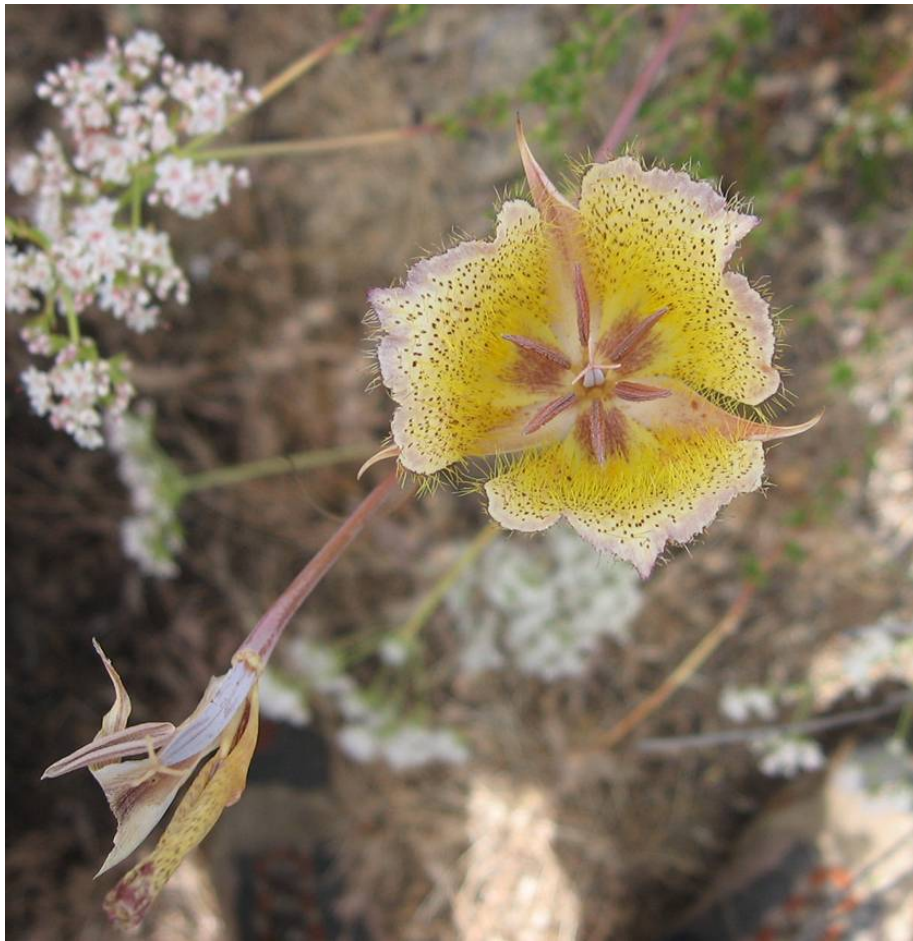


**Western Riverside County
Multiple Species Habitat Conservation Plan (MSHCP)
Biological Monitoring Program
Rare Plant Survey Report 2010**



23 March 2010

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NOTE TO READER:

This report is an account of survey activities conducted by the Biological Monitoring Program for the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The MSHCP was permitted in June 2004. The Monitoring Program monitors the distribution and status of the 146 Covered Species within the Conservation Area to provide information to Permittees, land managers, the public, and the Wildlife Agencies (i.e., the California Department of Fish and Game and the U.S. Fish and Wildlife Service). Monitoring Program activities are guided by the MSHCP species objectives for each Covered Species, the information needs identified in MSHCP Section 5.3 or elsewhere in the document, and the information needs of the Permittees.

MSHCP reserve assembly is ongoing and it is expected to take 20 or more years to assemble the final Conservation Area. The Conservation Area includes lands acquired for conservation under the terms of the MSHCP and other lands that have conservation value in the Plan Area (called public or quasi-public lands in the MSHCP). In this report, the term “Conservation Area” refers to the Conservation Area as understood by the Monitoring Program at the time the surveys were planned and conducted.

We would like to thank and acknowledge the land managers in the MSHCP Plan Area, who in the interest of conservation and stewardship facilitate Monitoring Program activities on the lands for which they are responsible. A list of the lands where data collection activities were conducted in 2009 is included in Section 7.0 of the Western Riverside County Regional Conservation Authority (RCA) Annual Report to the Wildlife Agencies. Partnering organizations and individuals contributing data to our projects are acknowledged in the text of appropriate reports.

While we have made every effort to accurately represent our data and results, it should be recognized that data management and analysis are ongoing activities. Any reader wishing to make further use of the information or data provided in this report should contact the Monitoring Program to ensure that they have access to the best available or most current data.

The primary preparer of this report was the 2010 Botany Program Lead, Jeff Galvin. If there are any questions about the information provided in this report, please contact the Monitoring Program Administrator. If you have questions about the MSHCP, please contact the Executive Director of the RCA. Further information on the MSHCP and the RCA can be found at www.wrc-rca.org.

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INTRODUCTION

The Western Riverside County MSHCP covers 63 plant species. For most of these species, the MSHCP requires the confirmation of a number of occurrences, often at specified sites, within the Conservation Area. Unless a given species-specific conservation objective has more rigorous requirements, the Biological Monitoring Program is obligated to survey for the distribution of covered plant species at least once every 8 years with the goal of verifying occupancy at $\geq 75\%$ of the sites listed in the species objective (Dudek & Associates 2003). Some covered plants also have “demonstrate-conservation” objectives that require us to document a specific level of conservation. These species are not considered adequately conserved until individual objectives have been met, usually a specified number of locations with a minimum number of individuals of the target species.

Historic distribution information for covered plant species was consolidated for the MSHCP from a variety of sources including herbarium records, field notes, ‘gray literature’, and species databases. The status of covered plant species at the recorded locations requires verification due to the varying sources, ages, and precision of the records. In order to ascertain whether species objectives are being met and to determine future long-term monitoring needs, we plan to field-verify historic records for each of the 63 covered plant species during the Inventory Phase (first 5-8 years of monitoring). As stipulated by the MSHCP, at the end of the Inventory Phase we will return to verified locations to monitor the occurrences at least once every 8 years. We will continue to search for additional occurrences for species with unmet objectives when expansion of the Conservation Area includes appropriate habitat.

Surveys conducted in 2010 built on the activities of previous years. The University of California, Riverside Center for Conservation Biology (UCR CCB), under a contract from the California Department of Fish and Game, conducted surveys for 27 covered plant species in 2003 and 2004 (UCR CCB 2005). Biological Monitoring Program staff conducted targeted surveys for 16 Covered Species in 2005, 32 species in 2006, 28 species in 2007, 44 species in 2008, and 37 species in 2009. In 2010, we monitored the phenology of 19 species at 13 sentinel sites with previously confirmed occurrences of Covered Species to guide the timing of target surveys elsewhere in the Conservation Area. We focused survey efforts on 34 plant species and documented the presence of 3 additional covered plant species encountered incidentally. The goals for the 2010 rare plant survey were as follows:

Goals and Objectives

1. Verify historical locations and document new locations of covered plant species in the Conservation Area.
 - a. Search for target species within all suitable habitats inside selected grid cells until surveyors locate the species of interest or determine that the species was unlikely to be detected.
2. Continue to improve knowledge of covered plant species status within the Conservation Area.

- a. Collect species-specific information at observation sites such as species abundance, phenology, and population size.
3. Continue to improve knowledge of covered plant species habitat suitability needs.
 - a. Collect habitat information at survey sites to determine covariates associated with species presence.
4. Continue to test and refine protocol for surveying historical locations of covered plant species.
 - a. Use phenological progression of plants at sentinel sites to make decisions about when to initiate and conclude surveys for target plant species.
 - b. Streamline the amount of information collected at survey grid cells to reduce the amount of time spent per survey, and thereby increase the number of grid cells surveyed per person per day.
 - c. Improve the resolution of actual area occupied by a given species by estimating the spatial area occupied by an occurrence into one of 6 size classes.

METHODS

Protocol Development

We made minor modifications to the existing rare plant survey protocol for 2010 surveys and have included the modifications and the forms used for the surveys in the *Western Riverside County MSHCP Biological Monitoring Program Protocol for Inventory-Phase Rare Plant Surveys* (Appendix A).

Personnel and Training

In February and March of 2010, Jeff Galvin, the Biological Monitoring Program Botany Lead, instructed members of the plant field crew in identification of common plant families and all 63 covered plant species. Members of the plant field crew were also required to become familiar with a variety of habitat types where Covered Species occur and with associated species. Crews went on training walks with personnel already familiar with common vegetation in the Plan Area and used a variety of field guides to assist in plant identification. Surveyors also were shown herbarium specimens of target species as well as closely related or potentially confusing species. Crew members were quizzed weekly on the information presented. For all quizzes, surveyors determined if pressed specimens and photographs were Covered Species and, if so, which Covered Species. At the end of the training period, surveyors took a test to determine if they could correctly identify all 63 covered plant species. Surveyors passed the final test if they correctly identified all Covered Species and did not mistake a co-occurring species for a Covered Species. The California Department of Fish and Game and Regional Conservation Authority funded Biological Monitoring Program personnel. Staff who conducted surveys for rare plants in 2010 are listed below.

- Jeff Galvin (Project Lead, Biological Monitoring Program)
- Ana Hernandez (Biological Monitoring Program)
- John Dvorak (Biological Monitoring Program)

- Karyn Drennen (Biological Monitoring Program)
- Kim Freeburn (Biological Monitoring Program)
- Kim Sparks (Biological Monitoring Program)
- Rose Cook (Biological Monitoring Program)

Survey Site Selection

Sentinel Surveys

Sentinel sites are locations where we know covered plant species regularly occur. We monitor the phenology of target species throughout the growing season at sentinel sites to determine the optimal time to document species occurrences. We chose sites based on the presence and diversity of recently documented Covered Species and, when possible, select sites with an elevation and aspect similar to planned target survey locations. During the 2010 field season, we visited 13 sentinel sites to monitor the phenology of 19 target species (Table 1). Based on initial surveys, we concluded that 2010 was an appropriate year to survey for all targeted plant species throughout the Conservation Area. We continued to use sentinel site surveys throughout the field season to determine the appropriate survey period for species of interest. We started sentinel surveys on 15 March 2010 in grassland, coastal sage scrub, and chaparral openings in the Perris Basin. As the spring and summer progressed, sentinel surveys transitioned to higher elevations in the San Jacinto Mountains and concluded on 21 July.

Target Surveys

We selected target species and broad survey locations from the remaining unmet objectives identified in the MSHCP species-specific accounts. A number of resources guided the selection of target survey sites including the MSHCP species accounts developed by Dudek and Associates (2001), the Consortium of California Herbaria (CCH), the California Natural Diversity Database (CNDDDB), and the 2005 Geographic Information System (GIS) vegetation map of western Riverside County (CDFG et al. 2005) (CCH 2010; CNDDDB 2010; CDFG et al. 2005). We also used our internal Rare Plant Database and the MSHCP Historical Database, which was created by georeferencing and consolidating available distributional data for all Covered Species throughout the Plan Area (Dudek & Associates 2001).

We began by surveying areas in and around CNDDDB polygons, focusing on sections that, according to the vegetation map, contained appropriate habitat as defined by the species account. When no CNDDDB data were available, we based survey site selection on point data in the Historical Database. Before selecting sites, we attempted to correct georeferencing errors that are widespread throughout the database, and then fine-tuned the selection based on a combination of recently vouchered specimens from the CCH and presence of appropriate habitat. If information from the database produced no historical observation points or if the surveys were unsuccessful, we focused instead on areas specifically mentioned in the species account or areas containing appropriate habitat. In general, previously unsurveyed areas took precedence over locations targeted during earlier survey efforts; however, if time allowed, we resurveyed sites as well.

We timed surveys based on observations during sentinel site visits. We completed our first target species surveys of the 2010 season on 13 March and the final survey on 9 November.

Table 1. List of 39 species surveyed for and/or detected in 2010.

Survey ^a	Detection ^a	Species Scientific Name	Common Name
S,R,T	--	<i>Allium munzii</i>	Munz's onion
T	I,T	<i>Arabis johnstonii</i>	Johnston's rock cress
T	I,T	<i>Arctostaphylos rainbowensis</i>	Rainbow manzanita
S	I	<i>Atriplex coronata</i> var. <i>notatior</i>	San Jacinto Valley crownscale
S,T	S,T	<i>Atriplex serenana</i> var. <i> davidsonii</i>	Davidson's saltscale
T	--	<i>Atriplex parishii</i>	Parish's brittlescale
T	--	<i>Berberis nevinii</i>	Nevin's barberry
S,R,T	S,R,T	<i>Brodiaea filifolia</i>	Thread-leaved brodiaea
--	I	<i>Calochortus palmeri</i> var. <i>munzii</i>	Munz's marisposa lily
S,R,T	I,S,R,T	<i>Calochortus plummerae</i>	Plummer's mariposa lily
T	T	<i>Calochortus weedii</i> var. <i>intermedius</i>	Intermediate mariposa lily
S,T	I,T	<i>Centromadia pungens</i> ssp. <i>laevis</i>	Smooth tarplant
S,R,T	I,S,R,T	<i>Chorizanthe leptotheca</i>	Peninsular spine flower
S,R,T	I,S,R,T	<i>Chorizanthe parryi</i> var. <i>parryi</i>	Parry's spineflower
S	I,S	<i>Chorizanthe polygonoides</i> var. <i>longispina</i>	Long-spined spineflower
T	I	<i>Chorizanthe procumbens</i>	Prostrate spine flower
S,R,T	S,R,T	<i>Convolvulus simulans</i>	Small-flowered morning-glory
S,T	S,T	<i>Deinandra mohavensis</i>	Mojave tarplant
T	T	<i>Dodecahema leptocera</i>	Slender-horned spine flower
S,T	S,T	<i>Dudleya multicaulis</i>	Many-stemmed dudleya
S,R,T	S,T	<i>Erodium macrophyllum</i>	Large-leaved filaree
S,T	S,T	<i>Harpagonella palmeri</i>	Palmer's graplinghook
T	T	<i>Holocarpha virgata</i> ssp. <i>elongata</i>	Graceful tarplant
S,T	S,T	<i>Hordeum intercedens</i>	Vernal barley
S,T	S,T	<i>Lasthenia glabrata</i> ssp. <i>coulteri</i>	Coulter's goldfields
T	--	<i>Lepechinia cardiophylla</i>	Heart-leaved pitcher-sage
--	I	<i>Lilium humboldtii</i> ssp. <i>ocellatum</i>	Ocellated Humboldt lily
S,R,T	R,T	<i>Microseris douglasii</i> var. <i>platycarpa</i>	Small-flowered microseris
--	I	<i>Mimulus clevelandii</i>	Cleveland bush monkey flower
T	I,T	<i>Mimulus diffusus</i>	Palomar monkey flower
T	T	<i>Myosurus minimus</i> ssp. <i>apus</i>	Little mousetail
T	T	<i>Nama stenocarpum</i>	Mud nama
S,T	T	<i>Navarretia fossalis</i>	Spreading navarretia
T	--	<i>Orcuttia californica</i>	California Orcutt grass
R,T	R,T	<i>Oxytheca caryophylloides</i>	Chickweed oxytheca
S,T	I,S	<i>Penstemon californicus</i>	California beardtongue
T	I,T	<i>Quercus engelmannii</i>	Engelmann oak
T	T	<i>Romneya coulteri</i>	Coulter's matilija poppy
T	--	<i>Trichocoronis wrightii</i> var. <i>wrightii</i>	Wright's trichocoronis

^a S = sentinel site, T = targeted search, R = revisited occurrence, "--" = not applicable

Deinandra mohavensis Mapping

We based site selection for *Deinandra mohavensis* mapping on recent point data queried from the Rare Plant Database and a U.S. Forest Service layer containing locations of rare plants documented in the San Bernardino National Forest (SBNF) (SBNF 2007). Spatial data showed that this species is widely distributed throughout the San Jacinto Mountains, so we selected sites with a high concentration of documented occurrences, including Garner Valley, Chimney Flats, and Oak Flats. We surveyed all 3 sites from 20 July through 28 July.

