

*Carlsbad
Desalination Project*

*Flow, Entrainment and Impingement
Minimization Plan
April 9, 2008*

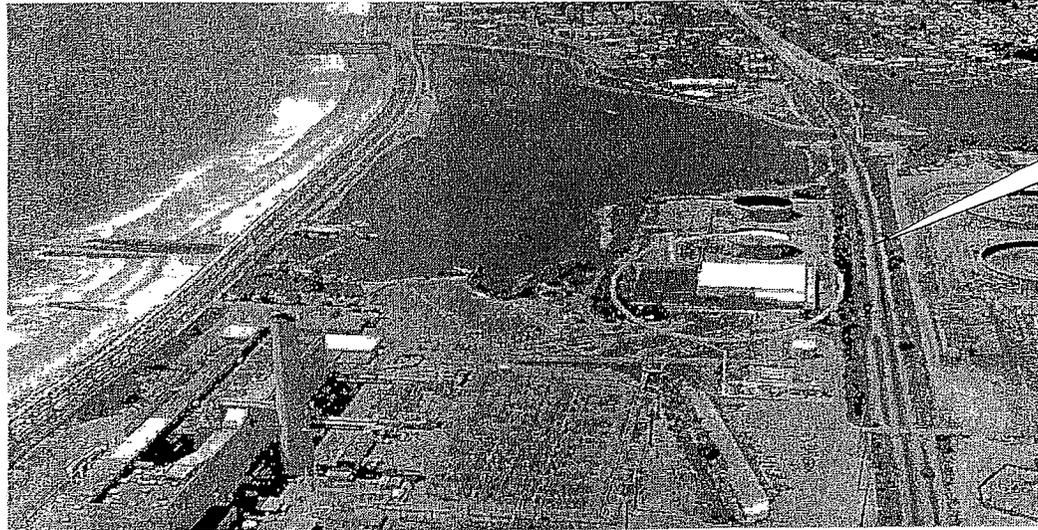


POSEIDON
RESOURCES

Discussion Points

- I. Project summary
- II. Why is this matter before the Board
- III. What the Plan entails
- IV. Why the Plan is conservative
- V. Why the Plan is responsive
- VI. What are the environmental benefits
- VII. Next steps
- VIII. Recommendation

I. Project Summary



Artist Rendering of the
Carlsbad Desalination
Project

- **Water Supply and Environmental Enhancement Project**
 - **Water Supply:**
 - 50 MGD seawater desalination plant and delivery pipelines
 - Provide a new locally-controlled, drought-proof water supply
 - Reduce dependence on imported water
 - Improve water quality
 - **Environmental Restoration and Enhancement:**
 - Preserve Agua Hedionda Lagoon and watershed
 - Restore 37 acres of marine wetlands
 - Create new opportunities for coastal access and recreation
 - Reduce project's carbon footprint to zero

