SALT CREEK COASTAL CACTUS WREN HABITAT RESTORATION PROJECT
4TH ANNUAL MONITORING REPORT

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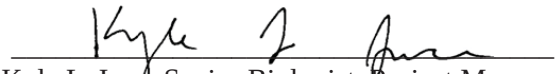

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SALT CREEK COASTAL CACTUS WREN HABITAT RESTORATION PROJECT
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Merkel & Associates, Inc.

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SUMMARY

Merkel & Associates, Inc. (M&A) conducted the fourth annual monitoring assessment for the Salt Creek Coastal Cactus Wren Habitat Restoration Project. Quantitative monitoring was performed on May 21, 2013 (bird survey) and September 17, 2013 (vegetation survey). Information from qualitative assessments of the site was obtained in April, July, and October of 2013 and is provided with this report (Appendix 3).

Avian point counts and vegetation coverage/cactus height was acquired and analyzed for 6 pre-established monitoring stations. These monitoring stations include two restored areas (Stations 1 and 2), two areas that have had previous records of coastal cactus wren (*Campylorhynchus brunneicapillus*) occupation (Stations 3 and 4), and two areas that were assumed to be suitable for cactus wren occupation but no wrens had been observed prior to this study (Stations 5 and 6). The purpose of this report is to provide information in regards to changes in habitat and avian use over time (approximately 4 years) at each of the monitoring stations. This report serves as the fourth annual report of a 5-year monitoring program.

On September 17, 2013, the vegetation along six permanent 25-meter long transects was analyzed, and plant coverage was determined using a point-intercept method. In addition, the heights of 10 coast cholla (*Cylindropuntia prolifera*) were measured along each transect. Transects within restored areas revealed an average total native vegetative cover of 62.0 percent. This is an increase from 2012, which revealed an average total native cover of 56.0 percent. Native plant species included coast cholla, California sagebrush (*Artemisia californica*), San Diego sunflower (*Viguiera laciniata*), and fascicled tarplant (*Deinandra fasciculata*). Tocalote (*Centaurea melitensis*) was the only non-native species recorded within the transects and had an average cover of 2.0 percent. Bare ground averaged 34.0 percent cover. The average coast cholla cactus height within restored areas was 16.3 inches. This is a slight decrease of 0.3 inches from 2012 when the average height was recorded as 16.6 inches. The slight decrease may be at least partially attributable to the random nature of the selection of plants that are measured along each transect. An increase in branching at the expense of upward growth may also be a factor. Transects in areas occupied by coastal cactus wren revealed an average total native vegetative cover of 64.0 percent, comprised of coast cholla and flat-top buckwheat (*Eriogonum fasciculatum*). The annual plant, fascicled tarplant, was not detected on these transects this year which contributed to less native cover compared to last year. Non-native species also was also absent from these transects. The average height of coast cholla within cactus wren occupied habitat was 40.5 inches.

Avian point counts were conducted on May 21, 2013. In general, there were six cactus wren observed at three stations (Station 3, 5, and 6) during the point counts. This is an increase from the counts in 2012 but a decrease from 2010 and 2011. There were no cactus wren located in the restoration area for the first time since our surveys began. No nests were located. Also, the California gnatcatcher (*Polioptilla californica californica*) has decreased in number from the 2012 count but is consistent with the previous counts. Stations 1 and 2 (i.e., the restoration sites) and Station 3 had the highest diversity of species and the highest count of individuals. Station 6 had the lowest diversity of species and Stations 4 and 6 had the lowest count of individuals.

INTRODUCTION

PROJECT BACKGROUND

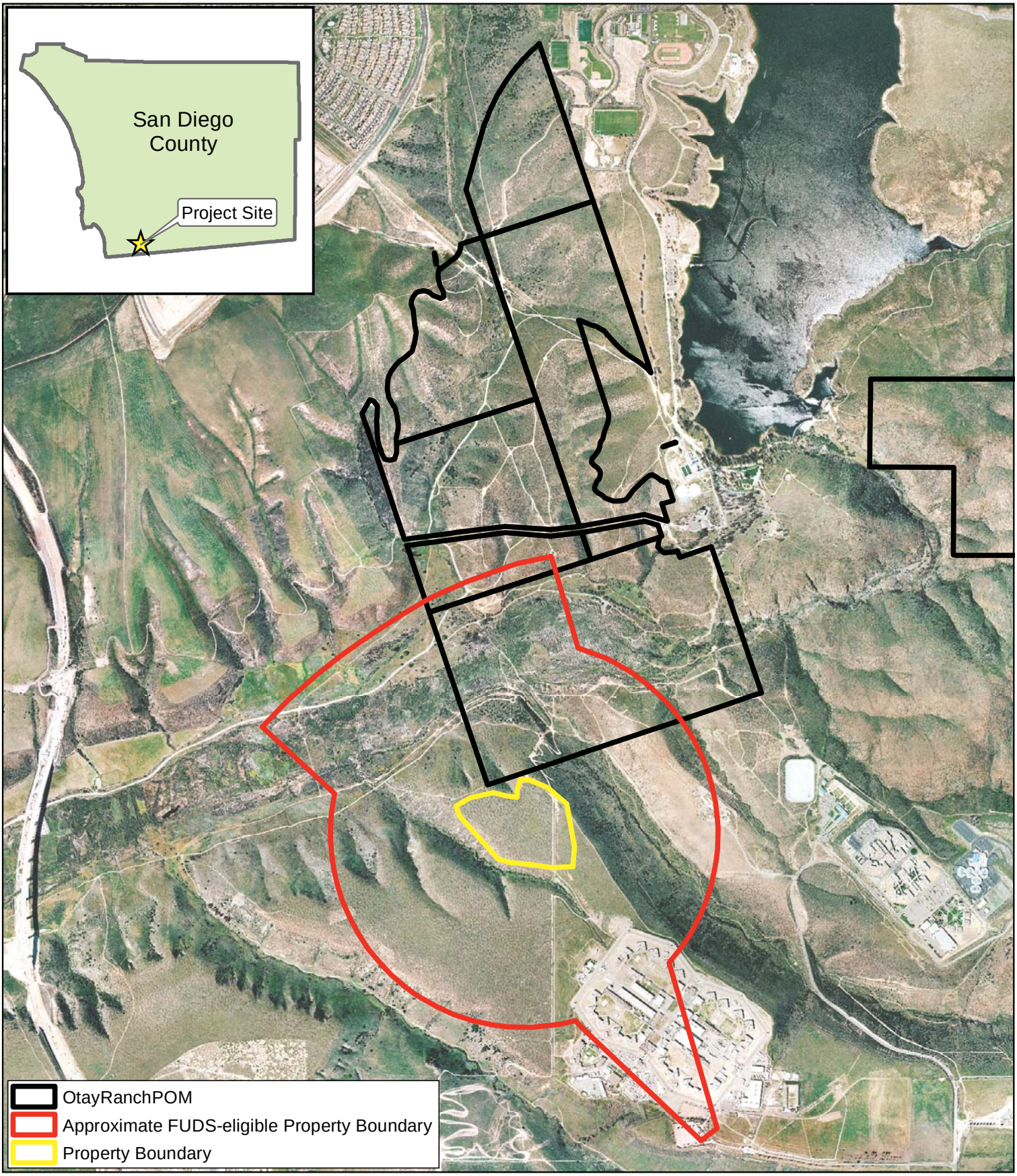
The southern portion of Salt Creek is managed jointly by the County of San Diego and the City of Chula Vista as the Otay Ranch Preserve Owner Manager (POM). Salt Creek has experienced the loss and degradation of coastal cactus wren habitat due to previous grazing, illegal off-road vehicle use, illegal dumping, an increase in invasive plants, drought, and direct competition with non-native plants for light and water. Salt Creek previously supported core regional populations of California gnatcatcher, coastal cactus wren, and coast barrel cactus (*Ferocactus viridescens* var. *viridescens*) as identified in the Multiple Species Conservation Program (MSCP) (Salt Creek Preserve Analysis, Ogden, 1999). In 1996, MSCP GIS data indicated 55 point observations of cactus wren. By 2001, wren locations had declined from 55 to 17 (Dudek and Associates 2001). The purpose of this restoration program is to enhance and expand extant coastal cactus wren habitat within the POM managed lands in the Salt Creek area outside of known formerly used defense (FUD) lands (Figure 1) referred to hereafter as the study area.

