

LONG-TERM MANAGEMENT PLAN FOR BALD EAGLE AND RARE PLANT HABITAT

MOON CAMP RESIDENTIAL SUBDIVISION PROJECT

SAN BERNARDINO COUNTY, CALIFORNIA

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Executive Summary

This Long-Term Management Plan (LTMP) has been prepared to provide permanent protection and long-term management of habitat for American bald eagle (*Haliaeetus leucocephalus*) and rare plant species on the Moon Camp residential subdivision (henceforth, “the Project”), situated near the unincorporated town of Fawnskin in Big Bear Valley, San Bernardino County, California.

Bald eagle use of the Moon Camp property is limited to occasional perching in trees along the lakeshore and foraging for fish and waterfowl over Big Bear Lake. Potential impacts of the Moon Camp residential development are therefore limited to the near-shore perch trees and foraging habitat along the lake.

Rare plant habitat on the Project site consists of ashy-gray Indian paintbrush (*Castilleja cinerea*), a federally Threatened species, and several other rare and locally restricted species. The rare plant habitat is primarily confined to the western portion of the Project area within the area designated as Open Space Letter Lots A and H.

This LTMP describes preservation measures, management activities and the implementation of a long-term monitoring program to improve and maintain optimal bald eagle and rare plant habitat onsite in perpetuity. The preservation and management strategies detailed herein are focused on the lakefront Letter Lots A, B, C, D and H. The LTMP calls for implementing a perch tree habitat enhancement program, and seasonal closure of all human activities along the lakefront lots during the period from December 1-April 1 each year. The management strategies herein are in addition to, and augment, the mitigation measures identified in the Project Environmental Impact Report (EIR). A Conservation Easement will be conveyed over the Letter Lots in the name of a California Department of Fish and Wildlife (CDFW) agency-approved land management entity for implementation and monitoring of the conditions set forth in this LTMP and any other biological mitigation measures, in accordance with final conditions of approval of the Project. A second Conservation Easement will be conveyed to CDFW to allow the agency access to the conservation easement area to verify compliance with mitigation measures and conditions of approval with regard to sensitive biological resources.

A non-wasting endowment fund will be deposited in an account dedicated to preservation, maintenance and monitoring of sensitive biological resources on the Moon Camp property, including funding for rare plant habitat on Lots A and H, as well as on the Dixie Lee Lane pebble plain habitat conservation area. Revenues generated by the endowment fund shall be used by the land management entity for the sole purpose of implementation, maintenance and monitoring of the conservation easements and the biological resources contained therein.

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Appendix A Photographs of Glare on Water From Eagle Perch Trees

Section 1 Introduction

1.1 THE PROJECT

The Moon Camp Residential Subdivision (Tentative Tract 16136, henceforth referred to as “the Project”) is a proposed rural residential development that will be limited to 50 custom homes. Residential lots will be a minimum of 20,000 square feet and will be sold and built separately over a period of approximately 10 years. All 50 residential lots will be located north of State Route 38 (SR-38). The current Project would create a total of 9.2 acres (15%) of open space situated on Letter Lots A-H, including all property south of SR-38 to the lake.

1.2 PROJECT LOCATION

The Project comprises 62.43-acres located on the north shore of Big Bear Lake in the unincorporated community of Fawnskin in the County of San Bernardino (Exhibit 1, *Local Vicinity*). SR-38, also known as North Shore Drive, runs east-west along the north shore of the lake and provides access to the site. The Project site is roughly bounded to the north by Flicker Road, to the south by Big Bear Lake, to the east by Polique Canyon Road, and to the west by Canyon Road. Site elevations range from 2,056 meters (6,744 feet) above mean sea level at the lakeshore to 2,121 meters (6,960 feet) above mean sea level at the northeast corner of the site. Individual slopes range from 5 percent to 40 percent and generally run north to south toward the lake. Vegetation primarily consists of an open Jeffrey Pine forest. The Project site is currently undeveloped and is within the San Bernardino County Bear Valley Community Plan.

1.3 PROJECT DESCRIPTION

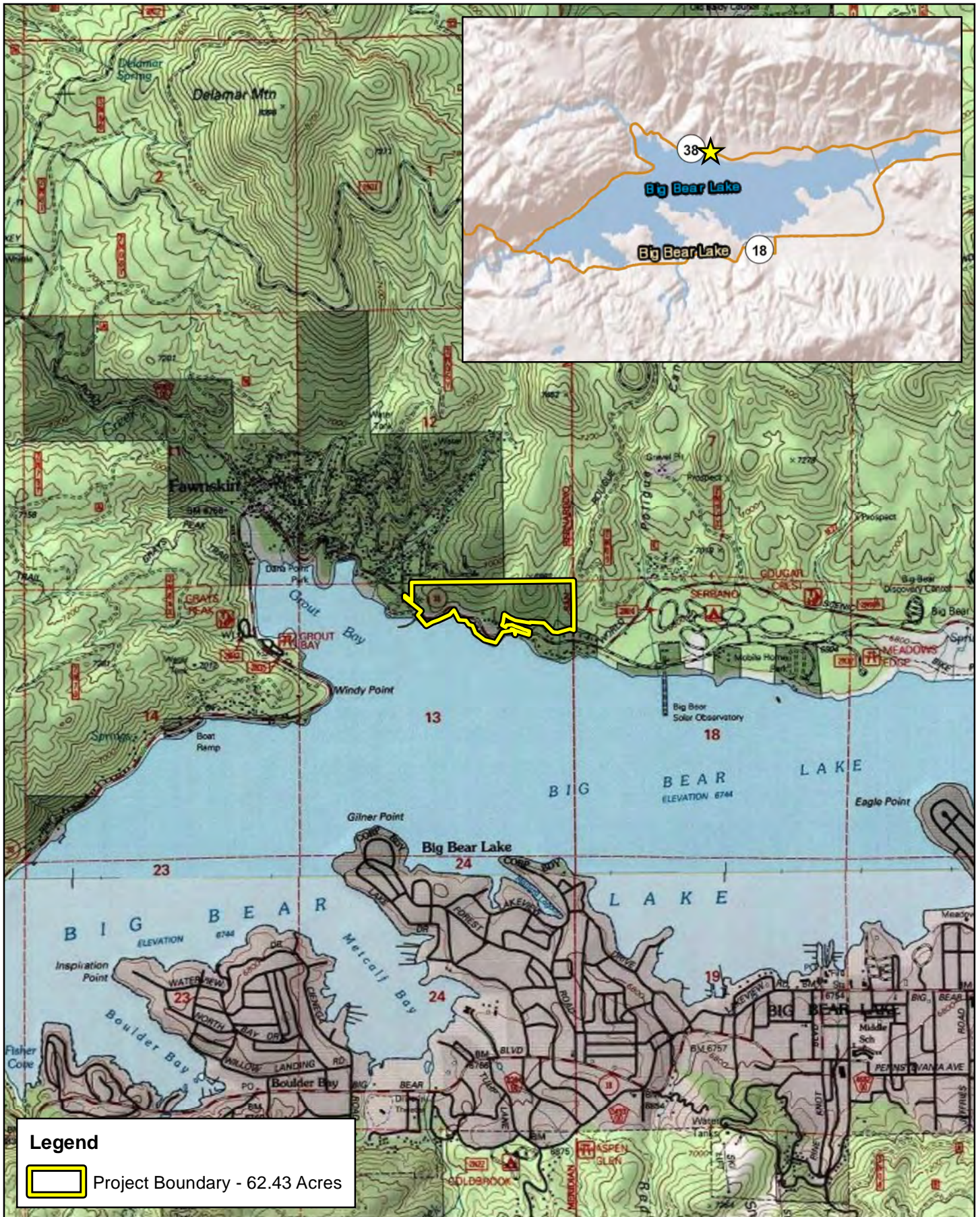
The Project scope and design has undergone several revisions over the past 32 years, resulting in the much-modified project described herein. These revisions have resulted in a reduction of the proposed density of the Project from 92 residential lots to 50; eliminating all residential development from the entire lakefront portion of the Project between SR-38 and the lake, and setting aside 9.2 acres (15%) of the lakefront and other sensitive biological resource areas as permanent Open Space, as detailed below.