Water Agency Partners



City of Oceanside
5,000 AFY



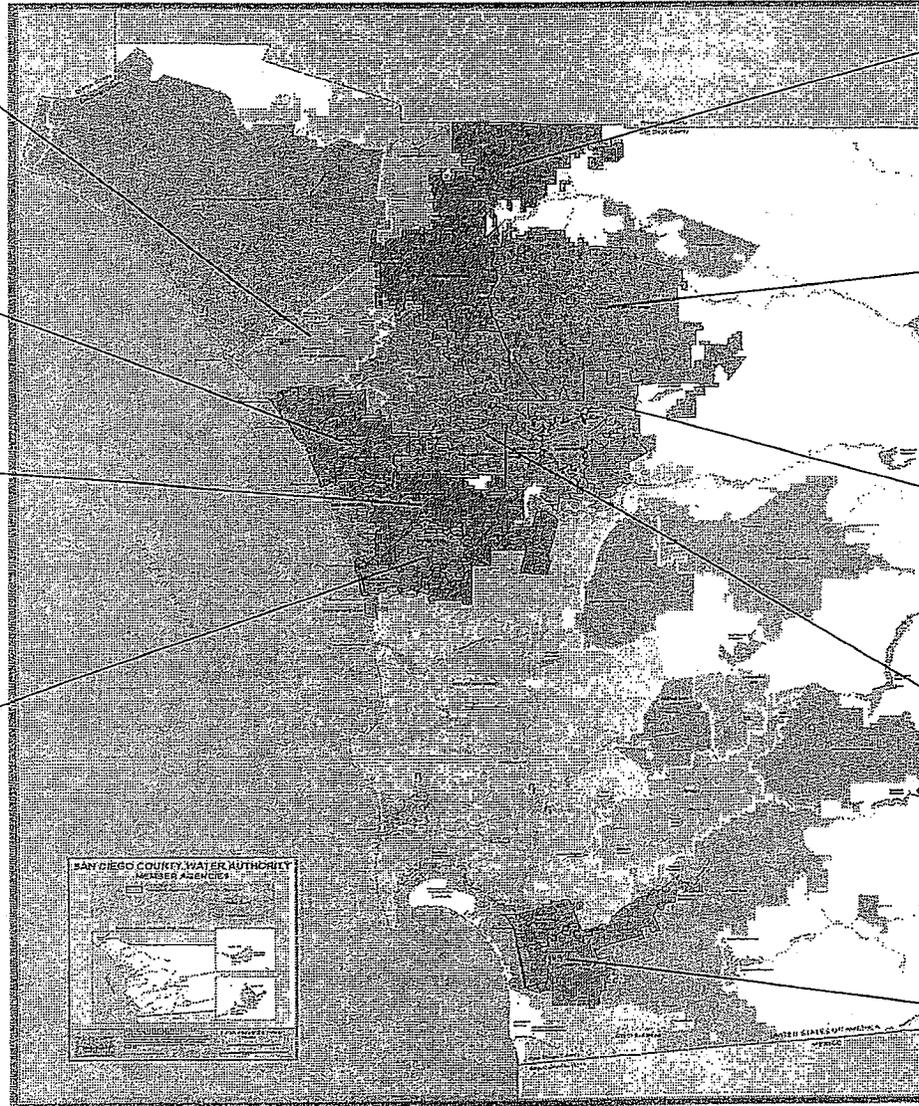
Carlsbad Municipal
Water District
22,000 AFY



