Agenda

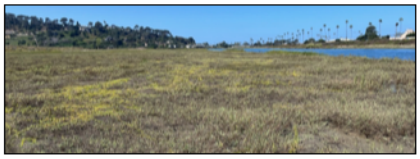
Annual Public Workshop

San Onofre Nuclear Generating Station Wetland Mitigation Project

May 6, 2025

9:30 – 9:40	**Introduction and Overview – Mark Page, UCSB**
9:40 – 10:20	**Performance of the San Dieguito Wetlands Restoration Project – Rachel Smith, UCSB**
10:20 – 10:50	**Causes and consequences of tidal creek loss at San Dieguito Wetlands – Kat Beheshti, UCSB**
10:50 – 11:30	**General Discussion**

For more information go to: http://marinemitigation.msi.ucsb.edu/



Introduction

Annual Review Workshop for SONGS Wetland Mitigation

May 6, 2025

SONGS Mitigation Monitoring Project
Marine Science Institute, University of California Santa Barbara

SONGS Mitigation Monitoring team

Principal Investigators

Dan Reed
Research Biologist

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Data Scientist

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Andres Deza
Wetland Field Research Supervisor

Science Advisory Panel

Richard Ambrose
Professor and Director

Peter Raimondi
Professor and Chair

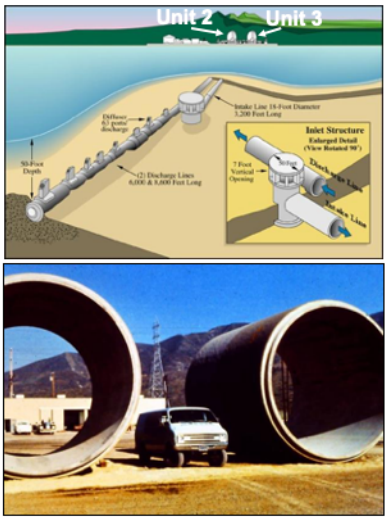
Russell J. Schmitt
Professor of Marine Ecology

- This map shows the locations of SONGS, the impact site in red, and the San Dieguito Lagoon, site of the San Dieguito Wetlands Restoration Project about 20 miles north of San Diego in southern California.

Wetland Mitigation Linked to the Adverse Effects of the SONGS Cooling Water System

(San Onofre Nuclear Generating Station = SONGS)

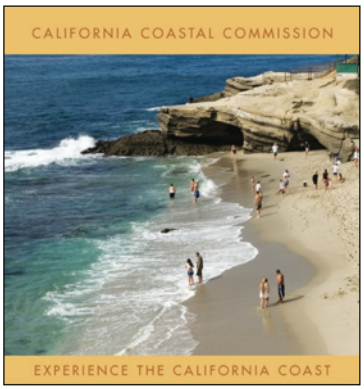
- **SONGS reactors were cooled by a single pass seawater system.**
- **Units 2 and 3 have separate intake lines located in about 30 feet of water offshore of the power plant.**
- **Power plant heated cooling water and turbulence kills fish eggs, larvae and small immature fish.**
- **SONGS operations projected to cause substantial reductions in populations of adult nearshore fish in the Southern California Bight.**



- It is useful to review the purpose and rationale beyond the SONGS wetland mitigation project.
- The SONGS reactors were cooled by a single pass seawater system.
- Units 2 and 3 had separate intake lines located in about 30 feet of water offshore of the power plant
- When operational, the water pumped into the plant was elevated about 19 degree F above ambient in the plant, and then discharged through an extensive diffuser system designed to dissipate the heat.
- Power plant heated cooling water and turbulence was found to kill fish eggs, larvae and small immature fish; these losses were projected to cause substantial reductions in populations of adult fish in the Southern California Bight.
- Construction of Units 2 and 3 was found to be consistent with the Coastal Act only if these significant adverse impacts to fish were mitigated.

