SALT CREEK COASTAL CACTUS WREN HABITAT RESTORATION PROJECT
3RD ANNUAL MONITORING REPORT

Prepared for:

County of San Diego
Parks and Recreation Department
9150 Chesapeake Drive, Suite 200
San Diego, CA 92123
Attention: Ms. Cheryl Goddard
Phone: (858) 966-1374

Prepared by:

Merkel & Associates, Inc.
5434 Ruffin Road
San Diego, California 92123
Contact: Mr. Kyle L. Ince
Phone: (858) 560-5465
Fax: (858) 560-7779

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Kyle L. Ince, Senior Biologist, Project Manager

Bonnie L. Peterson, Senior Biologist

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Merkel & Associates, Inc.

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SUMMARY

Merkel & Associates, Inc. (M&A) conducted the third annual monitoring assessment for the Salt Creek Coastal Cactus Wren Habitat Restoration Project. Quantitative monitoring was performed on May 10, 2012 (bird survey) and October 5, 2012 (vegetation survey). Information from qualitative assessments of the site was obtained in April, July, and October of 2012 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 (*Camplyorhynchus brunneicapillus*) occupation (Stations 3 and 4), and two areas that were assumed to be suitable for cactus wren occupation but no wrens have 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 5 years) at each of the monitoring stations. This report serves as the third annual report of a 5-year monitoring program.

On October 5, 2012, 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 56.0 percent. This is an increase from 2011, which revealed an average total native cover of 42.0 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 at 2.0 percent cover. Bare ground averaged 42.0 percent cover. The average coast cholla cactus height within restored areas was 16.6 inches. This is only a modest increase of 0.2 inches from 2011 when the average height was recorded as 16.4 inches. The increase in native cover and cactus height is attributable to on-going maintenance including hand watering of cactus within the restoration areas. Transects in areas occupied by coastal cactus wren revealed an average total native vegetative cover of 72.0 percent comprised of coast cholla, flat-top buckwheat (*Eriogonum fasciculatum*), and fascicled tarplant. Non-native species averaged 12.0 percent and bare ground averaged 14.0 percent. The average height of coast cholla within cactus wren occupied habitat was 43.9 inches.

Avian point counts were conducted on May 10, 2012. In general there were fewer cactus wren observed during the point counts than there has been since the surveys began in 2010. They were detected only in Stations 2 and 3. No nests were located. Also, the California gnatcatcher (*Polioptilla californica californica*) has increased slightly in number and was detected at all point count stations, as revealed by point count data. 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 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 the cactus across San Diego County, after which they were expected to conduct presence/absence surveys. 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, and included walking around or through the scrub during the morning hours to search for birds and nests and to collecting 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.

During the week of November 5th, 2012, restoration crews for RECON Environmental removed approximately 150 planted cacti from revegetation associated with Station 2 for the purpose of planting elsewhere within the preserve. These plants were returned and re-planted on November 29th. The impacts to the site were incurred after both the avian point count and vegetation monitoring were conducted. The impacts will unlikely have a significant negative affect on the project. No cactus wren have been currently noted to utilize planted cacti within Station 2.