The Moon Camp Project was originally proposed as a 92-lot residential subdivision, including 31 lakefront lots south of a realigned SR-38, with a minimum lot size of 7,200 square feet (Exhibit 2, *Original Moon Camp Site Plan*). However, the initial California Environmental Quality Act (CEQA) analysis identified significant and unavoidable impacts from development of the original project on biological resources, as well as other environmental impacts. The Project was subsequently redesigned to avoid or substantially minimize impacts to sensitive biological features, in particular bald eagle perch trees used for perching and foraging and a large population of ashy-gray Indian paintbrush—a federally threatened rare plant species.

The current project design plans for 50 residential lots with eight lettered lots (lots that cannot be sold or developed) to provide onsite conservation and protection of sensitive biological resources (Exhibit 3,

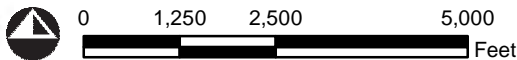
Current Moon Camp Site Plan). Lakefront residential lots have been eliminated, leaving 3.72 acres of undeveloped shoreline habitat to be preserved in perpetuity with a conservation easement and will be managed as Open Space (Exhibit 4, *Proposed Conservation and Open Space*). Letter Lots A and H, comprising 5.3 acres, will be designated as Open Space, conserving ashy-gray Indian paintbrush onsite, as well as several large potential perch trees. A separate section of this LTMP has been prepared to guide the preservation, maintenance and management of the conservation area for ashy-gray Indian paintbrush on site. Additionally, a 10-acre offsite lot with pebble plain habitat will be preserved in perpetuity by recording a conservation easement as part of the project (see Exhibit 4); and the offsite management and long-term maintenance as discussed below in Section 3, *Rare Plant Habitat*, of the LTMP.

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MOON CAMP RESIDENTIAL SUBDIVISION PROJECT
LONG-TERM MANAGEMENT PLAN

Local Vicinity




Source: Federal Highway Administration, US Department of Transportation, USA Topographic Map, San Bernardino County

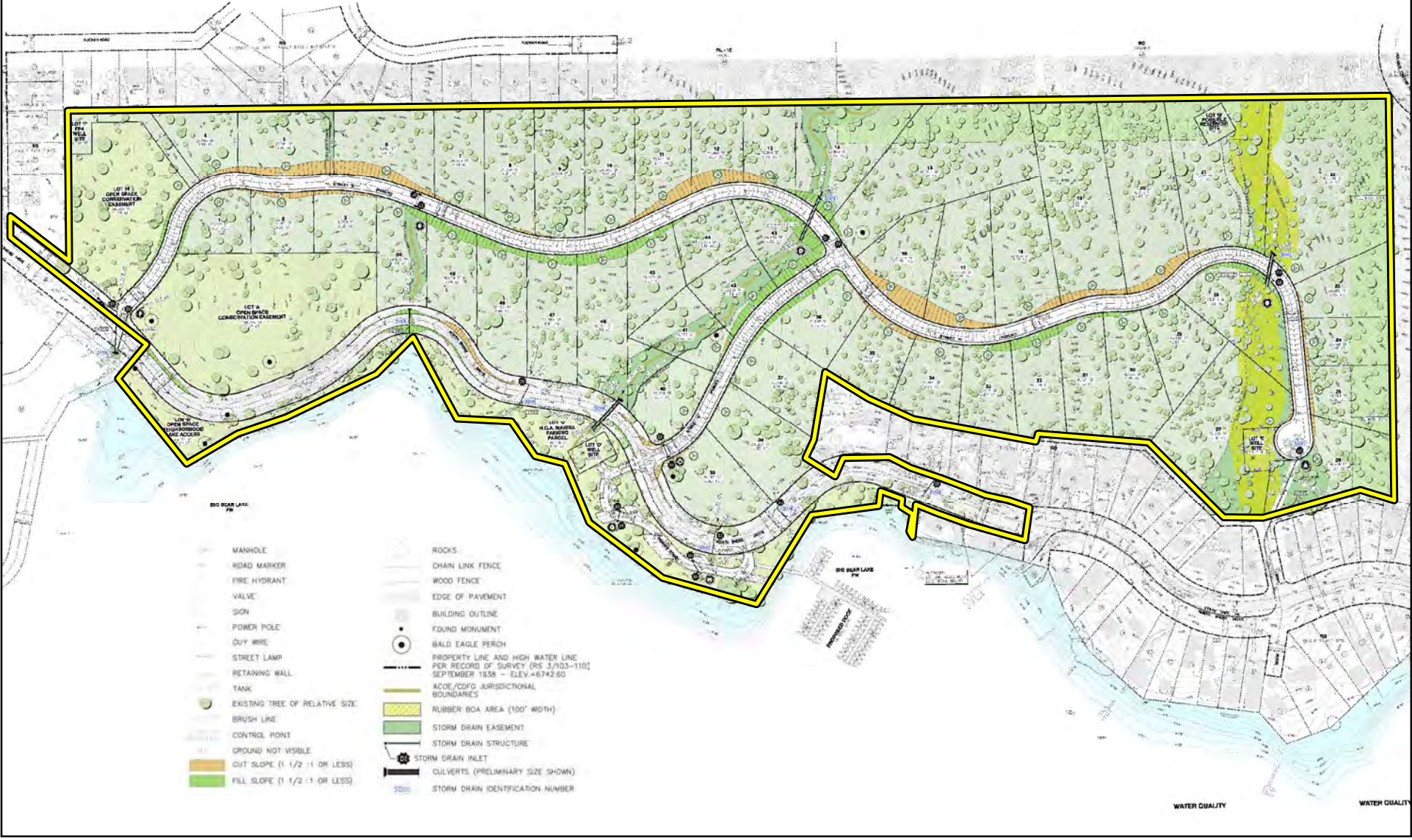


Source: ESRI Aerial Imagery, World Transportation, MBA, San Bernardino County

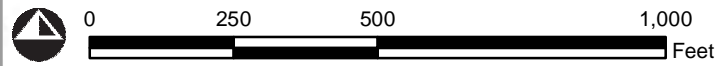
MOON CAMP RESIDENTIAL SUBDIVISION PROJECT
LONG-TERM MANAGEMENT PLAN
Original Moon Camp Site Plan

