

**San Diego Association of
Governments Bernardo Bay
Cactus Wren Habitat
Restoration Final Report
Reporting Period: April 1,
2017 – June 8, 2018
SANDAG Contract Number:
5004946**

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Executive Summary

The Bernardo Bay cactus restoration project around Hodges Reservoir included the planting of native cactus on 20 acre clusters surrounding the hills of the reservoir to enhance and re-create the cactus habitat that once existed under pre-Witch Fire conditions. This project would allow the endangered Cactus wren to work its way back from eastern populations along the San Dieguito River (SDgR) to the west. Additionally, the cactus will help stabilize the slopes around Hodges Reservoir and close off unauthorized trails that will also reduce erosion and maintain higher water quality in the reservoir.

This project is already showing 90% success of surviving cacti that was planted. The significant root systems have also shown clear signs of stabilizing the soil in areas that were once bare, exposed, or taken up by weeds prior to the cactus being planted. Although these areas where the cacti were planted are somewhat exposed and warmer temperatures are being recorded, we are hoping the steam fog from the reservoir in combination with the valley fog will help provide the needed moisture for these cacti to survive the longer summer months.

Once these cacti have become established in the coming years, we anticipate they will provide adequate habitat for Cactus wren foraging in this area and grow large enough to deter trail visitors from going off trail to disturb wildlife and damage native habitat.

Project Background

This entire site burnt down during the Witch Fire of 2007. Most of the cacti populations that once thrived in this area melted away and were never re-established. Some minor patches grew back in time in various areas around these hills at Bernardo Bay surrounding Hodges Reservoir just north of Rancho Bernardo, a community in the City of San Diego. Cactus wren once thrived in these large clusters of cactus before they burnt down. Most of these populations that survived the 2007 fires retreated to the east to cacti that did not burn.

This project would address a high-priority MSP (Management Strategic Plan) species and their habitats. Since the Cactus wren is such a high priority species in the MSP for Conserved Lands in Western San Diego County (MSP), The City felt this project would help establish habitat for the coastal cactus wren and enable restored and existing wildlife sites to link up with the cactus wren habitat corridor east of Hodges Reservoir.

The City teamed up with San Diego Zoo Global Institute for Conservation Research (ICR), The San Dieguito River Park (SDgRP), and Dr. Kris Preston to identify areas most suitable for Cactus wren habitat restoration around the hills of Bernardo Bay at Hodges Reservoir.

Additionally, the cacti planting would effectively close unauthorized trails within the project area, enhancing the development of the wren habitat by limiting human contact and minimizing erosion.

Directional signage and fencing has been placed at strategic sites around the perimeter of the restoration sites to restrict access while the cacti become established.

The City felt the Management Strategic Plan for Conserved Lands in Western San Diego County

(MSP) priorities were being met in the following ways:

1. Directly furthers the Management Approach that is already established for San Pasqual Valley and Hodges Reservoir, which has the largest genetic cluster and represents the largest concentration of Coastal cactus wren in San Diego County. (excluding Camp Pendleton) (*Vol. 2, P.2-157-258*).
2. Addresses the loss of habitat cluster from the 2007 wildfires that is mentioned as a threat in the MSP *Table 2-2.8 Conserved Lands identified for potential restoration of cactus scrub to expand occurrences and maintain connectivity within Coastal cactus wren genetic clusters in MUs 3, 4, 5, and 6*.
3. The proposed project will address an urgent need and includes actions that will reduce or manage an identified threat.
4. The Management Strategic Plan (MSP) recognized that a major threat to the project area was a loss of suitable habitat from previous wildfires (*Table 2-2.8 Conserved Lands identified for potential restoration of cactus scrub to expand occurrences and maintain connectivity within Coastal cactus wren genetic clusters in MUs 3, 4, 5, and 6*), where native groundcover was destroyed and wren habitat was depleted.
5. The proposed project would seek to establish new habitat for the coastal cactus wren and establish a wildlife linkage for the genetic cluster to the south of Hodges Reservoir.
6. Additionally the San Dieguito River Park has a trail system established in the area and unauthorized trail blazing has historically occurred. These unauthorized trails have destroyed existing groundcover and introduced invasive plant species which both directly threaten the natural recruitment of the Coastal Cactus wren habitat.