Olivenhain Municipal
Water District
5,000 AFY



Santa Fe Irrigation
District
2,000 AFY



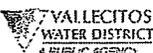

Rainbow Municipal
Water District
7,500 AFY



Valley Center
Municipal Water
District
7,500 AFY



Rincon del Diablo
Municipal Water
District
4,000 AFY

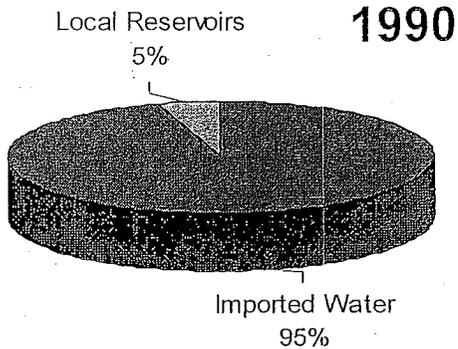


Vallecitos Water
District
7,500 AFY



Sweetwater Authority
2,400 AFY

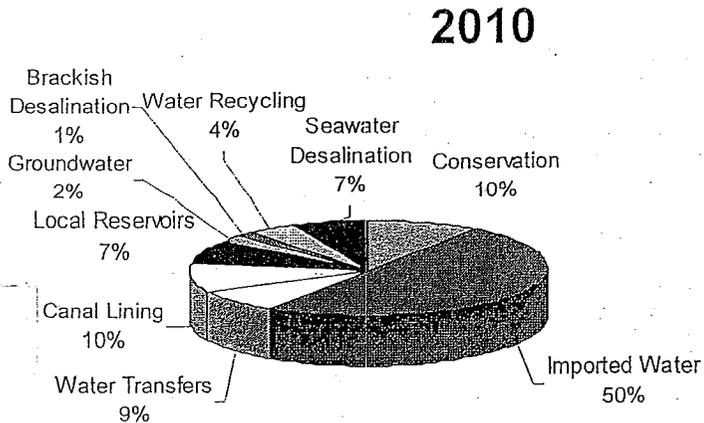
Need for the Project



Total Demand: 717,017 AFY
 Conservation Savings: 0 AFY
 Per Capita Demand: 190 GPD*

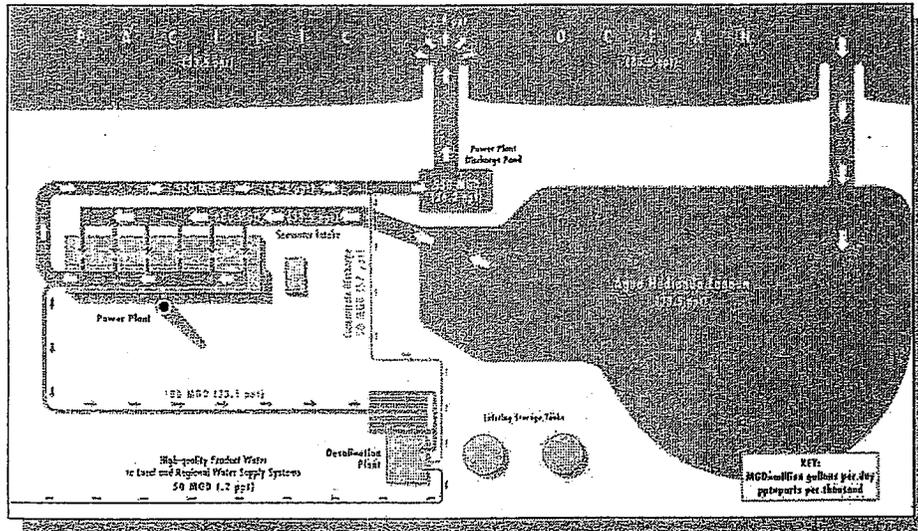
➤ The San Diego region is taking steps to reduce its dependence on imported water

➤ Along with water conservation and water recycling, desalination a critical component of regional water supply diversification plans



Total Demand: 715,450 AFY
 Conservation Savings: 79,960 AFY
 Per Capita Demand: 166 GPD

Project Location



- Primary Advantages
 - Existing infrastructure
 - Compatible zoning

- Two Operating Scenarios
 - With power plant
 - Without power plant
- With Power Plant Operating
 - De minimis marine impacts
- Without Power Plant Operating
 - Less water circulated
 - No significant impacts
 - Net increase in marine habitat productivity after mitigation

II. Why Is This Matter Before The Board

- Plan is *not* required as a precondition of Poseidon's ability to commence the discharge
- *However*, the Permit does require RWQCB approval of the Plan as a precondition of Poseidon's ability to access seawater when power plant is not operating
- Due to the intermittent operation of the power plant, action by the RWQCB is necessary at this time to specify the conditions under which Poseidon would be able to access seawater under the Permit
- Additionally, the State Lands Commission is delaying approval of Poseidon's Lease regarding use of the existing intake and outfall until RWQCB's approval of the Plan
- Both the City of Carlsbad and Coastal Commission have evaluated the impacts of the project without the operation of the EPS and approved conditions for this mode of operation
- Approval of the Plan would facilitate coordination among interested state agencies and ensure the RWQCB's requirements are being also addressed

III. What the Plan Entails

- RWQCB required Poseidon to assess:
“the *feasibility* of site-specific plans, procedures, and practices to be implemented and/or mitigation measures to be taken to minimize the impacts to marine organisms when the Project requirements exceed the volume of water being discharged by the EPS [Encina Power Station]”