Survey Methods

Sentinel Sites

We navigated to points where Monitoring Program biologists or UCR CCB had documented target plant species in previous years. Due to the recent nature of these records, and the fact that all coordinates were collected using GPS units, we assumed points were highly accurate and, therefore, only searched for the target species in the immediate area of the given point. If located, we recorded the same species-specific information required for target surveys, as described below. If unable to locate a target species, we took it as evidence that current environmental conditions and phenology of the target species were not yet suitable for targeted surveys. In these cases, we revisited the site until the phenology progressed to a point where we could easily detect the species.

Target Surveys

We used 2 different approaches for target surveys. For distributional objectives, we navigated to assigned 250 m x 250 m grid cells containing historically documented occurrences of targeted plant species. For demonstrate-conservation objectives, we often conducted surveys around known occurrences queried from the Rare Plant Database. We searched assigned cells until all species of interest were located, or all suitable habitats, as defined by the “Habitat and Habitat Associations” section of the species account (Dudek and Associates 2001), were covered. Although each survey focused on particular target species, we remained vigilant for all Covered Species. When we found a target species, either as the result of a directed search or incidental to a search for a different species, we recorded species-specific information including abundance, phenology, patch size, dominant substrate, dominant vegetation community, and dominant species in 5 functional groups (trees, shrubs, native forbs, exotic forbs, and grasses). Regardless of the outcome of the survey, we documented the search effort and collected vegetation community, site phenology, and site disturbance information about the area surveyed. We describe survey methods in further detail in the *2010 Protocol for Inventory-Phase Rare Plant Surveys* and *Rare Plant Survey Forms* (Appendix B).

Deinandra mohavensis Mapping

One species, *D. mohavensis*, required a different survey protocol to achieve its species objective. The demonstrate-conservation objective for this species requires the confirmation of localities covering at least 100 ac (0.4 km²). To achieve this objective, we focused surveys around known occurrences at Garner Valley, Chimney Flats, and Oak

Flats. At each site, we recorded UTMs for every individual located at least 5 m from an individual already marked during the survey. For each attempted locality, we searched all suitable habitat until we mapped at least 100 ac or the field day ended.

Data Analysis

In this report, we present results of surveys conducted in 2010 as well as overall progress toward meeting species objectives. To determine if we confirmed localities of *D. mohavensis*, we uploaded all recorded coordinates into ArcMap (ESRI 2009), created 5-m buffers for all points, dissolved the buffers, and calculated the overall acreage. Next, we divided the polygon into localities of at least 100 ac that were at least a quarter section (804 m) apart. To report on total progress towards meeting species objectives, we evaluated our data along with recent data that other agencies have shared with us, including data collected by SBNF, the Center for Natural Lands Management (CNLM), and UCR CCB. This analysis is necessarily qualitative given the descriptive nature of the information we collected during surveys.

The species-specific objectives listed in the MSHCP specify a certain number of locations, occurrences, records, and/or localities for each species, and often identify areas where the species have historically occurred. For distributional objectives, the MSHCP uses 3 terms (“location”, “locality”, and “occurrence”) interchangeably but does not define them. For clarity, when referring to distributional objectives in this report, we will only use the term “occurrence”. We define “occurrence” as the unit or group of individuals meeting the criteria for 1 location in the species objective. When species objectives have a one-to-one relationship between number of occurrences and locations where they require confirmation, we have a very clear idea of what constitutes an occurrence. For example, objective 2 for *Mimulus clevelandii* requires that we “include within the MSHCP Conservation Area the two known [occurrences] of this species on Santiago Peak in the Santa Ana Mountains and on the Northern Slopes of the Agua Tibia Mountains.” Other species objectives require the inclusion of a specified number of known occurrences in the Conservation Area without listing each specific site where conservation of the species will occur. For example, objective 2 for *Penstemon californicus* requires that we “include within the MSHCP Conservation Area at least 15 occurrences in Aguanga, Blackburn Canyon, and the San Jacinto Mountains.” We are unable to apply a single definition of “occurrence” when species objectives do not specify a distinct location for each occurrence. Instead, we define “occurrence” on a case-by-case basis, factoring in, when available, the typical spatial distribution of the species, general ecology, geography, and conservation intent. In addition, we use a combination of a close reading of the MSHCP species account and U.S. Fish and Wildlife Service Biological Opinion (USFWS 2004), as well as the original data points shown in the MSHCP Historical Database, to delineate, to the best of our abilities, the known occurrences to which the objectives refer.

Per the MSHCP, we cannot consider some species adequately conserved until we achieve additional goals beyond the conservation of historic occurrences. In this report, we will use the term “demonstrate-conservation objective” to refer to these additional goals. For demonstrate-conservation objectives, the MSHCP uses the term “locality” and defines its minimum dimensions as a quarter section (160 ac). In this report, for the

purpose of clarity, we will only use the term “locality” when referring to objectives regardless of extent. The species-specific demonstrate-conservation objectives typically list a minimum number of individuals that must be present for a given occupied site to qualify as a locality, unless a smaller population has been demonstrated to be self-sustaining. We use the highest number of individuals counted in an area in a single day to determine the total number of individuals at a locality and to avoid over-counting individuals. A few species have demonstrate-conservation objectives that only ask for a specific number of localities without regard to the number of individuals at each locality.

RESULTS

We conducted 15 sentinel site visits at 13 unique sites for 19 targeted species between 11 March and 8 July 2010 (Table 1). We detected the first annual Covered Species beginning to flower at the McElhinney-Stimmel property on 11 March. We focused target surveys on annual and herbaceous perennial species in the Perris Basin in March, April, and early May, based on the plant phenology at our sentinel sites. By mid-May, the phenology for many of these species was past peak detectability, so we shifted our survey effort to higher-elevation sites and perennial species.

We surveyed 338 unique grid cells, 34 of which we surveyed twice, for a total of 372 survey events. Of those grid cells, we completely surveyed 214 (58%) and partially surveyed another 158 (42%). On average, we took 44 minutes to survey a grid cell; surveys lasted from 1 to 270 minutes depending on the extent of suitable habitat, vegetation structure, and topography. In 104 surveyed cells (31%), we detected at least 1 covered plant species, though not always the targeted species.

In 2010, we detected 27 of the 34 targeted Covered Species and recorded incidental observations of an additional 5 Covered Species (Table 1). Counting multiple detections of the same species in a single grid cell as 1 detection (i.e., presence/absence in a cell) and including incidental data, we made a total of 155 detections of 32 covered plant species in 2010 (Appendix C) (Figures 1-5). We confirmed 41 new occurrences for 19 Covered Species that fulfill requirements of a distributional species objective (Appendix C). We also confirmed 41 localities for 8 species that fulfill a requirement of a demonstrate-conservation objective (Table 2). We have confirmed 332 of 476 required occurrences (70%) and 119 of 141 required localities (84%) based on all surveys to date by the Biological Monitoring Program, UCR CCB, and recent data from SBNF. We have confirmed all occurrences for 20 species (30%) and all localities for 9 (64%). The remaining species have a mean of 55% of required occurrences confirmed and 45% of required localities (Appendix C).

We mapped 701 acres of *D. mohavensis* throughout the San Jacinto Mountains, from Oak Flat in the Northwest to Quinn Flats in the Southeast. The spatial separation between polygons allowed us to divide the mapped area into 5 localities that meet the demonstrate-conservation objective for this species.

Table 2. Summary of demonstrate-conservation objective for 13 covered plant species.

Species	Objective		Confirmed Localities		
	Localities	Individuals per Locality	2010	Total	% of Total
<i>Arctostaphylos rainbowensis</i>	10	50	3	3	30%
<i>Calochortus plummerae</i>	6	500	2	6	100%
<i>Chorizanthe leptotheca</i>	10	1000	8	10	120%
<i>Chorizanthe parryi</i> var. <i>parryi</i>	10	1000	5	10	110%
<i>Deinandra mohavensis</i>	4	N/A ¹	4	4	100%
<i>Holocarpha virgata</i> ssp. <i>elongata</i>	10	1000	0	10	100%
<i>Hulsea vestita</i> ssp. <i>callicarpha</i>	16	50	0	16	100%
<i>Microseris douglasii</i> var. <i>platycarpha</i>	10	1000	9	9	90%
<i>Muhlenbergia californica</i>	10	50	0	0	0%
<i>Oxytheca caryophylloides</i>	10	1000	9	10	100%
<i>Polygala cornuta</i> var. <i>fishiae</i>	10	50	0	10	100%
<i>Potentilla rimicola</i>	5	N/A ²	0	1	20%
<i>Romneya coulteri</i>	30	N/A ²	3	30	100%
Total	141	-	41	119	84%

¹ Demonstrate-conservation objective calls for 100 ac occupied per locality.

² Demonstrate-conservation objective does not specify number of individuals per locality.

DISCUSSION

The 2009 Rare Plant Survey Report recommended that we place a greater emphasis on meeting demonstrate-conservation objectives in 2010. This survey year we confirmed 41 demonstrate-conservation localities, more than 8 times as many as in 2009 ($n = 5$). We also surveyed 50% more grid cells ($n = 160$) with the intent of meeting more demonstrate-conservation objectives than we did in 2009 ($n = 108$). The increase in localities may have been partially due to an increased focus on demonstrate-conservation objectives. Favorable environmental conditions, such as above-average rainfall and a long, moderate spring, may also have led to an increase in the abundance of herbaceous species. Many of the Covered Species with demonstrate-conservation objectives are herbaceous, so it is possible there were simply more individuals to count towards the objective.

In addition, this season we saw an increase in the number of confirmed occurrences for distributional objectives. We confirmed 41 occurrences for distributional objectives, a 46% increase over 2009 ($n = 28$). In almost all previous rare plant survey reports, we stated that as the Inventory Phase progressed we would likely observe a gradual decline in confirmed occurrences. We assumed that in the beginning of the Inventory Phase, we would confirm more occurrences because of the larger pool of occurrences to choose from and the ability to select those with precise locality descriptions and/or recent spatial data. Then, in the later years, we would have to confirm occurrences based on old observations without reliable spatial data. Besides the favorable

environmental conditions, the increase in detections was achieved by re-georeferencing all historic points and, when available, factoring in detailed information about the associated voucher, including dominant species, soil composition, fire history, and general habitat descriptions. By doing this, we were able to target smaller areas and eliminate occurrences that actually exist outside of the Conservation Area.

Also in 2010, we focused on identifying and preparing vouchers of a number of species with confusing or recently altered taxonomy. We revisited all 4 *Brodiaea filifolia* CNDDDB polygons at the Santa Rosa Plateau to confirm that *B. filifolia* was present and that we didn't mistake it for *Brodiaea santarosae*, a recently described and very similar species. We confirmed *B. filifolia* in 3 polygons, including EO05, EO30, and EO31, and we detected only *B. santarosae* in the fourth, EO03. As a result, we recommend that the species objective not include CNDDDB polygon EO03. We also vouchered all previously confirmed occurrences of *Chorizanthe leptotheca*, as well as any confirmed this year. In the past, surveyors have had difficulty differentiating *C. leptotheca* from *C. staticoides* and *C. xanti* var. *leucotheca*. Andy Sanders, UCR Herbarium curator, confirmed that all vouchers submitted were the Covered Species *C. leptotheca*.

Recommendations for Future Surveys

While we made substantial progress towards meeting all of the demonstrate-conservation objectives this year, *Arctostaphylos rainbowensis*, *Microseris douglasii* ssp. *platycarpa*, *Muhlenbergia californica*, and *Potentilla rimicola*, still have unconfirmed localities. For *A. rainbowensis*, we confirmed 3 of 10 localities at the Santa Rosa Plateau, the Tenaja Corridor, and San Mateo Canyon. There are numerous potential localities at the Santa Margarita Ecological Reserve, the Santa Rosa Plateau, the Tenaja Corridor, and the Agua Tibia Mountains. While this species is identifiable throughout most of the year, it is easier to differentiate from *Arctostaphylos glandulosa*, a morphologically similar species, when it is flowering and/or fruiting. We should therefore focus surveys for *A. rainbowensis* when it is typically flowering and/or fruiting and survey all potential locations until we confirm an additional 7 localities. This year we confirmed 9 of 10 localities for *M. douglasii* ssp. *platycarpa*. Although we were able to confirm 90% of the localities in 1 season, the remaining occurrence may prove difficult to confirm because we might have exhausted all the potential locations within the Conservation Area. The demonstrate-conservation objectives for *M. californica* and *P. rimicola* may be impossible to achieve. There are no historic records for *M. californica* within the Plan Area. The basis for including this species in the MSHCP relies solely on an unpublished USFWS document that we have been unable to acquire. We should only survey for this species if we acquire new information pertaining to its distribution throughout the Plan Area. There are only 2 historic records for *P. rimicola* within the Plan Area, both located on the southwestern slopes of the San Jacinto Mountains. In 2008, we confirmed 1 locality south of Seven Pines Trail and surveyed all remaining suitable habitat within the Plan Area. Therefore, unless additional suitable habitat is added to the Conservation Area, we should not continue to survey for this species.

As of the end of 2010, we have confirmed 331 of 475 occurrences (71%) required to meet the distributional objectives. This does not include *Brodiaea orcuttii* and *M. californica* because the best available information indicates that they do not occur in the

Plan Area. Of the remaining 144 occurrences, 75 (52%) are completely or mostly outside of the Conservation Area and 28 (19%) are unlikely to be confirmed because the objective includes duplicate records, the potential survey area is prohibitively large, or all potential habitat has been searched multiple times. During the 2011 rare plant survey season, we should target the remaining 41 occurrences (28%) for 16 Covered Species. We should survey for the other 103 occurrences when and if the Conservation Area includes appropriate parcels.