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

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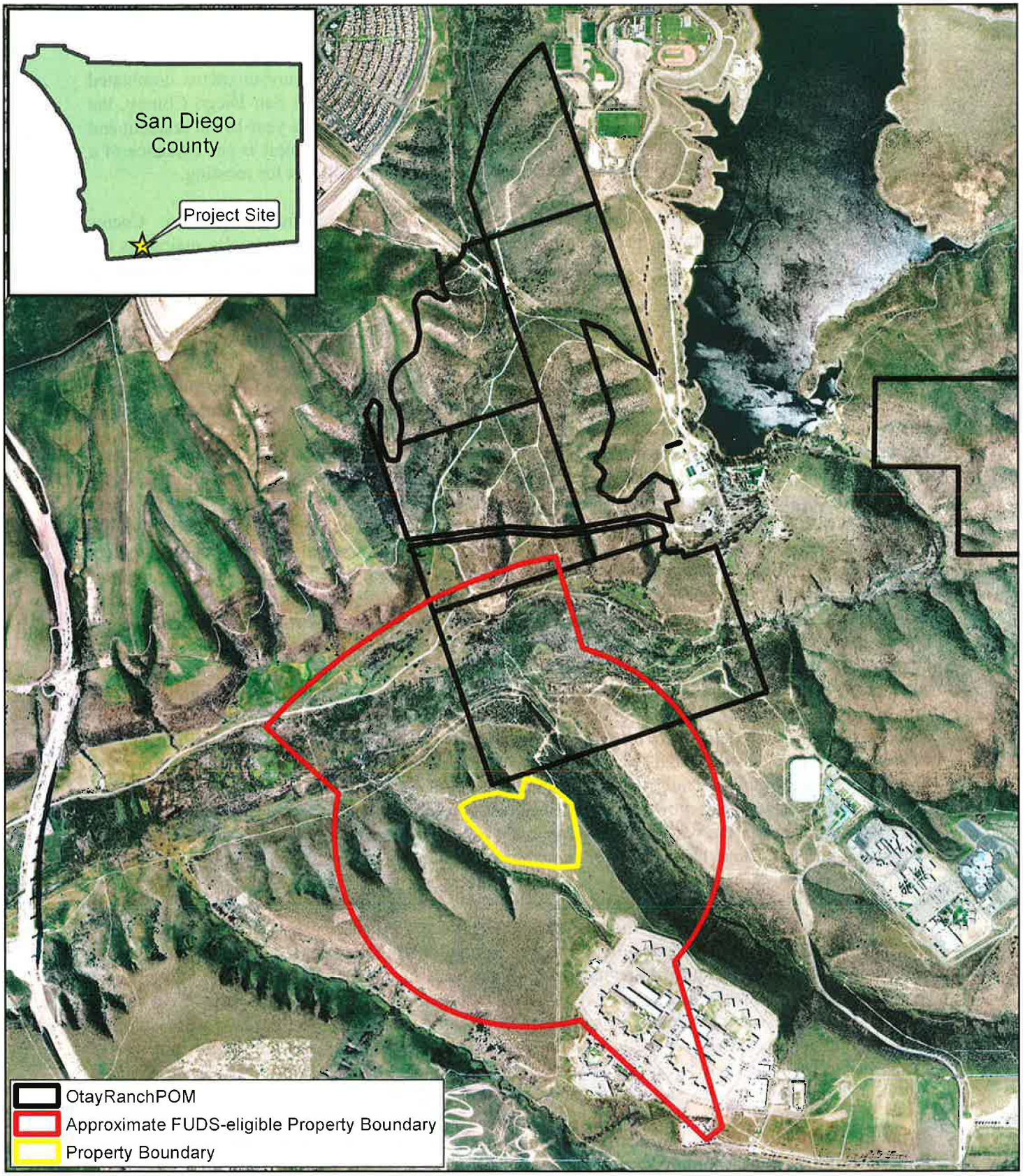


Salt Creek Coastal Cactus Wren Habitat Restoration Project

Vicinity/Boundary Map

Figure 1

Merkel & Associates, Inc.

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.

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 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.