The California Coastal Act Requires Mitigation of Impacts to the Marine Environment

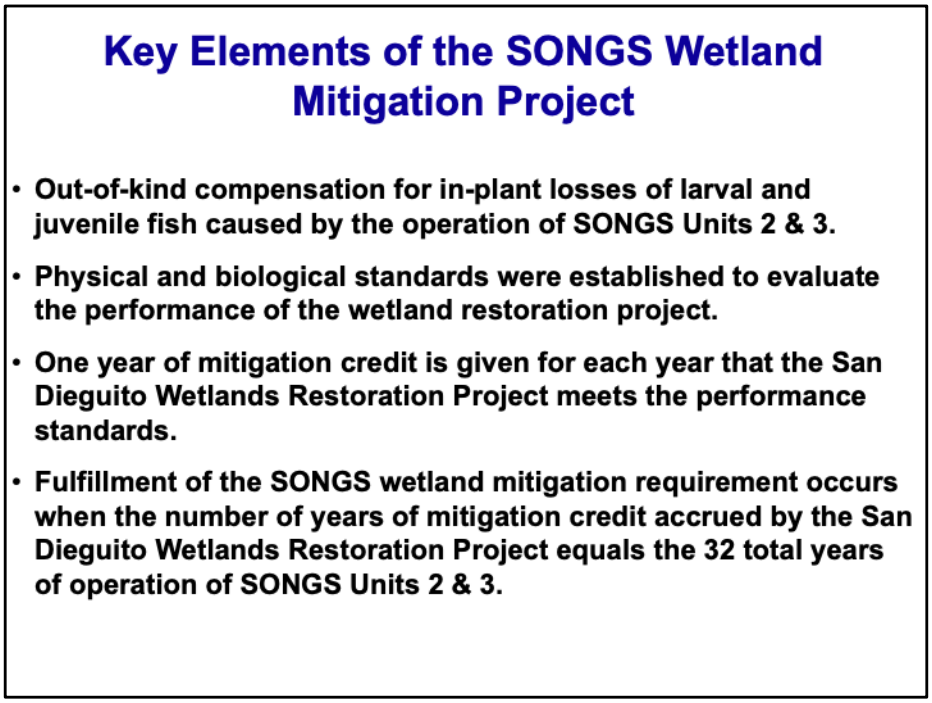
California Coastal Commission (CCC) responsible for implementing the Coastal Act



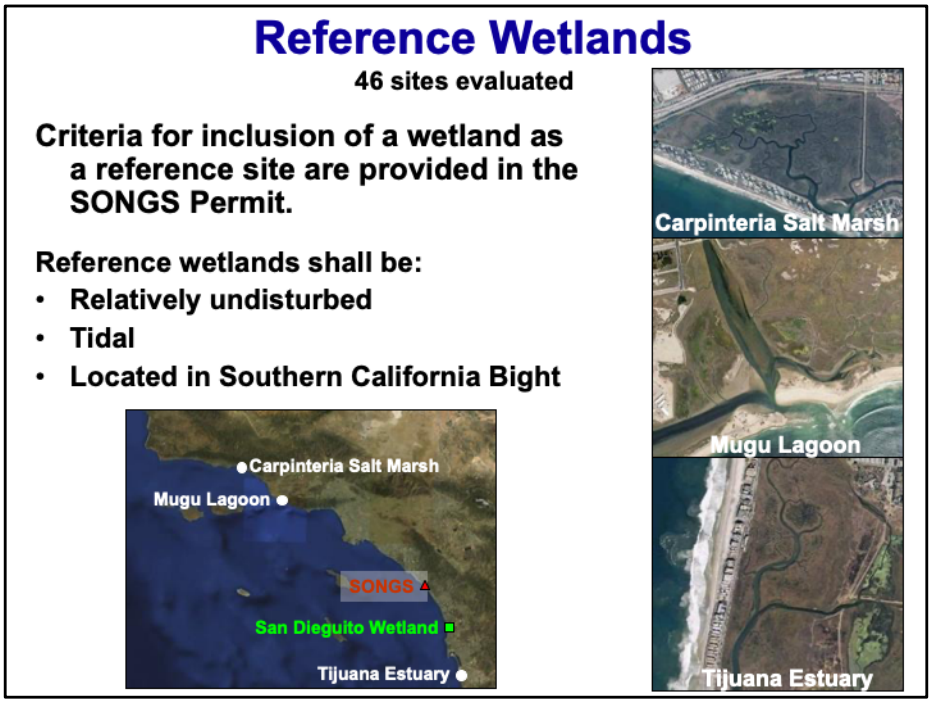
As mitigation for the impacts to larval and juvenile fish caused by SONGS the CCC required SCE to:

- **Create or substantially restore a minimum of 150 acres of wetlands, excluding buffer zone and upland transition area.**
- **Provide funding for scientific oversight and monitoring of the restoration project that is *independent* of SCE.**

- The California Coastal Act requires the mitigation of impacts to the marine environment.
- Enforcement of the Coastal Act resides with the California Coastal Commission (CCC).
- As mitigation for the impacts to larval and juvenile fish caused by SONGS the CCC required SCE to:
  - Create or substantially restore a minimum of 150 acres of wetlands, excluding buffer zone and upland transition area.
  - Provide funding for scientific oversight and monitoring of the restoration project that is *independent* of SCE.