Legend

 Project Boundary - 62.43 Acres

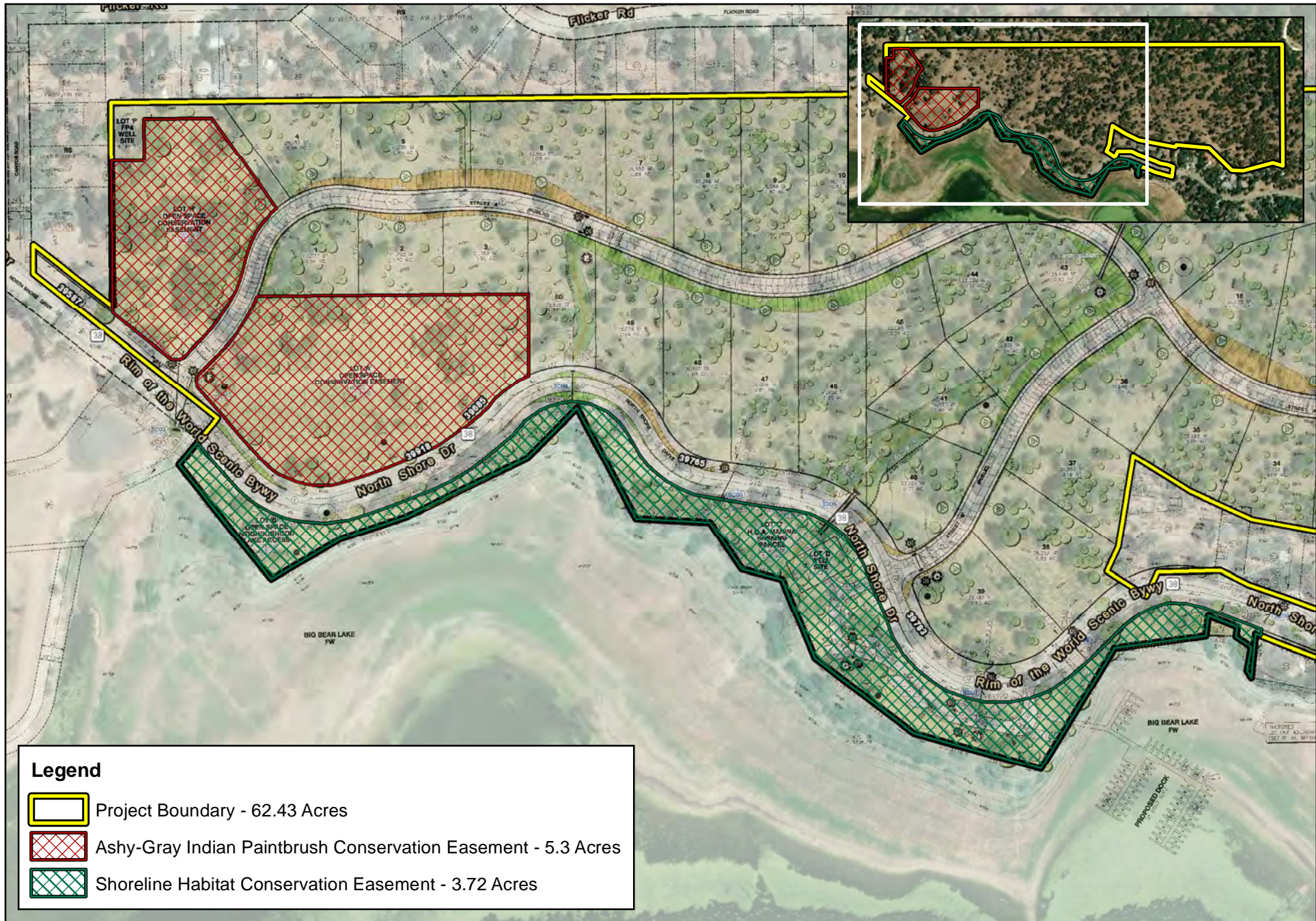


- | | |
|--|--|
|  MANHOLE |  ROCKS |
|  ROAD MARKER |  CHAIN LINK FENCE |
|  FIRE HYDRANT |  WOOD FENCE |
|  VALVE |  EDGE OF PAVEMENT |
|  SIGN |  BUILDING OUTLINE |
|  POWER POLE |  FOUND MONUMENT |
|  GUY WIRE |  BALD EAGLE PERCH |
|  STREET LAMP |  PROPERTY LINE AND HIGH WATER LINE
PER RECORD OF SURVEY (RS 3/103-110)
SEPTEMBER 1938 - ELEV. = 6742.60 |
|  RETAINING WALL |  ACDE/CDPS JURISDICTIONAL
BOUNDARIES |
|  TANK |  RUBBER BOA AREA (100' WIDTH) |
|  EXISTING TREE OF RELATIVE SIZE |  STORM DRAIN EASEMENT |
|  BRUSH LINE |  STORM DRAIN STRUCTURE |
|  CONTROL POINT |  STORM DRAIN INLET |
|  GROUND NOT VISIBLE |  CULVERTS (PRELIMINARY SIZE SHOWN) |
|  CUT SLOPE (1 1/2 : 1 OR LESS) |  SD01 STORM DRAIN IDENTIFICATION NUMBER |
|  FILL SLOPE (1 1/2 : 1 OR LESS) | |




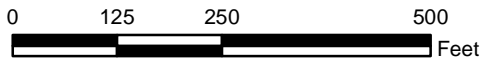
Source: ESRI Aerial Imagery, World Transportation, MBA, San Bernardino County

MOON CAMP RESIDENTIAL SUBDIVISION PROJECT
 LONG-TERM MANAGEMENT PLAN
Current Moon Camp Site Plan



Legend

-  Project Boundary - 62.43 Acres
-  Ashy-Gray Indian Paintbrush Conservation Easement - 5.3 Acres
-  Shoreline Habitat Conservation Easement - 3.72 Acres



Source: ESRI Aerial Imagery, World Transportation, Tim Krantz, MBA, San Bernardino County

MOON CAMP RESIDENTIAL SUBDIVISION PROJECT
 LONG-TERM MANAGEMENT PLAN
 Proposed Conservation and Open Space

Section 2 Bald Eagle Habitat

2.1 LIFE HISTORY OF BALD EAGLES

The bald eagle is an opportunistic, generalized predator and scavenger adapted to aquatic and marine habitats (Buehler 2000). They are primarily piscivores, catching live fish from streams and lakes, as well as waterfowl. On Big Bear Lake, foraging is entirely limited to the lake and nearby ponds, given the lack of surface flowing streams with fish populations. During periods of ice formation on the lake in winter months, the enclosing ice crowds flocks of American coots (*Fulica americana*) and other waterfowl into dense remaining patches of open water. At these times, bald eagles in the valley may crowd together on the ice, perching on the ice and eating directly from the lake surface.

Breeding eagles typically produce one to three young each year and require relatively large bodies of water that support an adequate supply of prey. Breeding populations of bald eagles exist predominantly in Alaska and Canada, as well as the northern portions of the United States, primarily Washington, Oregon, northern California, Idaho, Montana, Wyoming, and Colorado.

In winter months, bald eagles may migrate south in the face of winter storms and freezing interior lakes. The San Bernardino Mountains host the largest wintering population of bald eagles in southern California. During the winter, 10 to 25 eagles make Big Bear Lake, Silverwood Lake and Lake Arrowhead their home. In spring, most of them migrate north to nest. However, Big Bear has supported one resident nest since 2012.

2.2 BALD EAGLES IN BIG BEAR VALLEY

Prior to inundation of the Big Bear reservoir, initially in 1884 and with the construction of a higher dam in 1912, the valley probably did not provide bald eagle habitat. There was no lake and there were no large, native fish that could have sustained resident bald eagles. With the creation of the reservoir, a wintering population of bald eagles was supported, but no systematic surveys of the eagle population were conducted until the late 1970s.

The first bald eagle censuses were conducted in the Big Bear area in the late 1970s by Michael Coffey, a San Bernardino National Forest (SBNF) wildlife biologist on the (then) Big Bear Ranger District, Kimball Garrett (now the Curator of Ornithology at the Los Angeles County Natural History Museum) and Dr. Tim Krantz. Dr. Krantz and Dr. James Malcolm (now both at the University of Redlands), conducted systematic wintering bald eagle censuses around Big Bear and Baldwin Lakes in 1980, further refining the fixed-position census system used by the SBNF today.

The wintering bald eagle censuses have run monthly, beginning in December and through March, each winter since that time. Census numbers in the 1980s typically ranged from 20-25 wintering eagles during peak periods in January and February. Numbers diminished through the 1990s and continue to be low, with

numbers typically ranging from 6-10 eagles around Big Bear Lake during recent years. The cause of the overall decline of wintering bald eagle use in Big Bear Valley is unknown, but corresponds with the drying of Baldwin Lake after the installation of major wells in upper Shay Meadow during the mid-1990s and urbanization of perch tree habitat along the south shore of Big Bear Lake. Recent years of drought have further reduced the available foraging habitat for bald eagles, especially with water levels receding from Grout Bay and Stanfield Pond. The decline of wintering bald eagle numbers in the valley is offset by an increase in bald eagle numbers elsewhere in Southern California, and by the increase in nesting sites in the southern portion of their range, such as at Lake Hemet and the Channel Islands.

2.3 BALD EAGLE HABITAT REQUIREMENTS

2.3.1 NESTING HABITAT

Most nest sites are found in forested areas adjacent to large bodies of water. Nests are usually located within one mile of foraging areas. In California, bald eagles normally choose large conifers in relatively secluded areas. Best sites include super-canopy trees and cliffs on leeward slopes from prevailing winds that afford easy flight access from the nest to feeding areas and a clear view of the surrounding areas. Nesting territories of bald eagles consist of an area close to 2.6 square kilometers (1 square mile) in size in which a pair will build one or more nests. (Buehler 2000)

In the case of the Big Bear Valley bald eagle population, there is one known nest site. The nest was first established and fledged a chick in 2012. Altogether, six fledglings have been produced from the nest since that time. It is believed that the first female chick from that nest is now the female, named “Jackie”, of the adult pair on the Big Bear nest. She and her mate, named “Shadow” because of the dark smudges on his head and tips of his tail retrices, are watched by thousands of viewers on a live “eagle-cam” as they have been raising two chicks this season. One of the chicks froze to death in an ice storm in late May, just as one of two chicks last year was also lost in an ice storm. The Big Bear bald eagle nest can be viewed on <http://www.iws.org/livecams.html> --a web site run by the Institute for Wildlife Studies.

