Final Report on SANDAG Environmental Mitigation Program Grant, Agreement #5001134, Effective January 7, 2009.

The subject grant was an award of $347,090 to the San Dieguito River Park Joint Powers Authority for four different category areas:

- Invasive Species Removal
- Natural Recovery
- Habitat Restoration
- Access Control and Management.

Invasive Species Removal:

Invasive Plants: The bulk of the grant funds were directed to removal of invasive plant species over a period of five years; a separate specific report addresses this task. See Appendix A.

Bull frogs: A component of invasive species removal, this task was to remove or reduce the number of bullfrogs at a series of ponds on open space property that the San Dieguito River Park JPA owns in the Santa Ysabel Gorge area. See attached Appendix B for details.

Natural Recovery.

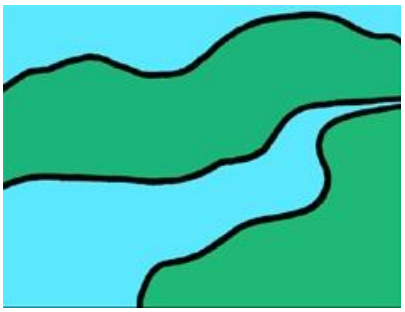
This task involved the purchase of a wood chipper. A "Bearcat" model CH6670H chipper was purchased from Pauley Equipment on 3/26/2009.

Habitat Restoration

This task was initially to drill a well and install temporary irrigation lines in order to provide water for a 3 acre plant restoration project. However, we were able to bring water to the site for less money by repairing an existing well. This work was done by Ransom Pump & Supply in July 2011. The savings were transferred to another task per amendment of the grant agreement.

Access Control and Management:

1. *Solar Gates*. Five solar powered automatic gates were installed to control how people can access the trails. The gates automatically close at night to prevent unauthorized access, and automatically open in the morning. The gates were installed at the San Pasqual Valley Staging Area, Ysabel Creek Staging Area, Heritage Trail Staging Area, Highland Valley Staging Area and Bernardo Bay Staging Area.
2. *Fire Recovery Interpretive Panels* – Four panels explaining the effects of wildfire were installed in four key trailhead locations (see attached photo).
3. *Watershed Protection Interpretive Panel* – One panel explaining how a watershed works to protect water quality was installed at Lake Hodges (see attached design).
4. *Trail Construction Fencing*. Initially funds were designated for use at the proposed Bernardo Bay Trail, but that trail was not constructed, and the funds were instead approved for reallocation to the new Heritage Trail, which was completed and opened to the public in October 2011.



Invasive Species Control Final Summary

San Diego Association of Government: Transnet EMP Grant

Jason Lopez, Resources and Trails Manager
San Dieguito River Park
November 1, 2013

INTRODUCTION

In 2008 San Diego Association of Government (SANDAG) awarded to the San Dieguito River Park (SDRP) a Transnet EMP grant for several Park projects. A component of that grant was invasive plant species control. SDRP utilized the grant funds to enhance and expand several projects throughout the watershed. Projects ranged from pond and oak woodland restoration in Santa Ysabel to high salt marsh enhancement and mitigation in Del Mar.

The focus of the effort was to build off of the Parks already existing, and extensive, habitat restoration efforts and utilize the grant resources to insure the success of the projects and connect the smaller projects to larger units of habitat.

Primary Projects:

- Cloverdale Creek: Wetland creation, upland and floodplain restoration, and riparian enhancement.
- Coastal Zone: Salt marsh and upland restoration**.**
- General Weed Control**:** SDRP staff maintenance on all projects and facilities maintenance.
- Habitat Management Area (HMA): Upland restoration and riparian enhancement.
- San Dieguito River: Riparian restoration and enhancement.
- Santa Ysabel Gorge Preserve: Pond and oak woodland restoration
- San Pasqual Valley Upland: Coastal cactus wren and California gnatcatcher habitat restoration.
- Sycamore Creek/San Dieguito River Park main office: Riparian restoration and upland enhancement.

PROJECT DETAILS

Cloverdale Creek

The SANDAG grant was used to maintain an important wetland creation project and also expand the amount of habitat created by maintaining adjacent areas outside the boundary of the mitigation project.

Wetland Creation and Mitigation: Comprehensive weed control over the 2.5-acre wetland creation and enhancement project site after the initial installation. The project is very successful and has resulted in over 1/4 mile of new and high quality riparian habitat. The riparian forest also helps to capture runoff

APPENDIX A

from upstream development. The project is mitigation for trail projects and also for the City of San Diego Public Utilities Department.

As part of the initial work, the soils that were extracted for wetland creation were planted with flood plain and upland species. This area was maintained weed free which enabled the creation of additional habitat adjacent to the wetland project boundary.

Cloverdale South: The 1000-foot section of creek downstream of the wetland creation project was maintained mostly weed free until summer 2012. This provided an environment in which the existing native plants flourished and the previously installed cuttings and container plants became established.

Date	Contractor	Amount	Notes
4/18/10	Kelly #314	$4,382.89	North and South
6/6/10	Kelly #328	$3,154.94	North and South
9/1/10	Kelly #351	$1,201.	North
9/1/10	Kelly #352	$515.	South
3/27/11	Kelly #367	6,419.33	North and South
5/3/11	Kelly #377	$4,830.08	North and South
2/3/12	Klemm #5448	$900.	North
2/15/12	Cal Fire	$200	Brush removal
3/29/12	Kelly #423	$3,080.52	North and South
6/21/12	Kelly #442	$2,362.29	North and South
9/14/12	Kelly 465	$1,431.38	North
4/12/13	Kelly #494	$600.	North
8/13/13	Kelly #521	$2,976.	North
		$32,053.43 Total	

Coastal Zone

Comprehensive weed control occurred over 6 sites (covering 11.7 acres) and SANDAG funds were used to maintain restoration projects and enhance adjacent habitat.

El Camino Coastal Sage Scrub: 1.7 acre coastal sage scrub restoration. The work area is located on a disposal site for the *San Dieguito Lagoon Wetland Restoration Project*. The creation of coastal sage scrub habitat has proven to be difficult at this location because of the extremely saline soils. Although the Park has decided to move the restoration site, the effort has provided very useful information for SDRP, other land managers, regulators, and scientists that are familiar with the effort and are working on other regional coastal restoration projects. The Park believes that quality wildlife habitat was created on the site but not the coastal sage scrub habitat that is needed by the mitigation requirements.

Horse Park Stream Bank Restoration: SDRP restored ½ mile of stream bank and buffer habitat along the San Dieguito River. This section of river is influenced by tidal flushing and contains diverse habitats including saltmarsh, riparian, and upland types. The Coast to Crest trail makes up the northern edge of the restoration site.

I-5 Salt Marsh: 1 acre high salt marsh restoration. An area adjacent to a newly created wetland was lowered/excavated for the purpose of creating high salt marsh habitat. The project is progressing well and ¾ of the site is occupied by native salt marsh plants.

