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### Hodges & Olivenhain Reservoir History

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### Project Need

Heavy Nutrient Loads – First Flush and Urban Runoff

Summer Time Algae Blooms

Current Reinforcing Systems Loop

Fall Lake Flip Over and Fish Kill

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### Project Need

- Water Quality Challenges
  - High Manganese/Sulfur Concentrations
  - High Organic Carbon Concentrations
  - Low DO
  - Algae (taste/odor)
  - Fish Kills
  - Methyl Mercury
  - Urban Runoff, Ag Runoff and Sewage Spills
- Quagga Mussel Infestation

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## Project Scope

- Increase coordinated efforts to improve water quality in Hodges Reservoir and Olivenhain Reservoir
- Produce plans to decrease levels of pollutants in Hodges Reservoir
- Evaluate Quagga Mussel Population in Olivenhain Reservoir and attached facilities



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## Budget

Budget Category	DWR Grant Amount	Match/Other Cost Share
Project Administration	\$75,000	\$16,000
Planning/Design/Engineering/Environmental Documentation	\$798,000	\$284,000
<b>TOTAL</b>	<b>\$873,000</b>	<b>\$300,000</b>
<b>Total Project Cost</b>		<b>\$1,173,000</b>

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## Overview of Work Completed

- Five Technical Studies
- Three Monitoring Programs
- Enhanced Water Quality Monitoring Equipment




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## Foundational Studies Completed

RNT Consulting Inc. Phone: 813 478 7564  
823 County Road 35 Fax: 813 478 0279  
Peters, Oregon, Canada  
90K 270

  
RNT CONSULTING INC.

**Vulnerability Assessment to Quagga Mussel Infestation for Olivenhain, Hodges and San Dieguito Reservoirs and Associated Facilities, Including a List of Viable Control Strategies**

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**Assessment Report**  
August 02, 2011

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**Prepared for:**  
San Diego County Water Authority.

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**Prepared by:**  
Renata Clausi, MSc  
Tom Prescott, MSc, PE/Eng.

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SDCWA - Task #12 - Invasive Species

 PUBLIC UTILITIES

City of San Diego Public Utilities

**Lake Hodges Reservoir Water Quality Assessment Study**  
**Final Conceptual Planning Report**

June 30, 2014



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## Wet Weather Sampling Studies Completed

FINAL REPORT

Hodges Catchment Wet Weather Sampling and Characterization of Nutrient Loads to Hodges Reservoir

*Prepared for:*  
City of San Diego

July 26, 2017


  
402 W. Broadway  
Suite 1450  
San Diego, CA 92101

FINAL REPORT

Hodges Catchment 2018 Wet Weather Sampling

*Prepared for:*  
City of San Diego

April 9, 2018

  
402 W. Broadway  
Suite 1450  
San Diego, CA 92101

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## Tributary Stream Sampling

JACOBS

- Hodges Nutrient Identification Study
  - Performed wet-weather sampling at 10 locations across Hodges 248 square mile watershed

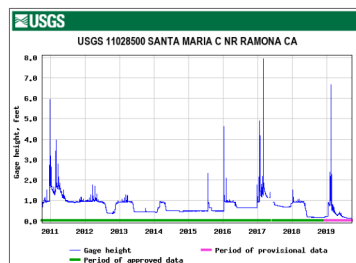
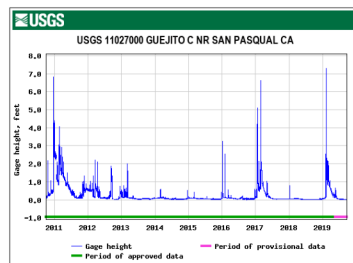


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## Tributary Stream Sampling

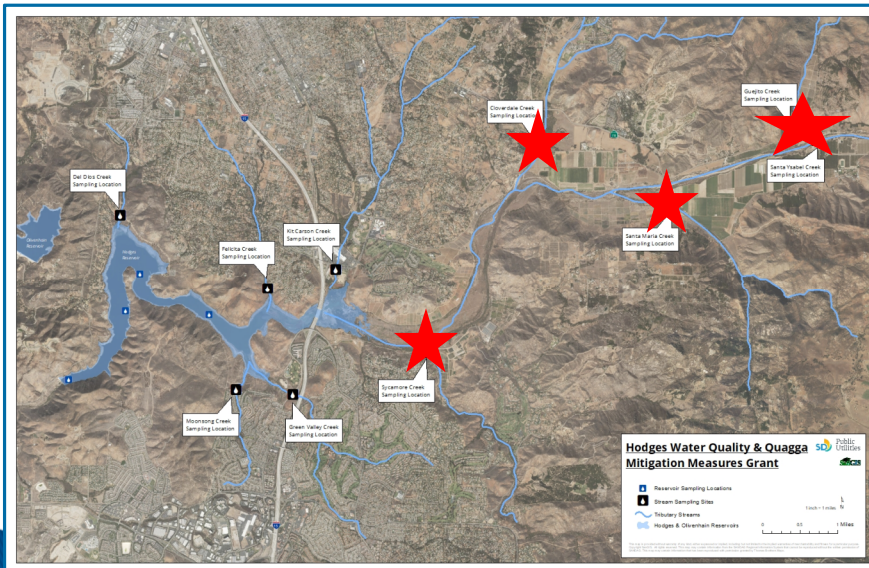
- Hodges Nutrient Identification Study
  - 5 of the sampling locations are located along episodic tributary streams, water quality data during flow periods identified as a major data gap