- This slide summarizes the key elements of the SONGS Wetland Mitigation Project:
- The mitigation project is out-of-kind compensation for in-plant losses of larval and juvenile fish caused by the 32 years of operation of SONGS Units 2 & 3.
- Physical and biological standards were established to evaluate the performance of the wetland restoration project to ensure that the restored wetland provides ecosystem functions that are similar to relatively undisturbed tidal wetlands in the region.
- One year of mitigation credit is given for each year that the San Dieguito Wetlands Restoration Project meets the performance standards.
- Fulfillment of the SONGS wetland mitigation requirement occurs when the number of years of mitigation credit accrued by the San Dieguito Wetlands Restoration Project equals the 32 total years of operation of SONGS Units 2 & 3.



- During development of the Monitoring Plan, we reviewed 46 sites as possible reference wetlands with which to compare the performance of the SDW project.
- Criteria for inclusion of a wetland as a reference site are provided in the SONGS permit and require that a reference wetland be relatively undisturbed, tidal, and located in the Southern California Bight.
- We narrowed the field to 3 wetlands, Carpinteria Salt Marsh, Mugu Lagoon, and Tijuana Estuary as best meeting these criteria.

Sewage pollution impacts Tijuana River Estuary

K.C. Alfred/The San Diego Union-Tribune

Miguel Gutierrez Jr., CalMatters

Supervisors Declare State of Emergency on Cross-Border Pollution, Sewage

June 28, 2023 / *Times of San Diego*
by Elizabeth Ireland

San Diego County supervisors unanimously approved a proclamation Tuesday declaring a state of emergency due to pollution and sewage flowing across the U.S.-Mexico border.

The San Diego Union-Tribune

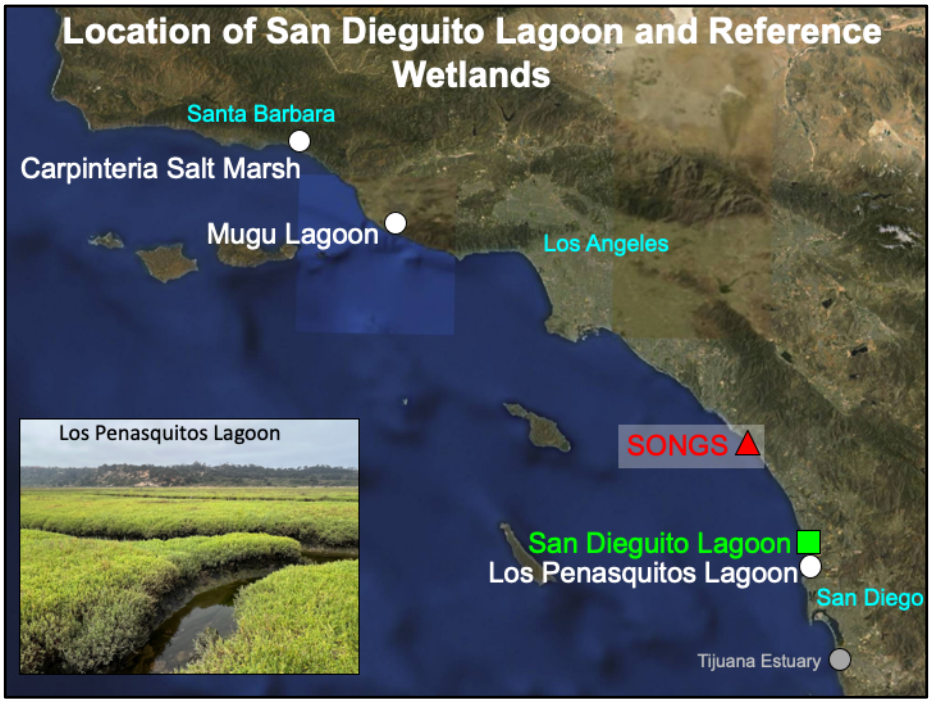
Rains turn Tijuana River Valley into 'swamp of sewage.' But wetlands may need those flows.

