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MOON CAMP TENTATIVE TRACT 16136

FOCUSED SPECIAL STATUS PLANT SPECIES SURVEY

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Project site location:	USGS Fawnskin 7½-minute topographic map, Township 2 North, Range 1 West, portion of Section 13.
Assessors Parcel Nos.:	0304-082-04 and 0304-091-12, 13 and 21
Owner /Applicant:	Tim Wood, RCK Properties, P.O. Box 6820, Big Bear Lake, CA 92315
Principal Investigator:	Dr. Timothy P. Krantz, (909)748-8590

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I. PURPOSE AND OBJECTIVES

A supplemental botanical survey was conducted to address comments submitted by concerned parties with regard to the Draft Revised and Recirculated Environmental Impact Report for the Moon Camp 50-Lot Residential Subdivision, Tentative Tract 16136. Specifically, this botanical survey focused on clarifying the following information:

- Reconcile differences between the findings of Scott White (White 2007) and Krantz (2008) with regard to the presence or absence of *Castilleja cinerea*;
- Provide additional quantitative and qualitative information with regard to *Castilleja cinerea* (CACI) and any other formally-protected plant species on site;
- Consider potential off-site impacts on the U.S. Forest Service pebble plain known to occur to the northeast of the project site; and
- Provide comparable quantitative and qualitative information with regard to the proposed off-site pebble plain mitigation area located at the terminus of Dixie Lee Lane.

These findings augment the Supplemental Focused Rare Plant Survey conducted by Dr. Krantz, dated June 29, 2008, providing an additional above-average precipitation year for observation. Particular attention was given to assessing the distribution and abundance of CACI—as this is the only formally-listed rare plant species identified on the Moon Camp property.

II. METHODOLOGY

The San Bernardino County Planning Department is reviewing a Revised and Recirculated Draft Environmental Impact Report for the Moon Camp 50-lot residential subdivision, Tentative Tract 16136. The project site is on the north shore of Big Bear Lake, in the eastern part of the community of Fawnskin, on unincorporated land in San Bernardino County. The project site is comprised of about 62 acres, situated on both sides of State Highway 38, between Canyon Road and Polique Canyon Road (on the Fawnskin USGS 7½' quadrangle map, in the north half of Section 13, Township 2N and Range 1W). The project site slopes from north to south. Elevation ranges from 6,960 feet in the northeastern portion of the site to 6,750 feet near the lakeshore (see Figures 1 and 2).

The Moon Camp property was surveyed on June 11, 26 and 27, and on July 27, 2010. The focus of the 2010 surveys was on the previously identified occupied habitat areas of CACI. The bench-top openings to the southeast of the property that were previously and erroneously identified as CACI habitat by the White surveys of 2007 (as discussed in Krantz 2008) were also re-visited; and the pebble plain situated on U.S. Forest Service property northeast of the Moon Camp property was also surveyed.

The Dixie Lee Lane pebble plain, proposed as off-site mitigation, was also examined, and line transects were tabulated across the habitat to determine abundance of *Castilleja cinerea*, *Arenaria ursina* and *Eriogonum kennedyi austromontanum* at that location.

III. DISCREPANCY BETWEEN FINDINGS OF WHITE (2007) AND KRANTZ (2008)

As discussed in the Krantz (2008) botanical report for the Moon Camp property, the previous findings of Scott White (2007) were found to be erroneous with respect to identifying two occurrences of CACI habitat located to the southeast portion of the property. The discussion of this discrepancy is cited below:

> Ashy-gray paintbrush (*Castilleja cinerea*) had been mapped as four distinct occurrences by White, but the author, in conjunction with this survey, found that the two eastern occurrences, indicated as occurring behind (north of) Lots 22, and 29-30-31, do not support any ashy-gray paintbrush plants. There were openings of Wright's matting buckwheat at these locations, with silver rat-tails (*Ivesia argyrocoma*), which is sometimes associated with pebble plains, and Heckard's paintbrush (*Castilleja montigena*) was found on the perimeter of the openings, but no ashy-gray paintbrush exists at those locations. To verify that the author was, indeed, at the proper locations, the areas considered to be concurrent with those areas indicated by White were delineated with GPS data points to confirm the negative findings.
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> Similarly, the GPS delineation of the middle ashy-gray paintbrush occurrence was found to be less than one-third the size of the occupied habitat indicated in the White survey. This occurrence corresponds to the southernmost portions of proposed Lots 47 and 48, adjoining Highway 18. In this case, it appeared that White had mapped the Wright's matting buckwheat distribution, without regard to association with the ashy-gray paintbrush.
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> The primary pebble plain (the westernmost occurrence according to White) was found to be more restricted than indicated by White at the eastern portion of the occurrence, but generally conformed to the area indicated by White in the area of the central pebble plain (within the proposed rare plant preserve) and toward the western portion of the pebble plain and ashy-gray paintbrush area.

All areas identified by White as containing CACI were re-visited during this 2010 survey. Once again, no CACI was found to occur at the two southeasterly sites, and the middle occurrence was confirmed as delineated in the 2008 survey. The general distribution of the westerly CACI occurrence was approximately the same as in both the White and Krantz (2008) surveys; and further delineating and quantifying the CACI within this westerly occurrence was the primary focus of this 2010 survey.

IV. FOCUSED SURVEY OF *CASTILLEJA CINEREA*

One of the primary objectives of this botanical survey was to complete a more definitive assessment of the Federally-Threatened plant species—*Castilleja cinerea*—otherwise known as the ashy-grey Indian paintbrush. *Castilleja cinerea* (henceforth, CACI) is endemic to the northeast San Bernardino Mountains, with an overall distribution ranging from Snow Valley (1,828m a.s.l.) to the west, Holcomb Valley to the north, through Big Bear Valley to Baldwin Lake, thence southeast to Onyx Peak, and west along Sugarloaf Ridge, extending up to 3,032m (9,950 feet) above sea level. It occurs mostly in association with pebble plains habitat, but also basin sagebrush scrub, yellow pine, and lodgepole pine forest. On the Moon Camp property, CACI occurs in the yellow pine forest (*Pinus jeffreyi)* plant community.

CACI is a perennial plant, and therefore, should be identifiable in the appropriate season year after year. It is a hemiparasite, that is, it is at least partially parasitic on host plants for nutrients. CACI is usually associated with one of several buckwheat (*Eriogonum*) or mugwort (*Artemisia*) species. On pebble plains it is usually associated with Kennedy's buckwheat (*Eriogonum kennedyi* subspecies), but this pebble plains indicator species does not occur on site. In the case of Moon Camp, CACI is associated with *Eriogonum wrightii subscaposum* (Wright's matting buckwheat) and perhaps occasionally on *Artemisia ludoviciana* or *A. tridentata.*

Based upon the initial field survey results of June, 2010, high densities of CACI plants were observed on the westernmost Lots in the area west of "Street A"—the public roadway through the property. Densities as high as seven (7) CACI plants per square meter were tabulated in a very dense occurrence extending across the originally-enumerated Lots 1, 2 and 3. After consultation with the Applicant's Representative and the Environmental Impact Report consultant team, the original Lot configuration was revised to create a new Lot "H" Open Space Conservation Easement over the original Lots 1-3; and three new Lots 1-3 were designated along the south side of Street "A", with much lower densities of CACI.

The results of these quantitative CACI surveys are summarized below.

Confirmation of Absence of CACI at Eastern Locations

Scott White identified two eastern occurrences of CACI in his 2007 botanical report, indicated as occurring behind (north of) Lots 22, and 29-30-31 of the adjacent existing residential tract (White 2007). These were found to not support any ashy-gray paintbrush plants by Krantz in 2008; and their absence was confirmed during this survey. In both cases, Wright's matting buckwheat is present and widespread in the openings corresponding to White's locations, but there are no CACI plants, and nothing that could be mistaken for CACI (*Castilleja montigena* was observed at the edges of one of the locations). One can only assume that because 2007 was a record drought year, White had simply mapped the distribution of Wright's matting buckwheat and recorded the locations because of their potential for CACI; however, there is no question that these locations do not harbor any CACI plants now, nor did they in 2007. Because CACI is a perennial plant, these

occurrences do not "come and go" year to year, depending upon seasonal rainfall (or lack thereof), as annual plants sometimes do.