Project Goals

The goals of this project were to enhance certain clusters of habitat for *Campylorhynchus brunneicapillus* (coastal cactus wren), at a 20 acre project site in Bernardo Bay, by planting *Opuntia littoralis* (cacti) and the closure of unauthorized trails throughout the area. The coastal cactus wren is a SDMMMP SO recognized species and faces numerous threats in the Hodges Reservoir area, including habitat loss from wildfires and unauthorized trails.

The initial objective of the project was to plant as many cacti provided by the Zoo Global Institute for Conservation Research within a designated 20 acre restoration site. The second phase seeks to preserve the restored areas as well as adjacent environmentally sensitive areas with the installation of directional fencing and signage. This project correlates with and will be managed similarly to the current and planned coastal cactus wren restoration sites within Bernardo Bay. While accomplishing the aforementioned objectives, this project will inclusively stabilize surrounding slopes at Bernardo Bay to further limit erosion and protect source water draining into Hodges Reservoir.

Work Performed by Task:

Task 1- Biomass Removal & Cacti Planting

Budget: \$41,000

Spent: \$40,822

Match for Task: None

As of May 8th, 2018, the City contractor, Black Sage Environmental Inc. (BSE) and Urban Corps of San Diego, have planted an additional 995 cacti for a total of over 2,137 individual cacti in the Bernardo Bay area of Hodges Reservoir. A budget amendment was approved by Sandag to change the budget for this work from \$18,680 to \$41,000. All the Coastal prickly pear (*Opuntia littoralis*) were provided by the San Diego Institute for Conservation Research (ICR). **Because the soil was mostly composed of hard clay mixed with granite rock, the actual task of digging through the ground to plant the cactus was a lot more time consuming and thus, more costly than originally anticipated.** Most of these additional cacti were planted on the higher west facing portion of Bernardo Hill just above the trail leading to the overlook. The remaining cacti planted after the initial planting work, were planted along the main trail leading up to the overlook which had been widened from the contractor's vehicle that had driven up to the top of Bernardo Hill to drop off the cacti. BSE has also remediated this trail alignment within the pre-disturbed area to minimize erosion and reclaim a more functional and better draining trail alignment. This remediation work will be paid for separately by the City. Many cacti have been planted on the southeast facing slope of Bernardo Bay to fill in the large open areas amongst the upland coastal sage scrub habitat that had never fully recovered from the 2007 Witch Fire. BSE also planted cactus in these additional areas: Along the unofficial trails on the north facing slope just above the southern edge of Hodges Reservoir, in open areas along the trail leading to the lookout above Bernardo Hill, on the east facing slope above the unofficial trail that leads down from the top of Bernardo Hill, and on the unofficial trail itself. Additionally, cactus was installed on the western lower and upper faces of Bernardo hill. BSE and the Urban Corps of San Diego also planted cactus on the lower south facing slopes on both sides of the trail (east and west) to deter unofficial trail use and further fortify the cactus population in vicinity of the already planted cacti clusters. City staff planted the majority of cactus pads chewed off by wildlife to further increase the survival rate of the cacti planted for this project. Please see the attached map.

Supplemental watering was provided during the warmer months to give the cactus a higher chance of survival. With the hotter weather during the months of July through November, the survival rate may not be as high as originally anticipated, although cacti sprouts from fully eaten cactus, have been detected. Most of the cactus (90%) that were planted including the chewed off cactus pads have survived through this winter. Even original potted cacti that were planted that had been chewed down to the nub have sprouted cacti.

Task 2-Install Directional Fencing & Signage

Budget: \$0

Spent: \$0

Match for Task: \$5,000

The City has installed 6 signs with the following language: "Keep Out, No Authorized Access, No Trespassing or Dumping, Violators Will Prosecuted To The Full Extent of The Law". Additionally, a large sign was installed at the staging area for hiking trails, which reads, "Public Utilities Department Watershed and Resource Protection, Protecting Water Quality and Sensitive Species, Hodges Reservoir, MSCP Cornerstone Land, Please Stay on Trail!" Because Hodges Reservoir is a drinking water reservoir, it is critical for the public to understand that hiking along these trails within water lands is a privilege and disturbance of the natural habitat kills and damages these sensitive plant communities, which in turn increases erosion into the reservoir and diminishes water quality. As a result of the installation

of these signs and planted cacti on these unauthorized trails, the City has been able to achieve a 95% reduction in use of these unofficial trails. During the planting of cacti and sign installation on the unauthorized trails, trail users would inquire regarding our work and would readily thank us for implementing this project to help protect the sensitive resources in the area.