The Big Bear nest is located approximately one mile west of the Moon Camp property, situated well outside of their nesting territory. Thus, the Project does not represent any direct or indirect impacts to the nest site itself; and mitigation related to the nesting habitat is not required and is not a part of this management plan.

2.3.2 PERCHING AND FORAGING HABITAT

Bald eagles generally hunt from perch trees or on the wing. They are opportunistic foragers and take whatever prey is available. Fish, both live and carrion, is their main food source, with waterfowl a major supplement during winter months. Bald eagles will scavenge on dead mammal carcasses, including large herbivores such as deer and livestock. Eagles will also steal food from other fish-eating birds, such as osprey or other eagles. A higher percentage of birds and mammals are taken in winter when fish are more difficult to catch, and waterfowl are more vulnerable. During periods of ice cover on the lakes, fish and waterfowl will crowd into the remaining patches of open water, providing concentrated foraging areas for the bald

eagles. American coots, dead fish and other waterfowl freeze into the ice around the edges of open water patches, whereupon eagles may forage directly from the ice.

Foraging habitat for bald eagles in Big Bear Valley is generally over the water on Big Bear or Baldwin Lakes, where the eagles hunt for fish or waterfowl. Important consideration for foraging habitat includes suitable perch trees near foraging sites, shallowness of water where they can easily see their prey, and availability of fish and waterfowl. Diurnal perching habitat is characterized by the presence of tall, easily accessible trees adjacent to the foraging habitat. Typical perch trees in the Big Bear area are large Jeffrey pines (*Pinus jeffreyi*), greater than 0.75 meter in trunk diameter-at-breast-height (dbh), with dead-topped crowns or large “windows” between limbs that afford unimpeded access for the birds with their two-meter wingspans. Such trees are often greater than 200 years old.

Perch trees typically provide direct line-of-sight to the foraging habitat along the lakeshore, where eagles can see fish or waterfowl in the shallows. For this reason, bald eagles prefer south shore, east- or west-facing perch trees, so as not to experience glare on the water. In winter months, with a low-angle sun exposure, the view over near-shore foraging habitat from north shore perch trees is substantially impeded by reflection. For this reason, north shore perching habitat is much less frequently used than south shore perches, except on overcast days (Krantz & Malcolm 1981).

This is the case for the Moon Camp property. Despite the fact that the Project site contains several suitable perch trees, bald eagle use of the property is infrequent because of the high level of glare on a typical, clear winter day. The bright reflection of sunlight prevents eagles from being able to see fish or waterfowl in the shallow lakefront area. Refer to Appendix A, *Photographs of Glare on Water from Eagle Perch Trees*.

The glare factor reduces the importance value of north shore perching habitat along the entirety of Big Bear Lake, despite the fact that the north shore is mostly undeveloped. This represents a habitat management problem for bald eagles in Big Bear Valley in that the optimal south shore perching and foraging habitat is within the largely developed City of Big Bear Lake. Most of the south shore has already been developed with residential or commercial structures, resulting in removal of perch trees and substantial disturbance from human activity, pets and vehicles. Even when perch trees have been spared from initial development and construction, the large trees are often removed as they lose heavy limbs or threaten to fall on adjacent structures or roadways. For these reasons, there is a systematic and cumulative loss of suitable perch trees faster than nature reproduces these centuries-old trees. Despite the fact that the Project site represents only occasional perching habitat for bald eagles, the Moon Camp perch tree habitat enhancement program described below will result in creating more suitable perch tree habitat on site.

2.3.3 ROOSTING HABITAT

Roosting habitat is comprised of perch trees in which bald eagles may rest during the day and/or spend the night. Typical roosting sites are away from the water on the leeward slopes of ridges, providing protection from the wind and weather. Because prevailing winds in the Big Bear area are from the west or southwest,

preferred roosting sites tend to be on the east-facing slopes, such as the nest site for the resident pair of nesting eagles. Due to its proximity to the lake and exposure to winds, there is no roosting habitat on the Moon Camp project site.

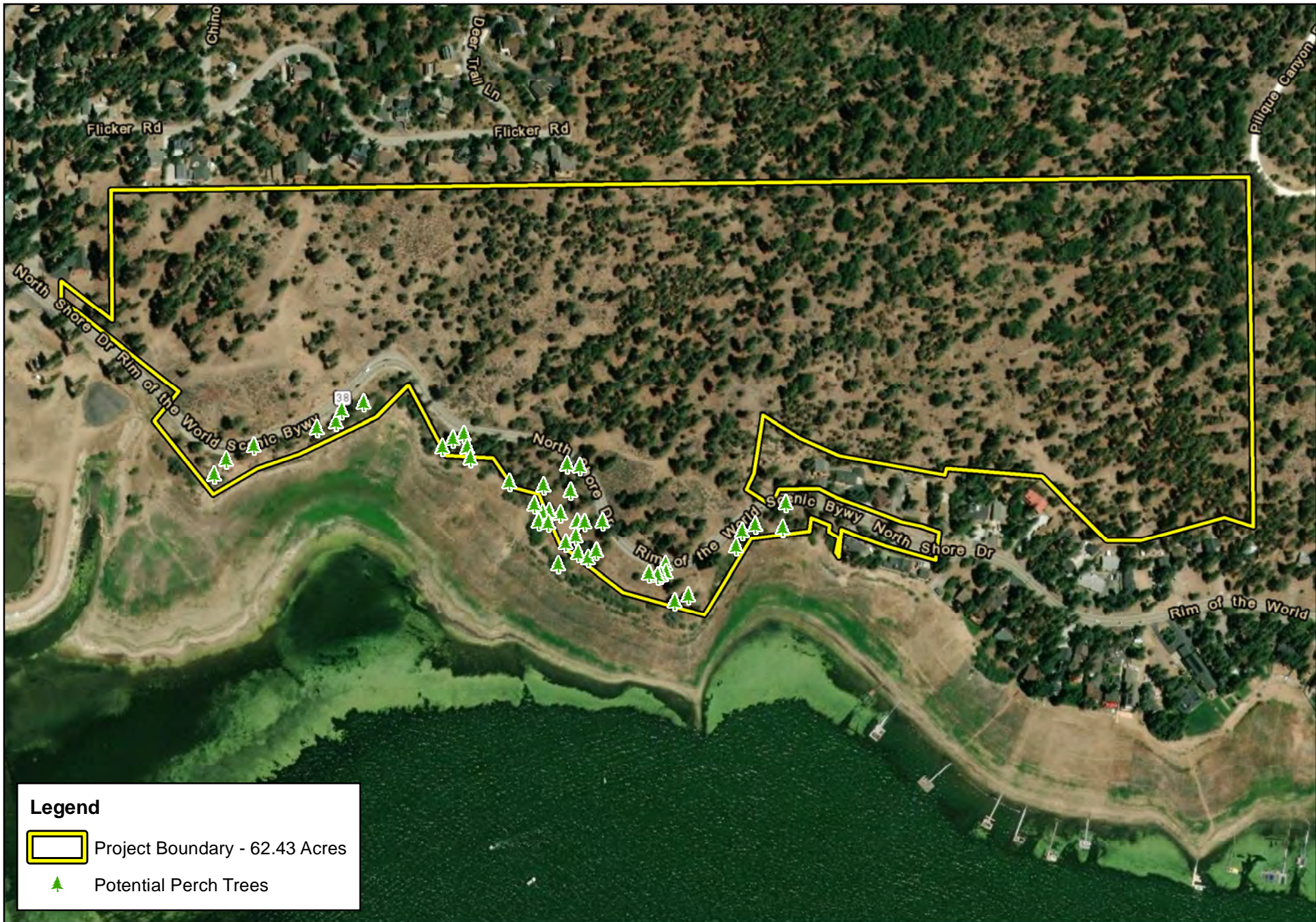
2.3.4 BALD EAGLE HABITAT ONSITE

Bald eagle use of the Project site is limited to occasional perching in trees along the lakeshore and near-shore area, and foraging over the adjacent lake. Perch tree habitat on the property is similar to perching habitat elsewhere in the valley, where eagles prefer perch trees within direct line-of-sight to the shallow lakefront foraging area. Such trees are typically large, with dbh of greater than 0.75 meter, with dead-topped platforms (large lateral limbs at the top) or large spaces or “windows” between stout limbs, affording easy access for their large wings, as well as good views over the foraging habitat.