Los Angeles Times

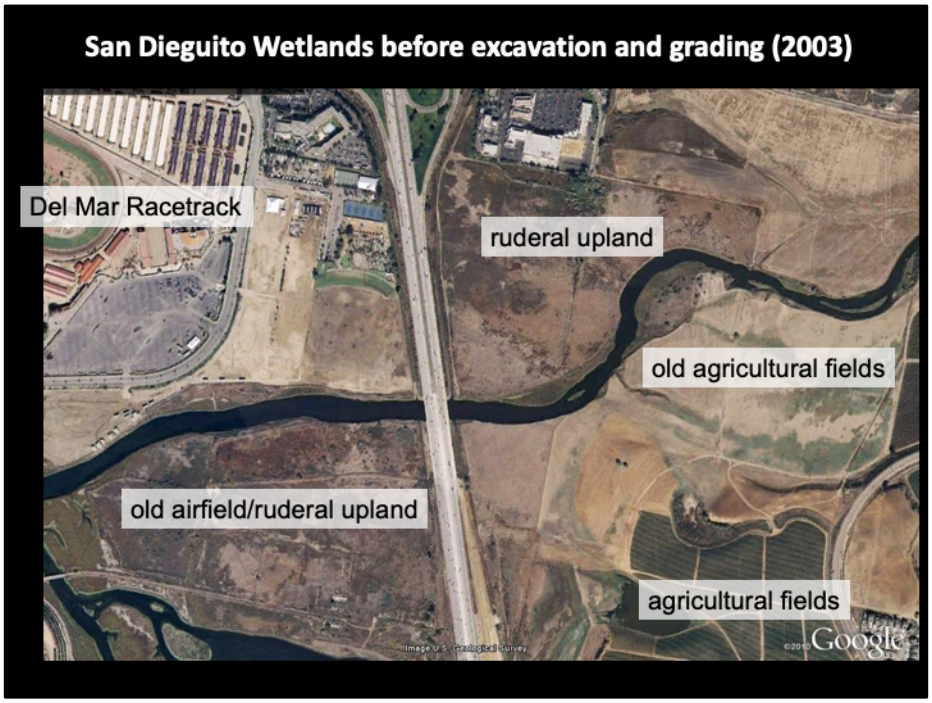
CALIFORNIA

U.S., Mexico pledge half a billion dollars to fight cross-border pollution from Tijuana sewage

- Unfortunately, TJE experienced record sewage inputs during the rains of 2023 rendering the site inappropriate to serve as a reference wetland and necessitating a search for a replacement reference wetland.



- After considering the options available, we selected Los Penasquitos Lagoon as best meeting the criteria in the SONGS permit with the advantage that it is close to SDW.
- At the time of the initial selection of reference sites, Los Penasquitos Lagoon had an inlet that was intermittently open, but the inlet is now maintained in an open condition meeting an important criterion of reference site selection.
- The three reference wetlands used to evaluate the performance standards in 2024 and moving forward are Carpinteria Salt Marsh, Mugu Lagoon, and Los Penasquitos Lagoon.



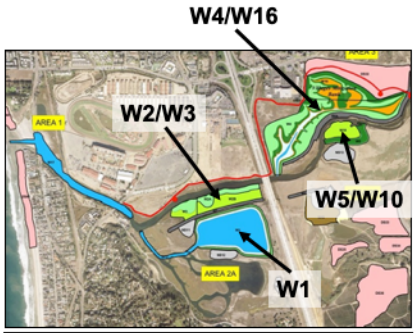
- This slide shows a satellite view of the project site before excavation and grading.
- You can see the San Dieguito River and adjoining ruderal upland, including the site of an old WWII airfield, and old agricultural fields.
- You can also see a portion of a basin that was constructed in the 1980's termed the Fish and Game Basin.

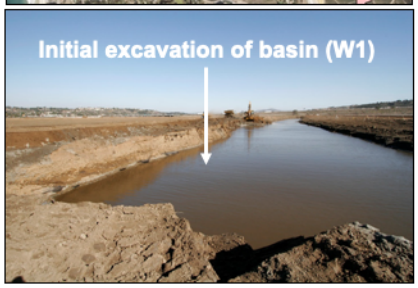
- During construction, the ruderal areas and old agricultural fields were excavated and graded to create the planned intertidal and subtidal wetland habitats of the restoration project visible in this image taken in 2016.
- In addition, you can see nesting sites that are not part of the mitigation requirement, and upland disposal sites that received the majority of the ~2.2 million yd3 of material excavated during construction.