LITERATURE CITED

- [CDFG] California Department of Fish and Game, Aerial Information Systems, California Native Plant Society. 2005. Vegetation - Western Riverside Co. [ds170]. Publication Date: 2005-07-31. Online: <http://bios.dfg.ca.gov/>.
- [CNDDDB] California Natural Diversity Database 2006. Sacramento (CA): Natural Heritage Division, California Department of Fish and Game.
- [CCH] Consortium of California Herbaria. 2010, Vouchered specimen of MSHCP covered species within Western Riverside County, California. <<http://ucjeps.berkeley.edu/consortium/>>
- Dudek & Associates. 2001. Species 8 Occurrence Point Data. Prepared for County of Riverside Transportation and Lands Management Agency. Prepared by Dudek & Associates, Inc. Created January, 2001.
- Dudek & Associates. 2003. Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). Final MSHCP, Volumes I and II. Prepared for County of Riverside Transportation and Lands Management Agency. Prepared by Dudek & Associates, Inc. Approved June 17, 2003.
- [ESRI] Environmental Systems Research Institute ArcGIS: Release 9.2 [software]. 2006. Redlands (CA): Environmental Systems Research Institute.
- [SBNF]. San Bernardino National Forest. 2007, Rare Plants occurrence in the San Bernardino National Forest (SBNF_20071211_data)[ESRI Shapefile]
- [UCR CCB] University of California, Riverside, Center for Conservation Biology. 2005. Final Report: Western Riverside County Multiple Species Habitat Conservation Plan Monitoring Program. Prepared for California Department of Fish and Game, under contracts titled: Inland Ecosystems of California: Resource Assessment Project and Western Riverside County and Sierra Nevada Wildlife Assessment Project. May 4, 2005.
- [USFWS] U.S. Fish and Wildlife Service. 2004. Intra-Service Biological and Conference Opinion on Issuance of an Incidental Take Permit for the Western Riverside County Multiple Species Habitat Conservation Plan (File FWS-WRIV- 870.19). Carlsbad, California. June.

Appendix A. Rare Plant Survey Protocol

Western Riverside County MSHCP

Biological Monitoring Program

Protocol for Inventory-Phase Rare Plant Surveys

March 6, 2010

INTRODUCTION

There are 63 plant species covered by the Western Riverside County MSHCP. For most of these species, the MSHCP requires the confirmation of a number of occurrences, often at specified sites, within the Conservation Area. Unless a given species-specific conservation objective has more rigorous requirements, the Biological Monitoring Program is obligated to survey for the distribution of covered plant species at least once every 8 years, with the goal of verifying occupancy at $\geq 75\%$ of the sites listed in the species objective. Some covered plant species also have a species objective that requires a specific level of conservation to be demonstrated. These species are not considered adequately conserved by the MSHCP until the terms of the species objective (usually a specified number of locations with a minimum number of individuals of the species in question) have been met.

Historic distribution information for covered plant species was consolidated for the MSHCP from a variety of sources including herbarium records, field notes, gray literature, and species databases. The current status of covered plant species at the recorded locations needs to be verified due to the varying sources, ages, and precision of the records. In order to ascertain whether species objectives are being met and to determine future long-term monitoring needs, we plan to field-verify historic records for each of the 63 covered plant species during the first 5-8 years of the permit. As stipulated by the MSHCP, at the end of this Inventory Phase we will return to verified locations to monitor the occurrences at least once every 8 years. We will continue to search for additional occurrences as reserve lands are acquired, or in the case of species that have not been found at the required number of locations, as additional information about habitat suitability and potentially suitable locations are acquired.

The University of California, Riverside Center for Conservation Biology (UCR CCB), under a contract from the California Department of Fish and Game, conducted surveys for 27 covered plant species in 2003 and 2004 (UCR CCB 2005). Monitoring Program biologists conducted targeted surveys for 16 covered plant species in 2005, 32 species in 2006, 28 species in 2007, 44 species in 2008, and 28 species in 2009. In 2010 we will focus our surveys on 37 covered species. The goals for the 2010 rare plant surveys are as follows:

Goals and Objectives

1. Verify historical locations and document new locations of covered plant species in the Conservation Area.

- a. Divide the Conservation Area into 250 m x 250 m grid cells.
- b. Search for target species within all suitable habitats inside selected grid cells until surveyors locate the species of interest or determine that the species was unlikely to be detected.
2. Continue to improve knowledge of covered plant species status within the Conservation Area.
 - a. Collect species-specific information at observation sites such as species abundance, phenology, and population size.
3. Continue to improve knowledge of covered plant species habitat suitability needs.
 - a. Collect habitat information at survey sites to determine covariates associated with species presence.
4. Continue to test and refine protocol for surveying historical locations of covered plant species.
 - a. Use phenological progression of plants at sentinel sites to make decisions about when to initiate and conclude surveys for target plant species.
 - b. Reduce amount of information collected at survey grid cells to reduce amount of time spent per survey and therefore increase the number of grid cells that can be surveyed per person per day.
 - c. Improve the resolution of actual area occupied by a given species by estimating the spatial area occupied by an occurrence into one of 4 size classes.

METHODS

Survey Design

We will conduct surveys for covered plant species throughout most of the spring, summer and fall depending on rainfall, other seasonal variants, and current status towards meeting Species Objectives. Surveys will take place during each species' peak flowering or fruiting time unless the target species is easily identifiable in sterile form (such as for many shrubs and trees). Sentinel sites will be established at locations with known occurrences of covered plant species in order to help time surveys appropriately. Focused surveys for these species will begin once the species' are documented in peak phenology at a sentinel site. Even with the use of sentinel sites, we cannot declare a survey absence to be a true absence because a species may not have been detected at a site due to regional differences in seasonality or because observers failed to detect the species. Inventory-phase rare plant surveys are aimed at recording species presence, not determining true absence.

Known locations of target species of interest will be chosen and visited on an approximately biweekly basis at sentinel sites. Sentinel sites will be chosen based on known presence of species of interest and overlap between species records, so that one visit can collect information about the status of several species. When the time is deemed

phenologically appropriate based on findings at sentinel sites, surveyors will begin targeted searches for species of interest. Each survey will involve thoroughly searching all appropriate habitat for species of interest within a 250 m x 250 m sampling station. An initial station will be chosen to survey when there is a species record within the station from the MSHCP Historical Database. Points in the Database were derived from herbarium records, CNDDDB information and other records. Additional distributional information will be added to the Database from sources such as regional HCPs and land managers' records as needed to further direct searches and meet Species Objectives. If the species of interest is not detected in the initial station, the survey effort will be expanded to include searches in surrounding stations that contain suitable habitat.

Field Methods

We will choose sentinel sites to inform us of the current phenological state of species of interest and to make generalizations about species of interest that do not have sentinel sites. Sentinel sites are composed of one or more sampling stations with occurrences of covered plant species documented in the last 5 years. Surveyors will be given coordinates for 1 or more species known from the sentinel site. There should be little error in the coordinates for sentinel sites; therefore, surveyors will confine themselves to searching the immediate area around the coordinates for each of the species of interest to determine presence/absence of each species. For each species at a sentinel site, surveyors will record their assessment of the site for the species, choosing from "found", "early", "late", "dry", or "other". Surveyors will record the standard survey information for the sentinel site, and, if a target species is detected, record the standard species-specific information (Described below). To avoid over-collection of plant material at the sentinel sites, surveyors will never make a plant collection at a sentinel site unless specifically directed to do so by the Botany Program Lead.

For target surveys, each surveyor will be assigned one to several sampling stations to survey in a day. For each station, surveyors will be given a list of target species, as well as the coordinates for any MSHCP Historic Database points of interest that fall within the station. Surveyors will also be given coordinates for covered plant species previously found in the station. Surveyors will thoroughly search the station for target species in those species' appropriate habitats. They will also document the presence of any other covered plant species that they find that has not been previously recorded in the sampling station. At the end of the survey effort, surveyors will determine whether the survey was "complete" or "incomplete." It will seldom be possible for surveyors to be absolutely confident that target species are not present in a sampling station. Surveyors will consider a survey to be complete if they have searched appropriate habitat across the breadth of the sampling station. Considering a survey complete before all target species are found means that the sampling station will have lower priority for future surveys, not that the species of interest is definitely not in the sampling station. Surveys will be considered incomplete when surveyors are not able to survey all appropriate habitat within the sampling station. Surveyors may return to the station to complete the survey at a later date.

Surveyors will list all of the species they targeted in their search and record an assessment of either "found" or "unknown." Surveyors will not record species as other

categories, such as “early” or “late” because information on survey timing will be dependent on sentinel site survey results. Regardless of whether or not covered plant species are found, surveyors will collect information about their search effort and the general area. Surveyors will record the time searched in minutes; a brief site description, including dominant species; vegetation communities searched; site impacts, including their relative intensity and details on the exact nature of the impact; and the dominant phenology of the herbaceous, shrub and tree layers.

Species-specific information will be taken for all covered plant species found during targeted plant surveys, unless a species has previously been documented in the sampling station. When a covered plant species is found, surveyors will search the area surrounding the occurrence to determine the spatial extent and total number of individuals in the occurrence. For species that are difficult to detect, surveyors may want to walk in a slowly widening spiral around the found occurrence or along a series of transects in order to make sure that all individuals are found. Only one occurrence record should be recorded for species that are continuously distributed, even if the species occurs in low densities. Only one occurrence should be recorded for species found in small patches that are common in the landscape. If species occur in small patches that would be difficult to relocate in subsequent years, surveyors should record separate occurrence information for each patch. Once the surveyor has determined the bounds of the species occurrence, they can record species-specific information, including: UTM's at the center of the occurrence, slope in degrees, aspect in degrees, abundance, patch size within 4 size classes (1= <10 m², 2= 10 m² - <100 m², 3= 100 m² = <1000 m², 4= >1,000 m²), phenology of the target species, substrate, vegetation communities, and the 3 most dominant species within 5 functional groups (trees, shrubs, native-forbs, exotic-forbs, and grasses). Surveyor will take at least 1 photograph of the target species and 1 of surrounding habitat. If the size of the occurrence, distribution of individuals, and overall detectability is appropriate, surveyors will record an exact count for abundance. If an exact count would be prohibitively time-consuming or difficult, surveyors will record abundance as 1 of 5 size classes (1= <25, 2= 25 - <100, 3= 100 - <250, 4= 250 - <1000, 5 = >1000). Surveyors will always record an exact count if one is required to meet a demonstrate conservation objective.

Surveyors will occasionally be asked to revisit sites in order to collect additional information about covered plant species. Surveyors may be asked to revisit sites in order to make a collection of the species so that the species can be definitively identified. Surveyors may also be asked to visit sites to look for the presence of a certain number of individuals of the species in order to meet Demonstrate Conservation objectives. For these visits, surveys will select a purpose of “revisit” and survey evaluation of “N/A.” Surveyors will make a note of the reason for the revisit and record the survey information and species-specific information as described above. Surveyors should always record UTM's, number of individuals and phenology information for the species of interest and can decide what additional information to record about the species.

Field Procedure

- 1) Before going into the field, surveyors will upload station corner-points to a handheld GPS unit using DNRgarmin. (S:\Projects\Plants\RarePlants\2010 Surveys\DNRGarmin). Equipment and survey maps are located on the desks in the

plant hallway. Survey and vehicle assignments will be posted on the white board located in the old mammal room.

- 2) **Targeted Surveys:** For each station, surveyors will be given a list of target species, as well as, the coordinates for any MSHCP Historic Database points and previously confirmed target species points that fall within the station. Surveyors will thoroughly search the station for target species in those species' appropriate habitats. In addition, surveyors will document the presence of any previously undocumented covered plant species that they find in the sampling station.
 - a) For all target surveys, regardless of the outcome, surveyors will record general site information, including: observer initials; survey type; station ID; survey evaluation (incomplete, complete, or N/A); date; search time in minutes; a description of the general area, including dominant species; target species, including an assessment (U= unknown or F= found) ; phenology of the sentinel site within three functional groups (herbaceous, shrub, and tree); vegetation communities present in the survey station; and site impacts.
 - i) Survey Evaluation: It will seldom be possible for surveyors to be absolutely confident that target species are not present in a sampling station. Surveyors can consider a survey to be complete if they have searched all appropriate habitat across the breadth of the sampling station. If a surveyor is unable to survey all habitats they believe to be appropriate, they should record "incomplete".
 - ii) Search Time: The search time is only the time spent surveying for the target species and does not include time spent taking site-specific or species-specific information. Search time will be recorded in minutes.
 - iii) General Description: Surveyors will use this space to briefly describe the habitat within the survey station. This description will include dominant species, major topographic features, hydrologic features, and anything else the surveyors feels is relevant to the survey.
 - iv) Target Species: The list of target species will only include those species that the surveyor was specifically instructed to survey for. If another covered species is detected, the surveyor will take species specific information, but will not record it as a target species. The surveyor will record an assessment code for each of the target species. The target species receives an "F" if it is found within the survey station or a "U" if it was not detected. The assessment codes "E", "L", "D", and "O" are not used for target surveys.
 - v) Vegetation Communities Surveyed: Surveyors will record all vegetation communities that were surveyed within the sentinel site. Communities listed in bold are a coarser classification than the other listed communities. Surveyors will only use the coarser classification if a finer classification is not applicable.
 - vi) Phenology: Surveyors will record the phenology of the herbaceous, shrub, and tree layers as "early", most individuals vegetative; "peak", most individuals in flower; "late", most plants in fruit or beginning to desiccate; "drought", sparse and/or stunted vegetation growth associated with unusually dry conditions; or "not applicable", layer not present in sampling station.

- vii) Site Impacts:** Surveyor will list all site impacts present in the survey stations using their numeric codes (listed on the datasheet). For each impact, the surveyor will record the intensity of the impact (“L” for low intensity, “M” for medium intensity, or “H” for high intensity), as well as, a brief description of each impact. For example, if *Bromus diandrus* is the dominant species within the station, the surveyor would record an impact code of “5” (competition from exotics), an impact intensity of “H”, and a description identifying the exotic species.
- b) Surveyors will record species-specific information for all covered plant species found during targeted plant surveys, unless a species has previously been documented in the sampling station. Once the surveyor has determined the bounds of the species occurrence, they can record species-specific information, including: UTM’s, slope in degrees, aspect in degrees, abundance (exact or estimate), patch size, phenology, photo ID, specimen ID, habitat photo ID, notes, substrate, vegetation communities, site impacts, and the 3 most dominant species within 5 functional groups (Trees, shrubs, native forbs, exotic forbs, and grasses).**
- i) UTM’s:** Surveyor will always record UTMs in NAD83 at the center of the occurrence. Determining where the center of the occurrence is located will require the surveyor to know the extent of the occurrence.
- ii) Slope:** Surveyors will use a clinometer to measure the average inclination in degrees of the terrain where the plant species grows.
- iii) Aspect:** Surveyors will use a declinated compass to determine the aspect in the direction of the slope. If the slope is 0, then there is no aspect.
- iv) Count Exact:** If the size of the occurrence, distribution of individuals, and overall detectability is appropriate, Surveyors will record an exact count for abundance. Surveyors will always record an exact count if one is required to meet a demonstrate conservation objective.
- v) Count Est.:** If an exact count would be prohibitively time-consuming or difficult, surveyors will record abundance as 1 of 5 size classes: **1**= <25, **2**= 25 - <100, **3**= 100 - <250, **4**= 250 - <1000, **5** = >1000.
- vi) Patch Size:** Surveyor will record patch size using the following codes: **1**= <10 m², **2**= 10 m² - <100 m², **3**= 100 m² = <1000 m², **4**= >1,000 m²
- vii) Phenology:** For woody species, surveyors will record the percent of individuals that are seedlings, saplings, vegetative adults, flowering adults, and fruiting adults. For woody shrubs, surveyors will consider “saplings” to be very young, pre-reproductive individuals that are not first year seedlings. For herbaceous perennials and annual species, surveyors will record percent of individuals that are vegetative, flowering, fruiting, and desiccated. For both measures, percents should add up to 100 and each individual will only be recorded as one category. Surveyors will consider individuals that are both flowering and fruiting as whichever category is dominant for that individual. Individuals in bud are considered flowering and individuals with dispersed fruit that are not desiccated are considered in fruit.
- viii) Photo ID:** Surveyor will record Initials and jpg numbers for each photograph taken of the target species. The jpeg number is show in the top-right corner of the cameras review screen; surveyor will not record any

leading zeroes. Surveyors should take several photos of each species they are recording as a separate occurrence, including photographs showing fruit, flowers and other distinguishing characteristics. Surveyors should include a ruler or other device in photos to show size of plants.