Pickleweed Site: 5 acres of high salt marsh enhancement. The area between the treatment ponds and the I-5 site contains salt marsh habitat. Weeds were targeted in order to enhance this area. This site connects the *Treatment Ponds* and *I-5 Salt Marsh* sites.

Treatment Ponds: 4 acres coastal sage scrub restoration, landscaping, riparian restoration, and high salt marsh. This project is very successful and has resulted in several acres of wildlife habitat and an improved experience for people visiting the area because the Coast to Crest Trail passes through the pond system. Riparian and salt marsh habitat was created at the bottom of the ponds. The ponds are intended to capture and filter urban runoff. Coastal sage scrub habitat was created on the banks of the ponds and along the trail. Several eucalyptus and pines were removed from the fill slope located between the treatment ponds and a shopping center and were replaced with Cottonwood (Populus fremontii) trees and coastal sage scrub plants.

West of I-5: Follow up weed control on previous rehabilitation efforts. The area provides a buffer between the river and trail and fairground parking.

Date	Contractor	Amount	Notes
12/26/09	Kelly #303	$206.56	Ponds
3/15/10	Habitat West #79451	$850.	Ponds
11/10/10	Habitat West #79678, #79776	$4,368.	Ponds and I-5
1/14/11	Habitat West #79850	$384	Ponds
4/5/11	Habitat West #79978	$768.	Ponds and I-5
5/10/11	Black Sage #1006	$381.70	I-5
5/10/11	Black Sage# 1007	$765.95	Ponds
6/10/11	Habitat West #80058	$2,000.	Ponds
6/28/11	Habitat West #80044	$768	Ponds.
7/31/11	Habitat West #80151	$768.	Ponds
8/31/11	Habitat West #80207	$384.	Ponds.
1/10/12	Urban Corps	$7,816.05	Mitigation sites
2/1/12	Urban Corps	$8,978	Mitigation sites
2/10/12	Klemm #5450	$750	El Camino
3/7/12	Habitat West	$768.	Ponds

3/31/12	Kelly #413	$2,786.11	West of I-5
3/31/12	Kelly #429	$3,443.70	Pickleweed
3/31/12	Kelly #428	$2,604.95	I-5
4/6/12	Habitat West #80515	$768.	Ponds
4/5/12	Urban Corps	$2,145.35	El Camino mulch
5/1/12	Klemm #5471	$750.	El Camino
5/11/12	Habitat West #80537	$768.	Ponds
7/17/12	Habitat West #80630	$768.	Ponds
9/14/12	Habitat West #80771	$1,120.	Ponds
9/14/12	Kelly #461	$335.	I-5
9/25/12	Klemm #5491	$600	El Camino
10/29/12	Kelly #470	$617.44	I-5
3/1/13	Habitat West #81060	$768.	Ponds
3/1/13	Klemm #5521	$800.	El Camino
4/12/13	Kelly #488	$618.	I-5
5/24/13	El Camino Rental	$27.	Equipment
5/29/13	Black Sage #1032	$678.60	Horsepark
6/3/13	Klemm #5534	$600.	El Camino
6/25/13	Habitat West #81245	$768.	Ponds
8/13/13	Kelly #522	$379.	I-5
8/13/13	Kelly #523	$186.	General touch up
		$43,763.20 Total	

General Weed Control

SDRP: Field staff is trained to apply herbicide and use it to control invasive species and clear trail corridors. Herbicide and materials were purchased with SANDAG funds.

SDRP staff focused on the following:

- Touch up herbicide applications to all restoration projects.
- Maintenance of volunteer habitat restoration sites.
- Weed control around trail facilities.

Highland Valley Staging: Weeds have been controlled in the staging area of the Highland Valley Trail for many years. There are drains on two sides of the staging area that often catch the nonnative palm and eucalyptus seed coming from upstream development. There is a small habitat garden in the staging area and people are encouraged to walk through the garden. SANDAG funds were used to remove exotics from the drainages and over the entire site and to maintain the garden area.

Orange Grove Eucalyptus: The Coast to Crest trail passes between an orange grove and the Santa Ysabel Creek fill slope. Several hundred Eucalyptus were treated in the area before and after the 2007 fire. SANDAG funds were used to treat the re-sprouts and seedlings.

Sikes Adobe

The Historic Sikes Adobe Farm House burned down in 2007 and was reconstructed. SANDAG funds were used to maintain the fire break and restoration and landscape areas. The house is adjacent to Kit Carson Creek which is known to be occupied by Least Bell's vireo (*Vireo belli*) and other sensitive species. The Coast to Crest Trail crosses Kit Carson Creek near Sikes Adobe. Mitigation for the crossing is adjacent to the trail and historic house. There is a vegetative swale near the dirt parking area that has been planted with native species. Mule fat and coast live oak were planted along the trail in order to provide a visual barrier between the trail and Sikes Adobe and the sewer treatment facility. In addition to the maintenance work, perennial pepper weed was controlled and excluded from public areas to reduce the possibility of seed dispersal.

Date	Contractor	Amount	Notes
4/18/10	Kelly #316	$370.08	Sikes
9/25/10	Grangettos	$463.66	Herbicide
3/24/11	LSS	$231.62	Safety supplies
3/31/11	Grangettos	$92.26	Herbicide
3/27/11	Kelly #368	$649	Sikes
5/3/11	Kelly #375 See *Sycamore Creek* section.	$0	Training
1/10/12	Grangettos	$98.05	Herbicide

3/31/12	Kelly #426	$543.76	Sikes
9/14/12	Kelly #464	$80.	Training
5/28/13	Klemm #5532	$900.	Orange Grove
6/10/13	Grangettos	$82.05	Herbicide
8/6/13	Black Sage #1041	$975.	HV Trail
8/12/13	Davey Tree	$1280.	Treated Eucalyptus hazard
8/13/13	Kelly #518	$483.	Sikes
		$6,248.48 Total	

Habitat Management Area (HMA)

The Park implements six Habitat Management Plan's (HMP) and five of the sites received weed control treatments funded by the SANDAG grant. The focus of the work was to maintain and significantly expand the restoration and weed control projects that are key components to the Park's HMP implementation strategy.