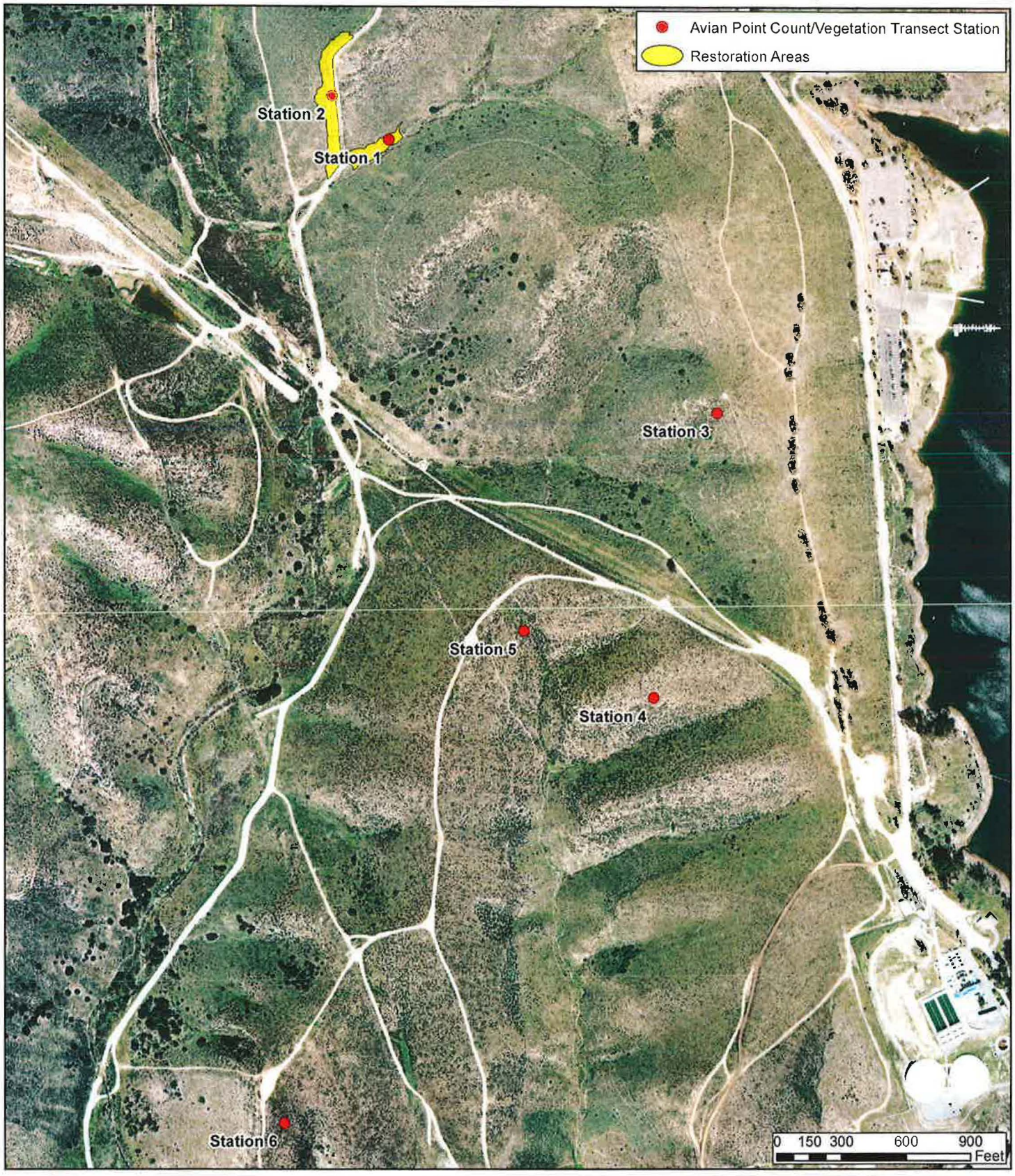
VEGETATION

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 and Bonnie L. Peterson conducted the third year vegetation monitoring survey on October 5, 1012 (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 takes species overlap (absolute cover) into account, 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 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 10, 2012 between sunrise and 1100 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.



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Salt Creek Coastal Cactus Wren Habitat Restoration Project

Point Count Stations and Restoration Areas

Figure 2

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

Dates	Time	Conditions (start-end)	Biologist	Task
10 May 2012	0600-1125	Weather: 100%-0% cc Wind: 1 –3 BS Temperature: 57°-66° F	Bonnie L. Peterson	Avian Point Count Monitoring
5 October 2012	0920-1130	Weather: 25% cc Wind: 0-1 BS Temperature: 67°-71° F	Kyle L. Ince Bonnie L. Peterson	Vegetation Monitoring

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

RESULTS

VEGETATION

Restoration Areas

The 1.0-acre restoration site exhibited 68.0 percent vegetative cover (without overlap). Native species provided all 68.0 percent cover and included coast cholla, coastal sagebrush, lemonadeberry (*Rhus integrifolia*), and San Diego sunflower, with cover values of 28.0, 24.0, 4.0, and 4.0 percent, respectively. No non-native plants were intercepted by the transect. Bare ground comprised 32.0 percent of the transect. The average height of coast cholla along this transect was 18.1 inches (1.5 feet).

The 0.4-acre restoration site exhibited 48.0 percent vegetative cover (without overlap), which was comprised of 20.0 percent coast cholla and 20.0 percent fascicled tarplant. One non-native species was recorded within the transect; tocalote with a cover of 4.0%. Bare ground comprised 52.0 percent of the transect. The average height of coast cholla along this transect was 15.2 inches (1.3 feet).

Occupied Cactus Wren Habitat

Average vegetative cover for occupied cactus wren habitat was 72.0 percent (without overlap). Native species provided 66.0 percent cover and included coast cholla, flat-top buckwheat, and fascicled tarplant with average cover values of 36.0, 38.0 and 2.0 percent, respectively. Non-native species occurring within the understory included non-native grasses and tocalote, with an average cover value of 8.0 percent and 6.0 percent, respectively. The average bare ground cover for these two transects was 28.0 percent. The average height of coast cholla was 43.9 inches (3.7 feet).

Suitable but Non-occupied Cactus Wren Habitat

Average vegetative cover for suitable but non-occupied cactus wren habitat was 90.0 percent (without overlap). Native species provided 88.0 percent cover and included flat-top buckwheat, coast cholla, and San Diego sunflower with average cover values of 72.0, 14.0, and 2.0 percent, respectively. Non-native species consisted of red brome (*Bromus madritensis* ssp. *rubens*), with an average cover value of 2.0 percent. The average bare ground cover for these two transects was 10.0 percent. The average height of coast cholla was 37.9 inches (3.2 feet).