It should be noted that the San Diego Field Station of the USGS Western Ecological Research Center conducted field studies of the coastal cactus wren starting in the 2011 spring season in cooperation with the US Fish and Wildlife Service. The goal of this study was to 1) to evaluate the degree of genetic connectivity among cactus wren populations in San Diego County and 2) to study fledgling dispersal. The results will provide information on cactus wren dispersal capabilities, genetic variability, and gene flow among populations that can be used to inform decisions regarding current and future needs for maintaining viable cactus wren populations in coastal California.

In addition, the US Fish and Wildlife Service has been in the process of mapping cactus dominated habitat across San Diego County, after which they were expected to conduct presence/absence surveys for cactus wren. The work included informing USGS when they found an occupied patch so that USGS could monitor nesting activities, with the goal of banding the nestlings for their dispersal study and to collect genetic samples for their genetic connectivity study. Surveys were purportedly conducted between March 2011 and March 2012 by USGS employees and private volunteers. These surveys included walking around or through the scrub during the morning hours to search for birds and nests and to collect genetic samples. Their work was to be confined entirely to the upland scrub habitat within the preserve, and they were not to enter any other parts of the property.

CACTUS WREN BREEDING BIOLOGY

The coastal cactus wren is a federal Candidate 2 Species and a State Species of Special Concern. It occurs along the coastal slope in Ventura, San Bernardino, Los Angeles, Orange, and San Diego Counties as well as Baja California (Solek and Szijj, 2004). The San Diego cactus wren is a subspecies with a more limited range of southern Orange County, San Diego County, and Baja California. The San Diego cactus wren occurs on south and west facing slopes below 1,000 feet elevation. Their territory size ranges from 0.8 to 2.0 ha in size and occurs in cactus dominated coastal sage scrub where the cactus is greater than 1 meter in height. In San Diego County, the cactus wren nests in coast cholla and prickly pear (*Opuntia littoralis*). It is a year-round resident and will have multiple nests for both nesting and roosting. The presence of a nest is not evidence of a nesting pair as old nests are often rehabilitated and new nests can be built just for roosting.



Salt Creek Coastal Cactus Wren Habitat Restoration Project

Vicinity/Boundary Map

Figure 1

The cactus wren is an insectivore, gleening insects from the ground and from vegetation. Cactus wren breeding season is between February 15th and August 15th. The male normally maintains the territorial defense while the female incubates the nest. Juveniles will often remain in the territory even after a new nest is created and aid with territorial defense and feeding the nestlings.

RESTORATION IMPLEMENTATION

During the late summer of 2009, Merkel & Associates biologists reviewed the study area to determine potential areas for cactus salvage and restoration activities. Several potential restoration areas were identified and then presented to Cheryl Goddard and Megan Hamilton of the County's Department of Parks and Recreation during a site meeting on August 13, 2009. Of the sites reviewed, three were mapped and forwarded by the County to the City of Chula Vista (City) for review and comment. Of these three, the City approved a 1.0-acre area, which occurs on land that was previously disturbed for the construction of a lateral sewer line leading from the Arco Olympic Training Center (Figure 2). Merkel & Associates restoration crews salvaged cactus cuttings/plants from November 30, 2009 through December 11, 2009. Cuttings and plants were obtained throughout the POM managed salt creek area within locations that were recorded to be outside occupied cactus wren habitat. An effort was made to obtain cuttings from outside lateral branches in order to avoid reducing the height of affected plants and reduce the potential for nesting by cactus wren. An attempt was also made to reduce each plant by no more than 5 percent of its total cover. The cactus cuttings/plants were stockpiled in small groupings throughout the 1.0-acre planting area and were left to callus from December 12, 2009 to January 6, 2010. Planting occurred from January 6 through January 14, 2010. Plantings were installed on 2 to 3-foot centers throughout the restoration site. An estimated seven to ten thousand cactus plantings were installed. Native seed collected from the nearby area (i.e., southeast Chula Vista) was hand broadcasted over the site on January 14, 2010, just prior to a significant rainstorm event. Seed included approximately 15.0 lbs. of flat-top buckwheat and 10.0 lbs. of a mixture of California sagebrush, San Diego sunflower, coastal deerweed (*Lotus scoparius*), and San Diego bursage (*Ambrosia chenopodiifolia*).

Following this planting effort, Merkel & Associates discovered a similar but smaller nearby area, which had also been disturbed by the aforementioned sewer construction project (i.e., staging area and access road). Subsequent to approval from the County of San Diego and the City of Chula Vista, planting at this 0.4-acre disturbed area commenced on April 29, 2010. Approximately 500 cuttings were obtained from unoccupied habitat within the area. Cuttings were allowed to callus for a period of two weeks and were then planted in mid-May. All planting (and salvaging) ceased when a cactus wren established a nest immediately adjacent to this planting area. Cactus wren nestlings were observed during a previous (early June) monitoring visit. The nestlings were not present during a July 26, 2010 visit of the site, and were presumed to have fledged.

Restoration activities resumed from August 16 to August 18, 2010 with the salvage of an estimated 1,300 to 1,500 cuttings from unoccupied habitat throughout the study area. Cuttings were allowed to callus and then were planted within the 0.4-acre area from September 8 through September 10, 2010. Cacti were planted on approximately 3-foot centers. An estimated total of 1,500 to 2,000 cacti were planted within the 0.4 acre planting area.

METHODS

In 2010, a total of 6 monitoring stations were established within the study area; one was established at each of the two restoration sites (Station 1 and 2), two were established in areas that have had

previous records of cactus wren occupation (Station 3 and 4), and two were established in areas that were presumed to be suitable for coastal cactus wren occupation but did not support cactus wrens prior to the study (Station 5 and 6) (Figure 2). A GPS unit with sub-meter accuracy was used to document the location of each monitoring station for relocation in subsequent years.