Bernardo Mountain Habitat Management Area:

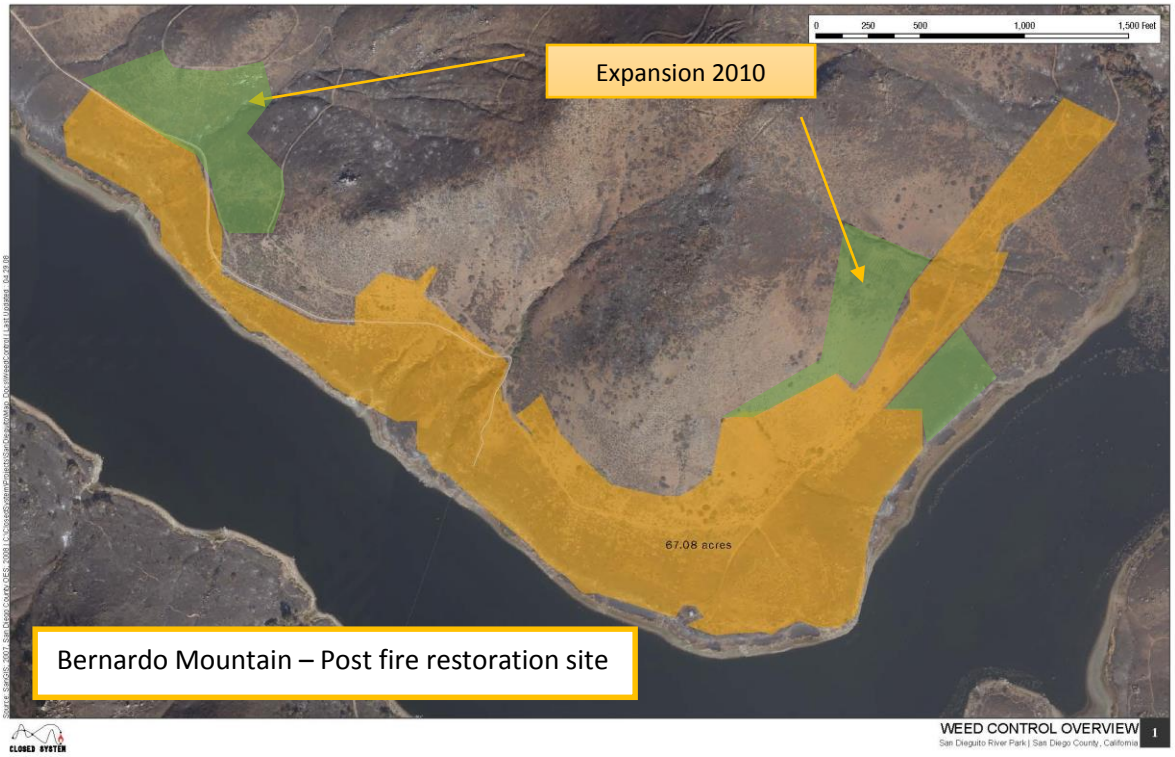
The largest of all of the SANDAG influenced projects and the Park's most continuous weed control project. Weed control, at some level, has been occurring on this site since 2005.

The largest factor affecting the management of Bernardo Mountain HMA has been the River Park's focus on creating cactus scrub and coastal sage scrub habitat though active restoration and persistent weed control.

SDRP implemented a large restoration project on the North Shore of Lake Hodges/South side of Bernardo Mountain after the 2007 Witch Fire. The Park rehabilitated approximately 82 acres in this area. All of the land received some sort of treatment ranging from weed control to container planting and irrigation. This project provided the framework for the use of the SANDAG funds which were used to maintain the post fire projects.

California gnatcatcher (*Polioptila californica californica*) and coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis)* have been the species of focus for the Bernardo Mountain projects and nesting occurs by both species. Weed control projects have been very effective at this site and has resulted in the expansion of existing habitat and the success of approximately 25 acres of habitat restoration projects where a disturbed site was converted to coastal sage or cactus scrub habitat by removing weeds and installing container plants and cuttings, dispersing seed, and conducting follow up maintenance.

- In 2010, 75 acres were treated.
- In 2011, 35 acres were treated.
- In 2012, 20 acres were treated.
- In 2013, 20 acres were treated

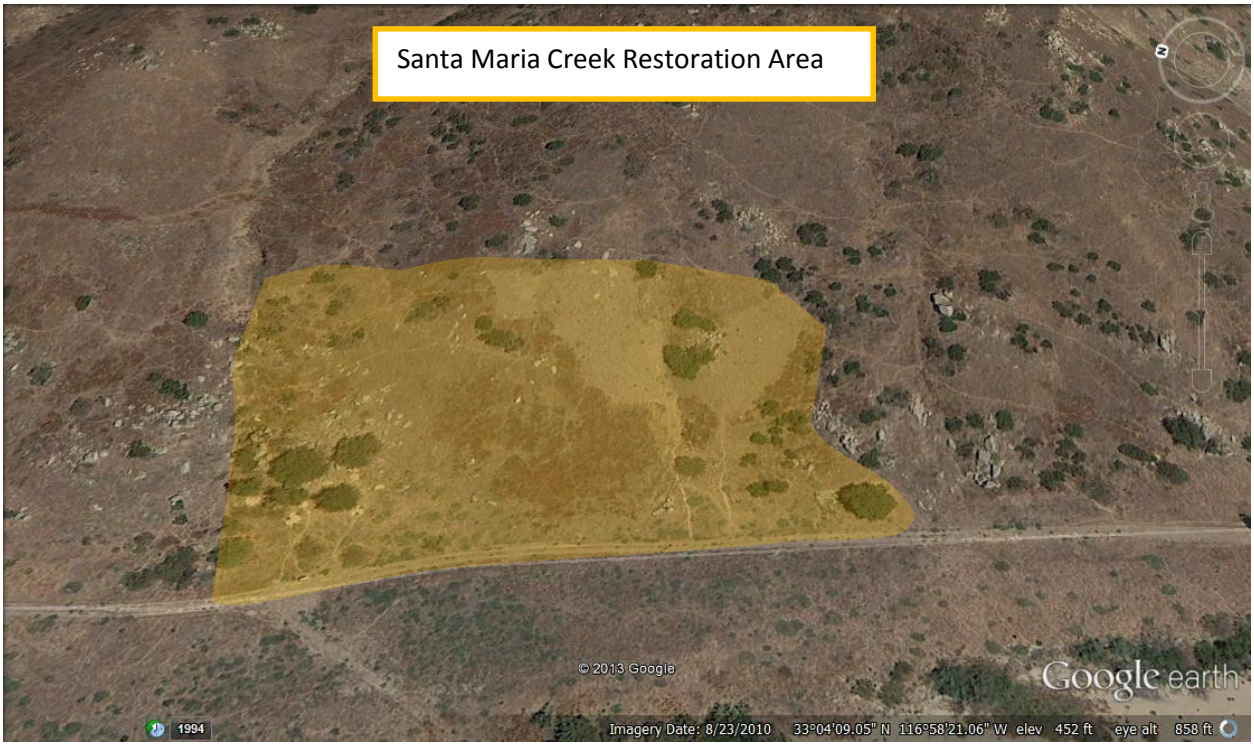


East Gorge Habitat Management Area: The focus of this HMP is the riparian area. Through other invasive species removal projects, the eucalyptus and other invasive species have been removed from the riparian area. The Riparian cooridor is important because one of the species of focus is Southern Pacific Pond Turtle (*Emys marmorata pallida)*. A biological study of the area revealed that the upland communities should also be a focus because of the presence of California gnatcatcher and many reptile species. There are three small (less than one acre) coastal sage scrub restoration projects which were partly maintained with SANDAG funds. The majority of the funds were used to expand the eucalyptus eradication effort outside of the riparian zone and also start to tackle the fennel and fountain grass problems.

