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A Company of Specialists

October 26, 2011

Mr. Glen Laube
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Reference: Year 2 Annual Report for the Chula Vista Cactus Wren Habitat Restoration and Enhancement Program (SANDAG Grant Number 5001130; RECON Number 5296)

Introduction

This second annual report provides background information and summarizes the tasks performed during the second year (September 2010 to August 2011) of the coastal cactus wren (*Campylorhynchus brunneicapillus*) habitat restoration and enhancement program in the Chula Vista Central City Preserve. Three quarterly reports have previously been prepared by RECON. The information from these reports is summarized below for tasks completed between September 2010 and the end of August 2011. This annual report also summarizes the results of the relevé vegetation data that was collected in spring 2011 at the treatment sites, as well as the results of the bird point count monitoring.

The Central City Preserve is in the central portion of the city of Chula Vista, east of Interstate 805, south of State Route 54 and Bonita Road, and north of Otay Lakes Road (Figure 1; see Attachment 1 for all Figures and Photos). The Central City Preserve covers approximately 1,350 acres and is subdivided further into four Preserve Management Areas (PMAs) for data management purposes and for the development of the Area Specific Management Directives that were prepared in 2004 (Figure 2). Each PMA consists of a number of open space areas, referred to as subunits, which are surrounded by residential development. Each of these subunits was assigned a number to organize and distinguish each distinct survey area (Figure 3). Restoration and enhancement work was performed in PMA 1 subunits 1–2a, 1-2b, and 1–1a (Figure 4).

During the first year of the project (August 2009-August 2010), a total of approximately 5.75 acres of shrub were thinned around existing cholla (*Cylindropuntia prolifera*) patches. Approximately 2.48 acres of dried weedy areas were dethatched using weed whips. Cholla cuttings were planted in all of the dethatched areas, around existing cholla patches to increase cholla density, and within existing openings in coastal sage scrub (approximately 0.81 acre), for a total of approximately 9.04 acres of treated area. In this second year of the restoration and enhancement project, maintenance and monitoring tasks were continued, and these activities are summarized below.

Coastal Cactus Wren Status and Conservation

Populations of the coastal cactus wren are in decline throughout much of southern California, including San Diego County. Over the last several years, large, intense fires have damaged coastal cactus wren habitat in the Lake Jennings area (Cedar Fire, 2003), the San Pasqual Valley (Witch Fire, 2007) and the Otay-Sweetwater Region, which includes the San Diego National Wildlife Refuge (Harris Fire, 2007). Populations of coastal cactus wrens have also declined in Preserve areas not yet affected by wildfires, including Salt Creek, Otay River Valley, and the Central City Preserve in Chula Vista. This recent trend of cactus wren population decline has been observed in other regions of southern California. Regional recovery efforts for coastal populations of cactus wrens are intended to stabilize and eventually increase population sizes.

In the Central City Preserve, coast cholla patches have declined in the last 10–15 years due to competition with weeds and large shrubs such as lemonadeberry (*Rhus integrifolia*). In addition, the below-average rainfall during most of the last decade has caused many patches of coast cholla to die. This cholla die-off has likely caused a decrease in suitable habitat for coastal cactus wren that has contributed to the observed population declines.

Project Goals and Habitat Restoration Methods

- Increase coast cholla patch sizes and density within portions of the Central City Preserve to benefit populations of coastal cactus wrens.

- Restore and enhance patches of coast cholla in a distribution pattern that facilitates dispersal of cactus wrens between areas of suitable habitat within PMA 1.

- Proactive reduction of native and non-native fuels in the immediate vicinity of nesting sized coast cholla patches to decrease the risk of catastrophic fires that could eliminate wren habitat.

- Restore habitat for coastal cactus wrens and other covered species, including coastal California gnatcatcher (*Polioptila californica californica*) and Belding's orange-throated whiptail (*Aspidoscelis hyperythra beldingi*), in areas currently dominated by weeds.

- Restore and enhance coastal cactus wren habitat through the selective thinning and removal of lemonadeberry, other native shrubs, and exotic annuals that are directly competing with coast cholla to the detriment of cactus wren populations.

2010-11 Rainfall Summary and Ecological Effects

In spite of cooler ocean temperatures in the eastern Pacific, and predicted below normal rainfall associated with La Nina climatic conditions, during the winter of 2010-11, rainfall in Chula Vista (11.73 inches) was above normal (approximately 10 inches) for the July 1, 2010 through June 30, 2011 period (Table 1).

Early fall rains began in late September 2010 and were followed by heavier than normal rainfall in mid-October 2010. October rainfall (1.50 inches) was more than 3.5 times normal. November was drier than normal, and subsequently very heavy precipitation occurred again in December with almost five inches of rain. The December total was over four times the average.

After the saturating rains of December, the weather pattern returned to drier than normal conditions in January. The extended warm and dry pattern during the month of January 2011 caused some native species to become temporarily drought stressed. Well-spaced rains eventually returned in February and March, and this helped continue the growth of the native vegetation, including coast cholla and prickly pear (*Opuntia littoralis*) in the treatment areas. The weather pattern that occurred in 2010-11, consisting of several heavy rain periods spread through the season, also triggered multiple germination events for the non-native weeds such as mustard (*Brassica* sp.) and tocolote (*Centaurea melitensis*). A more detailed description of weed control

efforts and information regarding the seasonal growth of the enhanced cactus wren habitat areas are discussed below.

The photographs included in this report depict the seasonal changes in habitat and weed conditions that occurred during the 2010-11 growing season. Weed control efforts, the seasonal changes observed in the native plant growth, and monitoring results were documented through photographs taken at the restoration and enhancement sites.

TABLE 1
SUMMARY OF RAINFALL DATA BY MONTH
AT CHULA VISTA
JULY 1, 2010 - JUNE 30, 2011

Month	Monthly Rainfall (inches)
July	0.00
August	0.00
September	0.17
October	1.50
November	0.63
December	4.92
January	0.45
February	2.05
March	1.17
April	0.73
May	0.26
June	0.02
TOTAL PRECIPITATION	11.73 inches

Year 2 Tasks Performed September 2010 through December 2010

Maintenance

Weed Control

As mentioned above, heavier than normal rain occurred in October 2010, which caused weeds to begin germination (Photograph 1). Annual weeds that had germinated from early rains in September and October were sprayed in December to prevent them from flowering and setting seeds (Photograph 2). Glyphosate was used to control non-native annuals in dethatch and shrub thinning areas, and in locations that were immediately adjacent to access roads. Non-native species that were controlled included tocolote, black mustard (*Brassica nigra*), crown daisy (*Chrysanthemum coronarium*), filaree (*Erodium* spp.), and burclover (*Medicago polymorpha*), and annual grasses such as Mediterranean grass (*Schismus barbatus*). Herbicide was applied by licensed applicators under the supervision of RECON Field Crew Director Ruth Vallejo, who is a certified Pest Control Advisor.

By early February, weeds were under good control both from the intital December spraying effort and the subsequent below-normal rainfall in January (Photograph 3). After heavy rains occurred again in February and additional rain episodes extended through May, new populations of annual weeds continued to appear. Because of the extended rainfall season, additional weeding visits were needed and weeding was performed by the RECON field crews in March, April, June, and early July (Photograph 4). These repeated visits helped to significantly reduce the overall cover of weeds at the treament sites, especially in the dethatch areas formerly dominated by mustard.

In addition to mustards and other annual weeds, a small population of onion weed (*Asphodelus fistulosus*) was also controlled at one of restoration areas in Rice Canyon. The plants were growing along the access road that runs the length of the canyon. This treatment will minimize the chance that this weed will invade surrounding cactus wren and other sensitive species habitat.

Shrub and Cactus Maintenance

Prior to the start of the bird breeding season, Native shrubs that had been previously cut and showed signs of regrowth were sprayed with herbicide. In previously cleared patches, small shrub seedlings were also sprayed with herbicide to prevent them from growing large and competing with the coast cholla and prickly pear. The openings created by the thinning program have increased potential open-ground foraging areas for the coastal cactus wren significantly. In thinning areas, the primary resprouting shrubs included jojoba and lemonadeberry. This spray program will reduce the long-term vegetation maintenance around nesting-sized cactus patches.