AVIAN POINT COUNTS

All results from the point count survey in 2012 are recorded in Table 2. In general, there were fewer cactus wren observed during the point counts than there has been since the surveys began in 2010. This year, there were only 5 cactus wrens (4 at Station 3) observed at 2 of the 6 sites. This compares to 9 individuals at 5 sites in 2011 and 7 individuals at 4 sites in 2010. There also appeared to be a very slight increase in the number of California gnatcatchers observed. This year there were a total of 8 individuals observed at all sites, while in 2011 there were 4 individuals at 4 sites and in 2010, 4 individuals at 3 sites.

Restoration Areas

This year there were no cactus wrens observed at Station 1, which was part of an established territory that has been used for at least 2 years. One cactus wren was heard calling from Station 2 but it was at a distance greater than 50 meters from the point count station.

Station 2 had a high number if individuals (29 birds) along with a very high number of species (16). Part of this diversity is due to birds heard from a nearby wetland. One male least Bell's vireo (*Vireo bellii pusillus*), one common yellowthroat (*Geothlypis trichas*), and one yellow-breasted chat (*Icteria virens*) were heard singing in the riparian habitat. There was an active red-tailed hawk (*Buteo jamaicensis*) nest to the west of Station 2 in a tall eucalyptus tree. The nest was observed with one adult and at least one chick.

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*) nearby. Two coastal cactus wrens were observed at this station during the point counts. One was observed calling just north of the point count station, and a second was observed at a distance greater than 50 meters. There were also a pair of cactus wrens observed near the end of the access road that were not counted during the point count survey. There were no cactus wrens observed at Station 4.

Of interest at Station 3 was a Cooper's hawk (*Accipiter cooperii*) chasing a great-horned owl (*Bubo virginianus*). This could be an indication that the hawk was nesting in the area. There were a total of three great-horned owls, two adults and one juvenile observed. One adult was with the juvenile and the other was about 20 meters away. Station 3, once again, had the highest density count (30 individuals); however, the diversity (9 species) was only average. The high number of individuals was reflective of a few species including mourning dove (*Zenaida macroura*) (12 individuals) and California quail (*Callipepla californica)* (5 individuals).

Suitable but Non-occupied Cactus Wren Habitat

No cactus wrens were observed at Station 5 or Station 6, although both point count stations had California gnatcatchers present. Station 5 had one pair of gnatcatchers that were moving around the territory and therefore between nests. No fledglings were observed. Station 6 had only one individual gnatcatcher present.

Of interest was a greater roadrunner (*Geococcyx californianus*) near Station 5. Also, western meadowlarks (*Sturnella neglecta*) were detected at both stations even though they had not been

previously observed on point counts. Station 6 had the lowest number of species (7) and the lowest number of individuals (9).

Table 2. Birds Observed During May 2012 Avian Point Counts at Salt Creek

SPECIES		Station 1	Station 2	Station 3	Station 4	Station 5	Station 6
Anna's Hummingbird	*Calypte anna*	1	1				1
Bewick's Wren	*Thryomanes bewickii*		3				
California Gnatcatcher	***Polioptila californica californica***		**1**		**1**	**2**	**1**
California Towhee	*Pipilo crissalis*	2		2	1	1	3
California Quail	*Callipepla californica*	3	7	5	4	1	
California Thrasher	*Toxostoma redivivum*	1	1				1
Cactus Wren	***Campylorhynchus brunneicapillus***		**1**	**2**			
Cooper's Hawk	*Accipiter cooperii*			1			
Costa's Hummingbird	*Calypte costae*		1				
Common Raven	*Corvus corax*				1		
Common Yellowthroat	*Geothlypis trichas*		1				
Great Horned Owl	*Bubo virginianus*			3			
Greater Roadrunner	*Geococcyx californianus*		1			1	
House Finch	*Carpodacus mexicanus*	2	2				
Killdeer	*Charadrius vociferus*					2	
Least Bell's Vireo	*Vireo bellii pusillus*	1	1				
Lesser Goldfinch	*Spinus psaltria*			3	2		
Mourning Dove	*Zenaida macroura*	1	2	12		1	
Northern Mockingbird	*Mimus polyglottos*		2	1	1	1	1
Red-tailed Hawk	*Buteo jamaicensis*		1				
Song Sparrow	*Melospiza melodia*	1					
Spotted Towhee	*Pipilo maculates*	1	2				
Western Meadowlark	*Sturnella neglecta*				1	3	1
Western Scrub-jay	*Aphelocoma californica*	1				1	1
Wrentit	*Chamaea fasciata*	1		1	1		
Yellow-breasted Chat	*Icteria virens*		1				
Total Number of Birds		**15**	**28**	**30**	**12**	**13**	**9**
Total Number of Species		**11**	**16**	**9**	**8**	**9**	**7**
Additional Species (includes flyovers)							
American Crow	*Corvus brachyrhynchos*			1			
Bushtit	*Psaltriparus minimus*	6					
Cactus Wren	***Campylorhynchus brunneicapillus***			2			
California Gnatcatcher	*Polioptila californica californica*	1		2			
Common Raven	*Corvus corax*				2	1	2
Mourning Dove	*Zenaida macroura*					1	
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*		1				1
Red-tailed Hawk	*Buteo jamaicensis*	1			2		