VEGETATION

A total of six transects, each 25 meters in length, were established at each of the monitoring stations. The beginning and end of each transect was staked for use throughout the 5-year monitoring period. A GPS unit with sub-meter accuracy was used to record the locations of these stakes. M&A biologists Kyle L. Ince conducted the fourth year vegetation monitoring survey on September 17, 2013 (Table 1).

A point-intercept method was used to determine total plant cover, percent cover of each species, and percent cover of bare ground for each of the six transects (Appendix 1). Plant cover was recorded at intervals of one meter along the tape, providing a total of 25 point intercepts per transect. Because the point-intercept method includes species overlap (absolute cover), percent cover may exceed one hundred percent. Total vegetative cover without overlap (relative cover) was also calculated. In addition, the height of 10 randomly selected coast cholla within and immediately adjacent to each transect was measured using a tape measure. Photographs were taken from the beginning of each transect (Appendix 2).

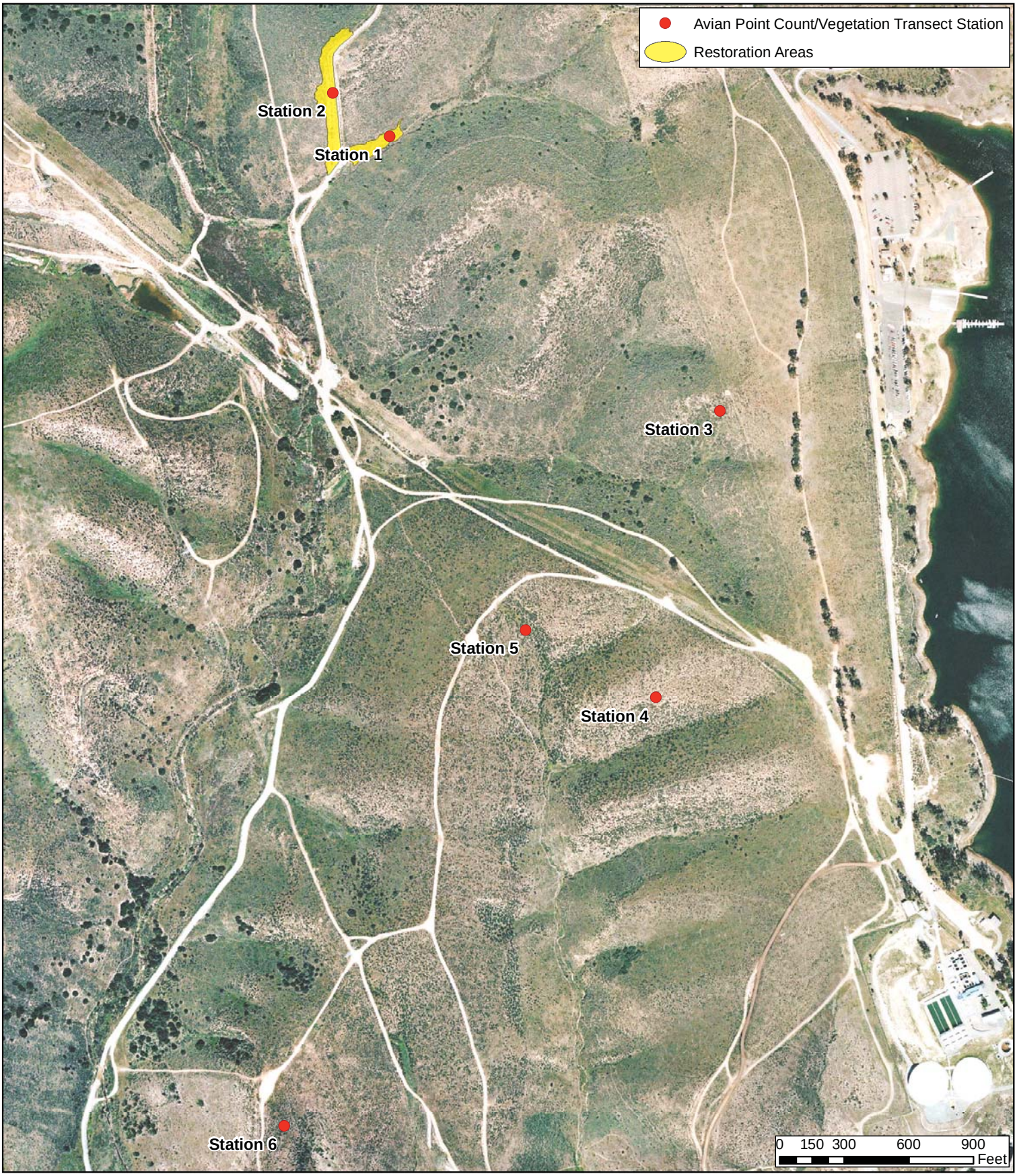
AVIAN POINT COUNTS

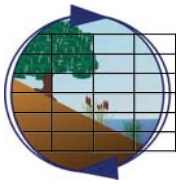
M&A biologist, Bonnie L. Peterson, collected point count information on May 21, 2013 between sunrise and 1000 hours, when the majority of avian species are most vocal. Methods for obtaining, and recording information followed a standardized format for point counts (Ralph et al 1995). Data collected included all birds heard or observed between 0-3 minutes, 3-5 minutes and those heard or observed between 5-10 minutes for a total of 10 minutes per point count station. Bird distance estimates of less than or equal to 50 meters, greater than 50 meters, and flyovers were also recorded for each observation. Two complete counts were done at each station. Following each point count period, Ms. Peterson remained in the area for 5 to 10 minutes to record any additional avian information as well as any information on the cactus wren including the number of pairs, location for nests, etc. All observed cactus wren territories and nests were mapped using a GPS unit with sub-meter accuracy. The following table provides dates, survey times, and weather conditions recorded during the avian monitoring events.

Table 1. Summary of Survey Dates, Times, Conditions, and Biologists

Dates	Time	Conditions (start-end)	Biologist	Task
21 May 2013	0540-0947	Weather: 100%-70% cc Wind: 0 –2 BS Temperature: 58°-66° F	Bonnie L. Peterson	Avian Point Count Monitoring
17 September 2013	0915-1400	Weather: 10% cc Wind: 0-1 BS Temperature: 68°-71° F	Kyle L. Ince	Vegetation Monitoring

cc=cloud cover; BS=Beaufort Scale; F = Fahrenheit





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Salt Creek Coastal Cactus Wren Habitat Restoration Project

Point Count Stations and Restoration Areas

Figure 2

RESULTS

VEGETATION

Restoration Areas

The 1.0-acre restoration site exhibited 68.0 percent vegetative cover (without overlap). Native species provided 64.0 percent cover and included coast cholla, coastal sagebrush, lemonadeberry (*Rhus integrifolia*), and San Diego sunflower, with cover values of 32.0, 28.0, 4.0, and 4.0 percent, respectively. The only non-native species that was intercepted by the transect was red brome (*Bromus rubens* ssp. *madritensis*) which provided 4.0 percent cover. Bare ground comprised 32.0 percent of the transect. The average height of coast cholla along this transect was 17.1 inches (1.4 feet).