Timeline

Construction start date **September 2006**

Project Task	Completion Date
Construction:	
All modules	November 2010
Re-grading of W2/W3	March 2014
Planting:	2008, 2009, 2011, 2016-2024
Inlet dredging:	2011, 2015, 2017, 2019, 2022, 2024
Performance monitoring	January 2012 to present (13 years)



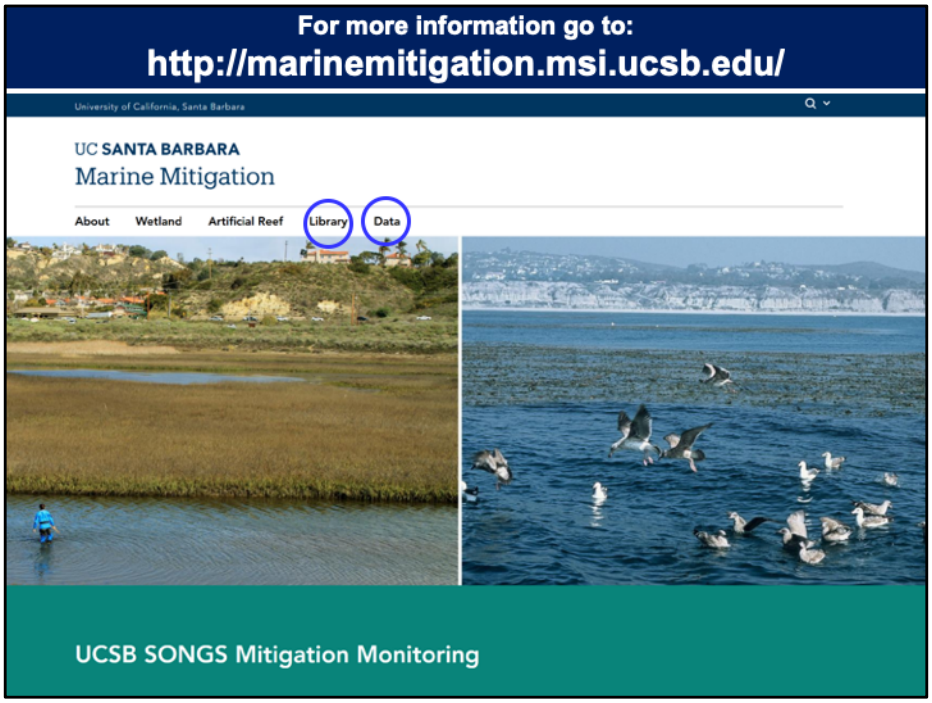


- This slide summarizes the project timeline.
- Construction began in September of 2006.
- Most excavation and grading was completed by 2008, with the addition of tidal creeks in W2/3 completed in November 2010, and re-grading of this area to lower elevations in March 2014.
- Large scale planting of salt marsh plants, including cordgrass, Spartina in the low marsh was completed in 2011, with additional planting of other species, initially in the higher elevations, but now more broadly that is on-going.
- Inlet channel dredging was completed in September 2011, with follow-up maintenance dredging approximately every 2-3 years to maintain tidal exchange as required by the permit.
- Performance monitoring began in the year 2012, following the initial September 2011 dredging.
- We will be reporting on the thirteenth year of performance monitoring.

Monitoring of Wetland Performance

- **Annual monitoring required to evaluate physical and biological performance standards provided in SONGS permit.**
- **Monitoring tracks ecosystem development and identifies adaptive management opportunities pertaining to physical and biological functioning of wetland.**
- **Independent monitoring is conducted by scientists from UCSB with advice from the Science Advisory Panel.**

- Following construction, annual monitoring is required to evaluate the physical and biological performance standards provided in the SONGS coastal development permit.
- Monitoring also tracks ecosystem development and identifies adaptive management opportunities pertaining to the physical and biological functioning of the wetland.
- Independent monitoring is conducted by scientists from UCSB with advice from the Science Advisory Panel.



- We want to bring to your attention to our UCSB SONGS Mitigation Monitoring website that can be found at the url on the slide and is easily searchable on web browsers by typing in ucsb msi songs or something similar.
- The website contains useful content on the history of SONGS coastal impacts, the rational and requirements for SONGS mitigation, and descriptions and status of the artificial reef and wetland mitigation projects.
- Importantly, all of the project's monitoring data are being made publicly available through a data portal of the U.S. National Science Foundation's Environmental Data Initiative, which can be easily accessed through the UCSB SONGS Mitigation Monitoring Website.

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