As part of the ongoing maintenance and adaptive management program, small areas that needed additional cholla cuttings were replanted in winter 2010-11 from segments collected from around the base of adjacent mature cholla. Cholla cuttings were distributed in previously weeded areas or adjacent to existing cholla stands to enlarge the patch size. Cholla segments were either placed horizontally in contact with the soil surface, or a small hole was excavated and the base of the cutting was placed in the soil.

Repair of Inadvertent Grading and Vehicle Damage at Terra Nova Drive

During a site visit in early November, RECON biologists discovered a small area of grading (approximately 8,300 square feet) within the preserve (south of Terra Nova Drive). A second area of disturbance was also discovered north of Terra Nova Drive (approximately 3,300 square feet) caused by a vehicle turning around adjacent to a water pipeline owned by the City of San Diego (Photographs 5 and 6). Weeding maintenance and cholla planting had previously been performed in these areas.

RECON coordinated and met with City of Chula Vista Staff on-site in early January at the Terra Nova Drive disturbance area to assess the grading damage. In late February, another site meeting was held to discuss the damage with Chula Vista and the City of San Diego Water Department staff. The City of San Diego agreed to repair the area and said they would contract with RECON to repair the damage and install a fence to protect the preserve from inadvertent impacts.

RECON prepared a scope of work to repair the damage to the cactus plantings at the Terra Nova Drive disturbance areas. The scope of work included repair of the damaged area by planting new cholla cuttings and installation of protective fencing. The fencing is intended to protect the preserve from inadvertent impacts from adjacent water pipeline maintenance in the future.

Once RECON was under contract with the City of San Diego to repair the damaged areas, RECON field crews implemented the scope of work on July 22, 2011. Hundereds of cholla cuttings were planted at each site, and a protective three-strand wire fence was installed at both areas (Photographs 7-10). The two repaired sites will be maintained as part of the regularly scheduled maintenance visits in years three to five for the cactus wren project.

Monitoring

Vegetation Sampling Methods

Vegetation patch sampling was done using the relevé method. Treated vegetation patches greater than 0.10 acre were sampled. All plant species occurring in each patch were recorded, and the cover of species was estimated. A total of 26 vegetation treatment areas were sampled by RECON biologists Anna Bennett, JR Sundberg, and Kayo Valenti in June 2011. Twenty of the

vegetation study plots were located at shrub thinning sites, and six were located at weed dethatching areas. The results of the vegetation sampling efforts are presented below.

Bird Point Count Methods

Repeat bird point counts were conducted by RECON biologists Beth Procsal and Erin McKinney at 26 stations. Point count locations were recorded using a handheld global positioning system unit so that the points can be relocated each year for repeat surveys. During May-June 2011, RECON biologists surveyed for 10 minutes at each point location and recorded birds that were detected either visually or by call. The results of the bird point count data are summarized below in the Results section.

Year 2 Vegetation Sampling Results

Table 2 lists the species observed at the shrub thinning areas in and around Rice Canyon. Table 3 lists the species observed at the weed dethatch areas in and around Rice Canyon.

The following results are from the 20 relevé shrub thinning locations:

- The average cholla height at the shrub thinning plots was:
    - Cholla less than 1 foot: 10.4%
    - Cholla between 1 and 3 feet in height: 14.4%
    - Cholla over 3 feet in height: 75.7%
- Average total cover (shrub and herbaceous): 23.6%
- Average bare ground: 76.5%
- Average total cover of cholla: 15.1%
- Average percent cholla cover out of the total cover: 67.1%
- A total of 96 plant species were recorded at the shrub thinning locations: 76 native species and 20 non-native species
- Average non-native cover: 0.5%
- Average non-native cover out of the total cover: 2.4%

The following results are from the six relevé dethatch locations:

- Average cholla height at the weed dethatch locations:
    - Cholla less than 1 foot: 78.8%
    - Cholla between 1 and 3 feet in height: 17.7%
    - Cholla over 3 feet in height: 8.0%
- Average total cover (shrub & herbaceous): 5.3%
- Average bare ground: 94.7%

- Average total cover of cholla: 4.5%
- Average % cholla cover out of total cover: 70.1%
- A total of 36 plant species were recorded in the dethatch areas: 22 native and 14 non-native species
- Average total non-native cover: 0.5%
- Average non-native cover out of total cover: 16.5%

Year 2 Bird Point Count Results

In spring 2011, 23 species of birds were detected during the point count monitoring compared to 14 species during the May 2010 point counts and 15 species during the August 2009 point counts. Two cactus wrens were detected during the spring 2011 point counts in the shrub thinned habitat where the birds were not present prior to implementation of this project (Figure 5).

Coastal California gnatcatchers were detected at 10 point locations in spring 2011, compared to two in May 2010 and eight in August 2009. A majority of these point count locations (7 out of 10) were in the shrub thinned habitat. A total of 17 individual gnatcatchers were observed at the 10 point count locations (see Figure 5). Figure 5 also includes incidental gnatcatcher observations made during the relevé sampling.

The following species of birds were the 10 most commonly observed (in descending order) during the spring 2011 point counts:

Lesser goldfinch
House finch
Mourning dove
Anna's hummingbird
Wrentit
Northern mockingbird
Coastal California gnatcatcher
California towhee
California quail
Spotted towhee

Discussion

Weed Control Results

Due to the continued maintenance efforts, weed cover at the shrub clearing and dethatch sites decreased compared to the cover present in spring 2010. Non-native cover at the shrub clearing sites decreased from 3.2 percent in 2010 to 0.5 percent in 2011. The relative percentage of weeds at the shrub thinning sites also dropped from 8 percent of the total cover in 2010 to 2.4 percent in 2011.

At the dethatch sites, non-native cover decreased from just under 1 percent in 2010 to approximately 0.5 percent cover. The relative percentage of weeds at the dethatch sites also dropped from 28 percent percent of the total cover in 2010 to 16.5 percent in 2011. These numbers indicate that weed control efforts have been successful and are continuing to decrease non-native cover.

Cactus and Other Native Plant Growth

Somewhat above-normal rainfall during the 2010-11 season was conducive for the cactus cuttings and existing cholla patches to exhibit new growth in Year 2 (Photograph 11). As weed cover and competition has been reduced, more water has become available for native plant growth. The positive effects of this additional water is reflected in the large number of new cholla and prickly pear stems that have appeared on the cuttings originally planted in 2009. This growth is particularly evident at the weed dethatching areas (Photograph 12). Prickly pear cuttings planted in 2009 have already begun to flower and are being visited by native pollinators such as cactus bees (Photographs 13-14). Over time, these dethatch areas will fill in with dense cholla and prickly pear growth that will benefit the coastal cactus wren by providing additional nesting areas.

Quantitative data shows that the cover of cholla at the shrub thinning sites increased about 1 percent since 2010, while the average cover of cholla at the dethatch sites increased about 1.5 percent. The most noticeable change in the cholla at the dethatch areas was the increase in height of the plants. The percentage of cholla that were one to three feet tall increased from 4 percent in 2010 to nearly 18 percent in 2011.The percentage of cholla over three feet tall increased from 5 percent to 8 percent in Year 2. Also, the average cover of cholla relative to the total plant cover at the dethatch sites increased from 50 percent in 2010 to over 70 percent in 2011.

In some shrub thinning locations, coast cholla plants that were leaning on native shrubs for support will need to have portions of their stems trimmed to prevent some of the branches from breaking under the weight of new growth (Photograph 15). The cholla stems trimmed from these plants will be dispersed throughout the patches to increase the amount of cholla cover.

As expected, shrub thinning locations had significantly more native annual cover than the dethatch sites. In the winter and spring of 2011, shrub clearing areas often supported large populations of annual natives such as Cleveland's cryptantha (*Cryptantha clevelandii*) and Nievitas crypthantha (*C. intermedia*) (Photographs 16-17). Other species such as Indian tobacco (*Nicotiana* sp.) and Nuttall's snapdragon (*Antirrhinum nuttallianum*) were also commonly observed in the shrub thinning areas. At one shrub thinning location, north of Terra Nova Drive, Quino checkerspot butterfly (*Euphydryas editha quino*) larval host plant dot-seed plantain (*Plantago erecta*) and nectar plants such as fringed linanthus (*Linanthus dianthiflorus*) are benefiting from the weed control program (Photographs 18-19) Additional annual species observed at the shrub thinning areas included California suncup (*Camissonia bistorta*) and slope semaphore (*Mimulus brevipes*) (Photographs 20-21).