The 0.4-acre restoration site exhibited 64.0 percent vegetative cover (without overlap). Native species comprised 60.0 percent of the transect and included fascicled tarplant (*Deinandra fasciculata*) coast cholla, coastal sagebrush, and flat-top buckwheat with cover values of 32.0, 20.0, 4.0, and 4.0 percent, respectively. One non-native species, tocalote (*Centaurea melitensis*), was recorded within the transect. It revealed an average cover of 4.0%. Bare ground comprised 36.0 percent of the transect. The average height of coast cholla along this transect was 15.4 inches (1.3 feet).

Occupied Cactus Wren Habitat

Average vegetative cover for occupied cactus wren habitat was 66.0 percent (without overlap). Native species provided 64.0 percent cover and included coast cholla and flat-top buckwheat with average cover values of 32.0 and 34.0 percent, respectively. No non-native species were intercepted by the transect. The average bare ground cover for these two transects was 36.0 percent. The average height of coast cholla was 40.5 inches (3.3 feet).

Suitable but Non-occupied Cactus Wren Habitat

Average vegetative cover for suitable but non-occupied cactus wren habitat was 92.0 percent (without overlap). Native species provided 90.0 percent cover and included flat-top buckwheat, coast cholla, and San Diego sunflower with average cover values of 44.0, 18.0, and 2.0 percent, respectively. Non-native species consisted of red brome (*Bromus madritensis* ssp. *rubens*), with an average cover value of 16.0 percent. The average bare ground cover for these two transects was 8.0 percent. The average height of coast cholla was 39.0 inches (3.3 feet).

AVIAN POINT COUNTS

All results from the point count survey in 2013 are recorded in Table 2. In general, there were six coastal cactus wren observed during the point counts in 2013. These were observed on three stations including Station 3, 5, and 6. Three wrens were observed at Station 5 and they appeared to be a family even though they were feeding independent of one another. No cactus wren were observed on the restoration sites. This year there were a total of five individual California gnatcatchers observed; one individual at Station 1, which is a restoration site, and three at Station 3. Three of the four birds were observed either before or after the actual point count but not heard during the count.

Table 2. Birds Observed During May 2013 Avian Point Counts at Salt Creek

SPECIES		Station 1	Station 2	Station 3	Station 4	Station 5	Station 6
American Crow	*Corvus brachyrhynchos*			1			
Anna's Hummingbird	*Calypte anna*					1	
Bewick's Wren	*Thryomanes bewickii*	3					
Black-headed Grosbeak	*Pheucticus melanocephalus*	1	1				
Bushtit	*Psaltriparus minimus*		4				
California Gnatcatcher	***Polioptila californica californica***			**1**			
California Towhee	*Pipilo crissalis*	4	2	1	2	2	
California Quail	*Callipepla californica*	4	3	8	4		
California Thrasher	*Toxostoma redivivum*	2	1	1			1
Cactus Wren	***Campylorhynchus brunneicapillus***			**2**		**3**	**1**
Common Raven	*Corvus corax*						1
Common Yellowthroat	*Geothlypis trichas*		1				
Greater Roadrunner	*Geococcyx californianus*		2				
House Finch	*Carpodacus mexicanus*			2			
Least Bell's Vireo	*Vireo bellii pusillus*		1				
Lesser Goldfinch	*Spinus psaltria*	5		2		1	1
Mourning Dove	*Zenaida macroura*		3	8			1
Northern Mockingbird	*Mimus polyglottos*		1	4	2	1	
Rufous-crowned Sparrow	*Aimophila ruficeps canescens*	2		1	3	1	
Red-tailed Hawk	*Buteo jamaicensis*		1*				
Red-winged Blackbird	*Agelaius phoeniceus*		1				
Song Sparrow	*Melospiza melodia*	1					
Spotted Towhee	*Pipilo maculates*	2	3				1
Western Meadowlark	*Sturnella neglecta*					1	
Wrentit	*Chamaea fasciata*	1	1	1			
Yellow-breasted Chat	*Icteria virens*		1				
Total Number of Birds		**25**	**26**	**32**	**11**	**10**	**6**
Total Number of Species		**10**	**15**	**12**	**4**	**7**	**6**
Additional Species (includes flyovers)							
Barn Swallow	*Hirundo rustica*						1
Bushtit	*Psaltriparus minimus*	10					
Common Raven	*Corvus corax*		1	2	1		
California Gnatcatcher	***Polioptila californica californica***	**1**		**2**			
Mallard	*Anas platyrhynchos*	2					
Mourning Dove	*Zenaida macroura*			2			
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*					1	

Stations 1 & 2 – Restoration Areas
Stations 3 & 4 – Recorded as Occupied Cactus Wren Habitat
Stations 5 & 6 –Suitable but Historically Non-occupied Cactus Wren Habitat
* observed on nest

Restoration Areas

This year there were no cactus wrens observed at Stations 1 or 2, which were part of an established territory that used in 2010 and 2011.

Station 1, 2, and 3 had the highest diversity and abundance of species. Station 3 had a high number of individuals (32 birds) along with a fairly high number of species (12). Station 2 had the highest number of species (15). Part of the diversity at Station 1 and 2 is due to birds heard from a nearby wetland. One male least Bell's vireo (*Vireo bellii pusillus*), two common yellowthroat (*Geothlypis trichas*), and one yellow-breasted chat (*Icteria virens*) were heard singing in the riparian habitat. Two mallard (*Anas platyrhynchos*) were also observed flying over and are probably associated with the wetland. There was an active red-tailed hawk (*Buteo jamaicensis*) nest to the west of Station 2 in a tall eucalyptus tree. This is an established nest and has been active for many years. The nest was observed with one adult siting on the nest. Two greater roadrunner (*Geococcyx californianus)* were also observed at Station 2.

Occupied Cactus Wren Habitat

Station 3 exhibits excellent cactus wren habitat with several 4.5 to 5 feet tall coast cholla and Mexican elderberry (*Sambucus mexicana*) occurring nearby. Two coastal cactus wrens were observed at this station during the point counts but they were greater than 50 meters from the point count station. There were no cactus wrens observed at Station 4. Station 3 had a large number of species and had the largest number of individuals (32). The high number of individuals was reflective of a few species including mourning dove (*Zenaida macroura*) (8 individuals) and California quail (*Callipepla californica)* (8 individuals). This is similar to past years. Station 4 had the lowest number of species (4) of all the point count stations.

Suitable but Non-occupied Cactus Wren Habitat

Four cactus wrens were observed in this study area; Station 5 (3 individuals) and Station 6 (1 individual). This was a record high for the previous three years of study. The only other year that cactus wren were observed at these stations was in 2011 when a pair of cactus wren were observed nest building at Station 5. This year, the three individuals observed at Station 5 appeared to be a family; however, they were all observed foraging independently. No gnatcatchers were observed at these stations.

Station 6 had only six avian species and a low number (6) of individuals.