The City of San Diego Public Utilities Department works jointly with the San Dieguito River Park (SDGRP) on a regular basis regarding communication, law enforcement, public outreach and education, sign maintenance and placement, and general scheduled maintenance. The SDGRP also has installed and maintains various signs and fencing in the area to encourage visitors to stay on designated trails and access paths.

The City has also contracted with BSE Inc. to provide environmental security in various areas including the habitat and trails surrounding these restoration sites. BSE staff will take pictures, contact individuals, monitor, patrol, and provide education to the public to help them understand the importance of protecting these sensitive native habitats.

Task 3- Herbicide Application

Budget: \$9,000

Spent: \$0

Match for Task: None

The City originally anticipated a significantly massive amount of weeds at this restoration site after the 2016 actual rainfall in San Diego County. This fact is why we anticipated spending a much larger amount of funds on herbicide application. After careful inspection of the Bernardo Bay project site, The City has determined that herbicide application will not be necessary for this site. A budget amendment was approved by Sandag to change the budget for this work from \$31,320 to \$9,000 as a result of this unforeseen benefit. The only weeds growing are small enough not to impact the planted cacti and are growing so closely around the base of the cacti that spraying these weeds would increase the likelihood of killing the actual cacti if these weeds were to be sprayed. Now that it has been warming up, a majority of weeds growing around the cacti are already starting to dry up and no new weeds are growing.

Conclusions:

During this project, we discovered how significant recent weather goes into play to determine the overall success of a project like this. Even though we planted one of the most drought tolerant native plants existing in this region, it's clear that already existing large clusters of Coastal prickly pear (*Opuntia littoralis*) have established themselves over hundreds of years. Establishing new cacti in dry hard soils like those at the Bernardo Bay Project site is significantly more difficult than we may have thought in addition to existing warmer climatic changes. Understanding of course, that new growth in the larger old growth clusters is constantly regenerating itself while protected from development, fire, or other large disruptive events. Even though the large existing cacti clusters in east San Pasqual Valley are well protected and do not have any recreational trails existing amongst them, it's clear to us that the cacti that we planted as part of this project in Bernardo Bay at Hodges Reservoir, are already surviving and slowly starting to establish themselves, regardless of the human related activities being in such close proximity to the restoration sites.

The store-bought potting soil used by ICR may have made it more difficult for the nursery cacti to become established since the soil on site is much higher in clay content and rock. Looking forward, it would be best to use native soil to better mimic site conditions and help the cacti acclimate more easily. The white colored balls (perlite) in the potting soil makes the potting soil lighter which reduces the strength of the soil to hold the cactus root system in place as compared to the harder native clay soils. The nursery cacti may have been irrigated a lot more frequently than needed. In the future, it would be best to decrease the watering schedule to harden the cacti and help them survive the drier months when planting time approaches. Another issue we noticed with the more developed nursery cacti was their increased weight, causing them to collapse from the increased water weight. The root system of these cacti did not have sufficient time to establish itself to have the strength needed to support the heavy cacti pads. City staff has been diligent about replanting many of these heavier pads that have slumped over from their increased weight. From our field observations, it appears that we are getting 90%+ survival rate for the cacti planted resulting from this project.

There is an element of vandalism from a small percentage of users that are not happy with some of the unofficial trail closures that were part of this project. This activity in time will taper off and most of our interactions with trail visitors during this project were very positive and complementary of the project and its goals.

There has been a significant amount of herbivory. Individual plants that suffered extensive damage have for the most part been replanted. With the unplanned extended heat over the last few months in combination with the high degree of herbivory from various native fauna, we did not initially anticipate as high a survival rate as originally thought. The critical fog layer that much of our semi-arid Mediterranean native habitats depend upon during the fall months had been delayed until late November. With much needed precipitation in the form of rain and fog in late November, the cacti finally received some moisture. Even though we had another heat spell in early December that had decreased the dew point window of opportunity for the cacti, we did receive additional rain storms in January, February, and March resulting in an overall 90% survival rate.

The City is currently applying for the Ninth Cycle of The TransNet EMP LMGP to continue planting native cacti in the current project site to further bolster this cacti population and various habitat clusters along the San Dieguito River east of Interstate 15 to provide a more contiguous connection for cactus wren from the east to these currently planted areas west of I-15.



Task 2 – Install Directional Fencing & Signage



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Task 1 – Cactus Installation & Biomass Removal



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Task 1 – Cactus Installation & Biomass Removal



Task 1 – Cactus Installation & Biomass Removal

Photos taken October 20, 2017