Perennial plant species such as foothill needlegrass (*Nassella lepida*), wishbone plant (*Mirabilis laevis* var. *crassifolia*), succulent chalk dudleya (*Dudleya pulverulenta*) and lady fingers (*D. edulis*) are also present (Photographs 22-25). Sensitive plant species that benefited from the shrub thinning include coast barrel cactus (*Ferocactus viridescens*) and snake cholla (*Cylindropuntia californica var. californica*), both Multiple Species Conservation Program (MSCP) covered species.

A plant species of particular note that was also found in the shrub thinning areas was tomatillo (*Physalis crassifolia* = *P. greenei*), which is common in the desert, but only has small and disjunct coastal populations (Photograph 26). This coastal form had been originally described as *P. greenei*, but was recently lumped with in *P. crassifolia*, even though the flower color and growth morphology of the coastal form is different (Reiser 2001). This plant has been previously documented in the Otay Valley area, but this locality in the Chula Vista preserve is new. Another notable plant species, also disjunct from its more common desert distribution, is linear-leaf stillingia (*Stillingia linearifolia*) (Photograph 27). This subshrub was observed growing in and around cholla patches located between H Street and Terra Nova Drive. The only previous collection of linear-leaf stillingia in the vicinity of the project site was made by the late botanist Frank Gander in 1937 from Telegraph road.

Cactus Wren and Other Wildlife Use

Incidental observations of birds by the project biologist during the 2011 maintenance site visits indicated that cactus wrens were beginning to occupy one of the shrub treatment areas in the southwest portion of the preserve (see Figure 5). This area had been occupied in 2003 (RECON 2004). Cactus wrens were not using the area prior to the start of this restoration and enhancement project in 2009-10. In early April 2011, a cactus wren was repeatedly heard calling from a shrub treatment patch northeast of the intersection of H Street and Terra Nova drive, and a new wren nest was found in the area at that time. During the bird point count survey, a pair of wrens was observed at this same location (Photographs 28-29). During the latest site visit in September 2011, a minimum of five active wren nests were observed at this newly occupied area.

Another sensitive bird species, coastal California gnatcatcher, was observed at 10 point locations, which represented up to 17 individual birds (Photograph 30). Other commonly encountered species included lesser goldfinch (*Carduelis psaltria*), housefinch (*Carpodacus mexicanus*) and California towhee (*Pipilo crissalis*) that forage in and around the edges of the enhancement sites (Photographs 31-33). Even the lesser nighthawk (*Chordeiles acutipennis*) was observed using the open areas in the project site (Photograph 34)

Several species of reptiles use the cactus wren restoration and enhancment sites, including the common western fence lizard (*Sceloprorus occidentalis*) and California kingsnake (*Lampropeltis getula californiae*) (Photographs 35-36). Sensitive reptile species also observed include the MSCP-covered Belding's orange-throated whiptail (*Aspidoscelis hyperythrus*), southern pacific rattlesnake (*Crotalus oreganus helleri*), and the red diamond rattlesnake (*Crotalus ruber*), which is a California species of special concern (Photographs 37-38).

Mammal species that are detected at the restoration and enhancment sites include cottontail rabbits (*Sylvilagus audubonii*), coyotes (*Canis latrans*), and the San Diego desert woodrat (*Neotoma lepida intermedia*), which collects cactus spines to build it's nest at the base of the coast cholla.

Invertebrates that are often seen in the cholla patches include funnel web spiders of the family Agelendiae that spin their webs in the cholla (Photograph 39) and other insects including butterflies such as the gray hairstreak (*Strymon melinus*) (Phootgraph 40).

We are encouraged by the rapid growth of cholla and prickly pear cuttings The ongoing maintenance program will continue to reduce non-native species cover and competition with native plants such as coast cholla. Photographs show the cholla patches during peak flowering that occurred in April 2011 (Photographs 41-42).

Future Restoration and Enhancement Tasks

In Year 3 of the restoration and enhancement program, weeds will continue to be controlled, as needed, to prevent seed set. Small amounts of native annual seed collected in Year 2 will be redistributed in dethatch areas that have had little native annual cover. The increased native annual cover will support a greater diversity of insect species, which will in turn provide food for cactus wrens that often forage on the ground. Vegetation sampling and bird point counts will be repeated in the spring of 2012.

If you have any questions regarding the coastal cactus wren habitat restoration and enhancement program, do not hesitate to call.

Sincerely,

Mark Dodero
Senior Biologist

MWD:sjg

Enclosure(s)

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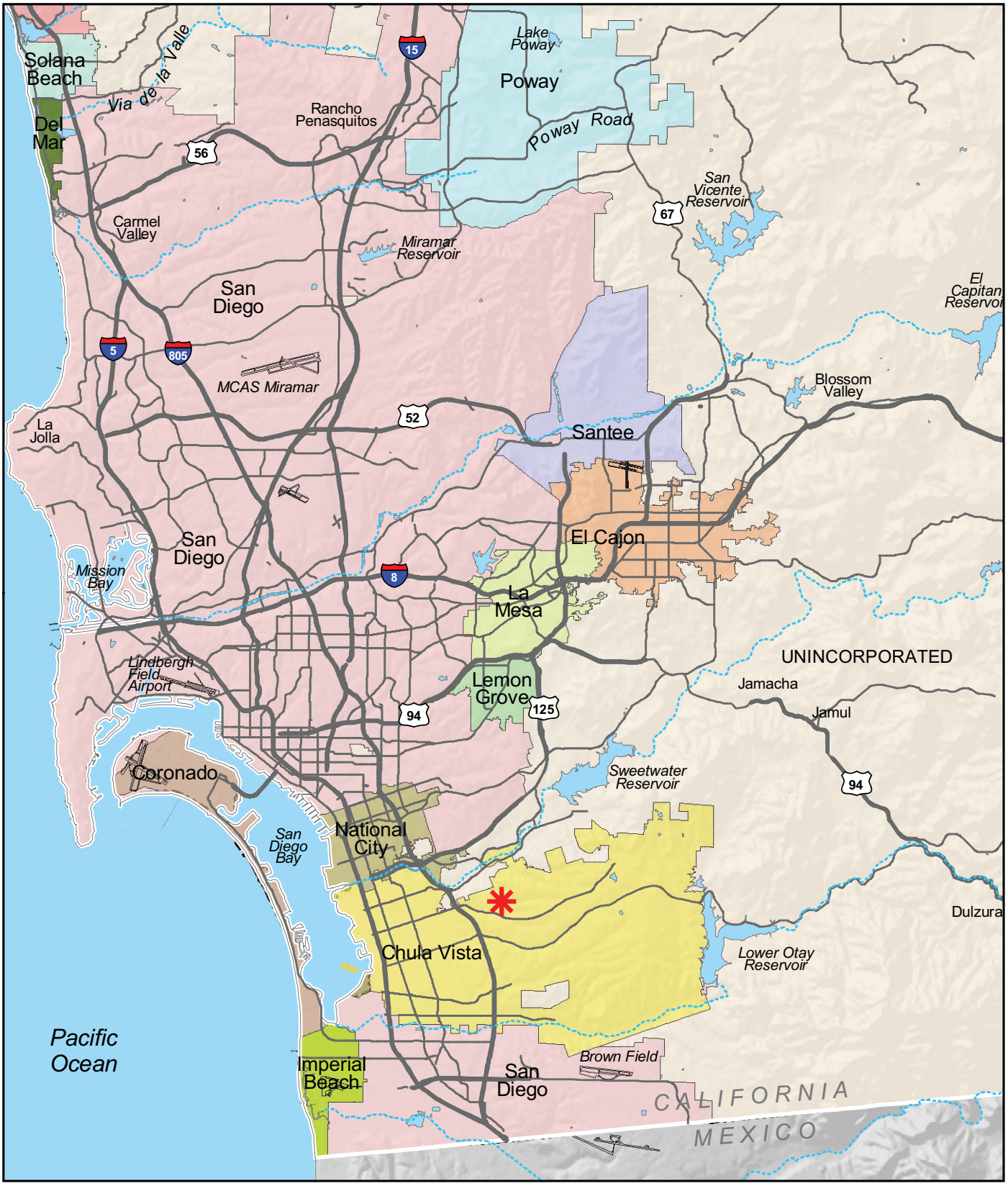
Reiser, Craig H.
2001 Rare Plants of San Diego Co. Aquafir Press. July

Contributers to this Report

RECON biologists that conducted field surveys and analyzed data included Anna Bennett, Beth Proscal, Erin McKinney, JR Sundberg, Kayo Valenti and Megan Lahti. Graphics and Production staff included Vince Martinez, Steven Gaughran, and Sean Bohac.