(Permit at F-48)

Plan Development

	Feb -07	Mar -07	Apr- 07	May -07	Jun- 07	Jul- 07	Aug -07	Sep -07	Oct- 07	Nov -07	Dec -07	Jan- 08	Feb -08	Mar -08	Apr- 08
Poseidon Submits Draft Plan	X														
Public Review & Comment															
Poseidon Submits 1st Revised Draft						X									
Public Review & Comment															
Poseidon Submits 2nd Revised Draft														X	
Public Review & Comment															
RWQCB Considers Approval of Plan															X

The Plan is Responsive to Permit Requirements

- To minimize intake and mortality of marine life, the Plan:
 - Identifies the best available site;
 - Identifies the best available design;
 - Identifies the best available technology;
 - Conservatively quantifies the unavoidable impacts;
 - Confirms that mitigation is feasible; and
 - Establishes a state-agency coordinated process for identification preferred mitigation plan.

Best Available Site

- The proposed location has a number of advantages:
 - Compatible zoning and land use;
 - Least environmental impacts;
 - Least disruption to public and private property; and
 - Lowest construction and operating cost.

- The Coastal Commission and Carlsbad EIR concluded that there are ***no feasible and less environmentally damaging alternative sites.***

Design Features to Minimize Impacts to Marine Life

- Eliminate impacts:
 - Use EPS discharge as a source of water for the CDP when available;

- Minimize mortality to marine life:
 - Reduce the flow velocity and temperature of the seawater
 - Eliminate heat treatment.

Technology Measures to Minimize Impacts to Marine Life

<i>Measures</i>	<i>Result</i>
Variable frequency drive intake pump motors	Reduces total flow and velocity to desalination facility.
Micro-screens (120 μ)	Low impact method, chemical-free removal of larvae and plankton from seawater.
Ultra-filtration technology	Low-impact, chemical-free removal of smaller plankton from seawater.
Return captured organisms to the ocean	Reduction in entrainment and impingement mortality.

Technology Measures Considered and Determined to be Infeasible

- The Coastal Commission concluded:
 - Poseidon “is using all feasible methods to minimize or reduce its entrainment impacts”
 - Impingement impacts are “*de minimis* and insignificant”
 - Alternative intake systems are not the environmentally preferred alternative:
 - Vertical beach wells
 - Horizontal well intake system
 - Submerged seabed intake system
 - New open ocean intake

IV. Why the Plan is Conservative

- Plan over-estimates entrainment and impingement impacts and associated mitigation:
 - Assumes 100% mortality;
 - No flow available from power plant operations;
 - No credit for avoided impacts associated with design features;
 - No credit for avoided impacts associated with technology measures.

- Actual Project related impacts to marine life will be well below estimated levels.

Mitigation Approach

1. Conservative estimate of impacts
2. Considered feasibility of in-lagoon and offsite mitigation opportunities
3. Provides for coordination with state agencies to:
 - a) Identify additional opportunities in Agua Hedionda Lagoon and elsewhere
 - b) Select preferred mitigation plan
 - c) Finalize implementation plan