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## Tributary Stream Sampling



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## Tributary Stream Sampling



- Left: Before & After Photo of Guejito Creek



- Right: Before & After Photo of Santa Ysabel Creek



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## Tributary Stream Sampling



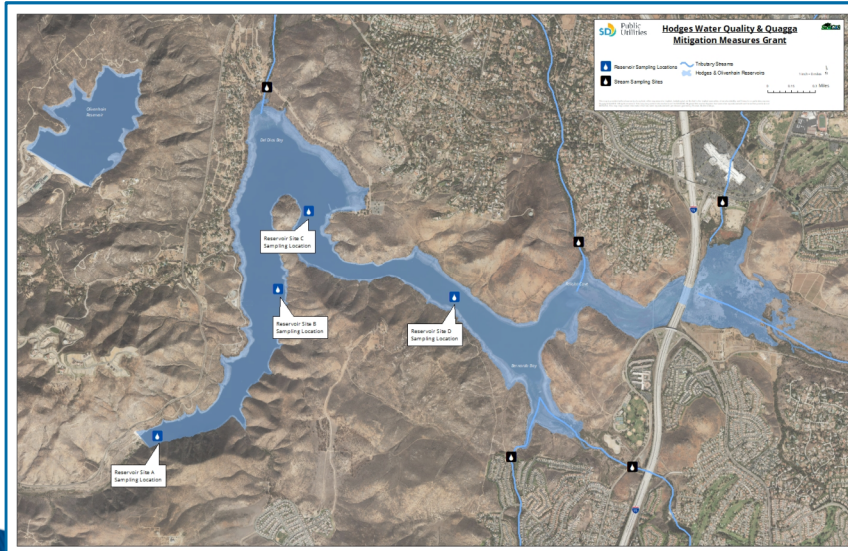
- Left: Before & After Photo of Sycamore Creek



- Right: Before & After Photo of Santa Maria Creek



## Project Location- Reservoirs



## Reservoir Sampling

- Data Collected
  - Reservoir profiles
  - Methylmercury accumulation
  - Nutrient concentrations
  - Sediment-Oxygen demand



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## Equipment Purchased



Eureka Data Probe



Van Dorn Bottles




Weather Station Equipment

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## Environmental Documentation



June 12, 2015

U.S. Fish and Wildlife Service  
Attn: Ms. Stacey Lowe  
Carlsbad Fish and Wildlife Office  
2177 Salk Ave., Ste. 200  
Carlsbad, CA 92008

Subject: 45-Day Report for Coastal California Gnatcatcher Surveys at the Lake Hodges Water Quality and Outage Mitigation Measures Project, City of San Diego, California


Ms. Lowe:

This letter presents findings of Coastal California Gnatcatcher (*Psaltriparus californicus californicus*; CAGN) protocol surveys conducted for the Lake Hodges Water Quality and Outage Mitigation Measures Project in the City of San Diego, California. CAGNs were observed during all surveys in the northern portion of the project area.

The surveys described in this report were performed on behalf of the City of San Diego's Public Utilities Department. The San Diego Region Regional Water Quality Control Board's Clean Water Act Section 303(d) and 303(d) Integrated Report 2008 states that Lake Hodges does not meet water quality objectives for pH, manganese, turbidity, nitrogen, or phosphorus. The impairments identified are primarily a result of eutrophic conditions due to nutrient loading. Resulting algal production is the primary concern, especially since algae decomposition in deeper waters can reduce and release iron and manganese and produce methanogenicity. In order to address these issues, the City of San Diego and the San Diego County Water Authority propose the following improvements:

- A concrete masonry unit concrete building with fire-resistant roof
- A 600-ampere main electrical service with components and capacity to support all HCS equipment
- Three ESA nitrogen generation units with a capacity of about 1 tpd each
- Programmable logic controller connected to the City's supervisory control and data acquisition (SCADA) system
- Skid-mounted Speece Cone with a rock or concrete base that is approximately 150x200 feet that will require lake bottom resurfacing to be placed on the bottom of the lake
- An intake screen, connecting piping, and discharge manifold/diffuser mounted on the Speece Cone and
- Submersible pump (75-horsepower name plate)
- Power cable and oxygen pipeline connecting the shoreline facilities to the Speece Cone


510 SEPTEMBER STREET • SAN DIEGO, CA 92110-1118  
PH: 619-594-3600 • E-MAIL: INFO@ROCKSONLINE.COM



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## Benefits

- Cross jurisdictional collaboration
- Data sharing
- Improved water quality modelling and validation
- Management actions investigated
- Projects that will improve water quality at Hodges Reservoir
- Protect water treatment infrastructure reliability



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## Challenges & Lessons Learned

- Project Manager Change
- Reallocation of Funds
  - Staying within scope and identifying new project needs.