Project Location

FIGURE 1

Regional Location

RECON

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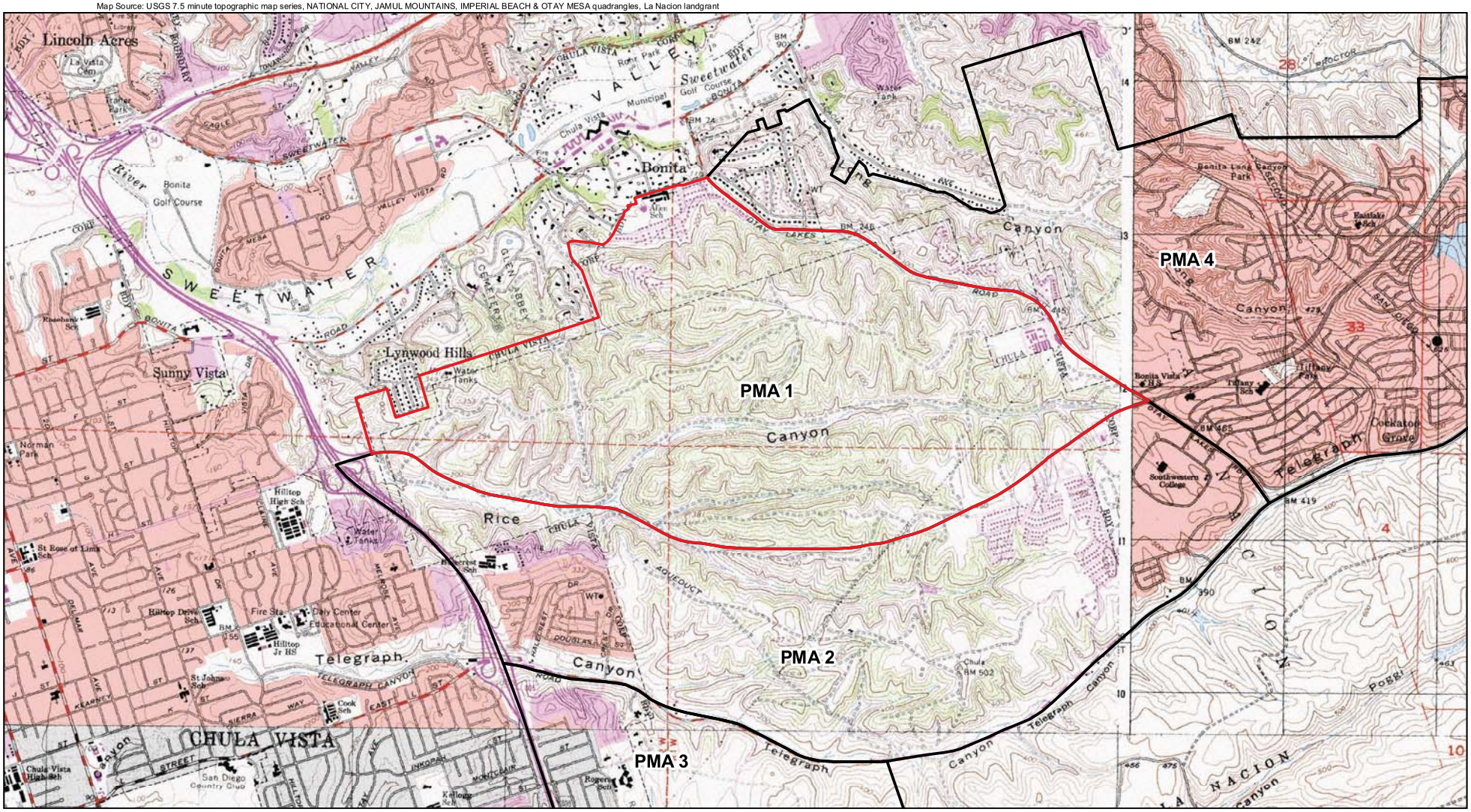
Map Source: USGS 7.5 minute topographic map series, NATIONAL CITY, JAMUL MOUNTAINS, IMPERIAL BEACH & OTAY MESA quadrangles, La Nacion landgrant



Preserve Management Areas

PMA 1

Other PMAs

RECON

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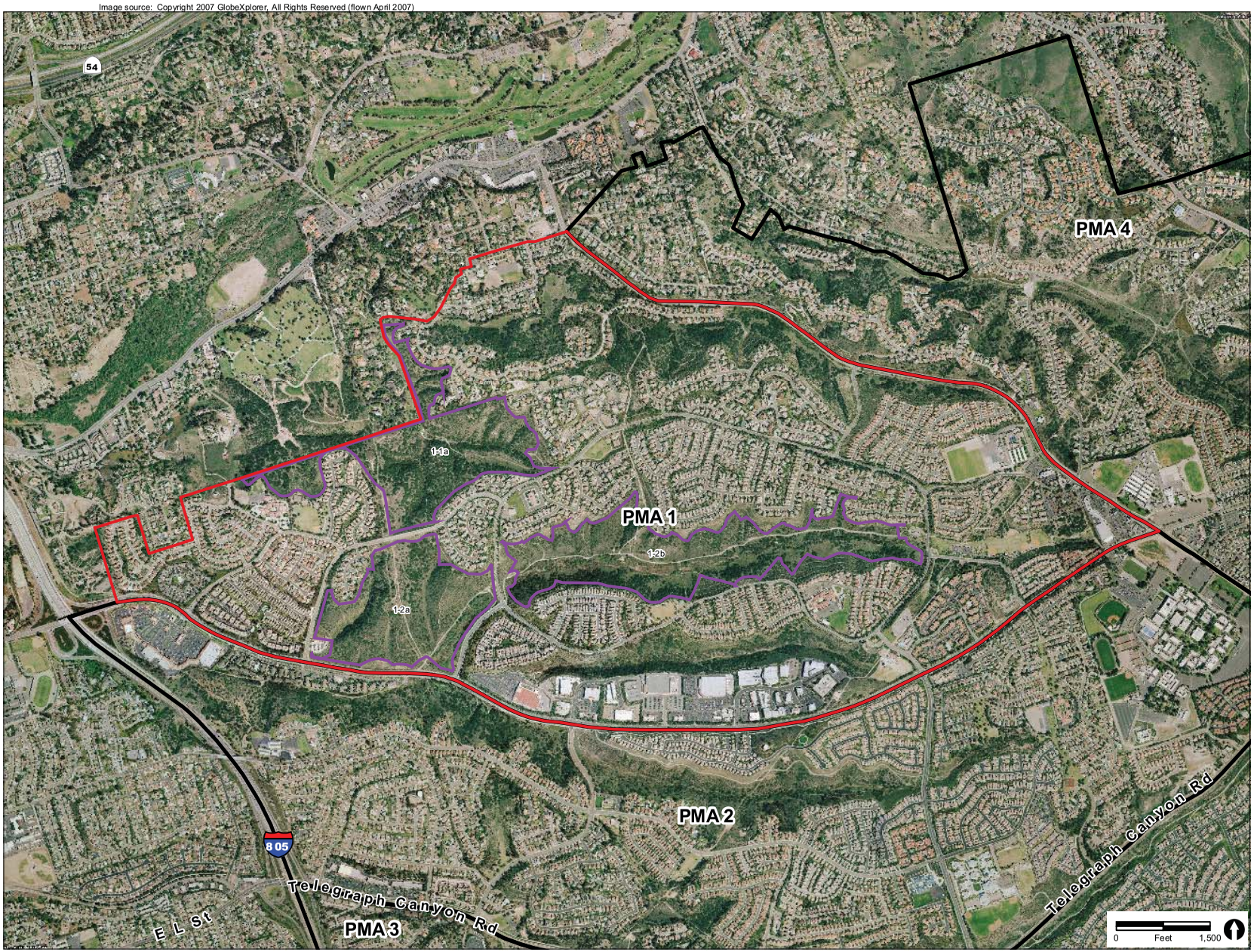
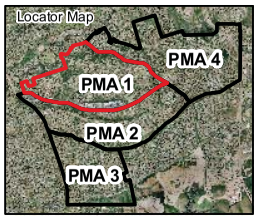
FIGURE 2