- ix) **Collection ID:** Surveyor will record initials and a collection number(s) for any specimen taken of the target species. Surveyors will follow plant collection guidelines when making collections of covered plant species (Appendix A) and will only make a collection when specifically told to do so by the Botany Program Lead.
 - x) **Habitat Photo ID:** Surveyor will take at least one photograph documenting the habitat surrounding the species occurrence. The surveyor will record their initials and the jpeg number without any leading zeroes. The species of interest should be flagged if it is not clearly visible in the photograph so that its relationship to the surrounding area can be seen.
 - xi) **Notes:** Surveyors will record any information that can help assess the health of the occurrence or further explain the species' habitat preferences. Surveyors will also record a description of the spatial extent of the species, such as "along an approximately 50 m length of the stream." The surveyor will not record the dominant species, that information is recorded elsewhere.
 - xii) **Substrate:** Surveyors will record the surface substrate(s) upon which the covered species is growing. Surveyors can choose one or more of the following: cliff, gravel (fragments between 2 mm and 7.5 cm), litter, log, moss, rock, bare soil (fragments < 2mm), or water. Specific soil information can be recorded in the notes section.
 - xiii) **Vegetation community:** Surveyors will record all vegetation communities in which the target species is growing.
 - xiv) **Site Impacts:** Surveyors will record this in the same way they do for the survey site assessment, except, they will only list impacts that directly influence the occurrence.
 - xv) **Dominant Species:** Surveyors will record the 3 most dominant species within 5 functional groups (tree, shrub, grass, native forb and non-native forb species) occurring within 10-m of the occurrence. Surveyors will record the full, scientific name of the dominant species and not the 6-letter code.
- 3) **Site Revisits:** Surveyors will occasionally be asked to revisit sites in order to collect additional information about covered plant species. Surveyors may be asked to revisit sites in order to make a collection of the species so that it can be definitively identified.
- a) Surveyors should always record UTM's, number of individuals and phenology information for the species of interest and can decide what additional information to record about the species.
 - b) Surveyors will record the survey evaluation as "N/A".
- 4) **Sentinel Site Visits:** Surveyors will navigate to and survey in the area of the confirmed occurrences within the sentinel site. We assume that these points are very accurate, so surveyors will only search within the immediate area of the confirmed occurrences.

- a) For all sentinel site visits, regardless of the outcome, surveyors will record general site information, including: observer initials; survey type; station ID; survey evaluation (incomplete, complete, or N/A); date; search time in minutes; a description of the general area, including dominant species; target species, including an assessment; phenology of the sentinel site within three functional groups (herbaceous, shrub, and tree); vegetation communities present in the sentinel site; and site impacts.
 - i) Target Species Assessment: The surveyor will record an assessment code for each of the target species. The target species receives an “F” if it is found within the sentinel site, an “E” if it is too early in the season for the species to be detected, an “L” if it is too late in the season for the species to be detected, a “D” if the species is unlikely to be detected because of drought conditions, and an “O” if there is another reason why the species is not detectable.
 - b) Surveyors will record species-specific information for all covered plant species found during sentinel site visits. Once the surveyor has determined the bounds of the species occurrence, they can record species-specific information, including: UTM’s, slope in degrees, aspect in degrees, abundance (exact or estimate), patch size, phenology, photo ID, specimen ID, habitat photo ID, notes, substrate, vegetation communities, site impacts, and the 3 most dominant species within 5 functional groups (Trees, shrubs, native forbs, exotic forbs, and grasses).
- 5) After returning from the field, surveyors will upload all photographs referenced on data sheets, properly label them (yearmonthday_initials_Jpeg#), enter them in the database (S:\Databases\RarePlantSurveys.mdb), and file them in the appropriate data photos folder (S:\Projects\Data_Photos\RarePlants\2010). Surveyors will also place all completed data sheets in the black letter tray next to the plant leads desk and return all permits and maps to their labeled folder in the filing cabinet at the beginning of the plant hallway.

Equipment:

- Clinometer
- Clipboard
- Declinated compass
- Digital camera
- Field forms
- Field plant press with newspaper
- Flags or flagging
- Hand held pruning shears
- Handheld GPS unit
- Plant identification aids
- Topographic maps
- Two way radio
- Weed digger

TRAINING

All surveyors will participate in 4 weekly trainings that consist of slideshows detailing field characteristics used to identify covered plant species. Proficiency of field crew to properly identify covered species will be measured through 3 weekly quizzes and a final examination. The quizzes and the exam will test the ability of the surveyor to properly identify covered species, as well as, their ability to tell them apart from similar, common species. Surveyors will also receive training in proper collection technique and the 2010 Protocol for Inventory-Phase Rare Plant Surveys.

Training Results

Surveyors that successfully complete training will be able to properly identify all 2010 target species and be able to differentiate them from similar, common species. In addition, surveyors will be able to properly collect specimen and survey for rare plants following the 2010 Protocol for Inventory-Phase Rare Plant Surveys.

DATA ANALYSIS

The species-specific objectives listed in the MSHCP specify a certain number of locations, occurrences, records, and/or localities for each species, and often include a list of areas where the species should be found. The term “population” is avoided in the species objectives for rare plants and also in this report due to the difficulty of determining what constitutes a population. For distributional objectives the MSHCP uses, but does not define, the terms: location, locality, and occurrence. Throughout the species accounts, when referring to distributional objectives, those 3 terms are often used interchangeably. We define “occurrence” as the unit to describe a group of individuals meeting the criteria for one location in the species objective. When species objectives have a one-to-one relationship between number of occurrences and locations where they are to be found, we have a very clear idea of what constitutes an occurrence. For example, objective 2 for *Mimulus clevelandii* requires that we “Include within the MSHCP Conservation Area the two known [Occurrences] of this species on Santiago Peak in the Santa Ana Mountains and on the Northern Slopes of the Agua Tibia Mountains.” Other species objectives require a specified number of known occurrences to be included in the Conservation Area without listing each specific site where the species will be conserved. For example, objective 2 for *Penstemon californicus* requires that we “Include within the MSHCP Conservation Area at least 15 occurrences in Aguanga, Blackburn Canyon, and the San Jacinto Mountains.” When distinct locations for each occurrence are not specified, we are unable to apply a single definition of ‘occurrence’. Instead, we define ‘occurrence’ on a case-by-case basis, factoring in, when available, the typical spatial distribution of the species, general ecology, geography, and conservation intent. In addition, we use a combination of a close reading of the MSHCP species account and Fish and Wildlife Service Biological Opinion (USFWS 2004), as well as the original data points shown in the MSHCP Historical Database, to delineate, to the best of our abilities, the known occurrences to which the objectives refer.

In the MSHCP, some species are not considered adequately conserved until additional goals, beyond the conservation of historic occurrences, are met. For demonstrate-conservation objectives, the MSHCP uses the term “locality” and defines its

minimum dimensions as 1 quarter section. In this report, for the purpose of clarity, the term “locality” will only be used when referring to demonstrate-conservation objectives. The species-specific objective typically lists a minimum number of individuals that must be present for a given occupied site to qualify as a locality, unless a smaller population has been demonstrated to be self-sustaining. We use the highest number of individuals counted in an area in a single day to determine the total number of individuals at a locality to avoid over-counting individuals. A few species have demonstrate-conservation objectives that only ask for a specific number of localities without regard to the number of individuals at each locality.

TIME LINE

- February-March 2010: Training
- March: Sentinel Site Visits
- March-August: Target Surveys

LITERATURE CITED

CNPS Vegetation Committee. April 20, 2004. California Native Plant Society Relevé Protocol. 9 p.

http://www.cnps.org/cnps/vegetation/pdf/rapid_assessment_protocol.pdf

United States Department of Agriculture Forest Service. March 2005. Threatened, Endangered and Sensitive Plants Survey Field Guide. Rangeland Management Staff. Washington, DC.

United States Department of Agriculture Forest Service. March 2005. Threatened, Endangered and Sensitive Plants Element Occurrence, Rangeland Management Staff. Washington, DC.

Appendix B. Rare Plant Survey Forms

MSHCP Biological Monitoring Program

Rare Plant Survey Site Assessment

Observer Initials: _____ Add. observers: _____

Survey Type: Grid Sentinel Revisit Station ID (Grid or Site ID): _____

Survey evaluation: Incomplete Complete N/A Date: _____ Search time: _____ min

General area description, including dominant species: _____

Target species:

Species	Assessment	Explanation

Assessment: Early, Late, Dry, No appropriate habitat, Unknown, Other, Found

Vegetation Community surveyed (circle all): Dunes Scrubland Chaparral CSS

Grass/Herb Alkali playa Meadow Native grassland Non-native grassland Vernal pool

Riparian Riparian scrub Riparian woodland Marsh

Broad-leaved woodland Coniferous woodland Rock Field

Phenology

Site Impacts

Site Impact Intensity: L- low, M- medium, H- high

Layer	Dominant Phenology
Herb	
Shrub	
Tree	

Dominant phenology

E- early, P- peak, L- late,

D- drought, N- Not applicable
(layer not present)

Impact	Intensity	Brief Description

MSHCP Biological Monitoring Program

Rare Plant Survey Species Occurrence Information

Observer Initials: _____ Add. observers: _____ Date: _____ Station: _____

Species	UTME		UTMN			Slope	Aspect			
	0	_____	_____	_____	_____	o	o			
# of indivs.	Exact/ Est?	Patch size	% Seed.	% Sapling	% Veg. Adult	% Flower	% Fruit	% Desic.	Photo ID	Specimen ID

Habitat photo ID: _____

Notes: _____

_____ Recheck: _____ Revisit: _____

Substrate (list all): _____ Veg. Community (list all): _____

Site impacts (Impact/Intensity/Note):

- 1) _____ / _____ / _____
- 2) _____ / _____ / _____
- 3) _____ / _____ / _____
- 4) _____ / _____ / _____
- 5) _____ / _____ / _____

Dominant trees: _____ / _____ / _____

Dominant shrubs: _____ / _____ / _____

Dominant native forbs: _____ / _____ / _____

Dominant exotic forbs: _____ / _____ / _____

Dominant grasses: _____ / _____ / _____

Appendix C. Summary of Species Objectives and Survey Needs for Covered Plant Species. Bolded Text Indicates Species That Have At Least 75% of Their Distributional Occurrences Confirmed.

Species Name	Detections				Occurrences			
	Grids Surveyed	Target ¹	Incidental	Total	MSHCP Defined	2010 Observed	Total Observed ²	% Occurrences Confirmed
<i>Allium marvinii</i>	0	0	0	0		No Distributional Objective		
<i>Allium munzi</i> ⁴	4	0	0	0	13	0	9	70%
<i>Ambrosia pumila</i>	0	0	0	0	2	0	1	50%
<i>Arabis johnstonii</i> ⁴	7	3	1	4	7	4	5	71%
<i>Arctostaphylos rainbowensis</i> ⁴	7	9	0	9	15	0	7	47%
<i>Astragalus pachypus</i> var. <i>jaegeri</i> ⁴	0	0	0	0	7	0	3	43%
<i>Atriplex coronata</i> var. <i>notatior</i>	0	0	2	2	4	0	2	50%
<i>Atriplex parishii</i>	20	0	0	0	3	0	0	0%
<i>Atriplex serenana</i> var. <i> davidsonii</i>	20	1	0	1	3	1	2	66%
<i>Berberis nevini</i>	20	0	0	0	3	0	1	33%
<i>Brodiaea filifolia</i>	24	3	0	3	10	1	5	50%
<i>Brodiaea orcuttii</i>	0	0	0	0	NA	0	NA	NA
<i>Calochortus palmeri</i> var. <i>munzii</i>	0	0	2	2	10	0	10	100%
<i>Calochortus plummerae</i>	12	13	5	18	7	2	7	100%
<i>Calochortus weedii</i> var. <i>intermedius</i>	3	3	0	3	3	0	1	33%
<i>Caulanthus simulans</i>	0	0	0	0		No Distributional Objective		
<i>Ceanothus ophiochilus</i>	0	0	0	0	3	0	2	67%
<i>Centromadia pungens</i> ssp. <i>laevis</i>	60	12	4	16	27	8	19	70%
<i>Chorizanthe leptotheca</i>	24	6	4	10		No Distributional Objective		
<i>Chorizanthe parryi</i> var. <i>parryi</i>	31	8	3	11	20	1	16	80%

¹ Grid-level detections from 2010 targeted surveys and incidental observations.

² Data collected by Biological Monitoring Program (2005 - 2010), San Bernardino National Forest (2002 - 2007), Center for Natural Lands Management (2006), Center for Conservation Biology (2003-2004, 2006).

³ Some uncertainty regarding species-level identification. See species-specific information in Appendix C.

⁴ See Appendix D for detailed description of species-specific objectives.

Appendix C. Cont.

Species Name	Detections				Occurrences			
	Grids Surveyed	Target ¹	Incidental	Total	MSHCP Defined	2010 Observed	Total Observed ²	% Occurrences Confirmed
<i>Chorizanthe polygonoides</i> var. <i>longispina</i>	0	0	7	7	32	0	32	100%
<i>Chorizanthe procumbens</i>	5	0	2	2	14	0	9	64%
<i>Convolvulus simulans</i>	8	1	3	4	8	1	7	88%
<i>Deinandra mohavensis</i>	8	5	0	5	5	0	3	60%
<i>Dodecahema leptoceras</i>	3	1	0	1	11	1	3	27%
<i>Dudleya multicaulis</i> ⁴	20	3	0	3	19	3	7	37%
<i>Dudleya viscida</i>	0	0	0	0	3	0	3	100%
<i>Eriastrum densifolium</i> ssp. <i>sanctorum</i>	0	0	0	0	3	0	3	100%
<i>Erodium macrophyllum</i> ⁴	6	1	0	1	5	1	4	80%
<i>Eryngium aristulatum</i> var. <i>parishii</i>	0	0	0	0	4	0	4	100%
<i>Galium angustifolium</i> ssp. <i>jacinticum</i>	0	0	0	0	8	0	8	100%
<i>Galium californicum</i> ssp. <i>primum</i>	0	0	0	0	4	0	4	100%
<i>Harpagonella palmeri</i>	9	6	2	8	24	4	21	88%
<i>Heuchera hirsutissima</i> ³	0	0	0	0	2	0	1	50%
<i>Holocarpa virgata</i> ssp. <i>elongata</i>	4	0	1	1	8	0	6	75%
<i>Hordeum intercedens</i>	21	5	2	7	4	1	2	50%
<i>Hulsea vestita</i> ssp. <i>callicarpa</i>	0	0	0	0	12	0	12	100%
<i>Juglans californica</i> var. <i>californica</i> ⁴	0	0	0	0	7	0	4	57%
<i>Lasthenia glabrata</i> ssp. <i>coulteri</i>	15	0	3	3	20	1	12	60%
<i>Lepechinia cardiophylla</i>	7	0	0	0	7	0	4	57%

¹ Grid-level detections from 2010 targeted surveys and incidental observations.