Santa Maria Creek Habitat Management Area: Two acres of cactus scrub and coastal sage scrub habitat were created from work that began in 2010. Rufous-crowned sage sparrow (*Aimophila ruficeps*), coastal cactus wren, and California gnatcatcher are the species of focus for the HMP. The expansion of Coast live oak woodland habitat is also a priority. SANDAG funds were used to maintain and expand the habitat restoration project.

Sycamore Westridge Habitat Management Area: California gnatcatcher is the species of focus for this project. Natural resource management actions were directed towards the creation of new habitat and protection of existing habitat. SANDAG funds were used to help maintain the 1 acre coastal sage scrub restoration site.

West Bernardo Habitat Management Area: The site is located adjacent to the Bernardo Mountain HMA. Several CSS restoration sites were maintained and also connections to habitat located on Bernardo Mountain HMA and City of San Diego property. California gnatcatcher and coastal cactus wren have been the management species of focus for this HMA. Often this work is included in the Bernardo Mountain HMA work.



Date	Contractor	Amount	Notes
4/18/10	Kelly #312	$600	West Bernardo
4/18/10	Kelly #313	$12,370.58	Bernardo and K-east.
6/6/10	Kelly #326	$681.67	Bernardo
12/12/10	Klemm #5377	$940.	SMC
3/27/11	Kelly #365	$22,726.	Bernardo
1/4/12	Klemm #5442	$1295.	SMC
3/12/12	Klemm #5457	$600	SMC
3/31/12	Kelly #427	$1,173.66	East Gorge
4/1/12	Kelly #430	$1,839.80	West Bernardo
4/1/12	Kelly #431	$7,231.01	Bernardo
6/21/12	Kelly #443	$2,580.92	Bernardo
9/14/12	Kelly # 463	$348.	East Gorge
2/12/13	Klemm # 5519	$1,000.	SMC
3/5/13	Black Sage #1025a	$365.45	Sycamore Westridge
8/13/13	Kelly #525	$445	West Bernardo
8/13/13	Kelly #526	$7,100	Bernardo

		$61,297.09 Total	

San Dieguito River

Three maintenance projects occurred along the San Dieguito River in the San Pasqual Valley. Aggressive weeds such as arundo, tamarisk, and perennial pepper weed, eucalyptus, and Bermuda grass persist in this area and comprehensive control is difficult and costly. SDRP prioritized weed control treatments based upon previous efforts and other parallel weed control projects. All three sites are connected and border the San Dieguito River channel. This section of the river is important because of the presence of good quality riparian habitat that is known to be occupied by Least Bell's vireo (*Vireo belli*) and other sensitive species.

Partners for Wildlife: 26 acre tamarisk removal project was completed in 1999. Then, 8,600 tamarisk trees were removed by SDRP. The SANDAG funds were used to comprehensively clear the site of tamarisk, eucalyptus, and arundo but other problem species like perennial pepper weed and annual weeds persist. There is healthy riparian habitat in this area.

Old Coach Mitigation: The Park installed a small (less than 1 acre) mitigation project and comprehensive weed control occurred inside the project boundary and also in the area (more than 1 acre) surrounding the site which contained high densities of aggressive non-native vegetation. Also included in this effort were the completed mitigation projects that surround the adjacent Coast to Crest Trail crossing of the San Dieguito River. The old mitigation sites were treated. The area close to the trail and mitigation site has been transformed from being mostly invasive to riparian habitat.

Highland Valley Eucalyptus: Follow up eucalyptus control occurred on an approximately 2-acre site that had an initial removal effort but no follow up maintenance. Cal Fire crews were utilized to cut and haul invasive trees.

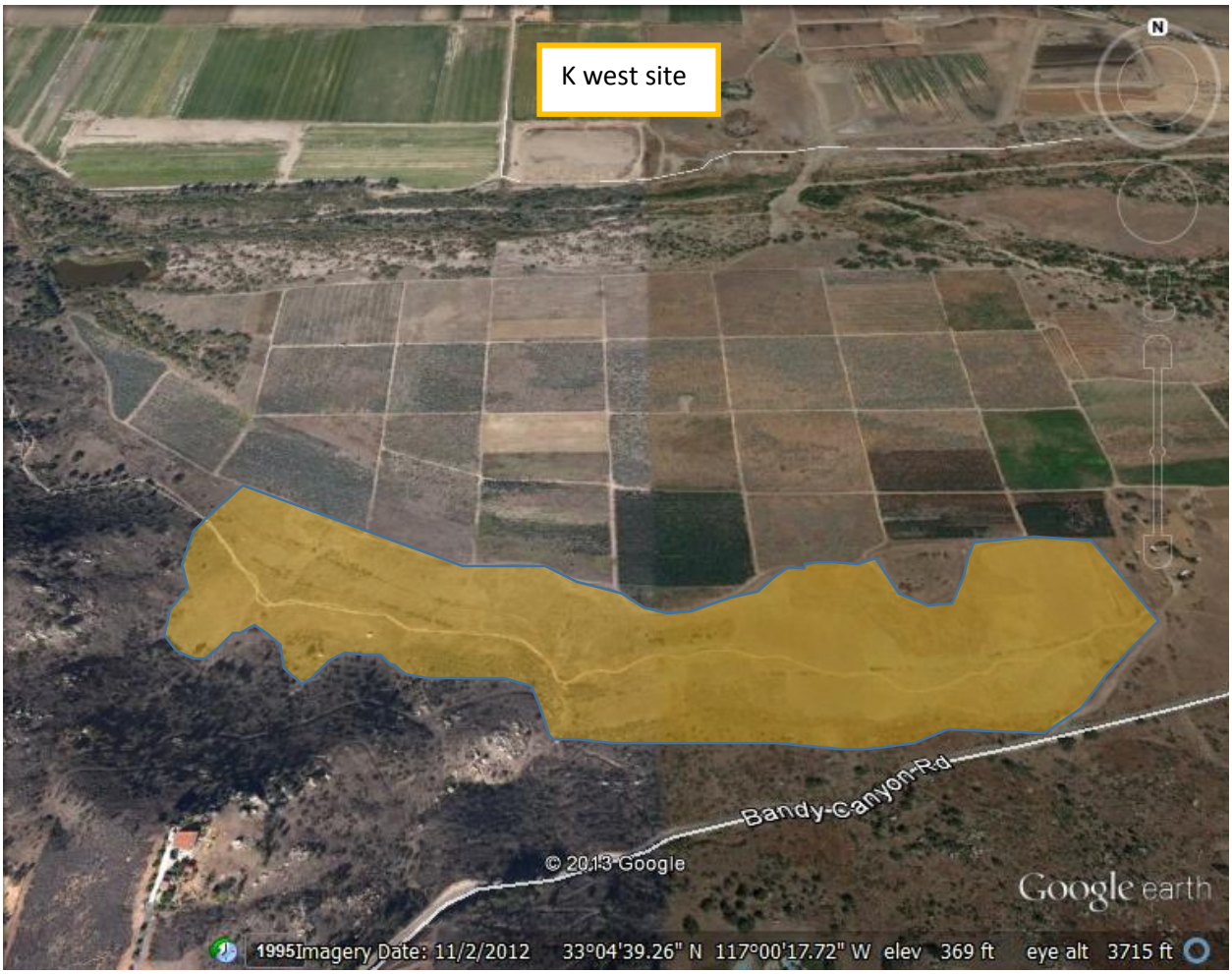
Date	Contractor	Amount	Notes
4/18/10	Kelly #315	$109.94	Old Coach
7/21/10	Kelly #343	$966	Old Coach
11/18/10	Kelly #356	$5,500.	Partners
5/3/11	Kelly #374	$506.25	Old Coach
3/29/12	Kelly #424	$463.	Old Coach
6/21/12	Kelly #441	$483.88	Old Coach
10/8/12	Black Sage # 1024a	$2370.05	Highland Valley
3/24/13	Cal Fire	$800.	Highland Valley
8/13/13	Kelly #520	$98.	Old Coach
4/12/13	Kelly #489	$5,075.	Old Coach
4/12/13	Kelly #491	$350	Partners
		$16,722.12 Total	