Project Location on USGS Map

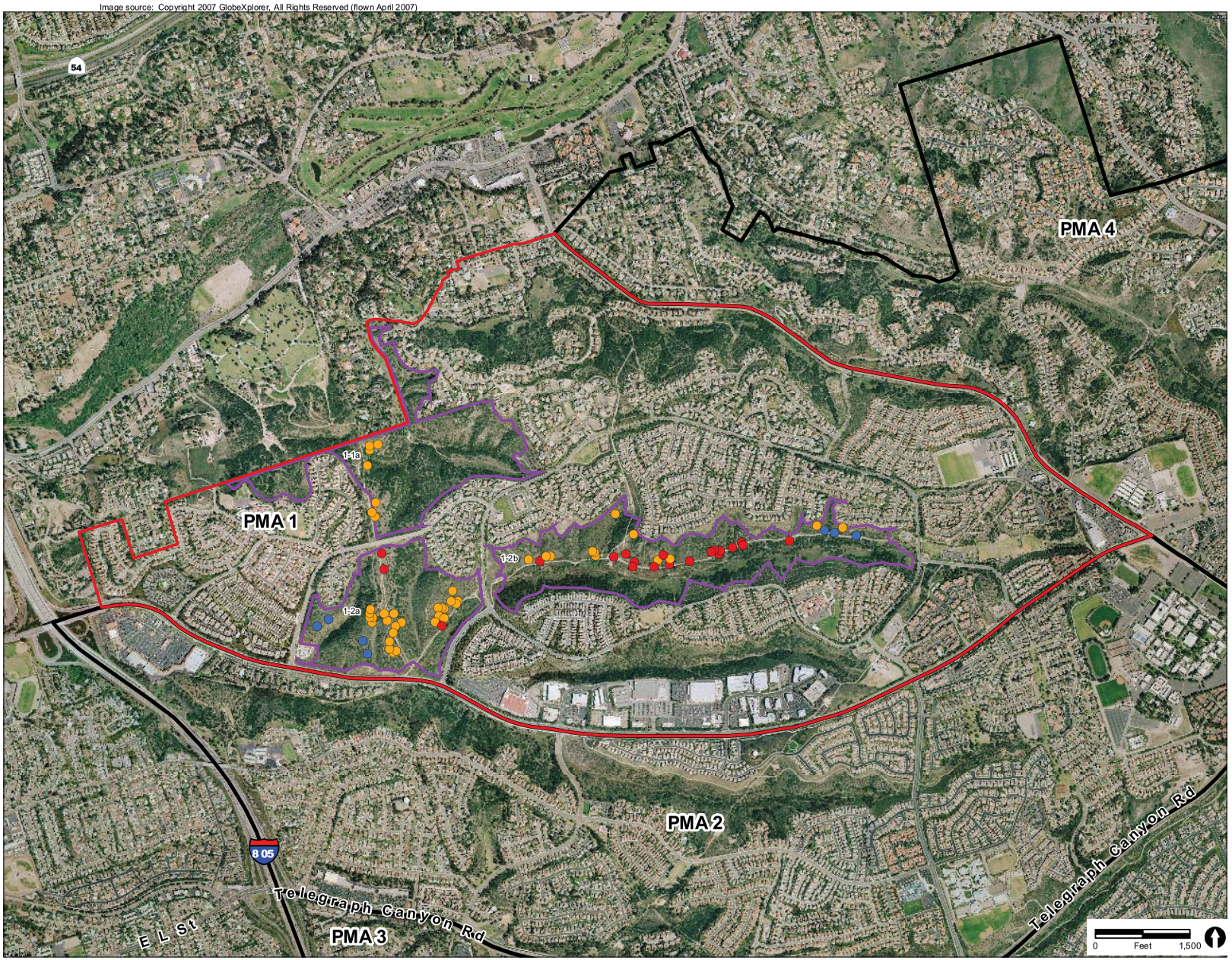


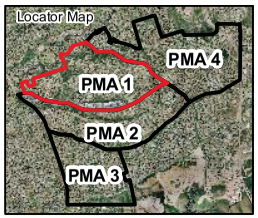


Preserve Management Areas

- PMA 1
- Other PMAs
- PMA Subunits

FIGURE 3
Preserve Management Subunits
Selected for Restoration



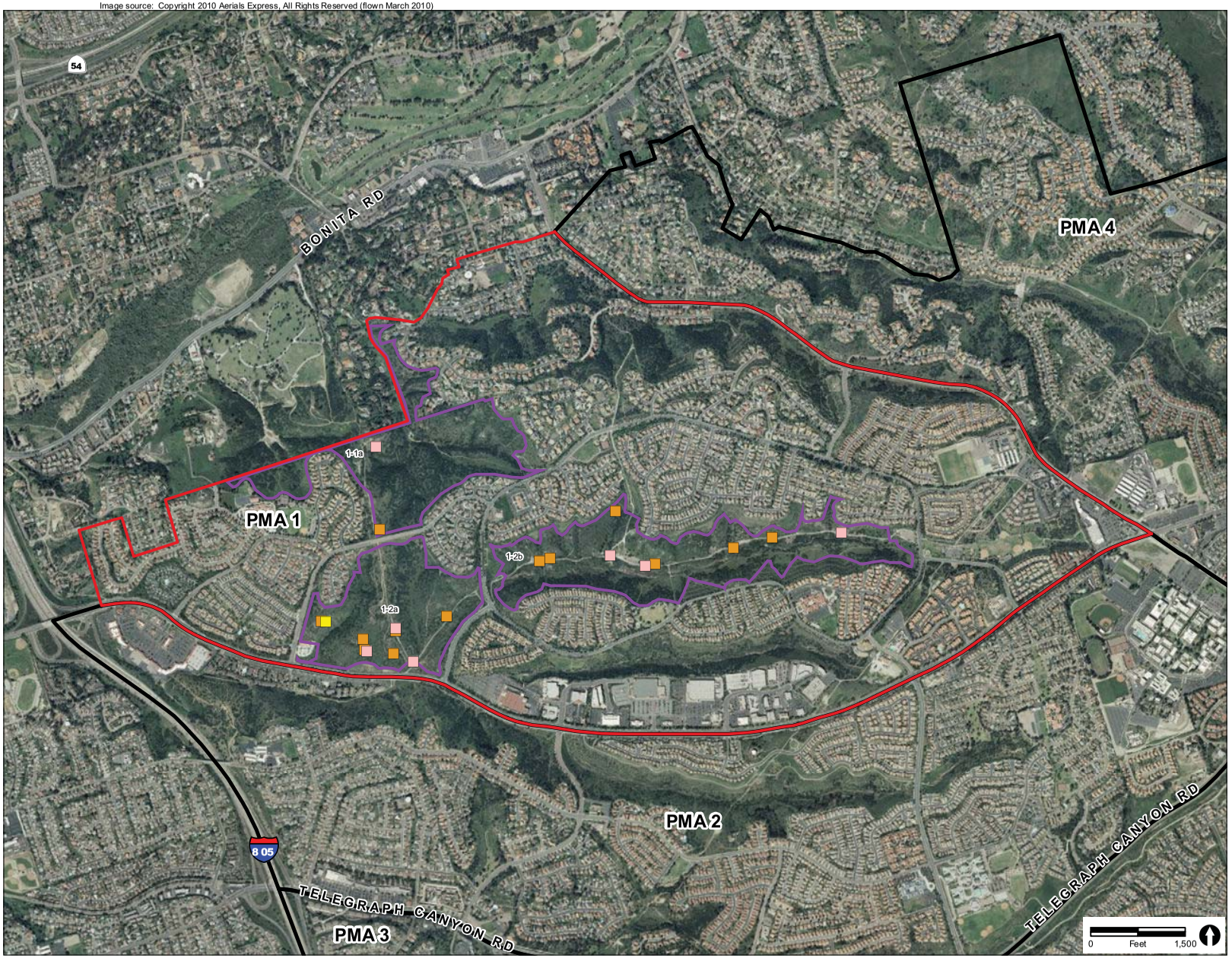


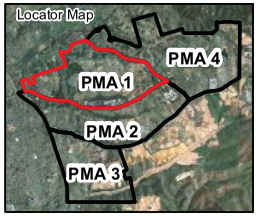
Preserve Management Areas

- PMA 1
- Other PMAs
- PMA Subunits
- Dethatch Areas
- Cut Areas (Sept - Nov '09)
- New Cut Areas (Dec '09 - Feb '10)