² Data collected by Biological Monitoring Program (2005 - 2010), San Bernardino National Forest (2002 - 2007), Center for Natural Lands Management (2006), Center for Conservation Biology (2003-2004, 2006).

³ Some uncertainty regarding species-level identification. See species-specific information in Appendix C.

⁴ See Appendix D for detailed description of species-specific objectives.

Appendix C. Cont.

Species Name	Detections				Occurrences			
	Grids Surveyed	Target ¹	Incidental	Total	MSHCP Defined	2010 Observed	Total Observed ²	% Occurrences Confirmed
<i>Lilium humboldtii</i> ssp. <i>ocellatum</i>	0	0	1	1	4	0	4	100%
<i>Lilium parryi</i>	0	0	0	0	7	0	7	100%
<i>Limnanthes gracilis</i> var. <i>parishii</i>	0	0	0	0	1	0	1	100%
<i>Microseris douglasii</i> var. <i>platycarpa</i>	20	5	0	5	8	1	5	63%
<i>Mimulus clevelandii</i>	0	0	2	2	2	0	2	100%
<i>Mimulus diffusus</i>	18	1	2	3	18	3	11	61%
<i>Monardella macrantha</i> ssp. <i>hallii</i> ⁴	0	0	0	0	4	0	4	100%
<i>Muhlenbergia californica</i> ⁴	0	0	0	0	NA	0	NA	NA
<i>Myosurus minimus</i> ssp. <i>apus</i>	13	4	2	6	5	2	5	100%
<i>Nama stenocarpum</i>	4	2	0	2	2	2	2	100%
<i>Navarretia fossalis</i>	44	3	0	3	13	3	5	38%
<i>Navarretia prostrata</i>	0	0	0	0	1	0	1	100%
<i>Orcuttia californica</i>	13	0	0	0	3	0	2	67%
<i>Oxytheca caryiophylloides</i>	10	6	0	6	5	0	5	100%
<i>Penstemon californicus</i>	19	0	1	1	14	0	5	36%
<i>Phacelia stellaris</i>	0	0	0	0	2	0	1	50%
<i>Polygala cornuta</i> ssp. <i>fishae</i>	0	0	0	0	3	0	3	100%
<i>Potentilla rimicola</i> ⁴	0	0	0	0	2	0	1	100%
<i>Quercus Engelmannii</i>	2	1	1	2	33	1	25	76%
<i>Romneya coulteri</i>	21	3	0	3		No Distributional Objective		
<i>Satureja chandleri</i>	0	0	0	0	7	0	3	43%
<i>Sibaropsis hammittii</i>	0	0	0	0	1	0	1	100%
<i>Trichocoronis wrightii</i> var. <i>wrightii</i>	27	0	0	0	4	0	0	0%
Totals	529	105	50	155	476	41	332	70%

¹ Grid-level detections from 2010 targeted surveys and incidental observations.

² Data collected by Biological Monitoring Program (2005 - 2010), San Bernardino National Forest (2002 - 2007), Center for Natural Lands Management (2006), Center for Conservation Biology (2003-2004, 2006).

³ Some uncertainty regarding species-level identification. See species-specific information in Appendix C.

⁴ See Appendix D for detailed description of species-specific objectives.

Appendix D. Summary of Species-specific Objectives and 2010 Survey Status for Each Covered Plant Species.

***Allium marvinii*, Yucaipa onion**

This species does not have a distributional objective listed in the MSHCP. However, in 2008, surveyors encountered an occurrence of 3000 individuals at the Potrero unit of the San Jacinto Wildlife Area (UCR205445). In 2009, incidental to a vegetation survey, we encountered an occurrence of 101 individuals on BLM land just north of the Soboba Indian Reservation (UCR205446). We did not survey for or detect this species during the 2010 survey season.

***Allium munzii*, Munz's onion**

Objective 2 for this species requires the inclusion of at least 13 occurrences within Temescal Valley and the southwestern portion of the Plan Area, including the following Core Areas: Harford Springs Park, privately owned EO 5 population in Temescal Valley, Alberhill, DiPalma Rd, Estelle Mountain, Domenigoni Hills, Lake Skinner, Bachelor Mountain, Elsinore Peak, Scott Road, North Peak, and northeast of Alberhill (EO 16). Based on the species account and cited CNDDDB occurrences, we consider this objective to require the inclusion of single occurrences at Estelle Mountain, the Domenigoni Hills, Lake Skinner, Scott Road, Alberhill, DePalma Road, Bachelor Mountain, CNDDDB EO05, Northeast of Alberhill, North Peak, Elsinore Peak, Harford Springs County Park, and 1 more unique occurrence. Prior to 2010, we confirmed single occurrences at Harford Springs Park, Alberhill (UCR217516), Estelle Mountain, Domenigoni Hills (UCR217543), Lake Skinner, Bachelor Mountain, Elsinore Peak, Scott Road, and North Peak. In 2010, we target-surveyed 4 stations in the Winchester 700 property but were unable to detect *Allium munzii*. Currently, the historic occurrence at DePalma Road is completely outside of the Conservation Area. We have confirmed 9 of 13 (70%) occurrences.

***Ambrosia pumila*, San Diego ambrosia**

Objective 2 for this species requires the inclusion of at least 2 of the 3 known occurrences: Alberhill Creek at Nichols Road and Skunk Hollow. Prior to 2010, the CNLM confirmed an occurrence near Skunk Hollow. In 2010, we did not survey for this species because the remaining occurrence at Alberhill Creek is not currently included in the Conservation Area. Including CNLM data, we have confirmed 1 of 2 (50%) occurrences.

***Arabis johnstonii*, Johnston's rock cress**

Objective 2 for this species requires the inclusion of 2 Core Areas, including at least 17 of the known occurrences in Garner Valley and Mountain Springs. Seven of the known occurrences are from the CNDDDB, and are, with the exception of 1 occurrence near San Jacinto Peak, located in Garner Valley. The remaining 10 occurrences, based on herbarium records and the UCR CCB database, are located in the immediate area of or have precision buffers overlapping the referenced CNDDDB occurrences. Based on this, we interpret the objective to require the inclusion of the 6 CNDDDB occurrences in Garner Valley and the 1 near San Jacinto Peak. Prior to 2010, we confirmed CNDDDB occurrence EO07, located in the Quinn Flats section of Garner Valley. In 2010, we surveyed 7

stations throughout Garner Valley and confirmed 3 of the remaining CNDDDB occurrences (EO06, EO05, and EO03). In addition, incidental to target survey for *Penstemon californicus* we detected *Arabis johnstonii* in EO08. Based on our interpretation of the objective, we have confirmed 5 of 7 (71%) occurrences.

***Arctostaphylos rainbowensis*, Rainbow manzanita**

Objective 2 for this species requires the inclusion of 15 of the known occurrences at San Mateo Canyon Wilderness, Gavilan Mountain, Santa Margarita Ecological Reserve, Santa Rosa Plateau, Temecula, Wildomar, Margarita Peak, and Pechanga. A few inconsistencies in the species account make a direct reading of the objective difficult. Namely, the incidental take section of the species account states that the Temecula and Pechanga occurrences will not be conserved, even though those occurrences are specifically mentioned in the objective. Fortunately, the “conservation levels” section of the species account clarifies the objective. Therefore, based on our reading of this section, we interpret the objective to require the inclusion of 9 occurrences near the Santa Rosa Plateau, 3 in the Santa Ana Mountains, 2 in the Agua Tibia Mountains, and 1 at the Santa Margarita Ecological Reserve. Prior to 2010, we confirmed 2 occurrences in Santa Ana Mountains (UCR189582 and UCR189791), 1 at the Santa Margarita Ecological Reserve (UCR189556), 1 in the Agua Tibia Mountains, and 3 near the Santa Rosa Plateau (UCR189797). In 2010, we did not survey for new occurrences of this species. We have confirmed 7 of 15 (47%) occurrences.

Objective 3 for this species, a demonstrate-conservation objective, requires the conservation of 10 localities with at least 50 individuals each. Prior to 2010, we had not confirmed any localities large enough to qualify for the objective. In 2010, we confirmed 3 localities from the Santa Rosa Plateau west to San Mateo Canyon. We have confirmed 3 of 10 (30%) localities.

***Astragalus pachypus* var. *jaegeri*, Jaeger’s milk-vetch**

Objective 2 for this species requires the inclusion of the 7 known occurrences in Aguanga Valley, the San Jacinto Mountains, Potrero Creek, Sage, Temecula Canyon and the core location at Vail Lake and the base of the Agua Tibia Mountains. The species account references 2 CNDDDB occurrences at Vail Lake, 1 in the Santa Margarita Ecological Reserve, 1 near Sage, 1 at Potrero Creek, 1 near Aguanga, and 1 in the Agua Tibia Mountains, as well as 11 historic locations that are clustered near or have precision buffers that overlap the CNDDDB records. We therefore interpret the objective to require the inclusion of the 7 CNDDDB records. Prior to 2010, we confirmed single occurrences in the Agua Tibia Mountains, the San Jacinto Mountains, and Potrero Creek. In 2010, we did not survey for this species. Of the remaining 4 occurrences, 1 is completely out of the Conservation Area (Vail Lake) and 2 have CNDDDB polygons that cover 7 km². We have confirmed 3 of 7 (43%) occurrences.

***Atriplex coronata* var. *notatior*, San Jacinto Valley crowscale**

Objective 2 for this species requires the inclusion of the Alberhill Creek occurrence as well as 3 Core Areas, located along the San Jacinto River from the vicinity of Mystic Lake southwest to the vicinity of Perris and in the upper Salt Creek drainage west of Hemet. We interpret this objective to require the inclusion of 4 occurrences:

Alberhill Creek, San Jacinto Wildlife Area, San Jacinto River south of the Ramona Expressway, and upper Salt Creek. Prior to 2010, we confirmed occurrences of *Atriplex coronata* at Davis Unit of the San Jacinto Wildlife Area and Salt Creek. In 2010, we didn't survey for this species but, incidental to another survey, we detected it on the western shore of Mystic Lake. Currently, all the historic occurrences near Alberhill Creek and along the San Jacinto River are outside of the Conservation Area. We have confirmed 2 of 4 (50%) occurrences.

***Atriplex parishii*, Parish's brittle scale**

Objective 2 for this species requires the inclusion of the 3 known occurrences in the upper Salt Creek drainage west of Hemet. In 2010 we surveyed 12 stations in the vicinity of Salt Creek but did not detect this species. We have confirmed 0 of 3 occurrences.

***Atriplex serenana* var. *davidsonii*, Davidson's salt scale**

Objective 2 for this species requires the inclusion of the 3 known occurrences of *Atriplex serenana* var. *davidsonii* at Salt Creek, the San Jacinto River and the San Jacinto Wildlife Area. Prior to 2010, we confirmed an occurrence at the San Jacinto Wildlife Area. In 2010, we surveyed 12 stations in the vicinity of Salt Creek and detected a population of 8 individuals just west of the Hemet Airport. The remaining historic occurrence along the San Jacinto River is currently outside of the Conservation Area. We have confirmed 2 of 3 (66%) occurrences.

***Berberis nevini*, Nevin's barberry**

Objective 2 for this species requires the inclusion of the known occurrences in the San Timoteo/Badlands area, Jurupa Hills, and Agua Tibia/Vail Lake area. Based on the species account and the MSHCP Historical Database, we interpret this objective to require the inclusion of occurrences near San Timoteo/Badlands, the Jurupa Hills, and the Agua Tibia/Vail Lake area. Prior to 2010, we confirmed a number of occurrences on Oak Mountain (UCR189589) and on the northern edge of the Agua Tibia Mountains (UCR217657). In 2010, we surveyed 20 stations in the hills east of Mystic Lake, but did not detect this species. Currently, the historic occurrence near the Jurupa Hills is completely outside the Conservation Area; and, according to the biological opinion it was destroyed by recent development. A very small portion of the precision buffer surrounding the historic occurrence in the Badlands is within the Conservation Area, and we have surveyed all of it. We have confirmed 1 of 3 (33%) occurrences.

***Brodiaea filifolia*, thread-leaved brodiaea**

Objective 2 for this species requires the inclusion of the Core Areas located at Goetz Road (EO1), Perris Valley airport (EO2), Tenaja Road (EO3), Mesa de Colorado (EO5), Hemet vernal pools (EO26), South [San Jacinto Wildlife Area] (EO27), Squaw Mountain (EO29), Santa Rosa Ranch (EO30), Slaughterhouse (EO31), North [San Jacinto Wildlife Area] (EO43) and Redondo Mesa (EO 52). Prior to 2010, we confirmed CNDDDB occurrences near the Santa Rosa Plateau (EO3, EO30, EO5, and EO31) and at the Davis unit of the San Jacinto Wildlife Area (EO43). In 2010, because of recent taxonomic changes to *B. filifolia*, we revisited the 4 previously confirmed occurrences at the Santa Rosa Plateau to confirm their identity. Of the 4 occurrences we confirmed *B.*

filifolia within 3 of the CNDDDB polygons (EO05, EO30, and EO31). At the remaining occurrence, EO03, we only detected *B. santarosae*, a recently described and closely related species. Additionally, we detected this species within CNDDDB occurrence EO27 near the southern boundary of the San Jacinto Wildlife Area. The remaining occurrences are currently not in the Conservation Area. Not including EO03, we have confirmed 5 of 10 (50%) occurrences.

***Brodiaea orcuttii*, Orcutt's brodiaea**

Objective 1 for this species requires the inclusion of 1 occurrence at Miller Mountain within the San Mateo Wilderness Area; a complex of about 5 occurrences on Mesa de Burro, Mesa de Colorado, and Mesa de la Punta on the Santa Rosa Plateau within the Santa Rosa Plateau Preserve; and 1 occurrence along the San Jacinto River. Prior to 2010, we only surveyed for *Brodiaea orcuttii* as part of vernal pool surveys and were unable to confirm any occurrences. Chester et al. (2007) suggest that previously identified occurrences of *Brodiaea orcuttii* in Riverside County may actually consist of a newly described species, *B. santarosae*. In 2010, we did not survey for this species. We have confirmed 0 of 7 occurrences.

***Calochortus palmeri* var. *munzii*, Munz's mariposa lily**

Objective 2 for this species requires the inclusion of 10 of the known occurrences within the San Jacinto Mountains, including Garner Valley. Prior to 2010, we confirmed 8 occurrences throughout the San Jacinto Mountains from Alvin Meadows west of Idyllwild to Bull Canyon trailhead south of Garner Valley (UCR189812). Another 2 occurrences have been confirmed using data from the U.S. Forest Service. Including Forest Service data, we have confirmed 10 of 10 (100%) occurrences.