San Pasqual Valley Upland

SDRP implemented a large restoration project in the San Pasqual Valley after the 2007 Witch Fire. The Park rehabilitated approximately 50 acres in this area. All of the land received some sort of treatment ranging from weed control to container planting and irrigation. This project provided the framework for the use of the SANDAG funds which were used to maintain the post fire projects. California gnatcatcher (*Polioptila californica californica*) and coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis)* are the species of focus for the San Pasqual Valley upland projects.

K-west/Grassland section of the Coast to Crest Trail: The 40 acre restoration site was maintained. Work on this site consisted of extensive weed control and the installation of small connected patches of habitat. Weed control was conducted by tractor and boom sprayer in many areas of this project. From experience with past restoration in this area, it was determined that weed control alone would be an effective method of conversion for the fields of annual weeds.

K-east/Santa Maria Creek section of the Coast to Crest Trail: The 10 acre restoration site was maintained. Several volunteer habitat restoration projects and a post fire project occurred. Cactus wren was known to occur in this area but disappeared after the 2007 fire and returned in 2012.



Date	Contractor	Amount	Notes
4/10/10	Klemm #5322	$1,126.	Kwest
4/18/10	Kelly #313 Invoiced with Bernardo Mountain HMA	$0	Keast
6/6/10	Kelly #327	$9,569.	Keast
6/8/10	Klemm #5337	$1,126.	Kwest
3/27/10	Kelly #366	$5,216.	Kwest
1/20/11	Klemm #5383	$660	Kwest
		$17,697.00 Total	

Santa Ysabel Gorge Preserve (SYG)

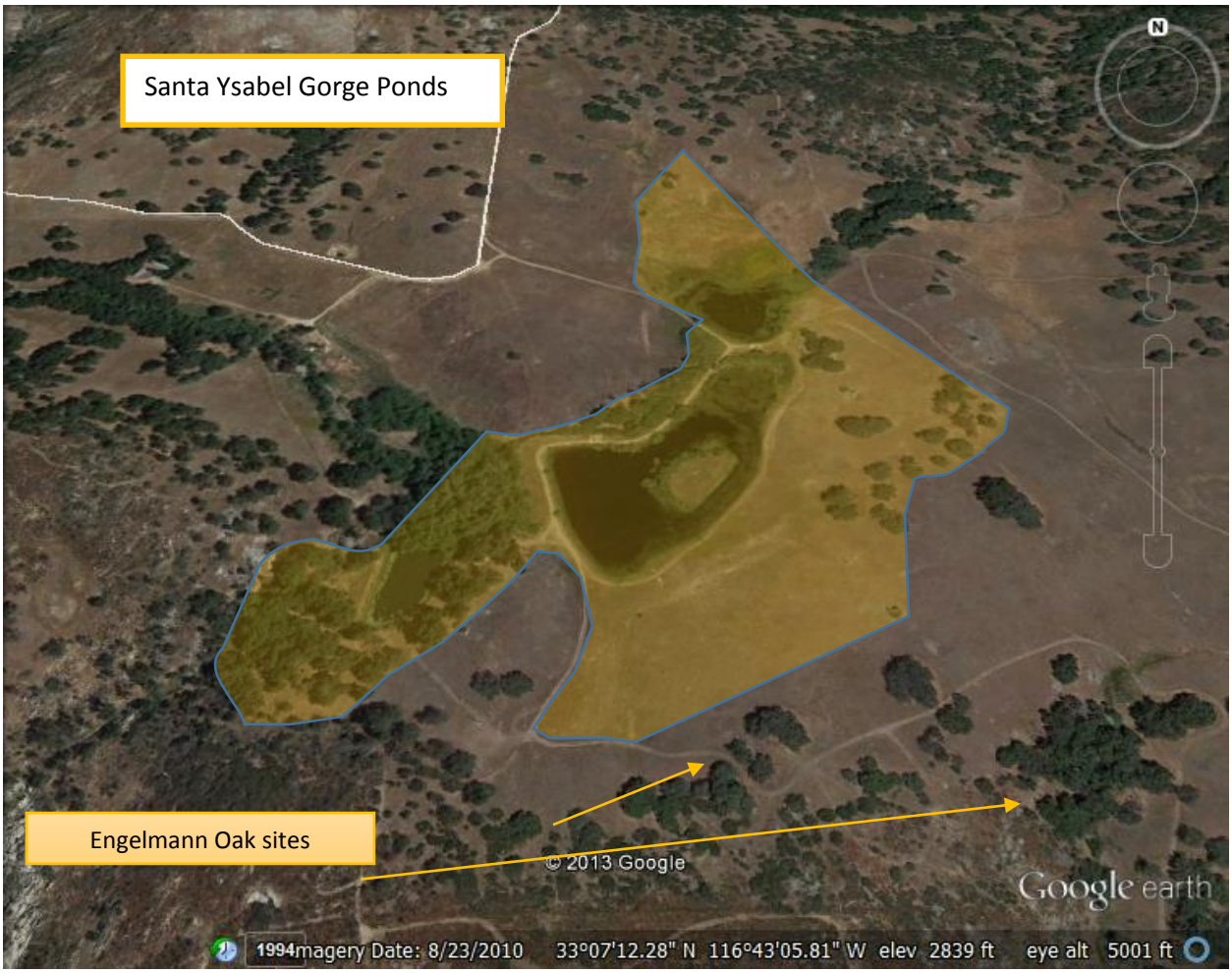
SDRP manages an isolated 800-acre preserve near Santa Ysabel. The preserve is not open to the public. SANDAG funds were used to maintain an 8-acre habitat restoration project and 3-acres of Engelmann oak understory. Access became more difficult in the final year of the grant.