FIGURE 4

Cactus Wren Habitat Restoration and Enhancement Locations





Preserve Management Areas

- PMA 1
- Other PMAs
- PMA Subunits

Avian Observations

- Cactus Wren
- Coastal California Gnatcatcher
- Orange-throated Whiptail

FIGURE 5

Locations of Cactus Wrens and Coastal California Gnatcatchers

PHOTOGRAPH 1
Newly Germinated Mustard, Tocolote and Burclover Seedlings
(October 2010)

PHOTOGRAPH 2
RECON Field Crew Applying Glyphosate Herbicide to Non-native weeds

PHOTOGRAPH 3
Low Weed Cover in Dethatch Area after Initial Spraying
(February 2011)

PHOTOGRAPH 4
RECON Field Crew Using a Combination of Spraying and Hand Pulling

PHOTOGRAPH 5
Grading Damage South of Terra Nova Drive

PHOTOGRAPH 6
Vehicle Damage North of Terra Nova Drive

PHOTOGRAPH 7
Coast Cholla Cuttings ready For Planting

PHOTOGRAPH 8
RECON Field Crew Installing Protective Fencing

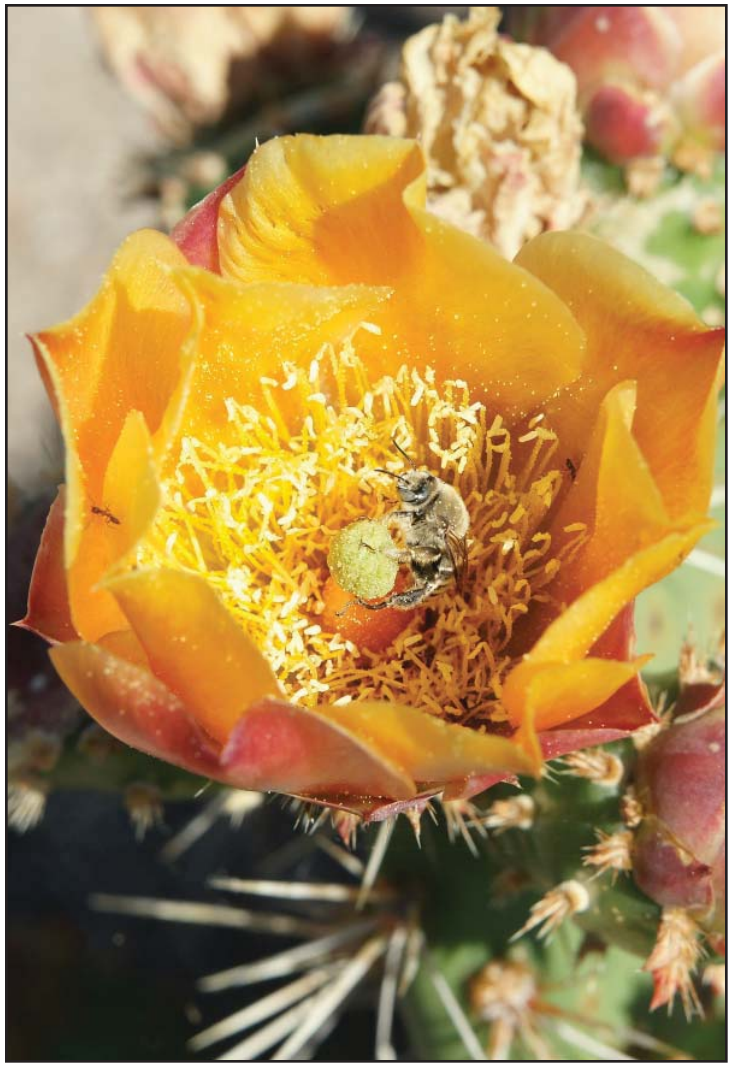
PHOTOGRAPH 9
Cholla Cuttings and Fencing South of Terra Nova Drive

PHOTOGRAPH 10
Newly Installed Fence and Cholla North of Terra Nova Drive

PHOTOGRAPH 11
Coast Cholla with New Growth Buds

PHOTOGRAPH 12
Coast Prickly Pear with New Growth

PHOTOGRAPH 13
Flowering Coast Prickly Pear Growing From Cuttings



PHOTOGRAPH 14
Flowering Coast Prickly Pear with Visiting Cactus Bee

PHOTOGRAPH 15
Coast Cholla After Shrubs Have Been Thinned

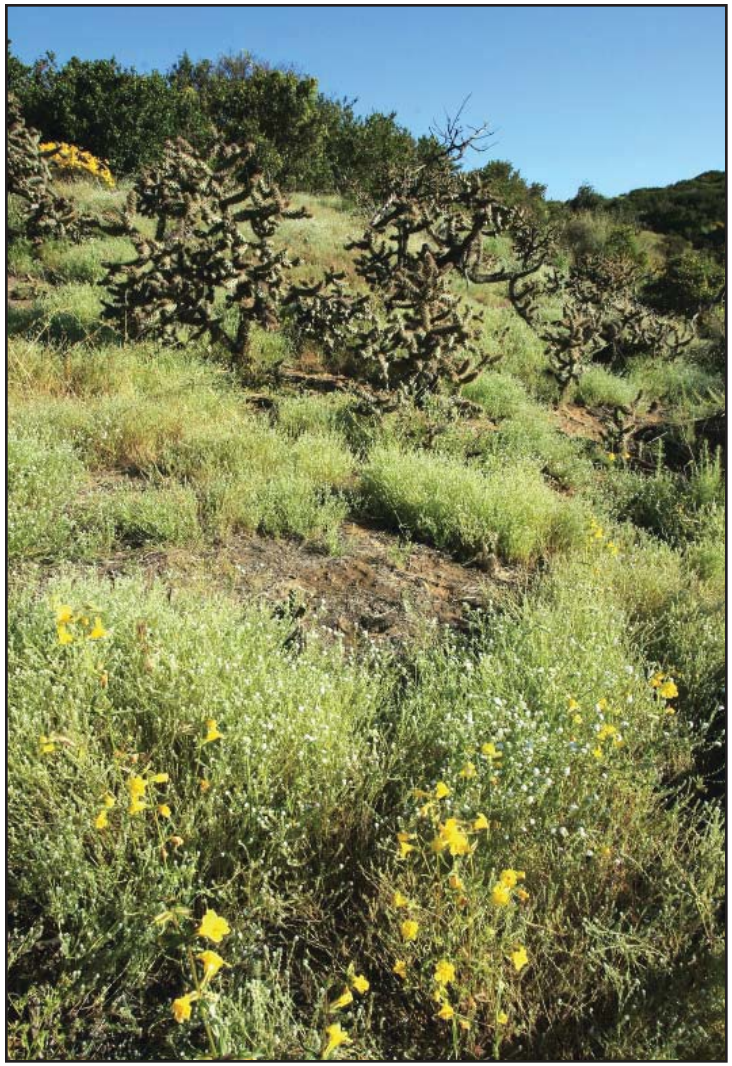
PHOTOGRAPH 16
Cleveland's Cryptantha Growing at Shrub Thinning Site

PHOTOGRAPH 17
Nievitas Cryptantha Growing at Shrub Thinning Site

PHOTOGRAPH 18
Shrub Thinning Area North of Terra Nova Drive

PHOTOGRAPH 19
Potential QCB food and Nectar Plants Dot-Seed Plantain (*Plantago erecta*) and Fringed Linanthus (*Linanthus dianthiflorus*)

PHOTOGRAPH 20
California Suncup (*Camissonia bistorta*)
Growing at Shrub Thinning Site



PHOTOGRAPH 21
Slope Semaphore (*Mimulus brevipes*)
Growing at Shrub Thinning Site

PHOTOGRAPH 22
Foothill Needlegrass (*Nassella lepida*)
Growing with Coast Cholla

PHOTOGRAPH 23
Purple-Flowered Wishbone Plant (*Mirabilis laevis* var. *crassifolia*)
Grows at Shrub Thinning Sites

PHOTOGRAPH 24
Chalk Dudleya (*Dudleya pulverulenta*)

PHOTOGRAPH 25
Lady Fingers (*Dudleya edulis*)