There were several large snags (entirely dead trees) on the property that were occasionally used by eagles along SR-38, but these were felled by Caltrans and/or County road maintenance crews over the last few years as they threatened to topple on the highway. In the future, as a condition of this LTMP, it is highly recommended that Caltrans and County road maintenance be required to consult with the Conservation Easement manager of the property prior to removal of potentially hazardous trees, and that onsite enhancement measures (trimming or limbing to create another suitable perch tree) be undertaken to offset the removal of the tree.

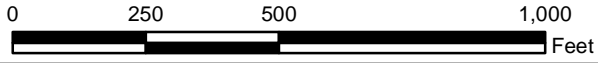
A survey of all trees greater than 0.5 meter dbh was conducted on Project Lots A, B, C, D and H on March 8, 2019. Several large trees on the rear portions of Lots 40 and 46-50 were also plotted in this survey. Most of these trees are within the Highway right-of-way. (Exhibit 6, *Shorezone Potential Perch Tree Survey*). A total of 65 trees were located using an ArcGIS Collector application. Each tree was assigned a unique identification number, the dbh was recorded and notes were made with regard to the tree health and condition (dead topped, large limbs suitable for trimming to create windows, etc.). The Collector application will allow one to conduct inventories, as well as to locate individual trees on the ground in real time by using the GPS on a cell phone, thus providing the basis for the perch tree enhancement and monitoring program described herein.

Foraging habitat onsite is over the lake below the high-water line (2,056 meters) and is, therefore, technically within the jurisdiction of the Big Bear Municipal Water District. The entire lakefront portion of the Project will be conserved in Letter Lots B, C and D. Seasonal use of Lot C will allow private lake access for Moon Camp residents via a dock and marina. The entire lakefront area, lakeward of SR-38, will be closed to human entry from December 1 to April 1 during the season when wintering bald eagles may be in the area.



Legend

- Project Boundary - 62.43 Acres
- ▲ Potential Perch Trees



Source: ESRI Aerial Imagery, World Transportation, Tim Krantz, Zachariah Smith, San Bernardino County

MOON CAMP RESIDENTIAL SUBDIVISION PROJECT
LONG-TERM MANAGEMENT PLAN

Shorezone Potential Perch Tree Survey

Section 3 Rare Plant Habitat

3.1 VEGETATION

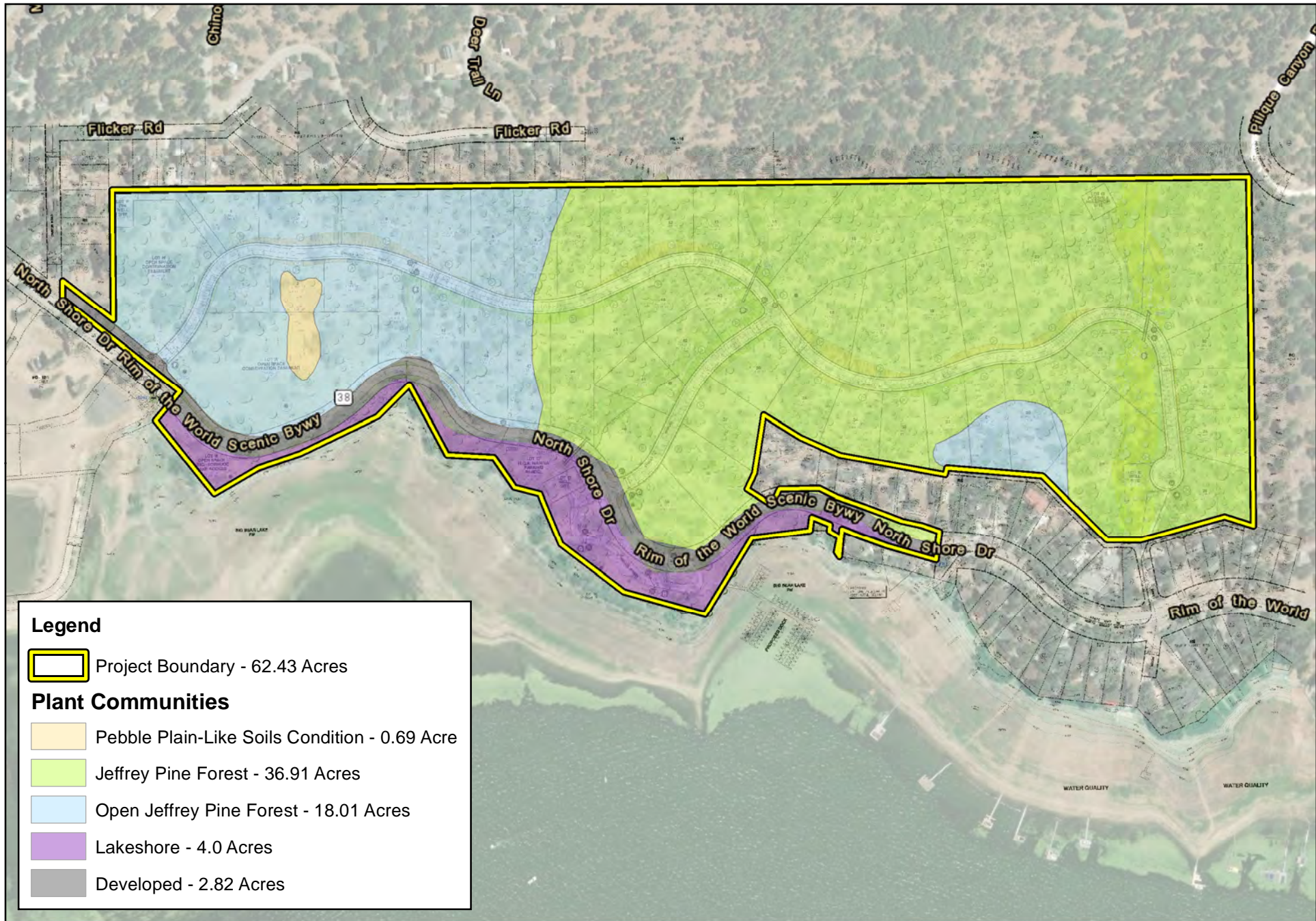
The project site is currently undeveloped and supports four vegetation types: 54.92 acres of an open Jeffrey pine forest, 6.2 acres of disturbed shoreline habitat, 0.69 acre of open pebble plain-like habitat and 2.82 acres of developed land associated with SR-38 (Exhibit 7, *Vegetation Map*). The Jeffrey pine forest is primarily occupied by Jeffrey pine, and also supports a limited number of other tree species, including white fir (*Abies concolor*), incense cedar (*Calocedrus decurrens*), western juniper (*Juniperus occidentalis*), single-needle pinyon pine (*Pinus monophylla*) and black oak (*Quercus kelloggii*). Vegetation in the narrow strip along the shoreline is very patchy, occurring just above the high-water level of the lake. It supports several Jeffrey pines and scattered patches of willows (*Salix scouleriana*) with an understory of ruderal vegetation and non-native grasses.

The flora of the San Bernardino Mountains is recognized for its high biodiversity and unusual number of endemic (restricted) species. In fact, the San Bernardino Mountains represent one of the most biodiverse floras in the continental United States for their size, with about 1,600 plant taxa (species and subspecies). That is about one fourth of the flora of California in an area of less than 1% of the state, with California representing the most diverse flora in the United States. Of these 1,600 plant species, 35 are strictly limited to the range, with another 85 taxa found only in the San Bernardino Mountains, but for one or two occurrences outside the range (Krantz 1994).

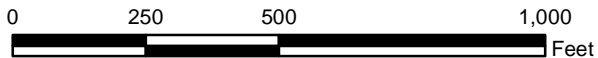
Within the San Bernardino Mountains, the Big Bear and Holcomb Valley areas host the majority of the locally endemic plant species, mostly occurring within three very specialized habitats: pebble plains, montane wet meadows and limestone endemics (ibid.).