Quantitative and Qualitative Analysis

The average native vegetative growth for both restoration sites has increased from 26.0 percent in 2010 to 42.0 percent in 2011, to 56.0 percent in 2012 and finally 62.0 percent in 2013. Cacti coverage increased from 24.0 percent in 2012 to 26.0 percent in 2013. In all years previous to 2013, average cacti height has increased from 14.6 inches in 2010 to 16.4 inches in 2011 to 16.6 percent in 2012. In 2013, average cactus height slightly decreased to 16.3 inches. This is likely attributable to the random selection of the plants that are measured along each transect. Lateral, basal branching in lieu of upward growth may also be a contributing factor and would explain the slight increase in cacti coverage from 2012 to 2013.

Figures 3 and 4 depict the change in coverage and height, respectively, throughout the monitoring period for each of the studied site conditions.

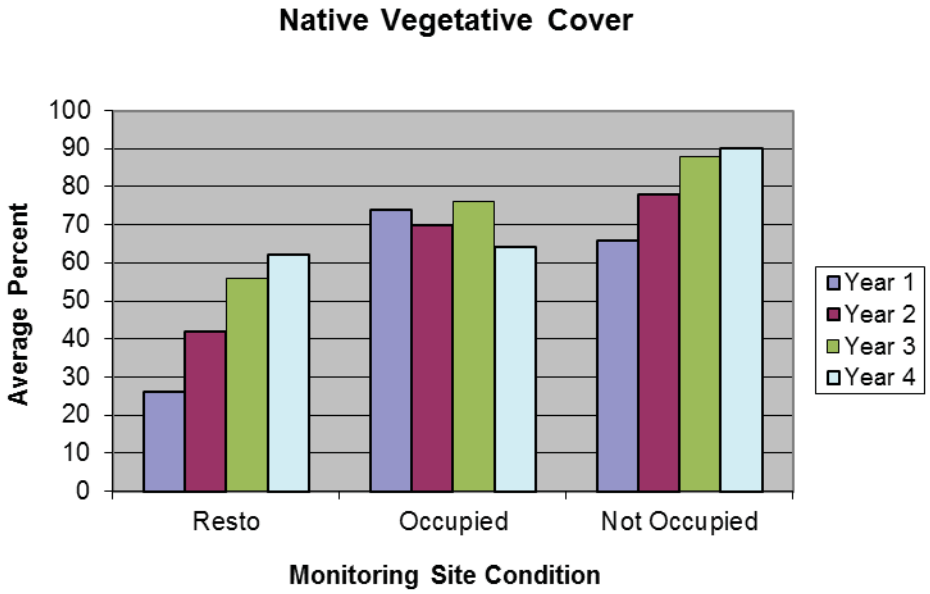

Figure 3. Average Percent Cover of Native Vegetation for Three Studied Site Conditions Over 4 Years. *Site Condition 1 = Restoration Areas, Site Condition 2 = Areas Recorded as Occupied by Cactus Wren, Site Condition 3 = Areas Suitable but Not Occupied by Cactus Wren.*

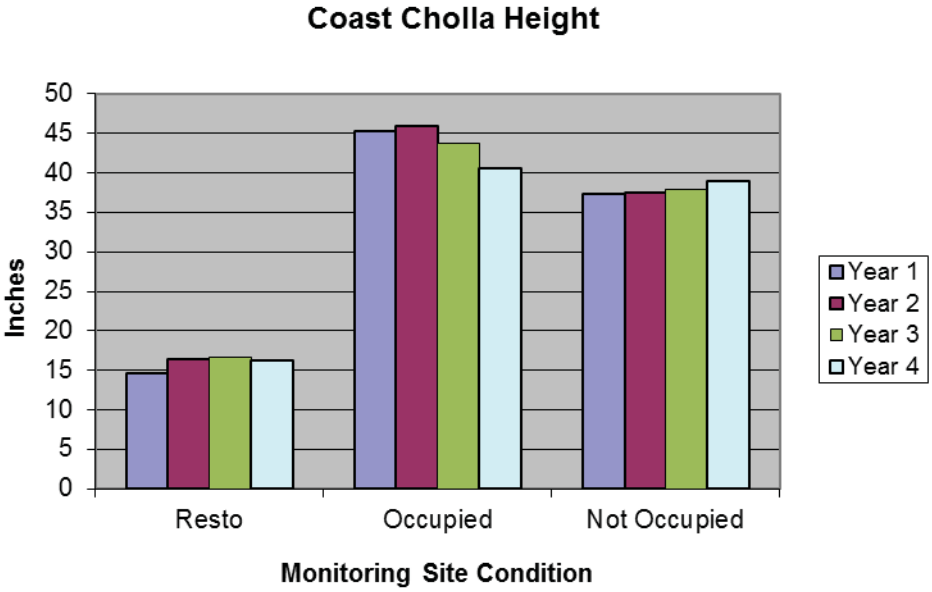

Figure 4. Coast Cholla Height for Three Studied Site Conditions Over a Period of 4 Years. *Site Condition 1 = Restoration Areas, Site Condition 2 = Occupied Cactus Wren Area, Site Condition 3 = Suitable but Not Occupied Cactus Wren Area.*

Stations 1, 2, and 3 have the highest avian species diversity and the highest counts of individuals of all the point count stations. These sites also appear to have less coverage from California buckwheat than Stations 4, 5, and 6. California buckwheat is a known dominant species in cactus wren habitat; however, there have been no studies that show the ideal percent cover for nesting habitat. It is also unknown if this has any correlation with species abundance and diversity.

In 2013, Station 6 had the lowest number of individuals and close to the lowest number of species, which is consistent to counts in 2012 and 2013 but in contrast with 2010. Station 6 has a high percent cover of California buckwheat and a high percent cover of non-native grasses along the transect.

In general, there was an increase in the number of cactus wren observed during the point counts compared to the number observed in 2012 but still a decline over sightings in 2011 and 2010 (Figure 5). This year, there were only 6 cactus wrens (Station 3, 5, and 6) observed at 3 of the 6 sites. This compares to a high of 9 individuals at 5 sites in 2011. There also appeared to be a decrease in the number of California gnatcatchers observed (Figure 6) in 2012 but comparable to those counted in previous years. This year there were a total of 4 individuals observed at all sites, while in 2012 there was a high of 8 individuals spread over all the sites.

The results of the point counts show that the number of cactus wren detected increased from 2010 to 2011 but declined in 2012 and then increased again in 2013. No cactus wren were detected on the restoration areas after having an active pair there for at least two years. It is possible that a nesting pair might not be detected during the point counts depending on their breeding status and where they are in the nesting cycle; however, M&A staff did not detect cactus wren activity in the restoration areas during any of their 2013 qualitative site assessments. There was also a slight decline in cactus wren on the sites that have been recorded as occupied by the species. To make this even more interesting, the areas that appeared suitable but not occupied prior to the point counts appear to be very dynamic with detections that only occur every second year. These detections have included either multiple pairs or fledglings.