Pond Restoration:

There are three ponds on the preserve that provide year round habitat for water fowl, year round forage, and also drinking water and habitat for mammals and other species. SDRP restored the edges of the ponds and installed fencing to exclude cattle in certain areas. After the project was complete, SANDAG funds were utilized to maintain the restoration sites along the edges of the pond and also continue to maintain the native grassland and oak woodland areas of the initial project. Because much of the project is fenced, there are dramatic visible differences between the project and surrounding land which has varying degrees of use by cattle.

Engelmann Oak:

There are large stands of Englemann oak (*Quercus engelmannii*) at the Santa Ysabel Gorge Preserve (SYG) and the adjacent Santa Ysabel Open Space Preserve West (managed by the County of San Diego) and on private land. Few seedlings have been observed in the area and extensive cattle grazing and the heavily disturbed understory of the woodland is partly to blame. Since grazing is mostly excluded from SYG, weed control occurred in the non-native understory of several oaks in the preserve. Treatments occurred over a three year period and there was a noticeable conversion of the understory. The restored understory provides a more hospitable environment for acorns to sprout.



Date	Contractor	Amount	Notes
5/9/10	Kelly #318	$6673.53	Ponds and upland
8/19/2010	Kelly #348	$502	Ponds
2/15/11	Klemm #5388	$3,385	Englemann
5/3/11	Kelly #376	$9,989.82	Ponds and upland
4/17/12	Klemm #5468	$1400.	Englemann
5/4/12	Klemm #5472	$1200.	Englemann
6/21/12	Kelly #444	$8,681.75	Ponds and upland
99/14/12	Kelly #460	$166.	Ponds
3/26/13	Klemm #5524	$2,100	Englemann
8/13/13	Kelly #519	$13,326.	Ponds and upland
		$47,424.10 Total	

Sycamore Creek/San Dieguito River Park main office

SANDAG funds were used to maintain the office native landscaping and to enhance adjacent habitat. In addition, funds were used to treat an arundo donax infestation on neighboring property.

The San Dieguito River Park Main office: Enhancement of habitat is important because the site is adjacent to the creek and bordered by private property. SDRP offices are located in an area that is considered to be an important wildlife corridor connecting the habitat preserves of Poway with the San Pasqual Valley. The office was burned in the 2007 fires and weed control was needed in order to manage and eradicate annual weeds, especially during construction and immediately after when the building was not occupied.

Tomayo project: The project involved the removal of Arundo donax from approximately 325 feet of stream bank, on both sides of the creek channel. Following removal, native plants will be installed. This is on private land adjacent to Park offices. Upstream and downstream from this project is land owned and managed by SDRP and relatively free from invasive species. This section of creek represented an island of weeds within a healthy section of creek.

Date	Contractor	Amount	Notes
6/6/10	Kelly #330	$635.18	Office
7/21/10	Kelly #344	$79.	Burned Olive
3/27/11	Kelly #369	$639	Office
5/3/11	Kelly #375	$814.15	Office and training
3/31/12	Kelly #425	$618.98	Office

7/10/13	Grangettos	$59.46	Tomayo
8/6/13	Grangettos	$20.09	Tomayo
8/8/13	Klemm #5537	$3,100.	Tomayo
8/20/13	Klemm #5538	$600.	Sycamore Creek
		$6,565.86 Total	

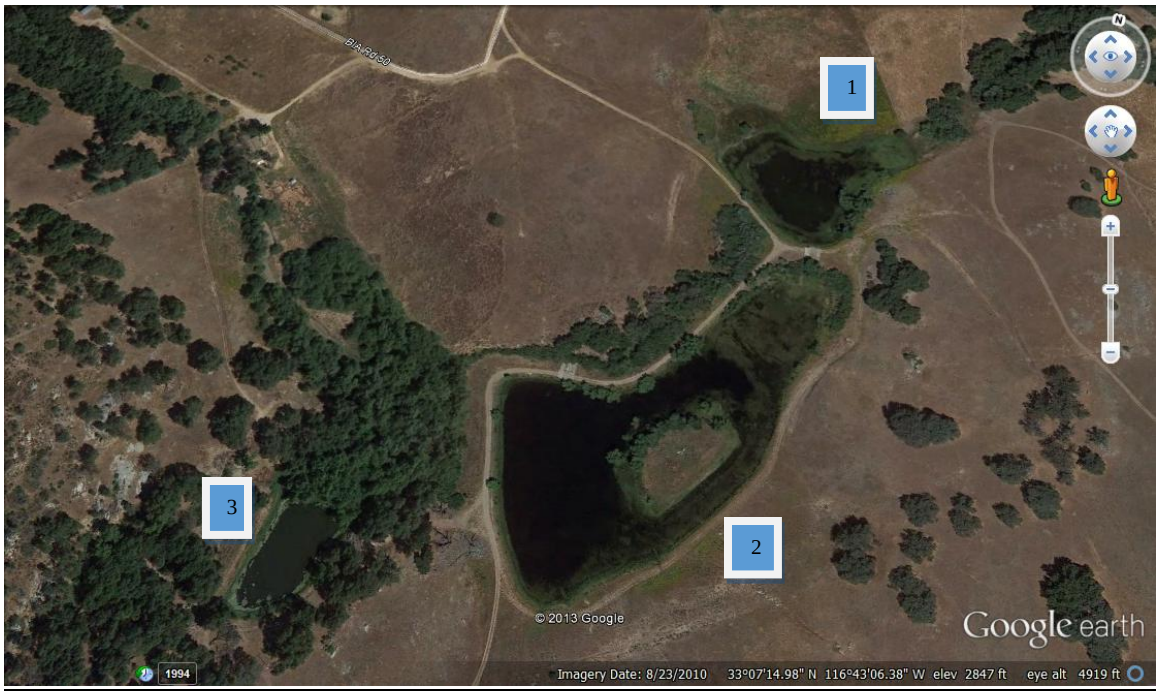
SANTA YSABEL GORGE PRESERVE
BULLFROG CONTROL PROGRAM SUMMARY

December 4, 2013

San Dieguito River Park
Jason Lopez, Resources and Trails Manager

Project Location

The Santa Ysabel Gorge Preserve (SYG) is located in the San Dieguito River Watershed at 33°07'14.98 N, 116°43'06.38" W. The preserve is 797 acres and is adjacent to the County's Santa Ysabel Open Space Preserve West and the conserved open space lands of Lake Sutherland. There are 3 ponds on the preserve that are manmade and trap water generated from a substantial watershed that drains into a pristine section of Santa Ysabel Creek below the ponds and eventually Lake Sutherland.



