impact Statements 5.11-3 and 5.11-4);

- Housing placement within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map (refer to Section 10.0, *Effects Found Not To Be Significant*);

- Placement within a 100-year flood hazard area structures which would impede or redirect flood flows (refer to Section 10.0, *Effects Found Not To Be Significant*); and/or

- Exposure of people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam (refer to Section 10.0, *Effects Found Not To Be Significant*).

Potential impacts associated with drainage and water quality are categorized below according to topic. Mitigation measures at the end of this Section directly correspond to the impact statements below.

The following discussion is an evaluation of the proposed Project which is then compared to the existing conditions analysis to determine impacts associated with development of the property. Proposed conditions investigated include: land use, proposed storm drain configuration, hydrology, floodplain mapping, groundwater and surface water quality.

Federal, State and local drainage laws and regulations govern the evaluation of impacts to surface water drainage. For this evaluation, impacts to surface water drainage would be considered significant if the Project alters the drainage patterns of the site, causing erosion, siltation, or increased runoff, thus, resulting in increased flooding. Increase in the amount of runoff could be considered significant if it impacts State Route 38 or downstream storm drain facilities.

The evaluation of impacts to storm water quality is of growing concern throughout Southern California. In response to the growing concerns and implementation of the Clean Water Act, the Santa Ana Regional Water Quality Control Board has a tentative draft of the Municipal National Pollution Discharge Elimination System (NPDES) Permit for San Bernardino County. The Order Number is R8-2002-0012. The current NPDES number for San Bernardino County is CAS618036.

Development Planning for Storm Water Management

The requirement to implement a program for development planning was based on Federal and State statutes including: Section 402 (p) of the Clean Water Act. The Clean Water Act amendments of 1987 established a framework for regulating storm water discharges from municipal, industrial, and construction activities under the NPDES program. The primary objectives of the municipal storm water program requirements are to:

- Effectively prohibit non-storm water discharges, and

- Reduce the discharge of pollutants from the storm water conveyance system to the Maximum Extent Practicable.

For this evaluation, impacts to storm water quality would be considered significant if the project did not attempt to address storm water pollution to the maximum extent practicable. Currently, there are no definitive water quality standards that require storm water quality leaving a project site to meet standards for individual pollutants.