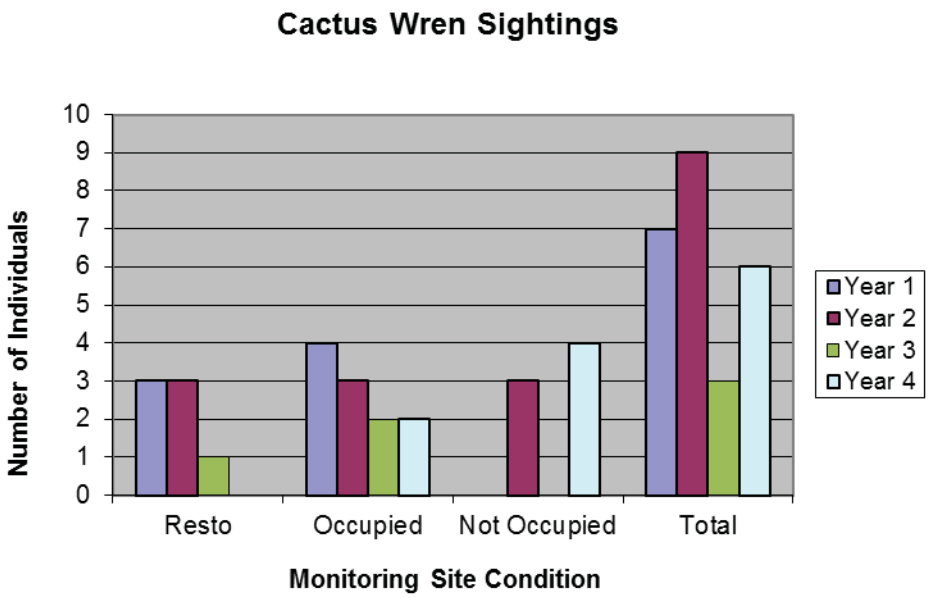

Figure 5. Year 1, 2, 3, and Year 4 Cactus Wren Sightings for Three Studied Site Conditions. *Site Condition 1 = Restoration Areas, Site Condition 2 = Occupied Cactus Wren Area, Site Condition 3 = Suitable but Not Occupied Cactus Wren Area.*

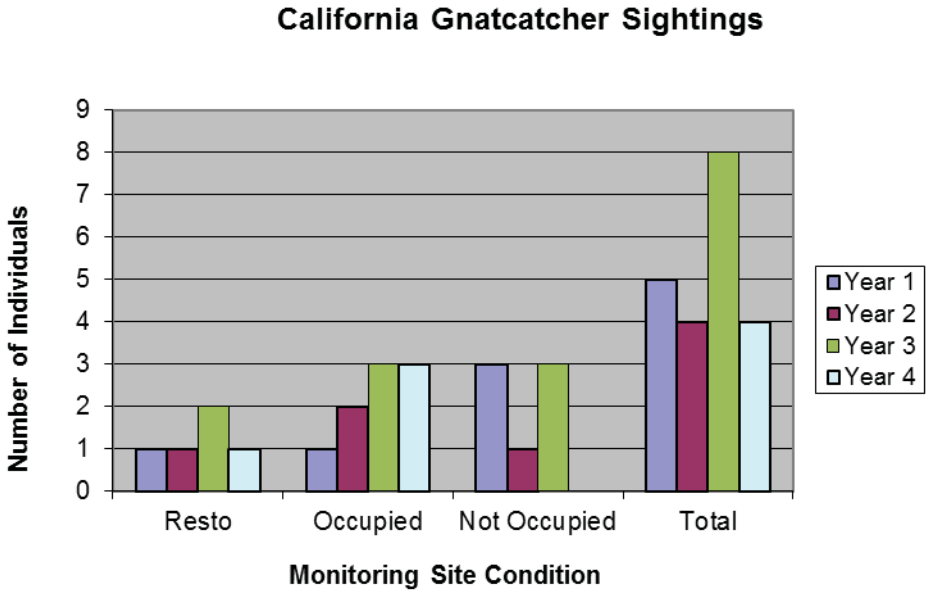

Figure 6. Year 1, 2, 3, and Year 4 California Gnatcatcher Sightings for Three Studied Site Conditions. *Site Condition 1 = Restoration Areas, Site Condition 2 = Occupied Cactus Wren Area, Site Condition 3 = Suitable but Not Occupied Cactus Wren Area.*

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APPENDIX 1. TRANSECT SAMPLING DATA

Monitoring Results

Plant Species	Percent Cover					
	Transect 1	Transect 2	Transect 3	Transect 4	Transect 5	Transect 6
Coastal Sagebrush (*Artemisia californica*)	4.0	28.0				
Laciniate Spineflower (*Chorizanthe fimbriata* var. *laciniata)*						
Nievitas Cryptantha (*Cryptantha intermedia*)						
Coast Cholla (*Cylindropuntia prolifera*)	20.0	32.0	48.0	16.0	36.0	
Fascicled Tarplant (*Deinandra fasciculatum*)	32.0				56.0	
Flat-top Buckwheat (*Eriogonum fasciculatum* var. *fasciculatum*)	4.0		24.0	44.0		88.0
Lemonadeberry *(Rhus integrifolia)*		4.0				
San Diego Sunflower (*Viguiera laciniata*)						4.0
**Red Brome (*Bromus madritensis* ssp. *rubens*)*		4.0				32.0
Tocalote (*Centaurea melitensis*)*	4.0					
Bare Ground	36.0	32.0	32.0	40.0	12.0	4.0
Total Percent Vegetative Cover (with overlap)	64.0	68.0	72.0	60.0	92.0	124.0
Total Percent Vegetative Cover (without overlap)	64.0	68.0	68.0	60.0	88.0	96.0
Total Percent Native Vegetative Cover (with overlap)	60.0	64.0	72.0	60.0	92.0	92.0
Total Percent Native Vegetative Cover (without overlap)	60.0	64.0	68.0	60.0	88.0	92.0
Total Percent Non-native Vegetative Cover (without overlap)	4.0	4.0	0.0	0.0	0.0	32.0

* Non-native Species

** May be mixed with other species of grass (very dry and difficult to identify)

	Restoration Sites no previous known CAWR nesting
	Previous records of CAWR nesting
	Suitable habitat for CAWR but not a recorded nesting site

APPENDIX 2. TRANSECT PHOTOGRAPHS

Photo Point 1. Viewing north from the southern end of the 1.0-acre restoration site prior to planting.

Photo Point 2. Viewing south at the southern half of the 1.0-acre restoration site prior to planting.