Resource Summary

The ponds, and adjacent riparian and oakwood forests, provide important habitat for a variety of water fowl, California Treefrog (*Pseudacris cadaverina*), pacific treefrog (*Pseudacris regilla*), Two-striped Gartersnake (Thamnophis hammondii), Western Toad (*Bufo boreas*) and Arroyo Toad (*Bufo californicus*), a Federally listed endangered species. In addition, the SYG ponds provide a year round water source and forage for mammals.

The ponds contained a large population of non-native North American Bullfrogs (*Rana catesbeiana)*. The bullfrogs are a voracious predator that impacts an array of native species. At the start of the project, night surveys revealed that the only amphibian species using the ponds was bullfrog. The proliferation of bullfrogs in this area presents the primary obstacle to effective management of the ponds for the purpose of wildlife habitat.

In Pond #3, the lowest pond, water enters from pond # 1 and #2 and also from a seasonal drainage. The water level of this pond is more consistent than the other two and contains healthy populations of fish, including bass, blue gill, and catfish. It is also possible that this pond is fed by a spring. Juvenile bullfrogs and tadpoles are mostly absent from this pond, possible due to predation by aggressive fish species.

At the start of the project, the ponds were heavily impacted from cattle and little vegetation existed around the edges of Pond #1 and Pond #2. In 2008, the Park began the process of rehabilitating the edges of the ponds by fencing to exclude cattle, the installation of container plants, and persistent weed control. Currently, there is thriving native vegetation around most of the three SYG ponds' perimeters and upland areas.

By 2009, Pacific Tree Frog was the dominant frog species at the ponds. Unfortunately, the bullfrog population eventually rebounded but the native species continue to persist

Bullfrog Information

North American Bullfrogs threaten native species by predation, dominating of habitats, and competing for limited resources. At the start of the SYG bullfrog control project, they completely controlled the terrestrial pond environment. Cattle trampled the vegetation so the population was easily observed.

Bullfrogs are only found around permanent water sources and the SYG ponds are isolated, which presents a situation where eradication is possible. The bullfrog's historic range is in much of the eastern U.S., where predators such as alligators, snapping turtles, bass, and large water snakes kept their numbers in check.

At SYG, the bullfrogs are dependent on the three ponds for reproduction and have a high reproductive capacity which make them a formidable wildlife management problem.

Project Goals

Initially the goal of the project was to eradicate bullfrogs from the three SYG ponds. This was thought possible because the ponds are isolated and located far from other permanent water sources. The isolated nature of the ponds is partly the reason why they are important waterways for wildlife. However, this isolation was also a critical obstacle in achieving the eradication goal as it was difficult to maintain the persistent control necessary for complete eradication.

Concurrently with the bullfrog control project, SDRP implemented habitat restoration and weed control projects which resulted in significant increases in native cover along edges of the ponds, in the water, and in some upland areas adjacent to the ponds.

The initial bullfrog control effort resulted in a dramatic decline in the adult bullfrog population which is thought to have provided a significant boost for the native tree frog and toad species that use the ponds for reproduction.

The eradication goal of the project evolved into the management of the bullfrog population. This control effort combined with the success of the vegetative projects was thought to be a sustainable management solution to the original bullfrog monoculture that

existed prior to the start of the project. Further evaluation is needed but positive results may be used as a pilot for future aquatic, non-native eradication projects.

Project Details

Initially, SDRP trapped bullfrogs with hand nets by walking the shore line and in shallow water with flash lights. Frogs were captured and euthanized.

SDRP applied for and received a Scientific Collecting Permit from California Department of Fish and Game in order to use pellet guns as a method of capture.

Arroyo Toad observed adjacent to pond #1 July 2008

In 2007, 2008 and 2009, the work resulted in a significant decrease in the bullfrog population. This was determined by visual and vocal surveys by staff and volunteers. In 2007, the only amphibian species observed near the ponds was North American Bullfrog. Other species, such as Western Toad (*Bufo boreas*), Arroyo Toad (*Bufo californicus*), California Treefrog (*Pseudacris cadaverina*), and Pacific Treefrog (*Pseudacris regilla*) were observed away from the ponds in the seasonal drainages and small ponds. By 2009, the pacific tree frog chorus was the dominant call at the pond.

The project started before SANDAG grant funds were allocated and continued after the funds were expended. The grant funds were used from September 2008-August 2012 and staff time was not charged at the start of the project

*In 2007, the SDRP capture records and project information was lost in the Witch Fire, Otherwise the results are listed below:

DATE	ADULT REMOVED	JUVENILE REMOVED	TOTAL
*2007	50	20	70
August 2007	32	8	40
May 6, 2008	22	6	28
May 20, 2008	18	20	38
July 1, 2008	11		11
July 29, 2008	8		8
September 10, 2008	4	21	25
September 30, 2008	6	129	135
May 6, 2009	-	-	28
May 20, 2009	-	-	33
June 3, 2009	-	-	48

June 4, 2009	10	4	14
July 28, 2009	-	-	12
August 18, 2009	-	-	140
April 30, 2010	-	-	31
May 1, 2010	-	-	15
May 25, 2010	-	-	38
July 13, 2010	-	-	59
August 10, 2010	-	-	29
May 31, 2011	-	-	58
June-August 2011	-	-	40
April 26, 2012	-	-	87
May 4, 2012	-	-	38
May 15, 2012	-	-	158
June 12, 2012	122	9	131
August 4, 2012		8	44
September 11, 2013	41	14	55
			1413 Total

In 2010 and 2011, the bullfrog population seemed to rebound. Some factors responsible for the increase could be the expansion of vegetative cover, high water levels, and

decrease in control efforts. In addition, bullfrog and tadpole life cycles are dependent upon habitat and available resources. It is also possible that when the large adults were removed in 2008 and 2009 that more breeding occurred as a reaction to the increase in available territory.

Although the bullfrog population eventually re-bounded, it appeared that the pacific tree frog (*Pseudacris regilla*) population was continuing to flourish. Their chorus was prevalent in 2013 and individuals and tadpoles were observed. Some factors responsible for their continued success could be the expansion of vegetative cover and high water levels in 2011 and 2012. Native tadpoles were observed in the adjacent creeks.

Future Management

In 2012 and 2013, native tree frogs continue to be present at the Santa Ysabel Gorge Preserve ponds and there has been an overall increase in biodiversity since the start of the bullfrog control project. SDRP access to the ponds changed in 2012 and the frequency of nighttime visits has decreased dramatically. A formal assessment of the site is needed to fully evaluate the effects of this project.