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

QUANTITATIVE AND QUALITATIVE ANALYSIS

Native vegetative cover and cactus height has increased at both restoration areas since last year. The average native vegetative growth for both restoration sites has increased from 26.0 percent in 2010 to 42.0 percent in 2011, and finally to 56.0 percent in 2012. Overall average cactus height has increased from 14.6 inches in 2010 to 16.4 inches in 2011 and to 16.6 percent in 2012. Figures 3 and 4 depict this increase in coverage and height, respectively. Both figures also depict vegetative cover and height for areas with known cactus wren populations and areas that appear suitable for cactus wren, but no cactus wren have been observed within the restoration areas this year. The relative increase in vegetative cover and cactus height at the restoration sites is likely due to on-going maintenance including periodic hand watering of cactus.

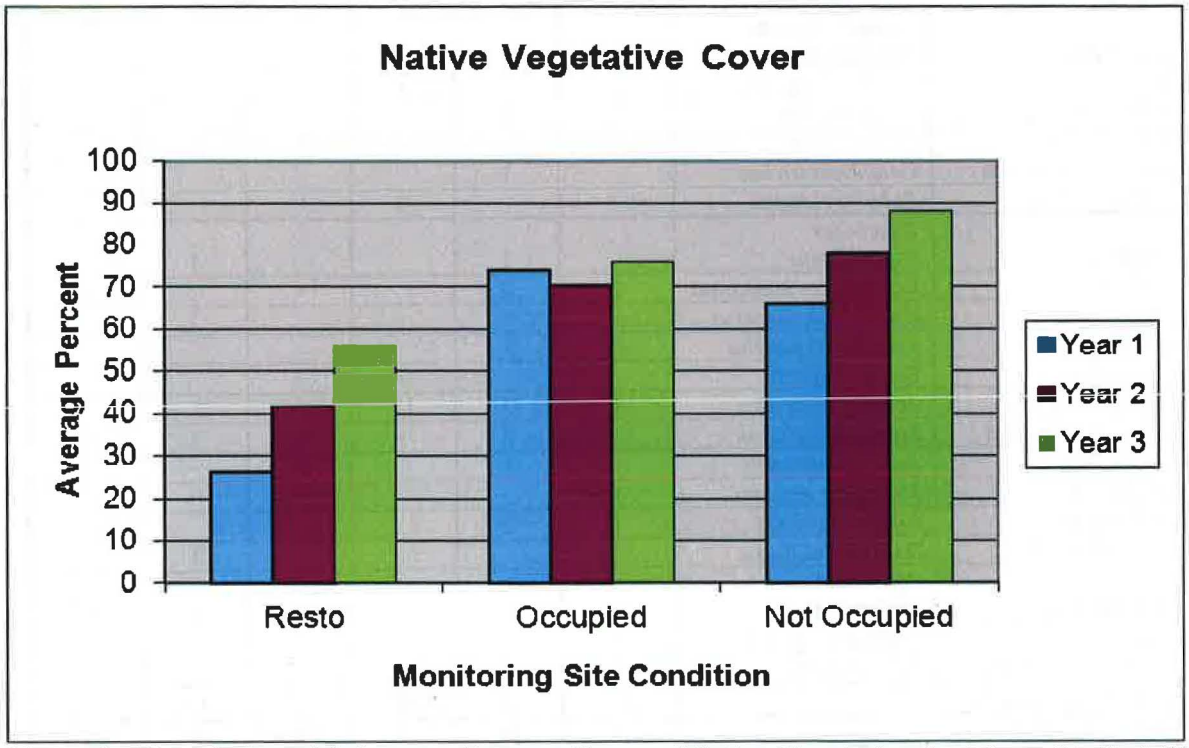

Figure 3. Year 1, 2, and 3 Average Percent Cover of Native Vegetation for Three Studied Site Conditions.

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.