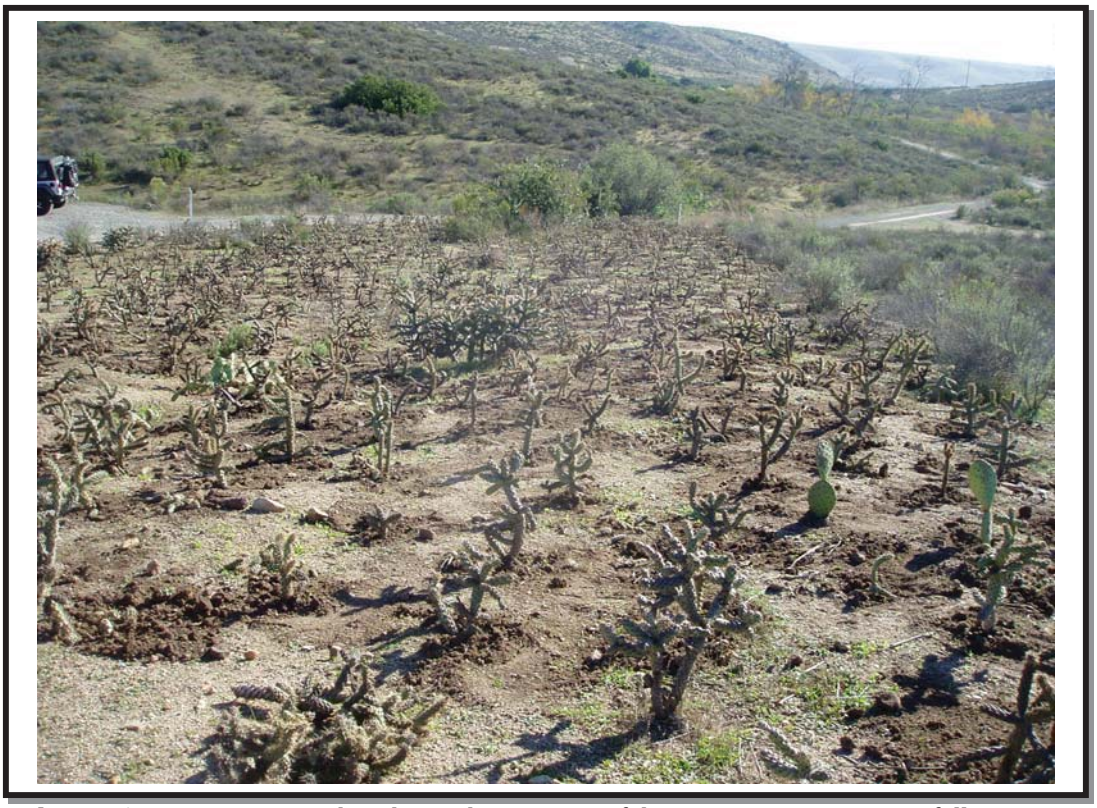

Photo Point 3. Viewing south at the southern portion of the 1.0-acre restoration site following planting.

Photo Point 4. Viewing south near the northern end of the 1.0-acre restoration site following planting.

Photo Point 5. Habitat restoration crews planting cactus at the 1.0-acre restoration site.

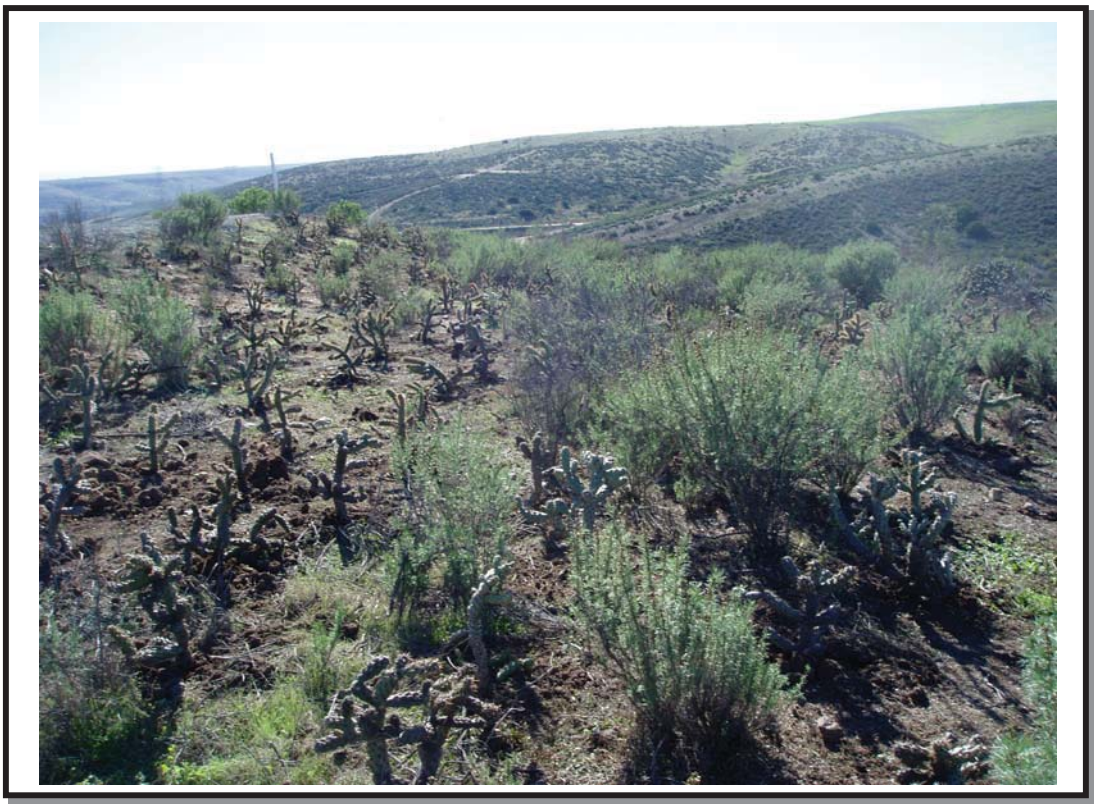

Photo Point 6. Viewing southwest at the northern portion of the 1.0-acre restoration site.

Photo Point 7. Viewing south from the northern end of the 1.0-acre restoration site. Photo taken on May 24, 2010.

Photo Point 8. Viewing northeast at the 0.4-acre restoration site following initial planting. Photo taken September 9, 2010.

Photo Point 9. Viewing east at 0.4 acre restoration site.

Photo Point 10. Viewing south at Transect 2 (1.0 acre restoration site). Photo taken September 17, 2013.

Photo Point 11. Viewing southwest at Transect 3 (cactus wren occupied habitat). Photo taken September 17, 2013.

Photo Point 12. Viewing southwest at Transect 4 (cactus wren occupied habitat). Photo taken September 17, 2013.

Photo Point 13. Viewing northwest at Transect 5 (presumed suitable and now occupied cactus wren habitat). Photo taken September 17, 2013.

Photo Point 14. Viewing southwest at Transect 6 (presumed suitable but unoccupied cactus wren habitat). Photo taken September 17, 2013.

Photo Point 15. Woodrat (*Neotoma* sp.) nest within cactus at 1.0 acre restoration site. Photo taken September 17, 2013.

Photo Point 16. Cactus wren (*Campylorhynchus brunneicapillus*) nest located near Transect 3 (cactus wren occupied habitat). Photo taken September 17, 2013.