3.2 RARE PLANT SPECIES ONSITE

Special-status plant species found on the site include the ashy-gray Indian paintbrush (*Castilleja cinerea*), Parish's rock-cress (*Boechera parishii*), Bear Valley woollypod (*Astragalus leucolobus*), fuzzy rattails (*Ivesia argyrocoma*), purple monkeyflower (*Erythranthe purpurea*), Sugarloaf phlox (*Phlox dolichantha*) and mountain Indian paintbrush (*Castilleja montigena*). Ashy-gray Indian paintbrush is federally listed as a threatened species, in accordance with the Federal Endangered Species Act. The other six plant species are CNPS (California Native Plant Society) Rare Plant Rank listed species. Of these, all but the mountain Indian paintbrush are categorized as List 1B.2. Such plants "meet the definitions of the California Endangered Species Act of the California Fish and Game Code, and are eligible for state listing. Impacts to these species or their habitat must be analyzed during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, as they meet the definition of Rare or Endangered under CEQA Guidelines §15125; (c) and/or §15380."



MOON CAMP RESIDENTIAL SUBDIVISION PROJECT
 LONG-TERM MANAGEMENT PLAN
Vegetation



Source: ESRI Aerial Imagery, World Transportation, Hicks & Hartwick, Inc. (December 2010), Tim Krantz (2008), Scott White, MBA, San Bernardino County

Table 1: Special-Status Species Occurring on the Moon Camp Property

Scientific Name	Common Name	Rare Plant Rank
<i>Arabis parishii</i>	Parish's rock-cress	Fed: none; S2.1: List 1B.2
<i>Astragalus leucolobus</i>	Bear Valley woollypod	Fed: none; S2.1: List 1B.2
<i>Castilleja cinerea</i>	Ashy-gray Indian paintbrush	Fed: Threatened; S2.2; List 1B
<i>Castilleja montigena</i>	Mountain paintbrush	Fed: none; S3.3; List 4.3
<i>Erythranthe purpurea</i>	Purple monkeyflower	Fed: none; S3.3; List 4.3
<i>Ivesia argyrocoma</i>	Fuzzy rattails	Fed: none; S2.2; List 1B.2
<i>Phlox dolichantha</i>	Sugarloaf phlox	Fed: none; S2.2; List 1B.2
<p>Fed – Federal Rank S – State Rank (S), California Natural Diversity Database S1: Fewer than six occurrences or fewer than 1 000 individuals or less than 2000 acres S1.1: Very threatened S1.2: Threatened S1.3: No current threats known S2: 6-20 occurrences or 1000-3000 individuals or 2000-10000 acres S3: 21-100 occurrences or 3000-10000 individuals or 10000-50000 acres S3: 21-100 occurrences or 3000-10000 individuals or 10000-50000 acres S4: Apparently secure in California; this rank is clearly lower than S3: But factors exist to cause some concern, <i>i.e.</i>, there is some threat or somewhat narrow habitat. No threat rank. S5: Demonstrably secure or ineradicable in California. No threat rank.</p>		

Most of the rare plants occurring on the Moon Camp property are associated with pebble plain habitats. Pebble plains were first described by Derby and Wilson (1978 and 1979), based on the Sawmill pebble plain; a discrete occurrence of this unique ecosystem near Sawmill Canyon between the communities of Big Bear Lake, Moonridge and Big Bear City. Pebble plains are distributed through Big Bear and Holcomb Valleys, ranging from Onyx Summit to the southeast and North Baldwin Lake to the northeast, into the City of Big Bear Lake to the southwest, where fragments of pebble plains remain on some vacant lots, and extend from east to west through Holcomb Valley to the north, and a disjunct archipelago of pebble plains “islands” in the Coxey Meadow area to the northwest. This overall distribution represents the entire extent of this unique relict Ice Age plant community (Krantz 1994).

Pebble plains are associated with a dense clay soil substrate covered by a surface vestiture of Saragossa quartzite pebbles. The clay soils are subject to “frost heave”—a freezing and thawing process during winter months, wherein ice crystals expand in the saturated clay soils, pushing the quartzite pebbles (and pine seedlings) to the surface. During summer months, the clay surface becomes brick hard, hot and dry, preventing pine seedlings from becoming established. Thus, the pebble plain habitats have remained as openings in the pine forest since Ice Age times.

Krantz (1981) mapped the distribution of the pebble plains ecosystem, using two indicator species: Kennedy's buckwheat (*Eriogonum kennedyi*), regardless of subspecies, and Bear Valley sandwort (*Arenaria ursina*) where they occur together, to confirm an area as pebble plain habitat. Other species, including the ashy-gray Indian paintbrush and other rare plant species on the Project site, occur on pebble plains most of the time, but also occur in other habitats in the Big Bear area.

On the Project site, "pebble plain"-like soil conditions exist on the knoll above SR-38 (refer to Exhibit 7). The "Knoll" habitat lacks the indicator species, although it does support a quartzite pebble surface and many of the other herbaceous perennial species typically associated with pebble plains. Most of the Knoll habitat is contained within Open Space Lot A. True pebble plain habitat with both indicator species occurs on Forest Service lands just to the northeast of the Moon Camp property in the area of Polique Canyon.

Sugarloaf phlox was found to be rather widely distributed on the Moon Camp property in open black oak woodland and under Jeffrey pines. Although restricted to Big Bear and Holcomb Valleys, its regional distribution extends up to the summit of Sugarloaf Mountain south of Big Bear Valley, and as far north as White Mountain, northwest of Holcomb Valley. The taxon is fairly common within its range, and is not considered to be a high priority candidate for listing or more formal protection (Krantz 1983).

The mountain Indian paintbrush (*Castilleja montigena*) has a similar distribution to the Sugarloaf phlox, occurring off of pebble plains under Jeffrey pines and black oaks; and also occurs in the Upper Santa Ana River drainage from Onyx Summit to Barton Flats, Angelus Oaks and the San Gorgonio Wilderness Area.

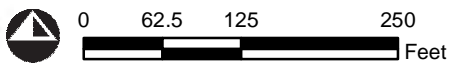
A primary focus of the Moon Camp rare plant surveys has been to map the distribution of the ashy-gray Indian paintbrush, as it is formally protected under the Federal Endangered Species Act (Exhibit 8, *Pebble Plain-like Habitat and the Distribution of Ashy-Gray Indian Paintbrush*). Ashy-gray Indian paintbrush is a hemi-parasite (partially parasitic) on its host plants, typically Kennedy's buckwheat or matting buckwheats (*Eriogonum wrightii subscaposum*), but also occasionally associated with western mugwort (*Artemisia ludoviciana*). Based on focused rare plant surveys by Krantz in 2008 and 2010, Letter Lot H was established as an Open Space Letter Lot to conserve the densest ashy-gray Indian paintbrush population in that area.

Of 7.71 acres of occupied ashy-gray Indian paintbrush habitat, 5.3 acres will be conserved on Letter Lots A and H, representing 69% of total habitat acreage and more than 80% of total ashy-gray Indian paintbrush plants. Of the remaining ashy-gray Indian paintbrush plants on private Lots, plants within Lots 1, 47, 49, and 50 are all within the rear lot building setbacks, as well as 20 plants on Lot 4, for a total of 127 plants. However, these are still considered as "take" specimens because they are not within formally protected Conservation Easements on the property.



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Pebble Plain-like Habitat and Distribution of Ashy-Gray Indian Paintbrush



Source: ESRI Aerial Imagery, World Transportation, Tim Krantz, MBA, San Bernardino County



3.3 SUGARLOAF PEBBLE PLAIN CONSERVATION AREA

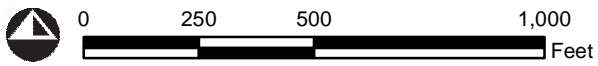
Offsite compensation for direct and indirect impacts to ashy-gray Indian paintbrush and pebble plain habitat, in addition to the 5.3-acre Open Space Letter Lots on the Moon Camp site, will be accomplished by acquisition and preservation of similar or better habitat resources elsewhere in the valley. There is a limited amount of privately held ashy-gray Indian paintbrush and pebble plain habitat available for offsite mitigation. One of the best remaining examples of pebble plain habitat in private ownership that could be used to off-set impact on the Moon Camp property is the “Sugarloaf Pebble Plain”, situated at the northern terminus of Dixie Lee Lane in the unincorporated community of Sugarloaf (Exhibit 9, *Sugarloaf Pebble Plain Conservation Area*). This is a 10-acre site of high-quality pebble plain habitat. It is fenced and has been protected from off-highway vehicles since the mid-1980s as partial mitigation for construction of the Big Bear High School. The intention, as per County Planning Department correspondence at the time, was to set aside a 2-acre portion of the 10-acre parcel as mitigation for impacts to pebble plain resources for the High School site, and use the remaining eight (8) acres for mitigation of other projects. The parcel was surveyed by Hicks & Hartwick Engineering in 1981, but was never formally recorded.