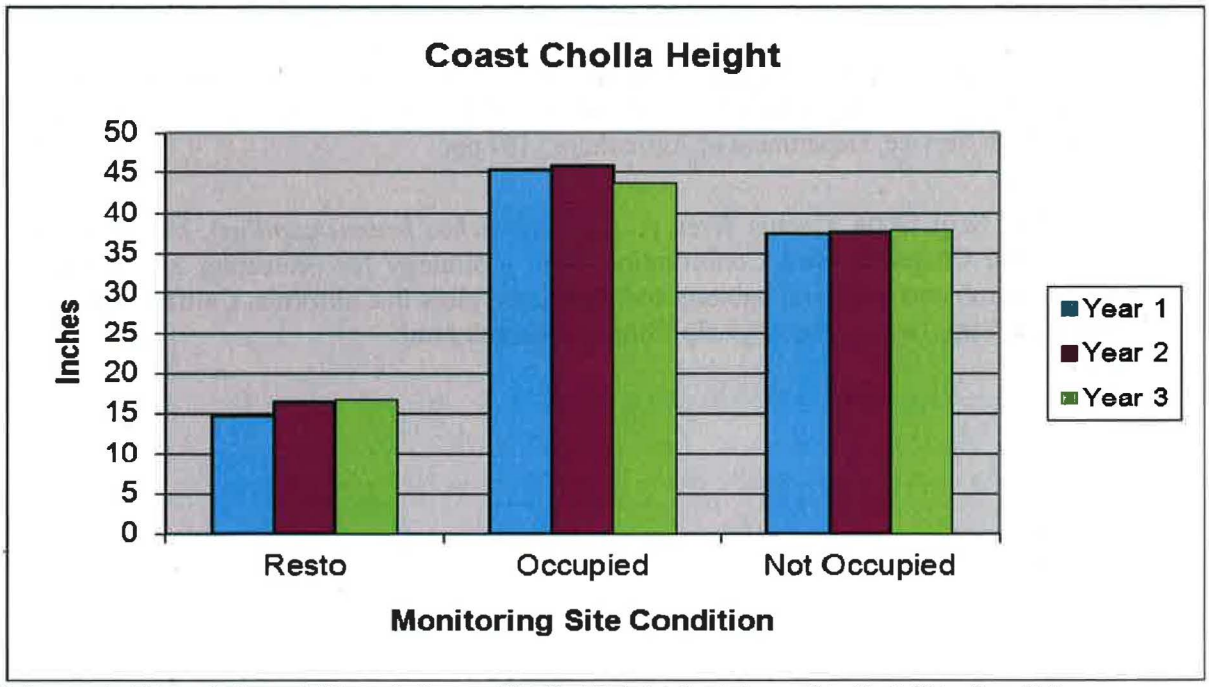

Figure 4. Year 1, 2, and Year 3 Coast Cholla Height for Three Studied Site Conditions.
Site Condition 1 = Restoration Areas, Site Condition 2 = Occupied Cactus Wren Area, Site Condition 3 = Suitable but Not Occupied Cactus Wren Area.

Station 2 has the highest avian species diversity of all the point count stations and is second only to Station 3 in the number of individuals. This station has also replaced many of the disturbance-related avian species, such as European starlings (*Sturnus vulgaris*), brown-headed cowbirds (*Molothrus ater*), and lesser goldfinch (*Spinus psaltria*) found in 2010 with more Diegan coastal sage scrub species. This may have been due to the decrease in forage available for these species once the disturbance-related plant species were removed.

In 2012, Station 6 had the lowest number of species and the lowest number of individuals, which is the same as in 2011 but in contrast with 2010. In 2010 there were a large number of species that occurred in the large canyon about 50 feet from the station. In 2011 and 2012 this canyon was quiet. The only physical difference in the vegetation counts is that there are fewer weedy species on the vegetation transect.

The results of the point counts show that the cactus wren have declined in 2012. Station 3 had a high count of wrens during the point count and an additional pair were observed nearby prior to the count. All other point count stations, with the exception of one individual detected at Station 2, were void of any cactus wren. This includes stations that had nesting pairs in past years. It is unknown whether this is an artifact of the point counts or whether there is an actual decline in the species throughout the project site. There is also an increase in the number of California gnatcatchers detected in the point counts; they were detected at all stations. This could be due to an increase in flat-top buckwheat at all stations. Buckwheat ranged from 0% cover at Station 1 and 2 to 56.0% cover at Station 6 in 2010 with an average cover of 24.7%. In 2012, flat-top buckwheat ranged in cover from 0.0% at Station 2 to 88.0% at Station 6 with an average cover of 44.8%.