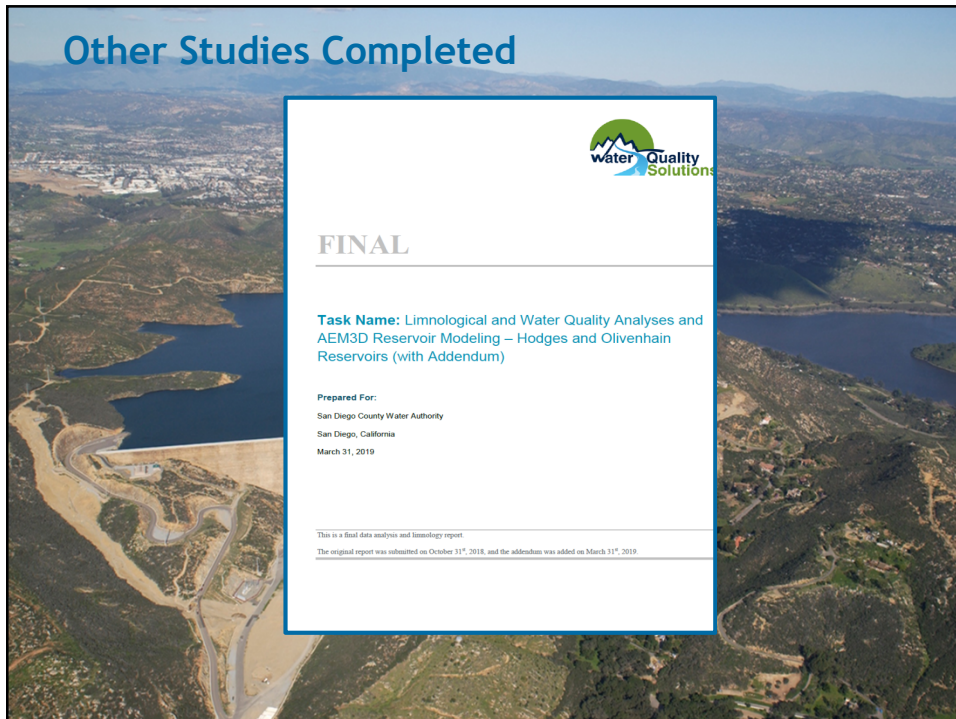



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## Other Studies Completed





**FINAL**

**Task Name:** Limnological and Water Quality Analyses and AEM3D Reservoir Modeling – Hodges and Olivenhain Reservoirs (with Addendum)

**Prepared For:**  
San Diego County Water Authority  
San Diego, California  
March 31, 2019

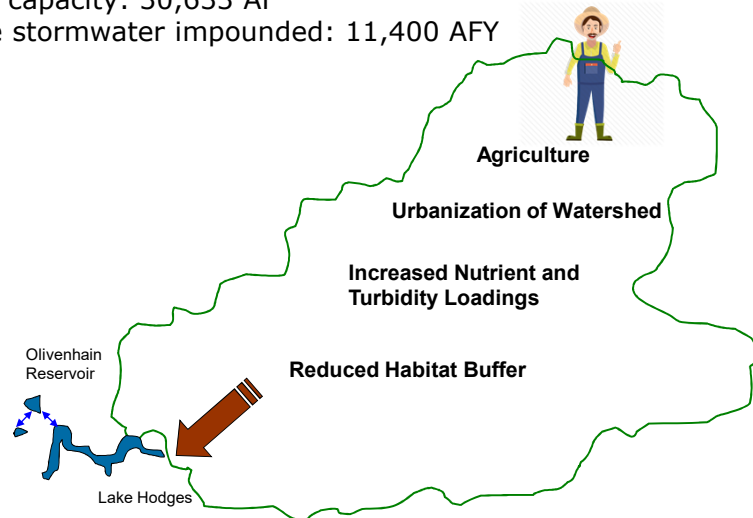
This is a final data analysis and findings report.  
The original report was submitted on October 31<sup>st</sup>, 2018, and the addendum was added on March 31<sup>st</sup>, 2019.

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## What makes this project the IRWM golden child?

Storage capacity: 30,633 AF

Average stormwater impounded: 11,400 AFY



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## IRWM Based Solutions

### Reservoir Solutions

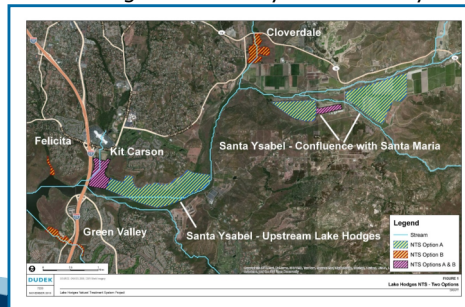


### Watershed Solutions

San Diego Zoological Society



San Diego River Valley Conservancy



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**Thank you**