APPENDIX 3. QUARTERLY MONITORING REPORTS

Merkel & Associates, Inc.
5434 Ruffin Road, San Diego, CA 92123
Tel: 858/560-5465 • Fax: 858/560-7779
e-mail: associates@merkelinc.com

May 7, 2013
M&A #09-048-01

Ms. Cheryl Goddard
Department of Parks and Recreation
County of San Diego
9150 Chesapeake Drive, Suite 200
San Diego, CA 92123

Re: Year 4, 1st Quarterly Progress Report for the Salt Creek Coastal Cactus Wren Habitat Enhancement/Restoration Project

Dear Cheryl:

The purpose of this letter is to provide you with a progress report of the Salt Creek Coastal Cactus Wren Habitat Enhancement/Restoration Project. Merkel & Associates (M&A) visited the site on April 17, 2013. Both the 1.0-acre and 0.4-acre areas continue to thrive. Nearly all of the observed cacti looked healthy. Native plants including broom matchweed (*Guiterrezia sarothrae*) and broom baccharis (*Baccharis sarothroides*) continue to naturally colonize the areas. The cactus appear to have grown since our last visit during the fall, and it is becoming more difficult to walk throughout the restoration areas. New cacti also continue to establish on the site from pieces dislodged from planted plants. The native annual tarplant (*Deinandra fasciculatum*) is once again abundant on site. Maintenance has occurred periodically to reduce competition from larger weeds such as mustard (*Brassica nigra*). Non-native grasses such as red brome (*Bromus madritensis*), and annual forbs including tocalote (*Centaurea melitensis*) are still common, especially at the 1.0-acre site. M&A will continue to maintain the site as needed. The cactus were watered the last week of April to supplement natural rainfall and assist with increasing growth.

I have attached photos of the restoration areas for your review. If you have any questions, please do not hesitate to contact me at Kince@merkelinc.com or (858) 560-5465.

Sincerely,

Kyle L. Ince
Project Biologist

PHOTO PAGES

Photo Point 1. Viewing north at 1.0-acre site. Photo taken April 17, 2013.

Photo Point 2. Viewing south at 1.0-acre site. Photo taken April 17, 2013.

Photo Point 3. Viewing east at 0.4-acre site. Photo taken April 17, 2013.

Photo Point 4. Viewing west at 0.4-acre site. Photo taken April 17, 2013.

Photo Point 5. Viewing new growth of coastal sagebrush (*Artemisia californica*) and coast cholla (*Cylindropuntia prolifera*) at 0.4-acre site. Photo taken April 17, 2013.

Photo Point 6. Viewing planted coast cholla with new growth at tips of stems. Photo taken April 17, 2013.

Merkel & Associates, Inc.
5434 Ruffin Road, San Diego, CA 92123
Tel: 858/560-5465 • Fax: 858/560-7779
e-mail: associates@merkelinc.com

July 26, 2013
M&A #09-048-01

Ms. Cheryl Goddard
Department of Parks and Recreation
County of San Diego
9150 Chesapeake Drive, Suite 200
San Diego, CA 92123

Re: Year 4, 2nd Quarterly Progress Report for the Salt Creek Coastal Cactus Wren Habitat Enhancement/Restoration Project

Dear Cheryl:

The purpose of this letter is to provide you with a progress report of the Salt Creek Coastal Cactus Wren Habitat Enhancement/Restoration Project. Merkel & Associates (M&A) visited the site on July 19, 2013. Both the 1.0-acre and 0.4-acre areas continue to thrive. Nearly all of the observed cacti looked healthy. Native plants including broom matchweed (*Guiterrezia sarothrae*), broom baccharis (*Baccharis sarothroides*), and flat-top buckwheat (*Eriogonum fasicuclautm*) continue to naturally colonize the areas. Coyote (*Canis latrans*) and Jackrabbit (*Lepus californicus*) scat was observed in the restoration areas. Several flat-top buckwheat seedlings appeared to have been grazed, likely by rabbits. A California gnatcatcher (*Polioptila californica*) was heard just east of the 1.0-acre site. Maintenance has occurred periodically to reduce competition from larger weeds such as mustard (*Brassica nigra*). M&A will continue to maintain the site as needed. The cactus were hand-watered three weeks ago to supplement natural rainfall and assist with increasing growth. M&A will also collect flat-top buckwheat (*Eriogonum fasiculatum* var. *fasiculatum*) seed from the area in the following weeks to sow on-site during the winter.

I have attached photos of the restoration areas for your review. If you have any questions, please do not hesitate to contact me at Kince@merkelinc.com or (858) 560-5465.

Sincerely,

Kyle L. Ince
Project Biologist

PHOTO PAGES

Photo Point 1. Viewing east at 0.4-acre site. Photo taken July 19, 2013.

Photo Point 2. Viewing east at 0.4-acre site. Photo taken July 19, 2013.

Photo Point 3. Flat-top buckwheat (*Eriogonum fasciculatum*) seedlings at 0.4-acre site.

Photo Point 4. Viewing north at 1.0-acre site. Photo taken July 19, 2013.

Photo Point 5. Viewing south at 1.0-acre site. Photo taken July 19, 2013

Photo Point 6. Viewing north near northern end of 1.0-acre site.

Merkel & Associates, Inc.
5434 Ruffin Road, San Diego, CA 92123
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e-mail: associates@merkelinc.com

October 31, 2013
M&A #09-048-01

Ms. Cheryl Goddard
Department of Parks and Recreation
County of San Diego
9150 Chesapeake Drive, Suite 200
San Diego, CA 92123

Re: Year 4, 3rd Quarterly Progress Report for the Salt Creek Coastal Cactus Wren Habitat Enhancement/Restoration Project

Dear Cheryl:

The purpose of this letter is to provide you with a progress report of the Salt Creek Coastal Cactus Wren Habitat Enhancement/Restoration Project. Merkel & Associates (M&A) visited the site on October 30, 2013. Both the 1.0-acre and 0.4-acre areas continue to thrive. The survey followed a rain event that occurred two days prior that brought less than 0.02 inches of rain to the area. Most of the cacti looked healthy. The stems of many of the sage scrub plants, including the cacti, are beginning to turn green, as they enter into the winter growing season. Jackrabbit (*Lepus californicus*) scat was once again observed in both restoration areas. Three desert woodrat nests (*Neotoma lepida intermedia*) were observed along the eastern edge of the 1.0-acre site.

Maintenance requirements have been minimal throughout the summer months, given the typical lack of weed growth during this time of year. The buckwheat seed that was collected during the summer months will be sown at both sites during the late fall, prior to a rain event.

Quantitative monitoring of the site was conducted in late September. Native vegetative growth increased from 56.0 percent in 2012 to 62.0 percent in 2013, while average cacti height remained approximately the same at 16.0 inches. This may suggest that basal branching/lateral growth increased at the expense of upward growth this year. Many of the cacti do appear to look wider in stature than observed in previous years. Several new patches of cacti have also formed from dislodged branches of planted cacti (see attached photos). A report detailing the results of the 4th year's quantitative survey is forthcoming.

I have attached photos of the restoration areas for your review. If you have any questions, please do not hesitate to contact me at Kince@merkelinc.com or (858) 560-5465.

Sincerely,

Kyle L. Ince
Project Biologist

PHOTO PAGES

Photo Point 1. Viewing east at 0.4-acre site.

Photo Point 2. Viewing north at 1.0-acre site.

Photo Point 3. Woodrat (*Neotoma lepida intermedia*) nest within 1.0-acre site.

Photo Point 4. New cacti growth from stems dislodged from planted cacti at 0.4-acre site.