***Calochortus plummerae*, Plummer's mariposa lily**

Objective 2 for this species requires the inclusion of at least 8 of the known occurrences (near Hemet Lake within Garner Valley within the San Jacinto Mountains, the Jurupa Hills, Reche Canyon, along Highway 74 in the San Jacinto Mountains and west of Oak Glen Conservation Camp within the San Bernardino Mountains). We interpret this objective to require the inclusion of single occurrences in the Jurupa Hills; in the vicinity of Reche Canyon/Boxsprings; along Highway 74, in the San Jacinto Mountains; at the Southwestern Riverside County Multiple Species Reserve; in Garner Valley; west of Oak Glen Conservation Camp; and 2 occurrences in the vicinity of the Badlands/San Timoteo Canyon. The historic point near Garner Valley is actually based on a voucher for *Calochortus palmeri* var. *munzii* and not *C. plummerae*, therefore we do not consider that occurrence to be part of the objective. Prior to 2010, we confirmed 1 occurrence along Highway 74, 2 in the Badlands, 1 at Lake Skinner, and 1 in the Jurupa Hills. In 2010, we confirmed occurrences on the southwestern slopes of Box Springs and near the Oak Glen Conservation Camp. Not including the occurrence near Hemet Lake, we have confirmed 7 of 7 (100%) occurrences.

Objective 3 for this species, a demonstrate-conservation objective, requires the conservation of 6 localities with ≥ 500 individuals each. Prior to 2010, we confirmed localities with over 500 individuals at the Potrero Unit of the San Jacinto Wildlife Area, along Rouse Ridge, at Chimney Flats, and in the Jurupa Hills. In 2010, we confirmed a

locality over 500 individuals along Highway 74 and throughout the Oak Flats area of the San Jacinto Mountains. We have confirmed 6 of 6 (100%) localities for this species.

***Calochortus weedii* var. *intermedius*, intermediate mariposa lily**

Objective 2 for this species requires the inclusion of at least 2 of the known occurrences, in the hills west of Crown Valley and Vail Lake, and possibly a third locality in the Sierra Peak area of the Santa Ana Mountains. Prior to 2010, we confirmed an occurrence near Sierra Peak in the Santa Ana Mountains (UCR217564). In 2010, we confirmed an occurrence east of the Hogbacks, in the Winchester 700 property (UCR217523 and UCR216952). The occurrence near the Hogbacks is not mentioned in the species account so we are not counting it toward the objective. The remaining 2 occurrences are currently outside of the Conservation Area. We have confirmed 1 of 3 (33%) occurrences.

***Caulanthus simulans*, Payson's jewelflower**

This species does not have a distributional objective in the MSHCP. Prior to 2010, we detected numerous occurrences of *Caulanthus simulans* near Silverado Ranch (UCR217523 and UCR189560). In 2010, we did not target or detect this species.

***Ceanothus ophiochilus*, Vail Lake ceanothus**

Objective 2 for this species requires the inclusion of at least 3 core locations in the vicinity of Vail Lake and the Agua Tibia Wilderness area. We interpret this objective to require the inclusion of occurrences in the vicinity of the 2 CNDDDB records at Agua Tibia and the 1 CNDDDB record near Vail Lake. Prior to 2010, we confirmed occurrences of *Ceanothus ophiochilus* at the 2 locations in the Agua Tibia Wilderness. In 2010, because the remaining CNDDDB occurrence is outside of the Conservation Area, we did not survey for this species. We have confirmed 2 of 3 (67%) occurrences.

***Centromadia pungens* ssp. *laevis*, smooth tarplant**

Objective 2 for this species requires the inclusion of at least 27 of the known occurrences of this species at Antelope Valley, Temescal Canyon, Lake Elsinore, Murrieta Creek, French Valley, Lakeview Mountains, Lake Skinner, Diamond Valley Lake, Sycamore Canyon Park, Alberhill Creek, Lake Matthews, the Santa Ana River, and the core locations at the San Jacinto Wildlife Area, the middle segment of the San Jacinto River, and Upper Salt Creek. The species account mentions substantially more historic occurrences than are listed in the objective and the USFWS Biological Opinion (2004) states that the populations at Lake Matthews and Diamond Valley Lake are most likely extirpated. Therefore, we interpret the objective to require the inclusion of at least 27 of the known occurrences of this species at Antelope Valley; Temescal Canyon; South of Lake Elsinore; Murrieta Creek; French Valley; Lakeview Mountains; Lake Skinner; Sycamore Canyon Park; Alberhill Creek; Northwest of Hemet; the Gavilan Hills; North of the Tres Cerritos Hills; Potrero Creek; Clinton Keith east of the Deer Creek development; the Santa Ana River; and multiple occurrence in the core locations at the San Jacinto Wildlife Area, the middle segment of the San Jacinto River, and Upper Salt Creek. Prior to 2010, we confirmed 1 occurrence at Lake Skinner, 1 at Murrieta Creek, 3 at the San Jacinto Wildlife Area (UCR189808 and UCR189803), 1 at Salt Creek, 2 in the Badlands, 1 at Harford Springs County Park (UCR217565), 1 along Potrero Creek

(UCR217656), and 1 at Sycamore Canyon (UCR217501). In 2010, we confirmed 3 occurrences along Murrieta creek (UCR217652), 1 along near the Deer Creek development, 1 north of the Tres Cerritos Hills (UCR217639), 1 at the San Jacinto Wildlife Area, 1 along the drainage north of Diamond Valley Lake (UCR217662), and 1 in the Hidden Valley Wildlife Area. We also surveyed 10 stations in French Valley but did not detect this species. We have confirmed 19 of 27 (70%) occurrences at 2 of 3 (66%) Core Areas.

***Chorizanthe leptotheca*, peninsular spine flower**

Objective 2 for this species, a demonstrate-conservation objective, requires the conservation of 10 localities with 1000 individuals each. Prior to 2010, we confirmed 3 localities in the San Jacinto Mountains: Juan Diego Flats (UCR217642), Garner Valley (UCR205449 and UCR205450), and west of the 371-74 junction (UCR205448). In addition, UCR CCB confirmed a locality with more than 1000 individuals along Highway 74, near the Cranston Ranger Station (UCR217641). In 2010, we confirmed 4 localities in Bautista Canyon (UCR217644 and UCR217645), 1 east of Dripping Springs Campground (UCR216959), 2 west of Durasno Valley (UCR217524), and 1 along Rousse Ridge (UCR217525). In addition, we confirmed occurrences of less than 1000 individuals in Bee Canyon and Temescal Canyon (UCR217527). We have confirmed 12 of 10 (120%) localities.

***Chorizanthe parryi* var. *parryi*, Parry's spine flower**

Objective 2 for this species requires inclusion of 20 occurrences of *Chorizanthe parryi* var. *parryi*, including locations throughout the Vail Lake area and in the vicinity of Lake Matthews, Gavilan Hills, Antelope Valley, Rawson Canyon, Santa Rosa Hills, Reche Canyon, Wilson Valley, Juniper Flats, Gilman Hot Springs Road and Diamond Valley Lake. The objective does not require the inclusion of *known* occurrences; therefore, we interpret this objective to require confirmation of the species at each of the 11 locations mentioned and confirmation of additional occurrences anywhere in the Conservation Area. Prior to 2010, we confirmed 1 occurrence at Harford Springs County Park, 1 in Crown Valley, 1 at the Potrero Unit of the San Jacinto Wildlife Area, 1 in Cactus Valley, 1 at Kabian Park, 1 on the McElhinney/Stimmel property, 2 in Rawson Canyon, 3 near Lake Skinner, 2 in Wilson Valley, 1 in the Sedco Hills, and 1 north of Diamond Valley Lake. In 2010, we confirmed the historic occurrence on the north side of Lake Matthews. Of the remaining 4 historic occurrences 3 are currently outside of the Conservation Area (Juniper Flats, Vail Lake, and Reche Canyon) and the Gilman Hot Springs occurrence is most likely extirpated. We have confirmed 16 of 20 (80%) occurrences.

Objective 3 for this species, a demonstrate-conservation objective, requires the confirmation of 10 localities with ≥ 1000 individuals each. Prior to 2010, we confirmed single localities with ≥ 1000 individuals at McElhinney/Stimmel, Bogart County Park, and Lake Skinner. In addition, UCR CCB documented single localities of this species in the Sedco Hills, Lake Skinner, and in the vicinity of Wilson Valley with ≥ 1000 individuals. In 2010, we confirmed 5 localities: 1 east of the Hogbacks, 1 at the Potrero Unit of the San Jacinto Wildlife Area, 1 at Harford Springs County Park, and 2 east of Lake Skinner. We have confirmed 11 of 10 (110%) localities.

***Chorizanthe polygonoides* var. *longispina*, long-spined spine flower**

Objective 2 for this species requires the inclusion of at least 32 occurrences of this species, including the 2 core locations at Lake Matthews and in the Agua Tibia Mountains. The objective does not specify the inclusion of “known” occurrences; therefore, we assume the 32 occurrences can be anywhere within the Conservation Area as long as 1 is near Lake Matthews and 1 is near the Agua Tibia Mountains. Prior to 2010, we confirmed 1 occurrence at Alberhill, 5 at Lake Skinner, 2 on Oak Mountain, 1 at McElhinney/Stimmel, 2 in Garner Valley, 1 on Elsinore Peak, 1 at Harford Springs County Park, 3 in San Mateo Canyon, 1 near Lake Matthews, 3 at the Santa Rosa Plateau, and 5 near Agua Tibia. In 2006, UCR CCB confirmed single occurrences of this species at Kabian Park and in the Sedco Hills. The CNLM has confirmed 3 occurrences, 1 at Johnson Ranch, 1 near Warm Springs, and 1 at Lincoln Ranch. While we did not target this species in 2010, we detected it 7 times incidental to other surveys. Including CCB and CNLM data, we have confirmed 32 of 32 (100%) occurrences.

***Chorizanthe procumbens*, prostrate spine flower**

Objective 2 for this species requires the inclusion of at least 14 of the known occurrences in the Santa Ana Mountains; in the Agua Tibia Mountains, including the Core Areas at Dorland Mountain; west of Beaumont; and the vicinity of French Valley. Based on our analysis of the species account and the MSHCP Historical Database, we interpret this objective to require the inclusion of 2 occurrences in the vicinity of the Agua Tibia Mountains, 1 west of Beaumont, 1 north of Bachelor Mountain (east of French Valley), 5 in the Santa Ana Mountains, and 5 other occurrences distinct from those already mentioned. Prior to 2010, we confirmed 5 occurrences of this species in the Santa Ana Mountains, 3 in the Agua Tibia Mountains, and 1 at the Santa Rosa Plateau. In 2010, we surveyed 5 stations near Warm Springs but did not detect this species. We have confirmed 9 of 14 (64%) occurrences.

***Convolvulus simulans*, small-flowered morning-glory**

Objective 2 for this species requires the inclusion of at least 8 of the known occurrences including Vail Lake, Lake Skinner, Lake Matthews, Temescal Canyon, Alberhill, Santa Rosa Plateau, Santa Ana Mountains, and Skunk Hollow. The historic occurrence in the Santa Ana Mountains was improperly georeferenced and is actually the same as the Temescal Canyon occurrence. Prior to 2010, we confirmed single occurrences on Oak Mountain (UCR189581), Lake Skinner, Alberhill, Lake Matthews (UCR217547), South of Scott Road (UCR205442 and UCR205452), and the Santa Rosa Plateau (UCR189584 and UCR189783). In 2010, we confirmed an additional occurrence south of Lake Matthews (UCR217666). The remaining occurrence in Temescal Canyon is not currently within the Conservation Area. Not including the Santa Ana Mountains occurrence, we have confirmed 7 of 8 (88%) occurrences.

***Deinandra mohavensis*, Mojave tarplant**

Objective 2 for this species requires the inclusion of at least 5 of the known occurrences within the San Jacinto Mountains, the foothills of the San Jacinto Mountains, and northeast of Vail Lake. Based on the species account, the CNDDDB, and the MSHCP Historical Database, we consider these to include CNDDDB occurrences along highway 243 (EO17, EO10), as well as historic occurrences near Wilson Valley, along 243 north

of Pine Cove, and near Mountain Center. Prior to 2010, we confirmed single occurrences at EO17, near Mountain Center, and along 243 north of Pine Cove. The occurrence in Wilson Valley is based on a suspect observation and has a precision buffer that covers 314 km². In previous years, we have exhaustively surveyed EO10 and have not detected this species. We have confirmed 3 of 5 (60%) occurrences.

Objective 3 for this species, a demonstrate-conservation objective, requires the inclusion of 4 localities occupying 100 ac each. In 2010, we mapped over 100 acres of *Deinandra mohavensis* at each of 5 locations throughout the San Jacinto Mountains: Chimney Flats, Oak Flats, Quinn Flats, Fobes Canyon, and the north end of Garner Valley. We have confirmed 5 of 4 (125%) localities.

***Dodecahema leptoceras*, slender-horned spine flower**

Objective 2 for this species requires inclusion of at least 11 of the known occurrences, including Temescal Canyon, Bautista Canyon, upper San Jacinto River, Agua Tibia Wilderness Area, Alberhill, Alberhill Creek east of Lake Elsinore, Railroad Canyon, Vail Lake, Kolb Creek, and east of State Street south of Hemet. Prior to 2010, we confirmed single occurrences near Bautista Canyon and the Agua Tibia Mountains. In 2010, we confirmed an occurrence along the upper portion of the San Jacinto River. We have confirmed 3 of 11 (27%) occurrences.

***Dudleya multicaulis*, many-stemmed dudleya**

Objective 2 for this species requires the inclusion of at least 26 of the known occurrences, including at Estelle Mountain, Temescal Canyon, the Santa Ana Mountains, Gavilan Hills, Alberhill Creek, and the Prado Basin. The MSHCP Historical Database does not contain locations for 26 unique occurrences and the USFWS Biological Opinion (2004) for this species only recognizes 19 unique records within the Conservation Area. We recommend that this species objective be amended to include only unique, known occurrences of *Dudleya multicaulis*. Based on the MSHCP Historical Database and the USFWS Biological Opinion (2004), we interpret the objective to require the inclusion of 8 of the 10 CNDDDB occurrences, including 2 on Estelle Mountain, 1 in the San Mateo Canyon Wilderness, 3 in Temescal Creek, 1 on Alberhill Mountain, and 1 in the Prado Basin. In addition, the objective requires the inclusion of 11 unique occurrences of DUMU at Vail Lake, La Paz Canyon, Arroyo del Toro, Bedford Canyon, the Estelle Mountain Reserve, Temescal Canyon, northwest of Lake Elsinore, and the San Mateo Canyon Wilderness. Prior to 2010, we confirmed 2 CNDDDB occurrences and 1 historic occurrence on Estelle Mountain and 1 occurrence in the Oak Flat area of San Mateo Canyon. In 2010, we confirmed an occurrence on Alberhill Mountain, and 2 occurrences within the Estelle Mountain Reserve, north of Dawson Canyon. We have confirmed 7 of 19 (37%) occurrences.