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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*)		24.0				
Laciniate Spineflower (*Chorizanthe fimbriata* var. *laciniata*)						
Nievitas Cryptantha (*Cryptantha intermedia*)						
Coast Cholla (*Cylindropuntia prolifera*)	20.0	28.0	52.0	20.0	28.0	
Fascicled Tarplant (*Deinandra fasciculatum*)	20.0	8.0	4.0			
Flat-top Buckwheat (*Eriogonum fasciculatum* var. *fasciculatum*)	4.0		36.0	40.0	56.0	88.0
Lemonadeberry (*Rhus integrifolia*)		4.0				
San Diego Sunflower (*Viguiera laciniata*)		4.0				4.0
Slender Wild Oat (*Avena barbata*)*						
Soft Chess (*Bromus hordeaceus*)*						
Red Brome (*Bromus madritensis* ssp. *rubens*)*			16.0		4.0	
Tocalote (*Centaurea melitensis*)*	4.0		4.0	8.0		
Bare Ground	52.0	32.0	16.0	40.0	12.0	8.0
Total Percent Vegetative Cover (with overlap)	48.0	68.0	112.0	68.0	88.0	92.0
Total Percent Vegetative Cover (without overlap)	48.0	68.0	84.0	60.0	88.0	92.0
Total Percent Native Vegetative Cover (with overlap)	44.0	68.0	92.0	60.0	84.0	92.0
Total Percent Native Vegetative Cover (without overlap)	44.0	68.0	80.0	52.0	84.0	92.0
Total Percent Non-native Vegetative Cover (without overlap)	4.0	0.0	20.0	8.0	4.0	0.0

* Non-native Species , grasses may be mixed but due to the time of year they were very 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.

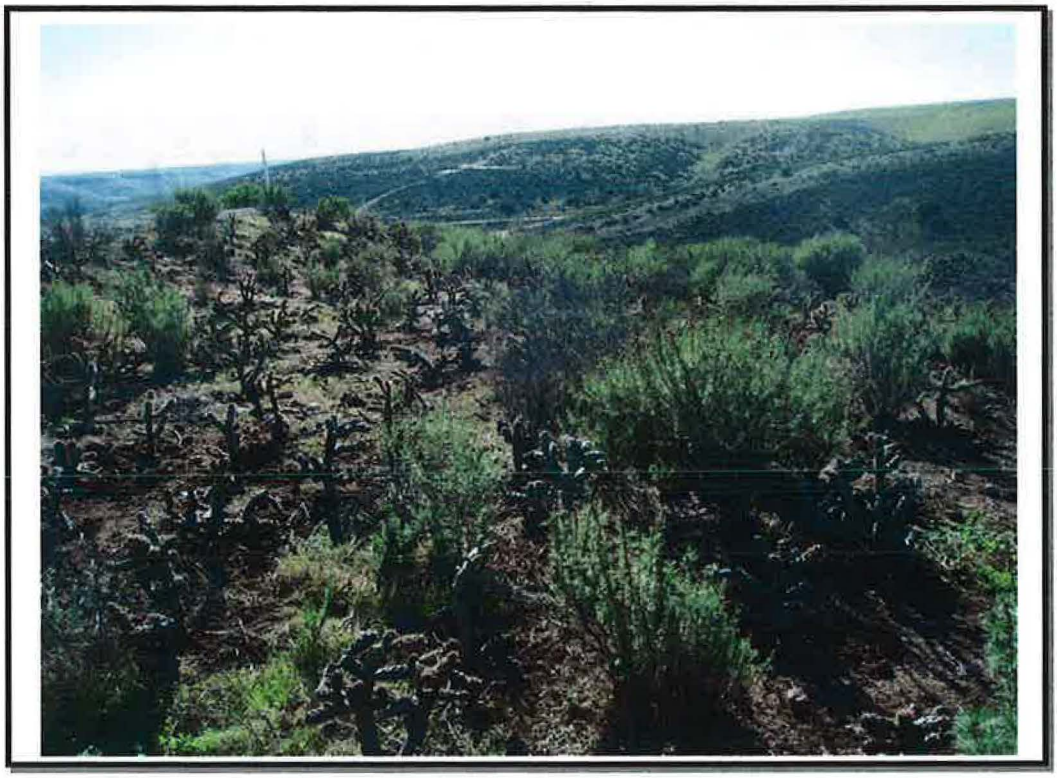

Photo Point 6. Viewing southwest at the northern portion of the 1.0-acre restoration site.

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 west at Transect 1 (0.4 acre restoration site). Photo taken August 17, 2011.

Photo Point 10. Viewing south at Transect 2 (1.0 acre restoration site). Photo taken August 17, 2011.

Photo Point 11. Viewing west at Transect 1 (0.4 acre restoration site). Photo taken October 5, 2012.

Photo Point 12. Viewing south at Transect 2 (1.0 acre restoration site). Photo taken October 5, 2012.

Photo Point 13. Viewing southwest at Transect 3 (cactus wren occupied habitat). Photo taken October 2012.

Photo Point 14. Viewing southwest at Transect 4 (cactus wren occupied habitat). Photo taken October 2012.

Photo Point 15. Viewing northwest at Transect 5 (presumed suitable and now occupied cactus wren habitat). Photo taken October 2012.