PHOTOGRAPH 26
Tomatillo (*Physalis crassifolia*)

PHOTOGRAPH 27
Linear-Leaf Stillingia (*Stillingia linearifolia*)
Growing in Cholla Patches

PHOTOGRAPH 28
Coastal Cactus Wren (*Campylorhynchus brunneicapillus*)
Have Moved into Shrub Thinning Areas

PHOTOGRAPH 29
Foraging Coastal Cactus Wren

PHOTOGRAPH 30
Coastal California Gnatcatcher (*Polioptila californica)*
Use Shrub Thinning Areas

PHOTOGRAPH 31
Lesser Goldfinch (*Carduelis psaltria*)

PHOTOGRAPH 32
House Finch (*Carpodacus mexicanus*)

PHOTOGRAPH 33
California Towhee (*Pipilo crissalis*)

PHOTOGRAPH 34
Lesser Nighthawk (*Chordeiles acutipennis*)

PHOTOGRAPH 35
Western Fence Lizard (*Sceloporus occidentalis*)

PHOTOGRAPH 36
California Kingsnake (*Lampropeltis getula californiae*)

PHOTOGRAPH 37
Orange-Throated Whiptail (*Aspidoscelis hyperythrus*)

PHOTOGRAPH 38
Red Diamond Rattlesnake (*Crotalus ruber*)

PHOTOGRAPH 39
Funnel-web Spider Uses Coast Cholla for Hunting

PHOTOGRAPH 40
Gray Hairstreak (*Strymon melinus*) Nectaring On Locoweed

PHOTOGRAPH 41
Coast Cholla and Flowers

PHOTOGRAPH 42
View of Shrub Thinning Site Dominated by Native Annuals

TABLE 2
PLANT SPECIES OBSERVED AT RICE CANYON CUT PATCHES

Scientific Name	Common Name	Origin
LYCOPODS		
SELAGINELLACEAE	**SPIKE-MOSS FAMILY**	
Selaginella cinerascens A.A. Eaton	ashy spike-moss	N
ANGIOSPERMS: DICOTS		
AMARANTHACEAE	**AMARANTH FAMILY**	
Amaranthus albus	tumbleweed	I
Atriplex canescens (Pursh) Nutt.	fourwing saltbush, shad-scale	N
Atriplex pacifica A. Nelson	south coast saltscale	N
Chenopodium album L.	lamb's quarters, pigweed	I
Chenopodium murale L.	nettleleaf goosefoot	I
ANACARDIACEAE	**SUMAC OR CASHEW FAMILY**	
Rhus integrifolia (Nutt.) Benth. & Hook. f. ex Rothr.	lemonadeberry	N
APIACEAE (UMBELLIFERAE)	**CARROT FAMILY**	
Apiastrum angustifolium Nutt.	wild-celery	N
Daucus pusillus Michx.	rattlesnake weed	N
ASTERACEAE	**SUNFLOWER FAMILY**	
Artemisia californica Less.	California sagebrush	N
Baccharis pilularis DC.	coyote brush	N
Bahiopsis [=*Viguiera*] *laciniata* (A. Gray) E.E. Schilling & Panero	San Diego County viguiera	N
Centaurea melitensis L.	tocalote, star-thistle	I
Chaenactis glabriuscula DC.	yellow pincushion	N
Cotula australis (Sieber ex Spreng.) Hook. f.	Australian brass-buttons	I
Deinandra [=*Hemizonia*] *fasciculata* (DC.) Greene	golden tarplant	N
Encelia californica Nutt.	common encelia	N
Erigeron bonariensis L. [=*Conyza bonariensis*]	flax-leaved horsewee	I
Erigeron canadensis L. [=*Conyza canadensis*]	horseweed	N
Glebionis coronaria (L.) Spach [=*Chrysanthemum coronarium*]	garland, crown daisy	I
Gutierrezia californica (DC.) Torr. & A. Gray	California matchweed	N
Helminthotheca [=*Picris*] *echioides* (L.) Holub	bristly ox-tongue	I
Lactuca serriola L.	prickly lettuce	I
Pseudognaphalium bioletti Anderb.	bicolor cudweed	N
Pseudognaphalium californicum [=*Gnaphalium californicum*] D.C.	Green everlasting	N
Pseudognaphalium beneolens [=*Gnaphalium canescens* ssp. *beneolens*] (Davidson) Anderb.	fragrant everlasting	N

TABLE 2
PLANT SPECIES OBSERVED AT RICE CANYON CUT PATCHES
(continued)

Scientific Name	Common Name	Origin
Sonchus asper (L.) Hill ssp. *asper*	prickly sow thistle	I
Sonchus oleraceus L.	common sow thistle	I
Stephanomeria sp.	stephanomeria	N
Stylocline gnaphaloides Nutt.	everlasting nest straw	N
BORAGINACEAE	**BORAGE FAMILY**	
Amsinckia menziesii (Lehm.) A. Nelson & J.F. Macbr.	rancher's fireweed	N
Cryptantha clevelandii Greene	Cleveland cryptantha	N
Cryptantha intermedia (A. Gray) Greene	nievitas cyptantha	N
Eucrypta chrysanthemifolia (Benth.) Greene	eucrypta	N
Phacelia cicutaria Greene var. *hispida* (A. Gray) J.T. Howell	caterpillar phacelia	N
Pholistoma auitum Lindl.) Liia var. *auritum*	Fiesta flower	N
Pholistoma racemosum (Nutt. ex A. Gray) Constance	pholistoma	N
BRASSICACEAE (CRUCIFERAE)	**MUSTARD FAMILY**	
Brassica nigra (L.) W. D. J. Koch	black mustard	I
Deschurainia pinnata (Walter) Britton	tansy-mustard	N
Hirschfeldia incana (L.) Lagr.-Fossat	short-pod mustard	I
Sisymbrium irio L.	London rocket	I
CACTACEAE	**CACTUS FAMILY**	
Cylindropuntia californica [=*Opuntia parryi*] (Torr. & A. Gray) F.M. Knuth	snake cholla	N
Cylindropuntia [=*Opuntia*] *prolifera* (Engelm.) F.M. Knuth	coastal cholla	N
Ferocactus viridescens (Torr. & A. Gray) Britton & Rose	San Diego barrel cactus	N
Mammillaria dioica K. Brandegee	fish-hook cactus	N
Opuntia littoralis (Engelm.) Cockerell.	shore cactus	N
Opuntia oricola Philbr.	chaparral prickly-pear	N
CONVOLVULACEAE	**MORNING-GLORY FAMILY**	
Calystegia macrostegia (Greene) Brummitt	morning-glory	N
CRASSULACEAE	**STONECROP FAMILY**	
Crassula connata (Ruiz & Pav.) A. Berger	pygmy-weed	N
Dudleya edulis (Nutt.) Moran	lady fingers	N
Dudleya pulverulenta (Nutt.) Britton & Rose	chalk lettuce, chalk dudleya	N
CUCURBITACEAE	**GOURD FAMILY**	
Marah macrocarpus (Greene) Greene	wild cucumber	N

TABLE 2
PLANT SPECIES OBSERVED AT RICE CANYON CUT PATCHES
(continued)

Scientific Name	Common Name	Origin
EUPHORBIACEAE	**SPURGE FAMILY**	
Chamaesyce micromera (Engelm.) Wooton & Standl.	Sonoran sandmat	N
Chamaesyce polycarpha (Benth.) Millsp.	smallseed sandmat	N
Croton [=Eremocarpus] setigerus Hook.	Dove weed	N
Stillingia linearifolia S. Watson	linear-leaf stillingia	N
FABACEAE (LEGUMINOSAE)	**LEGUME FAMILY**	
Acmispon strigosus (Nutt.) Brouillet [=*Lotus strigosus*]	strigose bird's-foot trefoil	N
Astragalus trichopodus (Nutt.) A. Gray var. *lonchus* (M.E. Jones) Barneby	coast locoweed	N
Melilotus indicus (L.) All.	sourclover	I
GENTIANACEAE	**GENTIAN FAMILY**	
Zeltnera [=*Centaurium*] *venusta* (A. Gray) G. Mans.	canchalagua	N
GERANIACEAE	**GERANIUM FAMILY**	
Erodium cicutarium (L.) L'Hér. ex Aiton	red stemmed filaree	I
LAMIACEAE	**MINT FAMILY**	
Marrubium vulgare L.	horehound	I
Salvia columbariae Benth.	chia	N
MALVACEAE	**MALLOW FAMILY**	
Malacothamnus sp.	chaparral mallow	N
MYRSINACEAE		
Anagallis arvensis L.	scarlet pimpernel, poor-man's weatherglass	I
NYCTAGINACEAE	**FOUR O'CLOCK FAMILY**	
Mirabilis laevis [=*californica*] (Benth.) Curran var. *crassifolia* (Choisy) Spellenb.	wishbone bush	N
ONAGRACEAE	**EVENING-PRIMROSE FAMILY**	
Camissonia bistorta (Torr. & A. Gray) P.H. Raven	California sun cup	N
Camissonia californica (Torr.& A. Gray) P.H. Raven	false-mustard	N
PHRYMACEAE [=SCROPHULARIACEAE]	**HOPSEED FAMILY**	
Mimulus aurantiacus Curtis	low bush monkey-flower	N
Mimulus brevipes Benth.	hillside monkey-flower	N
PLANTAGINACEAE	**PLANTAIN FAMILY**	
Antirrhinum nuttallianum Benth. ex A. DC.	Nuttall snapdragon	N