***Dudleya viscida*, sticky-leaved dudleya**

Objective 2 for this species requires the inclusion of 3 occurrences within the San Mateo Wilderness Area of the Santa Ana Mountains. Prior to 2010, we confirmed 3 occurrences in the San Mateo wilderness separated from one another by at least 1 km. We have confirmed 3 of 3 (100%) occurrences.

***Eriastrum densifolium* ssp. *sanctorum*, Santa Ana River woolly star**

Objective 2 for this species requires the inclusion of at least 3 occurrences along the Santa Ana River near the San Bernardino County border. Prior to 2010, we confirmed 3 occurrences of this species along a 2-km stretch of the Santa Ana River, from Mission Blvd to the San Bernardino County Line. We have confirmed 3 of 3 (100%) occurrences.

***Eryngium aristulatum* var. *parishii*, San Diego button-celery**

Objective 2 for this species requires the inclusion of at least 4 known occurrences on the Santa Rosa Plateau. Prior to 2010, we confirmed 2 occurrences of *Eryngium aristulatum* var. *parishii* on Mesa de Burro and 2 on Mesa de Colorado. We have confirmed 4 of 4 (100%) occurrences.

***Erodium macrophyllum*, round-leaved filaree**

Objective 2 for this species requires the inclusion of 8 out of the 10 known occurrences of round-leaved filaree: 4 occurrences in the Gavilan Hills region and 1 each at Lake Matthews, along Temescal Wash near Lee Lake, at Diamond Valley Lake, and in the foothills of the Agua Tibia Mountains. Of the 8 included occurrences, all 4 in the Gavilan Hills are from the same location south of Lake Matthews. In addition, based on the MSHCP Historical Database, we realize the occurrence in the foothills of the Agua Tibia Mountains is actually located on Oak Mountain and the occurrence at Diamond Valley Lake is actually located on the south side of Bachelor Mountain, just north of Lake Skinner. Therefore, based on the USFWS Biological Opinion (2004) and the Historical Database, we consider this objective to require the inclusion of 5 out of the 7 known occurrences in the Gavilan Hills region, at Lake Matthews, along Temescal Wash near Lee Lake, at Lake Skinner, and on Oak Mountain. Prior to 2010, we confirmed 1 occurrence each at Lake Skinner, Oak Mountain, and the Gavilan Hills. In 2010, we confirmed a single occurrence just south of Lake Matthews (UCR216951). The occurrence in Temescal Canyon is currently out of access. We have confirmed 4 of 5 (80%) unique occurrences.

***Galium angustifolium* ssp. *jacinticum*, San Jacinto Mountains bedstraw**

Objective 2 for this species requires the inclusion of at least 8 of the known occurrences at Lake Fulmor, Dark Canyon, and the Black Mountain area. There are 3 CNDDDB records for this species and 6 records in the MSHCP Historical Database. However, all but 2 of the records in the MSHCP Historical Database are virtually identical to the CNDDDB polygons. The remaining 2 records are extremely imprecise and may overlap with 2 of the CNDDDB records. Therefore, for our analysis, we are only considering the 3 CNDDDB records as specific sites to be confirmed and counting any additional, unique occurrences toward the objective. To further complicate matters, the CNDDDB occurrence near Black Mountain appears to be poorly georeferenced. After reading the locality information of the voucher the CNDDDB record is based on, we determined that the area 1 km northwest was a more likely area for the occurrence to be located. Prior to 2010, we confirmed the CNDDDB occurrences at Lake Fulmor, near Black Mountain, and near Stone Creek Camp as well as historic occurrences near Lawler Park, Dark Canyon, along Seven Pines Trail, on Fuller Ridge, and on the southern edge of Pine Cove. We have confirmed 8 of 8 (100%) occurrences.

***Galium californicum* ssp. *primum*, California bedstraw**

Objective 2 for this species requires the inclusion of at least 4 of the known occurrences in the vicinity of Alvin Meadows between Pine Cove and Idyllwild in the San Jacinto Mountains. Prior to 2010, the San Bernardino National Forest confirmed 4 occurrences near Alvin Meadows. Including U.S. Forest Service data, we have confirmed 4 of 4 (100%) occurrences.

***Harpagonella palmeri*, Palmer's grapplinghook**

Objective 2 for this species requires the inclusion of at least 24 of the known occurrences of this species at Temescal Wash, Alberhill, Lake Elsinore, Antelope Valley, Bachelor Mountain, Vail Lake, Lake Matthews, Harford Springs Park, Cleveland National Forest, Skunk Hollow, and Lake Skinner. Prior to 2010, we confirmed 1 occurrence at Harford Springs Park (UCR217545), 2 at Lake Matthews (UCR217510 and UCR217556), 1 at Alberhill (UCR217542), 5 at Lake Skinner, 2 at Vail Lake/Oak Mountain, 1 at McElhinney/Stimmel, and 2 in the Cleveland National Forest (UCR217554). The CNLM has reported single occurrences at Lincoln Ranch, Warm Springs, and Skunk Hollow. In 2010, we confirmed 1 occurrence east of Dripping Springs, 1 east of the Hogbacks (UCR217648), and 2 near Lake Matthews (UCR217521 and UCR217646). Including CNLM data, we have confirmed 21 of 24 (88%) occurrences.

***Heuchera hirsutissima*, shaggy-haired alumroot**

Objective 2 for this species requires the inclusion of 2 known occurrences in the San Jacinto Mountains: 1 on the western slopes of the San Jacinto Mountains above the San Jacinto River and the other in a gully behind Tahquitz Rock. *Heuchera hirsutissima* is a difficult species to identify because it is only distinguishable from similar species of *Heuchera* sp. when it is in flower and it is part of a complex of species in need of monographic study (Elvander 1993). In 2007, with the aid of Andy Sanders, curator of the UCR Herbarium, we were unable to positively identify to species a collection we made of *Heuchera* sp., even though the specimen contained flowers. Therefore, we are reporting only on our observations of *Heuchera* sp. Prior to 2010, we confirmed an occurrence on the western slopes of the San Jacinto Mountains. Additionally, Monitoring Program staff have twice documented *Heuchera* sp. growing on or near Tahquitz Rock during off-work hours. However, all individuals located around Tahquitz Rock were growing outside of the Plan Area. If the individuals at the first location are indeed *H. hirsutissima*, we have confirmed 1 of 2 (50%) occurrences.

***Holocarpha virgata* ssp. *elongata*, graceful tarplant**

Objective 2 for this species requires the inclusion of at least 8 of the known occurrences, including 4 occurrences located on Santa Rosa Plateau and 4 occurrences in the San Mateo Canyon Wilderness Area. Prior to 2010, we confirmed 4 occurrences at the Santa Rosa Plateau (UCR217500 and UCR189778) and 2 in the San Mateo Canyon Wilderness. In 2010, we surveyed 4 stations in the San Mateo Canyon Wilderness but did not detect this species. We have confirmed 6 of 8 (75%) occurrences.

Objective 3 for this species, a demonstrate-conservation objective, requires the conservation of 10 localities with at least 1000 individuals each. Prior to 2010, we

confirmed 8 localities on the Santa Rosa Plateau and 2 in the area of the Tenaja Corridor. We have confirmed 10 of 10 (100%) localities.

***Hordeum intercedens*, vernal barley**

Objective 2 for this species requires the inclusion of at least 4 occurrences (including 3 core locations) in the San Jacinto Wildlife Area, the middle segment of the San Jacinto River from the Ramona Expressway south to Railroad Canyon, the upper Salt Creek drainage west of Hemet, and near Nichols Road at Alberhill. Prior to 2010, we confirmed an occurrence at the San Jacinto Wildlife Area (UCR189804, UCR189805, and UCR189806). In 2010, confirmed an occurrence near the Salt Creek Drainage. We have confirmed 2 of 4 (50%) occurrences.

***Hulsea vestita* ssp. *callicarpa*, beautiful hulsea**

Objective 2 for this species requires the inclusion of at least 12 of the known occurrences at Lake Fulmor, Pine Cove, Idyllwild, Mountain Center, Pine Meadow and Lake Hemet. The MSHCP Historical Database contains 23 records for this species in the San Jacinto Mountains that are precise to within 2000 m or less. The Biological Monitoring Program and SBNF have detected *Hulsea vestita* ssp. *callicarpa* within the vicinity of at least 18 of these records, including in the vicinity of all of the specific areas mentioned in the species account. Including data from SBNF, we have confirmed 12 of 12 (100%) occurrences.

Objective 3 for this species, a demonstrate-conservation objective, requires the conservation of 16 localities with no less than 50 individuals each. Of the 23 confirmed occurrences, 16 contain more than 50 individuals. Including data from SBNF, we have confirmed 16 of 16 (100%) localities.

***Juglans californica* var. *californica*, California black walnut**

Objective 2 for this species requires the inclusion of at least 7 known occurrences within the Santa Ana Mountains, at Lake Skinner, at the Santa Rosa Plateau, and east of Pedley. Prior to 2010, we confirmed 2 occurrences at Lake Skinner, 1 along the Santa Ana River/east of Pedley, and 1 in Chino Hills State Park. All of these locations contain only a few scattered individuals, not extensive California walnut woodlands. Occurrences of *Juglans californica* var. *californica* in the vicinity of Lake Skinner and Santa Rosa Plateau are not thought to be naturally occurring, but rather the result of introductions (USFWS 2004). Also, according to Zach Principe, former Project Ecologist at the Santa Rosa Plateau Ecological Reserve, naturally occurring *J. californica* var. *californica* has never been documented on the Santa Rosa Plateau (2007 email from Z. Principe to Diane Menuz, former Botany Program Lead, Biological Monitoring Program, unpublished data). As a result, we recommend that the objective for this species be reevaluated and rewritten. Native stands of this species are thought to be restricted to the area around the Santa Ana River and the northern Santa Ana Mountains (USFWS 2004). As the objective is currently written, we have confirmed 4 of 7 (57%) occurrences.

***Lasthenia glabrata* ssp. *coulteri*, Coulter's goldfields**

Objective 2 for this species requires the inclusion of at least 20 of the known occurrences, including 3 Core Areas: the San Jacinto Wildlife Area and the southern

shores of Mystic Lake, the middle segment of the San Jacinto River, and a portion of the Alberhill locality. Based on the species account, the MSHCP Historical Database, and the CNDDDB, our interpretation of the known occurrences includes the 5 CNDDDB records along the San Jacinto River south of Ramona Expressway, 7 in San Jacinto Wildlife Area, and 1 near Alberhill, as well as any 7 other historic occurrences that are distinct from the CNDDDB records. Prior to 2010, we confirmed 11 occurrences at San Jacinto Wildlife Area, 5 CNDDDB occurrences and 6 historic occurrences. In 2010, we confirmed an additional occurrence on the southern shore of Mystic Lake. We have confirmed 12 of 20 (60%) occurrences.

***Lepechinia cardiophylla*, heart-leaved pitcher sage**

Objective 2 for this species requires the conservation of 7 known occurrences in the vicinity of Sierra Peak, Indian Truck Trail, Bald Peak, Trabuco Peak, Horsethief Trail, Pleasants Peak, and the ridge between Ladd Canyon and East Fork Canyon. All 7 of the historic locations correspond to a CNDDDB occurrence. Prior to 2010, we confirmed occurrences of *Lepechinia cardiophylla* at Sierra Peak, near Pleasants Peak, Bald Peak, and Indian Truck Trail. The remaining 3 occurrences are all along the Riverside/Orange County boundary and we have thoroughly surveyed all suitable habitat located within the Riverside portion of their CNDDDB polygons. Although not specifically mentioned in the species account, we have detected this species in 5 additional locations throughout the Santa Ana Mountains: EO03 above Wardlow Canyon, along Skyline Drive, and 2 places along Indian Truck Trail. We have confirmed 4 of 7 (57%) occurrences.

***Lilium humboldtii* ssp. *ocellatum*, ocellated Humboldt lily**

Objective 2 for this species requires the inclusion of at least 4 of the known occurrences at Arroyo Seco Canyon in the Agua Tibia Wilderness Area, Fisherman's Camp in Tenaja Canyon, Castro Canyon, Horsethief Canyon, Elsinore Mountains, and Corona between Tin Mine Canyon and Santiago Peak, Skyline Drive populations. Castro Canyon is located in San Diego County, and the reference to the Elsinore Mountains and Horsethief Canyon probably comes from the same 1955 herbarium collection by Gale Sphon that lists the locality as "Peninsular Ranges; Santa Ana Mountains region; Horsethief Canyon, Elsinore Mountains." Therefore, we interpret the objective to require the conservation of *Lilium humboldtii* ssp. *ocellatum* in Arroyo Seco Canyon, Tenaja Canyon, Horsethief Canyon, and in the vicinity of Tin Mine Canyon. Prior to 2010, we confirmed single occurrences at Arroyo Seco, Horse Thief Canyon (UCR217561), Tin Mine Canyon, and Fisherman's camp. In 2010, incidental to a stream survey, we detected this species in De Luz Creek. We have confirmed 4 of 4 (100%) occurrences.

***Lilium parryi*, lemon lily**

Objective 2 for this species requires the inclusion of at least 7 occurrences within the San Jacinto Mountains. Prior to 2010, we confirmed 7 occurrences in the San Jacinto Mountains. We have confirmed 7 of 7 (100%) occurrences.

***Limnanthes gracilis* var. *parishii*, Parish's meadowfoam**

Objective 2 for this species requires the inclusion of at least 1 known occurrence on the Santa Rosa Plateau. Prior to 2009, we surveyed for *Limnanthes gracilis* var.

parishii, but were unable to confirm its presence. In 2009, we confirmed the known occurrence on the Mesa de Colorado, at the Santa Rosa Plateau. We have confirmed 1 of 1 (100%) occurrence.

***Microseris douglasii* ssp. *platycarpa*, small-flowered microseris**

Objective 2 for this species requires the inclusion of at least 8 of the known occurrences at Lake Matthews, in the Cleveland National Forest, at Lake Skinner, and at Vail Lake. Prior to 2010, we confirmed 2 occurrences at Lake Skinner (UCR189562), 1 on Oak Mountain/Vail Lake (UCR189587), and 1 at Lake Matthews (UCR217515). In 2010, we confirmed an additional occurrence near Lake Matthews (UCR217636). We have confirmed 5 of 8 (63%) occurrences.

Objective 3 for this species, a demonstrate-conservation objective, requires the conservation of 10 localities each with ≥ 1000 individuals. In 2010, we confirmed 9 localities, including: 1 south of Lake Matthews (UCR217636), 1 near Alberhill (UCR189588), 1 on the Mesa de Burro (UCR217650), 2 at the McElhinney/Stimmel property (UCR217519), 1 east of the Hogbacks (UCR217528), 1 on the southern slope of Bachelor Mountain (UCR189562), 1 east of Lake Skinner, and 1 on Oak Mountain (UCR189587). We have confirmed 9 of 10 (90%) localities.

***Mimulus clelandii*, Cleveland's bush monkey flower**

Objective 2 for this species requires the inclusion of the 2 known occurrences of this species on Santiago Peak in the Santa Ana Mountains and on the northern slopes of the Agua Tibia Mountains. Prior to 2010, we confirmed the occurrence near Santiago Peak (UCR189579) and in the Agua Tibia Mountains (UCR217549). In 2010, we didn't target this species but we detected it incidentally in two new locations. We have confirmed 2 of 2 (100%) occurrences.

