Agenda

Annual Public Workshop

San Onofre Nuclear Generating Station Wetland Mitigation Project
Power House, Del Mar, CA
May 6, 2019

1:30 – 1:40	Introduction and Overview – ***Mark Page, UCSB***
1:40 – 2:10	Performance of the San Dieguito Wetlands Restoration Project – ***Steve Schroeter, UCSB***
2:10 – 2:30	Salt Marsh Vegetation: Status Update & Experiments to Inform Adaptative Management – ***Mark Page, UCSB***
2:30 – 3:00	General Discussion

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

Introduction

Annual Review Workshop for SONGS Wetland Mitigation

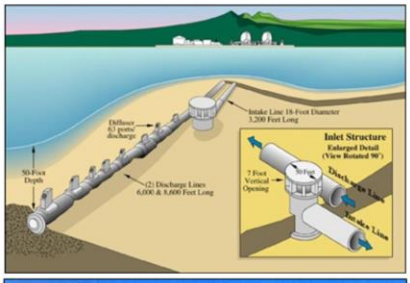
May 6, 2019

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

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

(San Onofre Nuclear Generating Station = SONGS)

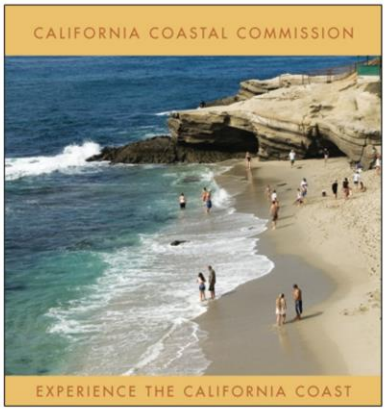
- **SONGS reactors were cooled by a single pass seawater system.**
- **Units 2 and 3 have separate intake lines located in about 30 feet of water offshore of the power plant.**
- **Power plant heated cooling water and turbulence kills fish eggs, larvae and small immature fish.**
- **SONGS operations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



- Some background is important for understanding the purpose and rationale for the SONGS wetland mitigation project.
- The SONGS reactors were cooled by a single pass seawater system.
- Units 2 and 3 have separate intake lines that are located in about 30 feet of water offshore of the power plant
- When operational, the water was elevated 19 deg 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 would be mitigated.

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

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



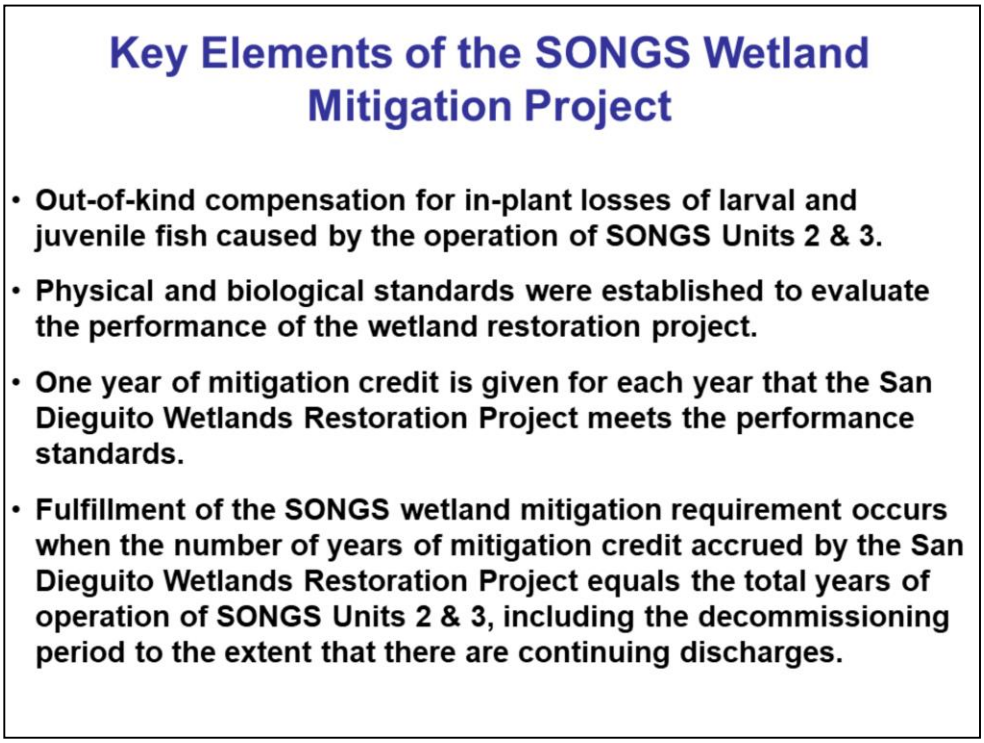
As mitigation for the impacts to larval and juvenile fish caused by SONGS the CCC required SCE to:

- **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:

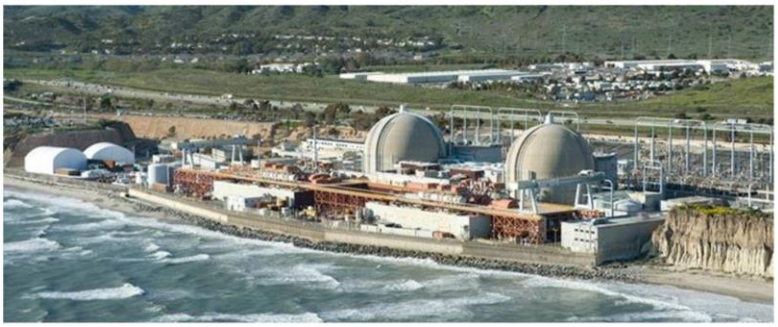
-Create or substantially restore a minimum of 150 acres of wetlands, excluding buffer zone and upland transition area.

-Provide funding for scientific oversight and monitoring of the restoration project that is *independent* of SCE.



- To summarize 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 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 total years of operation of SONGS Units 2 & 3, including the decommissioning period to the extent that there are continuing discharges.

SONGS Units 2 & 3 Operating Conditions



1982: Unit 2 operations begin
1983: Unit 3 operations begin
2012: Units 2 and 3 operations suspended
2013: Units 2 and 3 operations permanently ceased
Transfer of fuel to spent fuel pool
Operating license modified

- **No operation of reactors**
- **No fuel in reactors**
- **"Possession Only" license**

- This slide provides a timetable of SONGS operations.
- Operations of SONGS Units 2 and 3 were suspended in January 2012 due to premature wear of components of replacement steam generators.
- SCE decided to permanently cease power operations in June 2013
- SCE's operating license has been modified to "possession only" and they are no longer authorized to operate the reactors

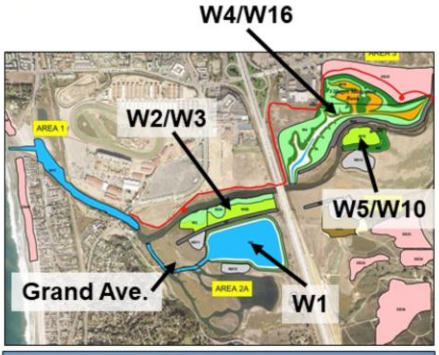
- This map shows the locations of SONGS, the impact site, the San Dieguito Lagoon, site of the San Dieguito Wetlands Restoration Project, and 3 wetlands that are used as reference sites to evaluate the performance of the restoration project: Carpinteria Salt Marsh, Mugu Lagoon, and Tijuana Estuary.

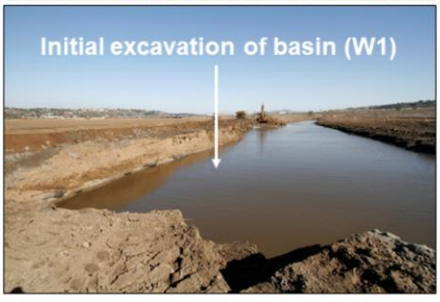
- This slide shows a satellite view of the project site before excavation and grading.
- You can see the San Dieguito River and adjoining ruderal upland, including the site of an old WWII airfield, and old agricultural fields.
- You can also see a portion of a basin that was constructed in the 1980's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

Project Task	Completion Date
Start date	**September 2006**
Construction:	
All modules	November 2010
Additional wetland (Grand Ave)	February 2011
Re-grading of W2/W3	March 2014
Planting:	2008, 2009, 2011, 2016, 2017, 2018
Inlet dredging:	September 2011
	November 2015
	Nov/Dec 2017
Performance monitoring	January 2012 to present





- This slide summarizes the project timeline.
- Construction began in September of 2006.
- Wetland construction was organized by area and module -- 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 some additional planting in high marsh in 2016, 2017, 2018.
- Inlet channel dredging was completed in September 2011, with follow-up maintenance dredging in November 2015 and 2017.
- Performance monitoring began in the year 2012, following the initial September 2011 dredging.

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 a 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 a Science Advisory Panel.