Agua Hedionda Lagoon

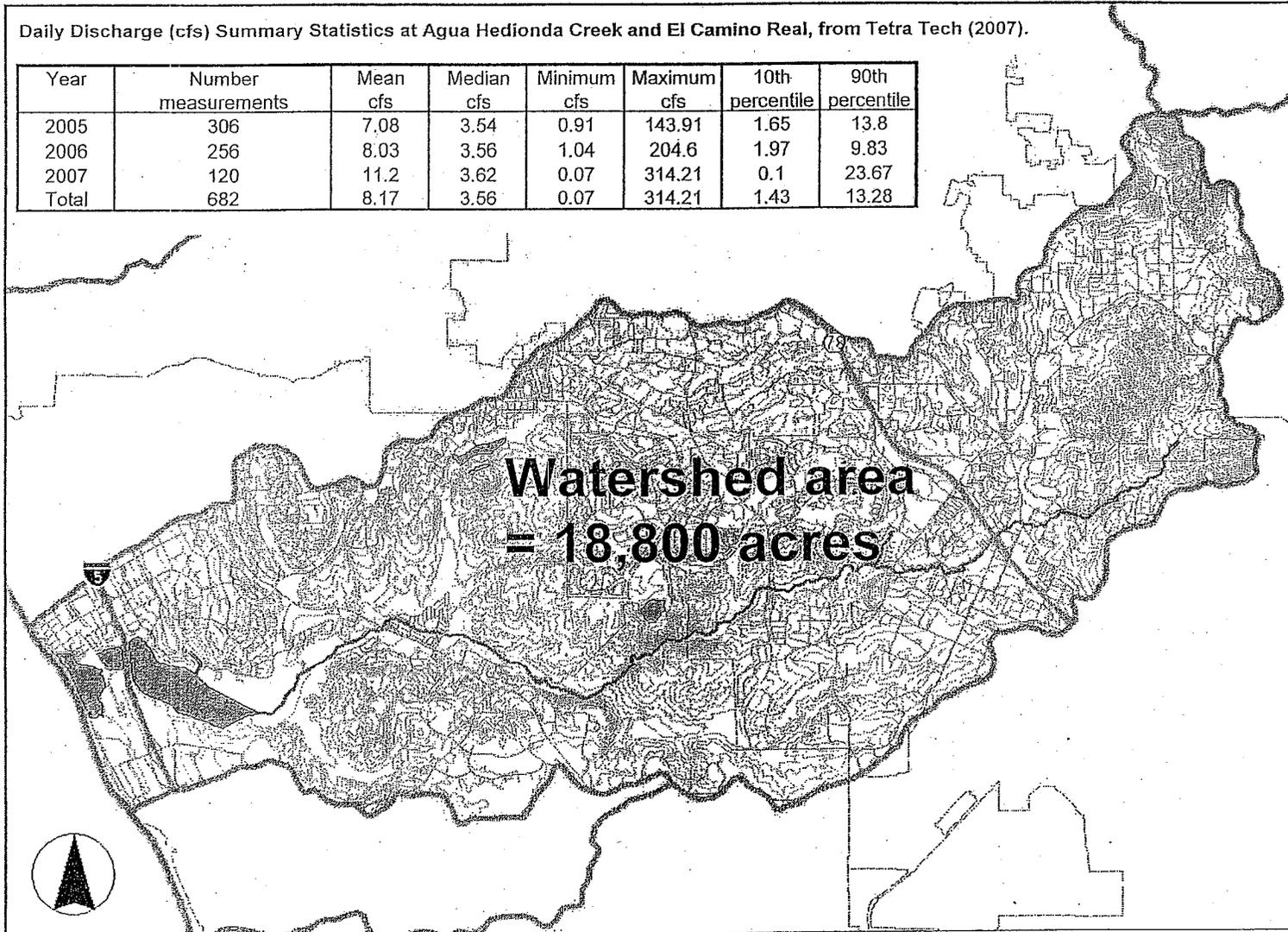


- Man-made estuary kept open to the Pacific Ocean by maintenance dredging;
- Vibrant and highly productive marine habitat today with power operations in place;
- Improved productivity with reduced flow from stand-alone desalination operation;
- Poseidon committed to long-term stewardship and watershed protection.

V. Why the Plan is Responsive

- Agua Hedionda Lagoon Hydrology – Dr. Scott Jenkins
- Entrainment and Impingement Study – David Mayer
- Environmental Benefits – Chris Nordby
- Legal Considerations – Chris Garrett

Agua Hedionda Watershed



Flow Statistics of Agua Hedionda Creek Watershed, 2005-2007.