Discrete Occurrences of CACI

Occurrences of CACI identified by Krantz (2008) were confirmed during this survey, including approximately 50 plants at the location at the rear of proposed Lots 47-48; nine plants at the rear of Lot 49; and three plants on the west bank of the swale at the rear of Lot 50. A recent large tree-fall above the swale may alter the exposure and drainage pattern immediately around the swale, but the three CACI plants were still observed at this location at this time.

Open Space Lot A

A discrete count of the CACI plants occurring on Lot A was conducted by systematically walking the surrounding area of the knoll at this location. Altogether, a total of ~230 CACI plants were tallied within the Lot A area.

Open Space Lot H

The newly-proposed Lot H Open Space Conservation Easement was created to protect the high densities of CACI occurring in this area. The highest concentration of these plants extends in a broad opening in the Jeffrey pine woodland, in association with Wright's matting buckwheat. Altogether, approximately 4,665 CACI plants were estimated to occur in this area based on a combination of discrete counts and a belt transect through the middle of the highest density area.

Lots 1-5, Road Easement and Well Lot F

Discrete tallies of CACI plants were conducted on Lots 1-5 of the revised Moon Camp subdivision, including the new Lots 1, 2, and 3. The new Lot 1 contains approximately 45 plants, all located within a 5m-radius of the southeast corner of the property. Although these plants are within the rear-lot and side-lot building setbacks, they are considered as a "take" because they are not included in the Conservation Easement areas.

CACI plants on the new Lot 2 are scattered across the Lot, with approximately 150 plants.

The new Lot 3 contains approximately 175 plants. Lot 4 contains approximately 70 plants to the front-center of the Lot, and another 20 plants to rear of the Lot (not in the buildable area of the Lot), for a total of ~90 plants; and Lot 5 contains approximately 30 plants and another ~40 CACI plants are in the road right-of-way across the front of Lot 5. Well Site Lot F and the associated access road contain approximately 80 plants.

Summary of CACI Occurrence on the Moon Camp Site

Altogether, then, one finds these total estimated numbers of CACI plants on the Moon Camp property:

Lot 1— 45 plants
Lot 2— 150 plants
Lot 3— 175 plants
Lot 4— 90 plants
Lot 5— 30 plants
Lot 47— 50 plants
Lot 49— 9 plants

Lot 50— 3 plants
Lot A— 230 plants
Lot F— 80 plants
Road ROW- 40 plants
Lot H— 4,665 plants

TOTAL 5,567 plants

Of the 5,567 CACI plants estimated to occur on site, 4,895 plants will be protected within Lot A and H, representing 88% of the total number of plants. Of the remaining CACI 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.

V. SURVEY OF THE U.S. FOREST SERVICE POLIQUE CANYON PEBBLE PLAIN

A survey was conducted of the pebble plain located on U.S.F.S. property, located generally within the NE/4 of the SE/4 of Section 12, Range 1 West, Township 2 North, San Bernardino Baseline and Meridian.

The Polique Canyon pebble plain is situated along a bench-top ridge northeast of the Moon Camp project site. The ridge runs generally north-to-south for a distance of about 290 meters (950 feet), with two small openings of approximately one acre each that support pebble plains vegetation. These are true pebble plains, with both of the indicator species—*Eriogonum kennedyi austromontanum* and *Arenaria ursina*—used to map the distribution of pebble plains habitat (Krantz 1981). Other associated pebble plains species include *Arabis parishii, Erigeron aphanactis, Ivesia argyrocoma* and *Lewisia rediviva.*

The pebble plain exhibited the impacts of off-highway vehicle use, with a motorcycle track that runs the entire length of the bench top, with access to the pebble plains from the northwest toward the residential subdivision in that direction, and to the northeast, where the motorcycle track connects with Polique Canyon Road. The Forest Service has placed logs and branches across the northern entry to the motorcycle track to prevent vehicular access to the pebble plains, with some success, as there was no evidence of recent motorcycle activity on the pebble plains.