The Project proposed to mitigate impacts to 2.41-acres of ashy-gray Indian paintbrush and other rare plant habitat by acquisition, fencing and permanent preservation of the Sugarloaf pebble plain site and will manage it as part of the LTMP.



Legend

-  Project Boundary - 62.43 Acres
-  Pebble Plain Conservation Area - 10 Acres



Source: ESRI Aerial Imagery, World Transportation, San Bernardino County

MOON CAMP RESIDENTIAL SUBDIVISION PROJECT
 LONG-TERM MANAGEMENT PLAN
Sugarloaf Pebble Plain Conservation Area

Section 4 Long-Term Management Plan

The objective of the LTMP is to define appropriate measures to preserve and manage bald eagle habitat and rare plant habitat within the Moon Camp's proposed rural residential development during construction and after buildout. For bald eagles, avoidance measures were accomplished by the redesign of the site plan to avoid potential impacts to bald eagle habitat. Minimization measures include enhancement, preservation and management of existing perch trees, periodic monitoring of site use by bald eagles for perching and foraging, and an annual survey and assessment of existing and potential perch trees. These measures are in addition to and augment the mitigation measures included in the Project approvals. For the rare plant habitat, mitigation measures described herein focus on the preservation and maintenance of open space Letter Lots A and H, establishment of building setbacks to conserve ashy-gray Indian paintbrush on the rear portions of several residential lots, and on the preservation and maintenance of the off-site Sugarloaf pebble plain habitat.

4.1 OPEN SPACE CONSERVATION EASEMENT PROGRAM

The Project includes establishment of five open space Letter Lots, identified on the Tentative Tract Map as Letter Lots A, B, C, D and H, comprising a total of 9.24 acres (refer to Exhibit 4); and an off-site lot, the Sugarloaf pebble plain, of about 10 acres (refer to Exhibit 9). These lots include the entire lakefront between SR-38 and the lake, as well as the majority of the rare plant habitat on the project site. There are other lettered lots used for well sites and future reservoir (Lots E, F, & G); however, these lots are not considered part of the main conservation areas. RCK Properties, Inc., as the Responsible Party and fee title landowner, shall dedicate a Conservation Easement (CE) over the named Letter Lots and Sugarloaf pebble plain to a land stewardship entity, such as a private, non-profit land trust. The CE manager must be approved by the CDFW as an organization that has the technical expertise and capacity to implement, maintain and monitor the Project resources in accordance with the conditions of approval of the Project, as set forth in the Project EIRs, this LTMP and all other regulatory requirements pertaining to these resources. A second CE shall be conveyed to CDFW, granting the agency rights to access the property and oversee the actions of the CE manager and the Responsible Party to ensure that the sensitive biological resources are being managed according to the terms and conditions of the CE.

A non-wasting financial endowment shall be deposited by the Responsible Party into an escrow account. Proceeds and interest accruing to the account may be used solely for the purpose of implementation of mitigation measures, maintenance of the habitat, and monitoring of the biological resources. An annual report will be provided to the Homeowners Association (HOA) and to the CDFW.

4.2 PERCH TREES HABITAT ENHANCEMENT PROGRAM

A perch tree habitat enhancement program will be implemented on the CE lots. In consultation with a certified arborist, trees will be selected for trimming and limbing to improve their suitability for bald eagle

perching. Selected trees may be topped to create better platform perches and/or limbed to create “windows” to afford a perched eagle a view of the foraging habitat in the shallows along the lakefront.

As mentioned above, a survey of 65 large trees (>0.5-meter dbh) was completed on Lots A, B, C, D and H. Trees were located using ArcGIS Collector, rendering a plot that can be accessed by a biological monitor in the field using their cell phone. The CE manager shall initially identify some of the trees on these lots for selective trimming by a certified arborist. The CE manager and arborist shall meet at least once per year to inspect the enhanced perch trees. All modifications to perch trees will be noted on the Collector application for future biological monitoring. Additional trees may be trimmed/limbed to replace the loss of these initially enhanced perch trees over time. By this means, the number of potential perch trees will be maintained over time.

Several other large potential perch trees were identified on residential lots in the Project EIR and in the ArcGIS perch tree survey described above. In particular, several potential perch trees were identified on the rear portions of Lots 40 and 46-50. These trees are located above SR-38, but within view of the lake, and may be conserved by means of the Caltrans setback along the highway, and/or by building setbacks from the rear property lines (Exhibit 10, *Potential Perch Trees North Side of SR-38*). Other trees identified as potential perch trees on the property may also be conserved by means of pre-construction surveys and building setbacks to avoid them to the extent possible.

4.3 COORDINATION WITH THE AREA’S TIMBER HARVEST PLAN

A landowner who intends to convert timberland (the cutting and removal of trees), besides needing to comply with local zoning regulations and permits, must also secure a Timberland Conservation Permit (TCP) from Cal Fire prior to construction if trees will be removed. Timberlands are defined by their physical characteristics rather than local zoning designations. A TCP simply approves the cutting and removal of timber for the new use of the property. It is highly recommended that the CE manager, as well as the HOA for each individual lot that is customarily designed and built consult with Cal Fire early in the planning process. This will ensure that the development of each lot is consistent with the Area’s Timber Harvest Plan as well as the Perch Tree Management Program that will be in place for the protection and management of bald eagle use of onsite habitat.

4.4 CONSTRUCTION GUIDELINES

As a general rule, structures shall not be permitted within the dripline (the radial extent of major limbs and branches from the trunk) of trees. Elsewhere in mountain forest communities, homeowners seek to maintain trees on their properties, excavating foundations right up to or close to trunks, building decks around them, or paving over their root zones within the driplines, while retaining the trees. These trees are weakened by these construction practices, reducing their uptake of water from the impacted root zones. Such trees are particularly vulnerable to bark beetles; native insect pests that burrow into and under the bark of trees. The trees’ natural means of defense against bark beetles is to produce sap, expelling the beetles in the sticky



MOON CAMP RESIDENTIAL SUBDIVISION PROJECT
 LONG-TERM MANAGEMENT PLAN

Potential Perch Trees on the North Side of SR-38



Source: ESRI Aerial Imagery, World Transportation, Tim Krantz, Zachariah Smith, San Bernardino County

substance. Compromised trees in urban forest communities act as host trees for the beetles. Then, when the area experiences a drought, as in recent years, the bark beetle population explodes out into the native forest, killing thousands of trees even in undeveloped forest areas.

Building inspectors for the residential lots on the Moon Camp property shall pay close attention to trees on lots that have been identified as potential perch trees to ensure that construction shall be maintained outside of the driplines of trees. Any tree greater than 0.75 meter (30 inches) dbh shall be considered a “potential perch tree”. The CE manager will review all building permits to ensure that construction is kept out of the drip line of all potential perch trees. If construction is within the dripline of the tree, then the tree shall be removed and another potential perch tree within the Open Space lots shall be enhanced to compensate for the loss of the tree. In the case that a potential perch tree must be removed, the homeowner shall pay a fee into the endowment fund to cover the cost of an arborist climbing the tree to trim/limb a tree within the Open Space lots to create another potential “perch-able” tree.

4.5 OPEN SPACE SECURITY

The Open Space Letter Lots shall be fenced along both sides of SR-38 and along the residential-open space boundaries of Lots A and H. Fencing types and standards shall be determined based upon communications with the CE manager, applicant or applicant’s representative and the HOA.

Open Space Lots shall be signed along SR-38 to indicate that the property is closed to all public entry from the highway. Highway frontage closure will be permanent, year-round, with no stopping or parking along the Project portion of SR-38.