Agua Hedionda Lagoon Hydrology

➤ 2004-2005 Entrainment Study

- Maximum daily flow in Agua Hedionda Creek 285 AF
- Mean Tidal Prism of Agua Hedionda Lagoon 1,700 AF
- Daily Average volume of seawater in Agua Hedionda Lagoon 3,450 AF

➤ Conclusion

- Only 8% of lagoon water was storm water during peak flood events from Agua Hedionda Creek
- Minimum lagoon salinity 30.75 ppt vs. 33.52 ppt average ocean salinity

Entrainment Study

- Data collection period June 1, 2004 through May 31, 2005
- Followed RWQCB approved data collection protocol
- Scaled results for 304 MGD
- Three abundant lagoon species found to make-up 96% of the entrained larval fish
- None of the entrained species are endangered or threatened
- 0.1% of the entrained species are sport or commercial fish
- Project will have no impact on species ability to maintain populations
- CEQA studies concluded no significant impact
- The Coastal Commission found that the Project, as mitigated, will maintain and enhance marine life productivity.

Impingement Study

- Same timeline & approach as entrainment study
- Average daily impingement less than 1 kgs/day
- CEQA conclusion same as entrainment
- Coastal Commission found that the impingement impacts would be “*de minimis* and insignificant”

Conservative Approach to Mitigation

- Plan overestimates mitigation requirements:
 - Followed California Energy Commission approach to establishing mitigation requirement – Area of Production Foregone (APF).
 - Assumes 100% mortality of larval fish entering the intake (note: zooplankton and phytoplankton are essentially unharmed).
 - APF approach identified 37 acres of lagoon habitat production were necessary to offset 100 percent of entrained larval fish in stand-alone operations.
 - While referred to as 1:1 mitigation; actual mitigation ratio is considerably greater.