TABLE 2
PLANT SPECIES OBSERVED AT RICE CANYON CUT PATCHES
(continued)

Scientific Name	Common Name	Origin
POLEMONIACEAE	**PHLOX FAMILY**	
Eriastrum sapphirinum (Eastw.) H. Mason.	sapphire woolly-star	N
Navarretia hamata Greene	hooked navarretia	N
POLYGONACEAE	**BUCKWHEAT FAMILY**	
Chorizanthe polygonoides Torr. & A. Gray var. *longispina* (Goodman) Munz	knotweed spineflower	N
Chorizanthe procumbens Nutt.	prostrate spineflower	N
Eriogonum fasciculatum Benth.	California buckwheat	N
Pterostegia drymarioides Fisch. & C.A. Mey.	California thread-stem	N
RESEDACEAE	**MIGNONETTE FAMILY**	
Oligomeris linifolia (Vahl ex Hornem.) J.F. Macbr.	narrowleaf oligomeris	N
SIMMONDSIACEAE	**JOJOBA FAMILY**	
Simmondsia chinensis (Link) C.K. Schneid.	jojoba, goat nut	N
SOLANACEAE	**NIGHTSHADE FAMILY**	
Nicotiana clevelandii A. Gray	Cleveland's tobacco	N
Nicotiana glauca Graham	tree tobacco	I
Physalis crassifolia Benth.	Greene's ground-cherry	N
Solanum americanum Mill.	white nightshade	N
URTICACEAE	**NETTLE FAMILY**	
Parietaria hespera Hinton var. *californica* Hinton	Caliornia pellitory	N
Utrica urens L.	dwarf nettle	I
ANGIOSPERMS: MONOCOTS		
AGAVACEAE	**AGAVE FAMILY**	
Chlorogalum parviflorum S. Watson	smallflower soap plant	N
Yucca schidigera Ortgies	Mohave yucca	N
ASPHODELACEAE	**ASPHODEL FAMILY**	
Asphodelus fistulosus L.	hollow-stem asphodel	I
POACEAE (GRAMINEAE)	**GRASS FAMILY**	
Aristida purpurea Nutt.	purple three-awn	N
Bromus madritensis L. ssp. *Rubens* (L.) Husnot	red brome	I
Melica imperfecta Trin.	California melic	N
Muhlenbergia microsperma (DC.) Kunth	littleseed muhly	N

TABLE 2
PLANT SPECIES OBSERVED AT RICE CANYON CUT PATCHES
(continued)

Scientific Name	Common Name	Origin
Nassella lepida (Hitchc.) Barkworth	foothill needlegrass	N
Schismus barbatus (L.) Thell.	Mediterranean schismus	I

Sensitive
Of note

TABLE 3
PLANT SPECIES OBSERVED AT RICE CANYON DETHATCH PATCHES

Scientific Name	Common Name	Origin
LYCOPODS		
SELAGINELLACEAE	**SPIKE-MOSS FAMILY**	
Selaginella cinerascens A.A. Eaton	ashy spike-moss	N
ANGIOSPERMS: DICOTS		
ANACARDIACEAE	**SUMAC OR CASHEW FAMILY**	
Rhus integrifolia (Nutt.) Benth. & Hook. f. ex Rothr.	lemonadeberry	N
ASTERACEAE		
Artemisia californica Less.	California sagebrush	N
Baccharis pilularis DC.	coyote brush	N
Bahiopsis [=*Viguiera*] *laciniata* (A. Gray) E.E. Schilling & Panero	San Diego County viguiera	N
Centaurea melitensis L.	tocalote, star-thistle	I
Cotula australis (Sieber ex Spreng.) Hook. f.	Australian brass-buttons	I
Deinandra [=*Hemizonia*] *fasculata* (DC.) Greene	golden tarplant	N
Encelia californica Nutt.	common encelia	N
Glebionis coronaria (L.) Spach [=*Chrysanthemum coronarium*]	garland, crown daisy	I
Isocoma menziesii (Hook. & Arn.) G.L. Nesom var. *decumbens*	decumbent goldenbush	N
Pseudognaphalium californicum [=*Gnaphalium californicum*] D.C>	green everlasting	N
BORAGINACEAE	**BORAGE FAMILY**	
Amsinckia menziesii (Lehm.) A. Nelson & J.F. Macbr.	rancher's fireweed	N
Cryptantha intermedia (A. Gray) Greene	nievitas cryptantha	N
BRASSICACEAE (CRUCIFERAE)	**MUSTARD FAMILY**	
Brassica nigra (L.) W.D.J. Koch	black mustard	I
Hirschfeldia incana (L.) Lagr.-Fossat	short-pod mustard	I
CACTACEAE	**CACTUS FAMILY**	
Cylindropuntia [=*Opuntia*] *prolifera* (Engelm.) F.M. Knuth	coastal cholla	N
Ferocactus viridescens (Torr. & A. Gray) Britton & Rose	San Diego barrel cactus	N
Mammillaria dioica K. Brandegee	fish-hook cactus	N
Opuntia littoralis (Engelm.) Cockerell.	shore cactus	N
EUPHORBIACEAE	**SPURGE FAMILY**	
Chamaesyce polycarpha (Benth.) Millsp.	spurge	N
Chamaesyce maculata (L.) Small	spotted spurge	I
FABACEAE (LEGUMINOSAE)	**LEGUME FAMILY**	
Astragalus trichopodus (Nutt.) A. Gray var. *lonchus* (M.E. Jones) Barneby	coast locoweed	N

TABLE 3
PLANT SPECIES OBSERVED AT RICE CANYON DETHATCH PATCHES
(continued)

Scientific Name	Common Name	Origin
Melilotus indicus (L.) All.	sourclover	I
GENTIANACEAE	**GENTIAN FAMILY**	
Zeltnera [=*Centaurium*] *venusta* (A. Gray) G. Mans.	canchalagua	N
GERANIACEAE	**GERANIUM FAMILY**	
Erodium botrys (Cav.) Bertol.	long-beak filaree	I
Erodium cicutarium (L.) L'Hér. Ex Aiton	red stemmed filaree	I
LAMIACEAE	**MINT FAMILY**	
Marrubium vulgare L.	horehound	I
MALVACEAE	**MALLOW FAMILY**	
Malva parviflora L.	cheeseweed, little mallow	I
MYRSINACEAE		
Anagallis arvensis L.	scarlet pimpernel, poor-man's weatherglass	I
POLYGONACEAE	**BUCKWHEAT FAMILY**	
Emex spinosa	spiny threecornerjack	I
SIMMONDSIACEAE		
Simmondsia chinensis (Link) C.K. Schneid.	jojoba, goat nut	N
SOLANACEAE	**NIGHTSHADE FAMILY**	
Nicotiana glauca	tree tobacco	I
ANGIOSPERMS: MONOCOTS		
ASPHODELACEAE	**ASPHODEL FAMILY**	
Asphodelus fistulosus L.	hollow-stem asphodel	I
POACEAE (GRAMINEAE)	**GRASS FAMILY**	
Nassella lepida (Hitchc.) Barkworth	foothill needlegrass	N
Schismus barbatus (L.) Thell.	Mediterranean schismus	I

Sensitive