Access to Lot C shall be gated and posted on SR-38 as to its seasonal closure from December 1 to April 1 for wintering bald eagles. Outside of this total pedestrian seasonal closure, private Moon Camp residents may access Lot C for use of the marina and lakeshore facilities. A designated trail will be established to provide pedestrian access along the lakefront of Lot B outside of the seasonal closure period. This section of the lakeshore trail will be accessible for non-Moon Camp residents outside of the seasonal closure period. A fence shall be extended from SR-38 to the highwater line at the west end of Lot B and east end of Lot C to prevent entry of non-residents to the lakefront from either side during the seasonal closure period.

Residential—Open Space fencing around the perimeters of Lots A and H shall be posted for no entrance to the Open Space lots. A designated trail may be constructed to allow private residential access to view the rare plant habitats on Lots A and H. The trail will be open to Moon Camp residents only, or by special permission of the HOA, and shall be seasonally restricted (December 1-April 1), the same as the Lot B-C seasonal closure.

Signs shall be installed at the private trail entrance indicating rare plant habitat and for residents to “stay on trail” and not harm sensitive resources. An interpretive kiosk may be developed to provide additional information regarding these unique natural resources. Additional interpretive materials about the bald eagles and rare plant resources on the conservation lots shall be developed for the Project homeowners so

that they may better appreciate the resources and take responsibility for observation and reporting of incidents to the CE manager—establishing their own “Neighborhood Watch” program.

All fences, signs and trails shall be maintained in good order by the CE manager.

4.6 SUGARLOAF PEBBLE PLAIN CONSERVATION AREA

The Sugarloaf Pebble Plain parcel shall be duly recorded with the San Bernardino County Assessor’s Office. A Conservation Easement shall be recorded over the parcel in the name of a CDFW-authorized entity.

As of this writing, the parent parcel surrounding the Sugarloaf pebble plain, owned by the Moon Camp Project Applicant, RCK Properties, Inc., has been conveyed to the Bear Valley Unified School District (BVUSD). The BVUSD and the Big Bear Valley Education Foundation are working with the San Bernardino Mountains Land Trust and the ad-hoc Pebble Plains Advisory Committee on several pebble plains restoration and biological monitoring projects on the Sawmill pebble plains west of the Sugarloaf property. The CE manager shall work closely with the Education Foundation on the preservation, restoration, management and monitoring programs for the Sugarloaf pebble plain habitat.

The entire perimeter of the Sugarloaf Pebble Plain shall be fenced with a post-and-cable, durable fence, similar to fencing installed around the Sawmill Pebble Plain conservation area west of Sugarloaf. Fencing shall be signed and posted at regular intervals, indicating “No Vehicle Entry”, such that any unauthorized vehicular entry may be reported and cited by local law enforcement authorities.

Primary access to the site is from the terminus of Dixie Lee Lane through the town of Sugarloaf. There is a single-track trail that provides pedestrian access across the pebble plain to a viewpoint approximately 100 meters north of the northern extent of the pebble plain. An interpretive kiosk, similar to the one at the Villa Grove pebble plain trailhead, shall be installed and signed, informing visitors about the pebble plains resources at the site. The terminus of the road shall be gated and posted to prevent vehicular entry. A pedestrian walk-through shall be constructed to allow pedestrian entry, but prohibit motorcycle or mountain bike entry. The trail entry shall be signed with regard to “no vehicle entry” and “Keep to Trail—Rare Plant Habitat”.

The property shall be monitored at least monthly by the CE manager, inspecting and maintaining all signs and fencing. Any incidents of vehicular trespass or other damage to resources shall be repaired as soon as possible; and all incidents shall be reported in the annual monitoring report, as described below.

4.7 SUGARLOAF PEBBLE PLAIN CONSERVATION AREA

The CE manager shall inspect the Open Space lots monthly to ensure that all signs and fences are maintained, and to enforce the seasonal closures. Monthly monitoring reports shall be recorded in a digital

log, such as ArcGIS Collector, noting all incidents of trespass, vandalism or noteworthy conditions of biological resources in the conservation area.

Monitoring of the seasonal use of the property by bald eagles shall include monthly participation in the wintering bald eagle censuses, with the Moon Camp biological monitors stationed on site during the census periods. This will ensure that the use of the property by bald eagles can be documented and correlated with bald eagle use of the Big Bear area as a whole.

All 65 trees in the perch tree database will be inspected once each year during the May monitoring inspection to document the condition of the trees on the Collector application. Particular attention will be given to those trees that have been identified as actual perch trees or enhanced trees.

Routine monitoring of bald eagle use of perch trees on the conservation lots shall be conducted monthly and/or in conjunction with the census during the seasonal closure period (December-April) and all use of perch trees or nearshore foraging shall be noted and recorded in the perch tree Collector application.

The HOA shall establish a Moon Camp residents' "Neighborhood Eagle Watch", in which private residents may participate in the monitoring and reporting of bald eagle perching on the property.

An online reporting system shall be established in which Project residents may report incidents to the CE manager, thus establishing a "neighborhood watch" regarding biological resources management within the conservation areas. The resident reporting system shall be operated in conjunction with a HOA web site and/or a direct call-in line or email dedicated to Project monitoring reports. The CE manager will respond to or investigate any reports in a timely manner.

4.8 REPORTING

An annual monitoring report shall be filed by the CE manager with the Responsible Party and with CDFW by June 30 of each year. The annual report shall summarize all findings with regard to monthly and occasional monitoring reports for both bald eagle and rare plant habitats. The annual report shall include a summarization of the monitoring results of the Sugarloaf pebble plain parcel.

The CE manager shall meet with the HOA after the filing of the annual report to present the findings to the members of the HOA and discuss any resource management issues with residents. The intent of these communications and with the residents' monitoring program noted above is to engage the Project homeowners as active participants in the conservation and stewardship of these unique biological resources.

4.9 ITEMIZED RESPONSIBILITIES OF THE CONSERVATION EASEMENT MANAGER

The following actions shall be completed by the CE Manager and/or Responsible Party, as per the programs detailed in this LTMP. Additional actions may be initiated as deemed necessary in response to biological resource management issues as they may arise.

Bald Eagle Habitat Management Program

- Participate in monthly United States Forest Service (USFS) wintering bald eagle censuses from December-March, observing the Moon Camp property during those censuses.
- Routine monitoring of bald eagle use of perch trees on the conservation lots shall be conducted monthly during the seasonal closure period (December-April).
- Meet with a certified arborist during May to evaluate perch tree conditions and inspect existing and enhanced bald eagle perch trees.
- Coordinate the Perch Tree Management Program with Cal Fire and the Area's Timber Harvest Plan
- The CE Manager shall be an ex-official member of the HOA Design Review Board for building inspections.
- Identify trees for perch tree habitat enhancements, and supervise creation of new perch trees to mitigate for lost or removed trees by trimming/limbing other trees on the property.
- Fencing and signs shall be monitored and maintained monthly.
- An annual monitoring report will be prepared and submitted to CDFW and the HOA.

Rare Plant Habitat Management Program

- Fencing and signs shall be monitored and maintained monthly around Lots A and H on the Moon Camp property; and on the Sugarloaf pebble plain.
- Incidents of vehicular trespass shall be monitored and remedied by means of reparation of fencing and re-posting of signs, as necessary.
- Damage to rare plant habitat shall be repaired and/or restored as soon as possible. Incidents requiring major reparations may require consultation with botanical authorities who are familiar with pebble plain or rare plant habitat restoration

Reporting

- The CE manager shall provide an annual report summarizing the monitoring and maintenance programs for bald eagles and rare plants on the Moon Camp property and on the Sugarloaf pebble plain. The annual report shall be submitted to the HOA and the CDFW.
- A presentation of the report findings shall be presented to the HOA to inform the Moon Camp residents about the unique resources on their community property.

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atropurpurea, *Taraxacum californicum*, *Arenaria ursina*, *Castilleja cinerea*, *Eriogonum kennedyi* var. *austromontanum*).

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Appendix A

**Photographs of Glare on Water From
Eagle Perch Trees**

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Photograph 1: Looking south from the shorezone at the glare off of Big Bear Lake from the Moon Camp project site.



Photograph 2: Looking southeast from the southwest corner of the Project site at the glare off of Big Bear Lake.