Photo Point 16. Viewing southwest at Transect 6 (presumed suitable but unoccupied cactus wren habitat). Photo taken October 2012.

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 15, 2012
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 3, 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. I visited the site on April 30, 2012. Both the 1.0-acre and 0.4-acre areas continue to thrive. Nearly all of the observed cacti looked healthy. Weed growth mostly consists of understory forbs such as tocalote (*Centaurea melitensis*) and filaree (*Erodium cicutarium*). The taller growing short-pod mustard (*Hirschfeldia incana*) occurred sporadically throughout both sites. It is recommended that weeding efforts focus on removing this species. Openings between cacti are filling in with native shrubs including coastal sagebrush (*Artemisia californica*) and San Diego viguiera (*Viguiera laciniata*). This is especially evident at the 1.0-acre site.

New growth was noted on many of the planted cacti. This new growth is easily distinguished from old growth by its light green color that sharply contrasts with the burned stems that were planted (see attached photos). New cacti have also established on the site from pieces dislodged from planted plants.

A woodrat was observed entering its nest beneath a planted cactus at the 1.0-acre site. This species is presumed to be the sensitive San Diego desert woodrat (*Neotoma lepida intermedia*).

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 Point 2. Viewing new growth (i.e. light green stems).

Photo Point 3. New plants originating from dislodged stems of planted cacti.

Photo Point 4. Viewing southeast at 0.4-acre site.

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, 2012
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 3, 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. I visited the site on July 23, 2012. Both the 1.0-acre and 0.4-acre areas continue to thrive. Nearly all of the observed cacti looked healthy. Merkel & Associates have been periodically watering cactus at both sites. The 0.4-acre site has received more water since growth has been relatively slow in this area due to heavily compacted soils. Watering appears to have benefited both sites, but especially the smaller site where growth was particularly noticeable.

Weed growth was minimal and consisted of the remains of annual plants such as tocalote (*Centaurea melitensis*). Openings between cacti continue to fill in with native shrubs including coastal sagebrush (*Artemisia californica*) and San Diego viguiera (*Viguiera laciniata*). This is especially evident at the 1.0-acre site. New cacti also continue to establish on the site from pieces dislodged from planted plants.

Annual quantitative vegetative monitoring of the site will be conducted in September. Information relative to vegetative cover, cacti height and bird use will be provided in the annual report to follow.

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 the 1.0-acre site.

Photo Point 2. Viewing south at the 1.0-acre site.

Photo Point 3. Viewing east at the 0.4-acre site.

Photo Point 4. Viewing new growth (i.e., light green stems) of coast cholla (*Cylindropuntia prolifera*) within the 0.4-acre site.

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

October 23, 2012
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 3, 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 5, 2012. Both the 1.0-acre and 0.4-acre areas continue to thrive. Nearly all of the observed cacti looked healthy. M&A staff have been periodically watering cactus at both sites. The 0.4-acre site has received more water since growth has been relatively slow in this area due to heavily compacted soils. Watering appears to have benefited both sites but especially the smaller site where growth was particularly noticeable.

Weed growth was minimal and consisted of the remains of annual plants such as tocalote (*Centaurea melitensis*). Openings between cacti continue to fill in with native shrubs including coastal sagebrush (*Artemisia californica*) and San Diego viguiera (*Viguiera laciniata*). This is especially evident at the 1.0-acre site. New cacti also continue to establish on the site from pieces dislodged from planted plants.

Annual quantitative vegetative monitoring of the site was conducted earlier this month and avian point counts were conducted in May. Results from the vegetative survey revealed an increase in cactus height for restoration areas. Average cactus height has increased 0.2 inches from last year. These studies also revealed an increase in native vegetative cover from last year's measurements. Average native vegetative cover has increased in restoration areas from 42.0 percent in 2011 to 56.0 percent in 2012. Results from the avian survey showed lower cactus wren counts and higher California gnatcatcher counts. The California gnatcatcher was detected at all sites including the restoration sites, and only one cactus wren was detected during the May survey. Species diversity was highest in the restoration sites. Of special interest was a family of great-horned owl (*Bubo virginianus*), 2 adults and one juvenile, at station 3. Detailed information relative to vegetative cover, cacti height and bird use will be provided in the annual report to follow.

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 the 1.0-acre site. Photo taken 10/05/2012

Photo Point 2. Viewing south at the 1.0-acre site. Photo taken 10/05/2012

Photo Point 3. Viewing east at the 0.4-acre site. Photo taken 10/05/2012

Photo Point 4. Viewing new growth (i.e., light green stems) of coast cholla (*Cylindropuntia prolifera*) within the 0.4-acre site. Photo taken 7/23/12