The bullfrog population is persistent and adaptable. Most likely, the creation of additional habitat was more important than the bullfrog control effort with regards to the persistency of the native frog and other species. When considering the long term viability of the pond as a site where native species can benefit, the vegetation seems to be a more sustainable and manageable solution. Without fully removing the bullfrogs from the ponds, the control effort only provides temporary relief. More investigation needs to occur regarding the reproduction changes caused by bullfrog control projects.

Without establishing a viable method of removing exotic species from this area, it can be assumed that exotic species will continue to have negative effects on native species.

Wildfire

Watch for a dynamic transformation. California poppies (*Eschscholzia californica*) and other wildflowers often bloom profusely after a wildfire, as shown in this photo. You can see burned hillsides across the Lake Hodges Dam. In time, wild lilac (*Ceanothus* sp.) and other plant species will sprout from burned stumps.

A fire destroys and renews

Look around you. This area was burned by the 2007 Witch Creek Fire, which scorched more than 50,000 acres of the San Dieguito River Park, including 40 miles of trails. The fire damaged coastal sage scrub, woodland and chaparral communities, however, these habitats are adapted to wildfires and are recovering. Some plants have sprouted anew from burned stumps. For others, seeds sprouted because of the fire. Wildfires are part of the ecosystems in the San Dieguito River Park, but recovering areas are fragile.

You can help nature recover

When visiting burned areas, your actions can support the natural recovery. Stay on trails so you don't trample new sprouts, compact the fragile soils, or accidentally introduce non-native seeds into the area. Keep dogs on leash and observe quietly so you don't disturb wildlife already stressed by fire. With your care and patience, plant communities will recover. As the plants come back, wildlife will return, too.

Coastal sage scrub

Woodland

Chaparral

San Dieguito River Park trails pass through sensitive natural environments, which are home to threatened and endangered species of plants and animals.

California gnatcatcher

The California gnatcatcher (*Polioptila californica*) nests and feeds only in coastal sage scrub habitat and is on the federal threatened species list. Due to its high numbers around Lake Hodges, the area was designated a "Globally Important Bird Area" in 1999. With the burning of this species' critical habitat, it's uncertain how severely the bird population has been harmed and if it will recover.

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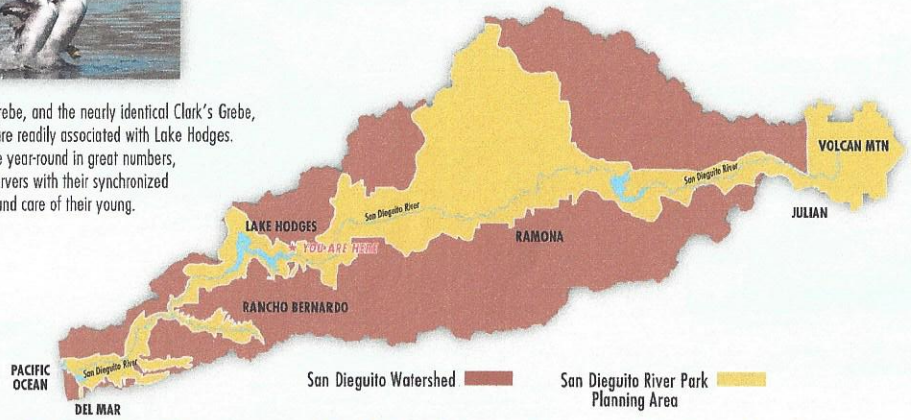
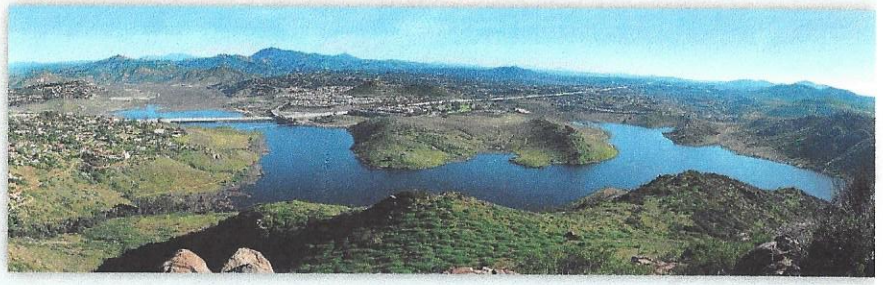
Watershed to River to Lake to You

The Western Grebe, and the nearly identical Clark's Grebe, are birds that are readily associated with Lake Hodges. They are visible year-round in great numbers, delighting observers with their synchronized dance routine and care of their young.





With 27 miles of shoreline, Lake Hodges is a prime recreation area for boaters, fishermen, and picnickers. The trails around the lake offer ample opportunities for hiking, bicycling, and horseback riding. Designated as a Globally Important Birding Area in 1999, bird watching enthusiasts visit from all over the United States. The reservoir is an important part of a larger wildlife corridor for a variety of species dependent upon the area's native plant communities, as well as a vital link for migratory birds traveling the Pacific Flyway.

San Dieguito River travels fifty-five miles to the Pacific Ocean

The river's headwaters begin on the western slopes of Volcan Mountain near the town of Julian

Watershed

A watershed is an area of land that drains water into a lake or river. Everything on the land, whether a natural feature or human activity, is part of the watershed. The watershed of Lake Hodges covers 248 square miles, and is part of the larger 346-square mile San Dieguito Watershed.

Reservoir

In 1918 a dam was built across this section of the river to impound water for the new community of Rancho Santa Fe, creating a man-made reservoir, Lake Hodges. In the San Diego region, all of the reservoirs are man-made features built to supply water for our communities. These reservoirs capture runoff from rainfall and also store water imported from hundreds of miles away. While capturing runoff, the reservoirs also become "accumulators" of anything that is picked up or carried by the runoff. Pollutants, sediments, and other materials from the watersheds end up in the reservoirs. Since we all live, work, and play within a watershed, what we do in our everyday lives affects the quality of our water throughout our connecting communities.

Trash travels! *Pollutants find their way into the reservoir by being carried downstream.*

Don't pollute the waterways with runoff from yards, cars, construction sites, businesses, farms, and streets. Help prevent pollution and contaminants from getting into our drinking water at its source:

- Pick-up and dispose trash and pet wastes properly. Please use doggy waste bags.
- Use less fertilizers, pesticides, and herbicides on landscaping. Use more organic control methods.
- Adjust irrigation schedules to prevent over-watering.
- Recycle used oil at appropriate facilities.
- Participate in clean-up events.

In 2011, the San Diego County Water Authority completed a significant project to connect Lake Hodges with the regional water system, providing emergency storage for the greater San Diego region. The connection allows water to be pumped back and forth between Lake Hodges and Olivenhain Reservoir. From Olivenhain Reservoir, water can be distributed throughout the region by the Water Authority's aqueduct system. A side benefit of this project is that the water level in Lake Hodges can be regulated to maintain a more constant level during dry seasons, and lowered to capture runoff during rainy season.

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