The Polique Canyon pebble plains are situated approximately 325m (1,056 feet) northeast of the Moon Camp property, at an elevation of about 60m (200 feet) above the project. Forest Service comments on the Revised and Re-circulated DEIR expressed concern that development of the Moon Camp property could represent an indirect impact to the pebble plains from foot traffic generated by the Moon Camp residents. There is no apparent footpath or trail connection between the Moon Camp property and the pebble plains. For Moon Camp residents to hike up to the pebble plains, they would have to traverse up the 300+ meter-ridge with a 60m-elevation gain across the brush-covered slope.

VI. SURVEY OF THE DIXIE LEE LANE PEBBLE PLAIN

The Dixie Lee Lane pebble plain is situated at the northern terminus of the street of the same name at the northwest corner of the community of Sugarloaf. It is a ten-acre, discrete pebble plain situated in a pinyon-juniper/Jeffrey pine woodland. It is one of a series of bench-top pebble plains extending from Upper Moonridge and the U.S.F.S.-owned Sawmill pebble plain on the west, to the once-expansive pebble plain situated on either side of Maple Lane road leading into the community of Sugarloaf from Big Bear City.

The Dixie Lee Lane pebble plain was originally proposed as a mitigation bank for the partial offset of impacts of development of the Big Bear High School on Maple Lane, which was formerly the site of a large pebble plain of the Sugarloaf series. The development of the High School required a Minor Subdivision of the parent parcel, including the Dixie Lee Lane pebble plain. At the time, pebble plains and their associated species were not formally listed or protected as endangered or threatened species; and the establishment of an off-site mitigation bank for the High School was considered adequate mitigation for the impacts of the High School project. The complete 10-acre

pebble plain was surveyed by Hicks & Hartwick Engineering, with the idea that two acres of the 10-acre pebble plain would be used to mitigate for the High School, and the remainder would be available for mitigation of other projects with pebble plain-related impacts. However, the 10-acre mitigation bank and two-acre subdivisions of it were never actually recorded.

The Moon Camp project is proposing to establish permanent protection of the entire 10-acre pebble plain at Dixie Lee Lane as part of their rare plant mitigation program. This supplemental botanical survey focused on providing a quantitative and qualitative assessment of the proposed Dixie Lee Lane pebble plain.

Survey Results

Three belt transects were tallied on the Dixie Lee Lane pebble plain to determine approximate densities of the three Federal-Threatened plant species that occur there: *Arenaria ursina* (ARUR), *Eriogonum kennedyi austromontanum* (ERKEA) and *Castilleja cinerea* (CACI), with the following results.

The Dixie Lee Lane pebble plain is a textbook example of this unique rare plant community. The original "type" pebble plain was described by Derby and Wilson (1978) based upon the Sawmill pebble plain—one of the Sugarloaf series of pebble plains situated two bench tops to the west of the Dixie Lee Lane population. The Dixie Lee Lane occurrence has relatively discrete borders with the surrounding pinyon-juniper-Jeffrey pine forest, indicating the dense clay substrate that prevents the competing pine seedlings from becoming established on the open plain. The surface of the pebble plain exhibits the classic vestiture of Saragossa quartzite pebbles and cobbles resulting from frost heave of the pebbles during winter freezing and thawing cycles of the clay soil, resulting in the pebbles being pushed to the surface of the clay.

The dominant species on the pebble plain are the two Federal-Threatened Big Bear-area endemics—ARUR and ERKEA—with the full suite of associated plant species, including several other Big Bear endemics and other rare plants found almost exclusively on pebble plain habitats, including the following:

Antennaria dimorpha		
Arabis parishii	Big Bear endemic	CNPS List 1B.2
Arenaria ursina	Big Bear endemic	Federal Threatened
Castilleja cinerea	Big Bear endemic	Federal Threatened
Cusickiella douglasii c.		
Erigeron aphanactis		
Eriogonum kennedyi a.	Big Bear endemic	Federal Threatened
Ivesia argyrocoma	SB Mts and Baja C.	CNPS List 1B.2
Lewisia rediviva minor		
Linanthuskillipii	Big Bear endemic	CNPS List 1B.2
Mimulus purpureus	BB near-endemic	CNPS List 1B.2

The three belt transects were established accordingly: one in the northern pebble plain opening, one across the middle opening, and one through the southern (entry from Dixie Lee Lane) opening. The transects were extended to 50m-lengths, and ten meter-square plots were tallied at 5m intervals along the transects, alternating right- to left-of-center line meter-squares to randomize the meters

selected for counting. The Federal-listed species were counted with regard to the number of mature (flowering or woody stems) and seedling plants per meter-square.