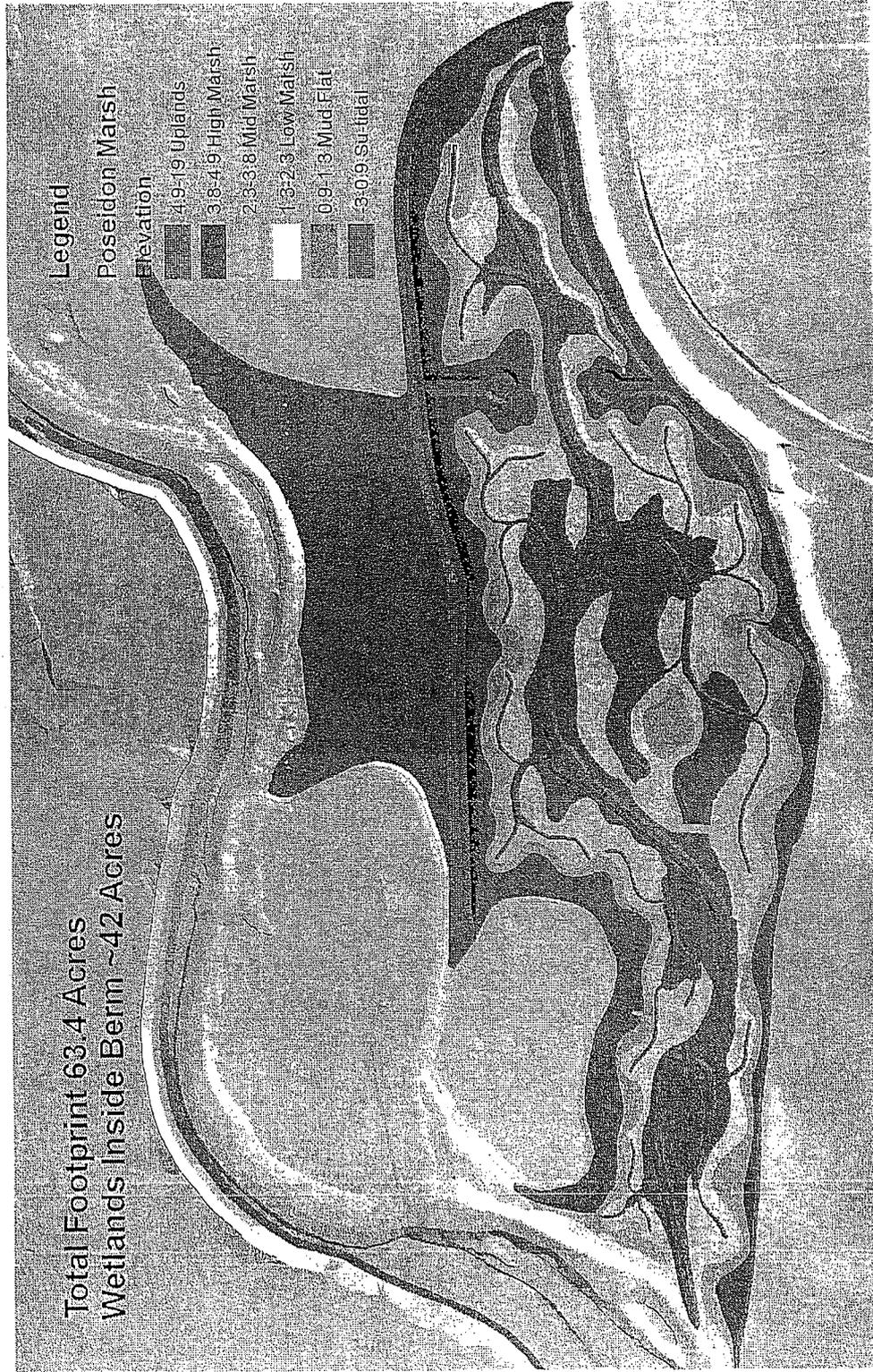
VI. Environmental Benefits

- Mitigating an acre of a partially impacted habitat with a fully functional acre of habitat elsewhere overcompensates for the impact
- The partially impacted habitat continues to provide numerous important functions:
 - Supports numerous benthic and pelagic species that are unaffected by the intake;
 - Provides foraging habitat for birds, mammals and fish;

Environmental Benefits *(cont'd)*

- Creation of new coastal wetland habitat would provide the following functions:
 - Increased productivity
 - Support of a new diverse assemblage of plant and animal species, including threatened and endangered species
 - Interaction with other wetland and upland systems

Example Restoration Project



Combined Area below Mean High Tide = 37.65

Legal Considerations

- Plan fully complies with Water Code Section 13142.5(b) by providing that the “best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life”
- Opponents before you simply disagree with the Plan, but do not provide any evidence of their own of feasible sites, designs, technology or mitigation measures that have not been considered by the Plan
- Approval of the Plan by the Board today provides a framework for coordination with other agencies and subsequent approval of final mitigation plan by the Board under Water Code Section 13225

Legal Considerations (cont'd)

- Plan addresses the issues described in the April 4, 2008 Central Watershed Unit Technical Report
 - Technical experts today confirm that independent sampling program does not provide “atypical” results
 - Plan provides for final recalculation of the Acres of Production Forgone (APF) based on final results
 - Board action today does confirm that the “agency approval mechanism for final selection of the specific mitigation alternative” will be Regional Board approval of the final mitigation plan
 - Plan does provide for full evaluation of mitigation alternatives

- Decision today is not a “revote” on whether the project should receive approval from the RWQCB, and is not a “vote” on the final mitigation plan

VII. Next Steps

- The Plan provides a framework for coordination with other agencies and subsequent approval of final mitigation plan.
 1. Staff from RWQCB, Coastal Commission and resource agencies will meet to:
 - a. Reach consensus on mitigation goals and objectives
 - b. Identify additional mitigation opportunities in Agua Hedionda Lagoon
 - c. Identify other possible mitigation opportunities and
 - d. Select preferred mitigation plan
 - e. Finalize project/s scope, locations, and implementation schedule
 2. Coastal Commission and RWQCB will consider approval of final mitigation plan

VIII. Recommendation

Approve Tentative Resolution R9-2008-0039