***Mimulus diffusus*, Palomar monkey flower**

Objective 2 for this species requires the inclusion of at least 18 of the known occurrences: on the Santa Rosa Plateau; in the vicinity of Sage; French Valley; east of Lake Skinner; and in the San Jacinto, Agua Tibia, and the Santa Ana Mountains. Based on our readings of the species account and the MSHCP Historical Database, we interpret this objective to require the inclusion of 5 occurrences in the Santa Ana Mountains, 3 in the Agua Tibia Mountains, 6 in the San Jacinto Mountains, 1 at the Santa Rosa Plateau, 1 near Sage, 1 at Lake Skinner, and 1 at the east end of French Valley. Prior to 2010, we confirmed 1 occurrence on Elsinore Peak, 1 in San Mateo Canyon (UCR205443), 1 near Lake Skinner (UCR217568), 2 in Agua Tibia (UCR205444 and UCR217534), and 3 in the San Jacinto Mountains. In 2010, we confirmed 3 occurrences in the Santa Ana Mountains (UCR217637 and UCR217640). In addition, we surveyed 12 stations in the San Jacinto Mountains and 2 in the Agua Tibia Mountains, but did not detect this species. We have confirmed 11 of 18 (61%) occurrences.

***Monardella macrantha* ssp. *hallii*, Hall's monardella**

Objective 2 for this species requires the inclusion of 5 known occurrences, including: Cahuilla Mountain, southwest of Pine Cove in the San Jacinto Mountains, 2 occurrences on the north slope of the Agua Tibia Mountains, and Santiago Peak in the

Santa Ana Mountains. Based on the MSHCP Historical Database and CNDDDB records, we believe the 2 cited occurrences in the Agua Tibia Mountains are actually at the same location. Therefore, we interpret the objective to require the inclusion of the 4 known occurrences at Cahuilla Mountain, southwest of Pine Cove, the north slope of the Agua Tibia Mountains, and Santiago Peak. Prior to 2010, we confirmed single occurrences in the Santa Ana Mountains, the Agua Tibia Mountains, Cahuilla Mountain, and the San Jacinto Mountains. Based on our interpretation of the objective, we have confirmed 4 of 4 (100%) occurrences.

***Muhlenbergia californica*, California muhly**

Objective 2 for this species requires the inclusion of known occurrences at Sage, Aguanga, Estelle Mountain, Prado Dam, Temescal Canyon, and Sitton Peak. Neither the MSHCP Historical Database nor the CNDDDB contain any records of *Muhlenbergia californica* within the Plan Area. In addition, the locations mentioned in the USFWS Biological Opinion (2004) and the species account are solely based on an unpublished report by the USFWS that we have been unable to acquire. Based on the current information we have about the distribution of this species, we recommend changing the species objective or not including this species in the MSHCP.

***Myosurus minimus* ssp. *apus*, little mouse tail**

Objective 2 for this species requires the inclusion of at least 5 of the known occurrences of this species, including Harford Springs County Park on the Gavilan Plateau and the 3 core locations: 1 along Salt Creek west of Hemet and 2 on the Santa Rosa Plateau. Prior to 2010, we confirmed single occurrences on Mesa de Burro, Mesa de Colorado, and near Salt Creek. In 2010, we confirmed single occurrences at Harford Springs and another location near Salt Creek (UCR216948). We have confirmed 5 of 5 (100%) occurrences.

***Nama stenocarpum*, mud nama**

Objective 2 for this species requires the inclusion of 2 of 3 known occurrences along the San Jacinto River near Gilman Springs Road. In 2010, confirmed 2 occurrences along the edge of Mystic Lake (UCR217638). We have confirmed 2 of 2 (100%) occurrences.

***Navarretia fossalis*, spreading navarretia**

Objective 2 for this species requires the inclusion of at least 13 of the known occurrences at Skunk Hollow, the Santa Rosa Plateau and core locations: the San Jacinto Wildlife Area, floodplains of the San Jacinto River from the Ramona Expressway south to Railroad Canyon, and upper Salt Creek west of Hemet. Based on our interpretation of the species account, these occurrences include 1 at Skunk Hollow, 1 at the Santa Rosa Plateau, 2 at Salt Creek, 4 along the San Jacinto River, and 5 at the San Jacinto Wildlife Area. Prior to 2010, we confirmed 1 occurrence at the San Jacinto Wildlife Area (UCR189559) and 1 on Mesa de Burro (UCR206021). In 2010, we confirmed 2 occurrences at the San Jacinto Wildlife Area, 1 near EO28 just north of the Ramona Expressway and 1 between EO37 and EO38. We also confirmed an occurrence in the vicinity of Salt Creek. In addition, we surveyed 16 stations (8 of them twice) on the south

side of the San Jacinto Wildlife Area but did not detect this species. We have confirmed 5 of 13 (38%) occurrences.

***Navarretia prostrata*, prostrate navarretia**

Objective 2 for this species requires the inclusion of at least 1 known occurrence at the Santa Rosa Plateau. Prior to 2010, we confirmed the occurrence on the Mesa de Burro (UCR206020). We have confirmed 1 of 1 (100%) occurrences.

***Orcuttia californica*, California Orcutt grass**

Objective 2 for this species requires the inclusion of at least 3 of the known occurrences at the Santa Rosa Plateau, Skunk Hollow, and in the upper Salt Creek drainage west of Hemet. Prior to 2010, we confirmed an occurrence at the Santa Rosa Plateau (UCR217551) and CNLM confirmed an occurrence at Skunk Hollow. In 2010, we surveyed 12 stations near the Salt Creek drainage, but did not detect any of this species. Including CNLM data, we have confirmed 2 of 3 (66%) occurrences.

***Oxytheca caryophylloides*, chickweed oxytheca**

Objective 2 for this species requires the inclusion of at least 5 of the known occurrences within the San Jacinto Mountains. Prior to 2010, we confirmed 5 distinct occurrences north of Idyllwild, in the San Jacinto Mountains (UCR217535). We have confirmed 5 of 5 (100%) occurrences.

Objective 3 for this species, a demonstrate-conservation objective, requires the conservation of 10 localities with ≥ 1000 individuals each. Prior to 2010, we confirmed 1 locality of this species with ≥ 1000 individuals. In 2010, we confirmed 9 localities with at least 1000 individuals in the vicinity of Hwy 243 between the Alandale and Vista Grande Ranger Stations (UCR217526 and UCR217651). We have confirmed 10 of 10 (100%) localities.

***Penstemon californicus*, California beardtongue**

Objective 2 for this species requires the inclusion of at least 15 occurrences in Aguanga, Blackburn Canyon, and the San Jacinto Mountains (including Garner Valley, Pyramid Peak, and Kenworthy Ranger Station). While the SBNF has confirmed the presence of *Penstemon californicus* at Pyramid Peak, it is located outside of the Plan Area. Based on our analysis of the species account, the MSHCP Historical Database, and the CNDDDB, we interpret this objective to require the inclusion of occurrences near Aguanga, the CNDDDB occurrence EO6 on Rouse Ridge, the 7 CNDDDB occurrences in Garner Valley, and 5 other historic locations distinct from those already mentioned. Prior to 2010, we confirmed 5 occurrences in Garner Valley. In 2010, we surveyed 6 stations near the CNDDDB polygon EO06 but did not detect this species. The habitat near EO06 does not appear to be suitable for *Penstemon californicus*, so we surveyed an additional habitat in 13 stations near Rouse Hill, an area with habitat similar to Garner Valley, but still were unable to confirm any occurrences. Not including Pyramid Peak, we have confirmed 5 of 14 (35%) of occurrences.

***Phacelia stellaris*, Brand's phacelia**

Objective 2 for this species requires the inclusion of the 2 known occurrences along the Santa Ana River at Fairmont Park and in the Santa Ana Wilderness Area. The latter locality is actually a site along the Santa Ana River west of Fairmont Park where *Phacelia stellaris* was collected in 2000. Prior to 2010, we confirmed the occurrence in the Santa Ana Wilderness. The occurrence at Fairmont Park is based on a voucher from 1925 that we have been unable to track down. In 2010, we did not survey for this species. We have confirmed 1 of 2 (50%) occurrences.

***Polygala cornuta* var. *fishiae*, Milk's fishwort**

Objective 2 for this species requires the inclusion of at least 3 of the known occurrences (Santa Rosa Plateau, Santa Margarita Ecological Reserve, and San Mateo Canyon). Prior to 2010, we confirmed occurrences of *Polygala cornuta* var. *fishiae* at the Santa Rosa Plateau (UCR189814), the Santa Margarita Ecological Reserve (UCR189555 and UCR217659), and in San Mateo Canyon (UCR189795). In 2010, we did not survey for this species. We have confirmed 3 of 3 (100%) occurrences.

Objective 3 for this species, a demonstrate-conservation objective, requires the conservation of 10 localities with ≥ 50 individuals or ramets each. Prior to 2010, we confirmed 6 localities greater than 50 individuals at the Santa Margarita Ecological Reserve, 1 in San Mateo Canyon, 1 in the Tenaja Corridor (UCR217566), and 2 in the Santa Ana Mountains (UCR189801 and UCR189815). In 2010, we did not survey for this species. We have confirmed 10 of 10 (100%) localities.

***Potentilla rimicola*, cliff cinquefoil**

Objective 2 for this species requires the inclusion of 2 known occurrences in Dark Canyon and near Deer Spring. In 2008, we spent 9 days backpacking in the San Jacinto Mountains to look for this species. Before surveying, we identified areas with seemingly appropriate habitat using digital imagery in ArcGIS. We surveyed these areas as well as areas near the localities cited in the species objective. We found this species in only 1 of 32 surveyed grid cells. We found *Potentilla rimicola* almost directly between the 2 occurrences mentioned in objective 2 (UCR217560). We believe the occurrences cited in the objective, which are both drawn from collections made on 27 July 1924, may actually refer to a single collection site. If this is the case, then we have confirmed the only known occurrence for this species within the Conservation Area, and the species objective should be modified accordingly.

Objective 3 for this species, a demonstrate-conservation objective, requires the conservation of 5 localities at least 1 quarter section apart without regard to number of individuals. Prior to 2010, we confirmed one locality in the San Jacinto Mountains. In 2010, we did not survey for this species. We have confirmed 1 of 5 (20%) localities.

***Quercus engelmannii*, Engelmann oak**

Objective 2 for this species requires the inclusion of at least 33 known occurrences of this species, including the core locations at the Santa Rosa Plateau and in the Santa Ana Mountains. Based on the MSHCP Historical Database, we interpret the objective to require the inclusion of 2 occurrences in the Tenaja corridor, 1 in the San

Mateo Canyon Wilderness, 7 at the Santa Rosa Plateau, 3 south of the Santa Rosa Plateau, 2 in the vicinity of the Santa Margarita Ecological Reserve, 1 along Murrieta Creek, 2 at Lake Skinner, 1 at Vail Lake, 1 near Sage, 1 at Wilson Valley, 1 at Potrero unit of the San Jacinto Wildlife Area, 1 at Estelle Mountain, 2 in the Santa Ana Mountains, 1 at Sycamore Canyon, 2 in the Agua Tibia Mountains, and 5 other occurrences distinct from those already mentioned. Prior to 2010, we confirmed 1 occurrence at the Potrero unit of the San Jacinto Wildlife Area, 7 at the Santa Rosa Plateau, 1 in San Mateo Canyon, 1 in the Agua Tibia Wilderness, 2 at the Santa Margarita Ecological Reserve, 2 near Lake Skinner, 2 in the Tenaja Corridor, 1 on Estelle Mountain, and 7 other distinct occurrences. In 2010, we confirmed an occurrence that falls within the precision buffer of the Vail Lake occurrence. We have confirmed 25 of 33 (75%) occurrences.

Objective 3 for this species requires recruitment to be maintained at a minimum of 80 percent of the conserved occurrences as measured by the presence/absence of seedlings and/or saplings across any 5 consecutive years. This objective is addressed in the *Engelmann Oak (Quercus engelmannii) Recruitment Pilot Survey Report 2010*.

***Romney coulteri*, Coulter's matilija poppy**

Objective 2 for this species, a demonstrate-conservation objective, requires the inclusion of 30 localities (locality in this sense is not smaller than one quarter section). Based on our interpretation of the species account, the 30 localities, as long as they are at least 1 quarter section from each other, can be located anywhere within the Conservation Area. Prior to 2010, we confirmed 27 localities for this species throughout the Conservation Area (UCR189813 and UCR217533). In 2010, we confirmed an additional 3 localities: 1 north of Alberhill, 1 along the Coldwater Creek Trail, and 1 in the foothills of the Santa Ana Mountains just northwest of Lake Elsinore (UCR217664). We have confirmed 30 of 30 (100%) localities.

***Satureja chandleri*, San Miguel Savory**

Objective 2 for this species requires the inclusion of at least 7 of the known occurrences on the Santa Rosa Plateau; in the vicinity of Tenaja guard station, 3 miles south of Murrieta near De Luz Road in the Santa Ana Mountains; and 3 miles southwest of Murrieta near Warner's ranch. Based on our reading of the species account, CNDDDB data, and the MSHCP Historical Database, we interpret the objective to require the inclusion of 5 occurrences at the Santa Rosa Plateau, 1 in San Mateo Canyon, and 1 in the Santa Ana Mountains. Prior to 2010, we confirmed 3 occurrences at the Santa Rosa Plateau: along Tenaja Truck Trail (UCR217505), in Miller Canyon (UCR189553), and in a drainage on the southeast corner of the Mesa de Burro (UCR189575). In 2010, we did not survey for this species. The remaining occurrences near the Plateau are currently outside of the Conservation Area and the 2 occurrences in the Santa Ana Mountains are based on extremely old and vague observations. We have confirmed 3 of 7 (43%) of occurrences.

***Sibaropsis hammittii*, Hammitt's clay-crest**

Species Objective 2 requires the inclusion of the 1 known occurrence near Elsinore Peak. Prior to 2010, we confirmed an occurrence on Elsinore Peak in the Santa Ana Mountains. We have confirmed 1 of 1 (100%) occurrence.

***Trichocoronis wrightii* var. *wrightii*, Wright's trichocoronis**

Species Objective 2 requires the inclusion of 4 known occurrences along the San Jacinto River from the vicinity of the Ramona Expressway, San Jacinto Wildlife Area, and along the northern shore of Mystic Lake. In 2010, we surveyed 25 stations through the San Jacinto Wildlife Area but did not detect this species. We have confirmed 0 of 4 occurrences.

LITERATURE CITED

Chester T, Armstrong W, Madore K. 2007. *Brodiaea santarosae* (Themidaceae), a new rare species from the Santa Rosa basalt area of the Santa Ana Mountains of southern California. *Madroño* 54:187-198.

Elvander PE 1993. Saxifragaceae. p. 1002 - 1008 in Hickman JC, editor. *The Jepson Manual: Higher Plants of California*. Berkeley (CA): University of California Press.

[USFWS] U.S. Fish and Wildlife Service. 2004. Intra-Service Biological and Conference Opinion on Issuance of an Incidental Take Permit for the Western Riverside County Multiple Species Habitat Conservation Plan (File FWS-WRIV- 870.19). Carlsbad, California. June.