A total of 128 ARUR plants were tallied in the 30 meter-square plots, for an average density of 4.3 plants per square meter. ERKEA plants exhibited a total of 475 flowering plants (and at times countless seedlings/m2!) in the 30 meter-square plots, for an average density of 15.8 plants per square meter. CACI was infrequent on the pebble plain, with only 21 plants tallied, limited to the north end of the pebble plain along the northeast edge of the opening. These plants were all in association with ERKEA.

A large number of ERKEA plants were observed to be recently dead or dying in the area of the pebble plain with the CACI, and in several other areas, with as many as 8.9 dead ERKEA crowns/m2 in the transect near the CACI occurrence. Some areas not sampled in the transects exhibited nearly 100% ERKEA mortality. These areas were associated with a high density of introduced cheat grass, *Bromus tectorum*. Similar ERKEA die-offs were observed by the author earlier this season at North Baldwin Lake; and this worrisome qualitative condition may deserve further evaluation with regard to pebble plain conservation.

Extrapolating these densities of the Federal-Threatened pebble plains indicator species across the entire Dixie Lee Lane pebble plain, one arrives at a total population for ARUR and ERKEA in the tens of thousands. To the best of the author's knowledge, this represents the highest densities of pebble plains species remaining on privately-owned land in Big Bear Valley.

VI. SUMMARY OF FINDINGS

The objectives of this supplemental botanical survey of the Moon Camp property were addressed as follows in the brief summary of findings described below.

The areas of discrepancy of reported CACI occurrence between the Scott White reports (2002 and 2007) and the Krantz supplemental report (2008) were revisited in the field, and the findings of the Krantz report were confirmed. There are no CACI plants on the two easterly occurrences reported by White.

The other CACI occurrences were confirmed in the field, the aerial extent of the occurrences were delineated, and numbers of CACI plants were discretely counted where possible, or estimated via quantitative transects in the larger occurrences. Altogether, a total of 5,567 CACI plants were estimated to occur on the Moon Camp property. Of these, 4,895 plants will be conserved within the Conservation Easements on Lot A and Lot H, representing 88% of the entire Moon Camp population. Lot H will represent the first formally-designated conservation easement dedicated to the preservation of this unique species.

The Polique Canyon pebble plain, situated on Forest Service land above and to the northeast of the Moon Camp property was surveyed, and was found to represent a true pebble plain ensemble of species, including the two indicator species, *Arenaria ursina* and *Eriogonum kennedyi austromontanum.* The Polique Canyon pebble plain has experienced impacts from unauthorized motorcycle activity in the recent past, with a motorcycle track running through the pebble plain from the Polique Canyon road area. The Forest Service has attempted to block this illegal off-

highway vehicle activity by laying branches and logs across the track, with apparent success. No impacts from existing adjacent pedestrian traffic were observed on the pebble plain. No off-site, indirect impacts of pedestrian foot traffic is anticipated from the Moon Camp property, as Moon Camp is more than 1,000 feet south of the Polique Canyon pebble plains, separated by brush without an established trail, and is several hundred feet in elevation below the pebble plains.

The "pebble plain" on Lot A, as identified in previous botanical reports by White *et alus*, has some of the soil characteristics of a pebble plain, but lacks the two indicator threatened plant species (*Eriogonum kennedyi austromontanum* and *Arenaria ursina*). Therefore there is technically no pebble plain on the property that requires mitigation.

The Dixie Lee Lane pebble plain, proposed for off-site mitigation of the Moon Camp project, was surveyed, and quantitative belt transects were tallied to estimate the abundance of Federal-Threatened species at that location. This ten-acre pebble plain exhibits very high densities of the two indicator species (mentioned above), with an estimated population in the tens of thousands for these two Federal-Threatened species. CACI was found to be poorly represented on the Dixie Lee Lane parcel, however, with only 21 plants observed.

VIII. REFERENCES

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