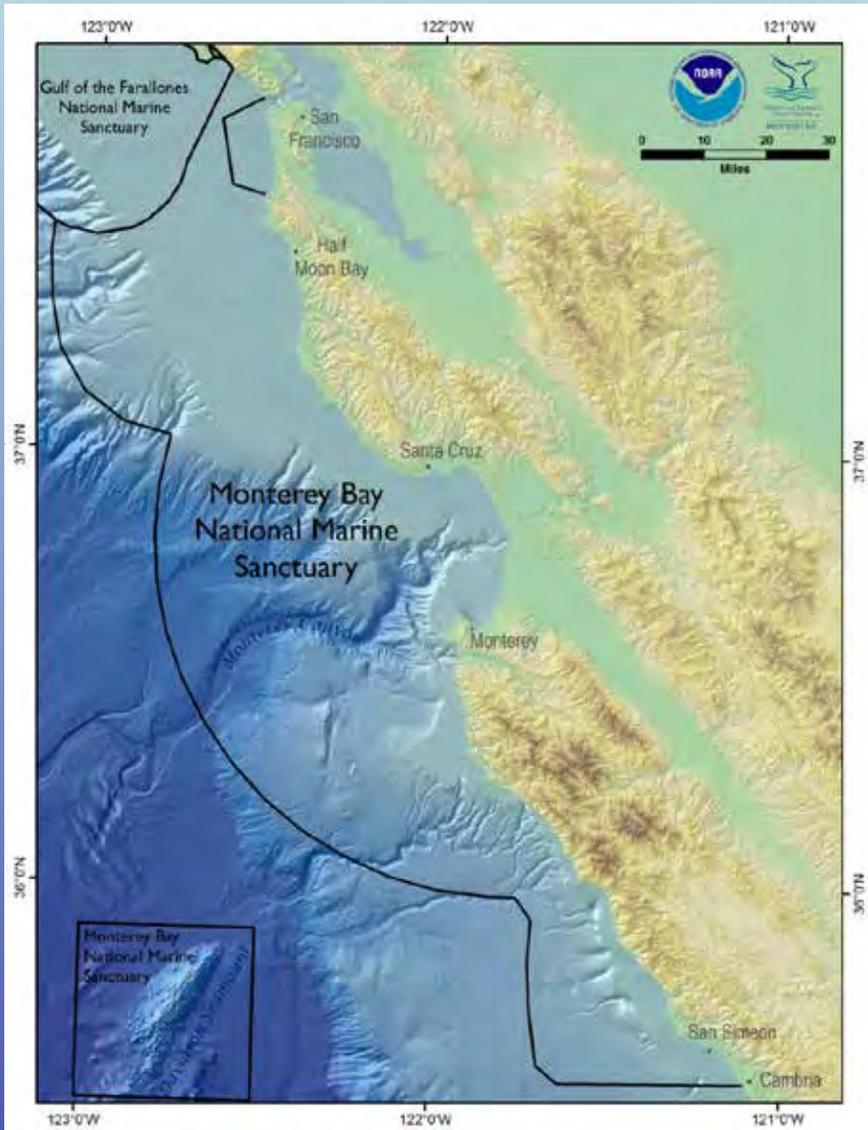


Desalination and NOAA's Monterey Bay National Marine Sanctuary

**Brad Damitz, MBNMS
MBNMS Advisory Council – April 21, 2011**



NOAA's Monterey Bay National Marine Sanctuary



- Designated: 1992
- Area: 6094 square statute miles
- Shoreline Length: 276 miles
- Deepest point ~ 12,000 feet
- Supports one of the world's most diverse marine ecosystems

Our Living Marine Resources



Fish: 345 species



Turtles: 4 species



Marine algae: 450 species
Invertebrates: 3,000+ species



Marine Mammals:
33 species



Seabirds: 94 species

Diverse Coastal and Marine Habitats



Sloughs



Rocky Shoreline



Kelp Forest

Human Elements of MBNMS



- ❖ Five Coastal Counties
- ❖ 12 Coastal Cities
- ❖ Four Urban Centers
- ❖ Six Congressional Districts
- ❖ Approx. 9 million within 25 mi.

Resource Protections - prohibitions



- Exploring for gas, minerals
- Discharge or deposit of any material
- Moving, removing, or injuring a Sanctuary historical resource
- Altering the seabed
- Disturbing marine mammals, sea turtles, or marine birds
- Flying motorized aircraft below 1000 feet in certain areas
- Operating motorized personal watercraft, except within the four designated zones
- Interfering with enforcement of Sanctuary laws or regulations
- Attracting white sharks
- Release of invasive species within or into the NMS

State and Regional Desalination Trends

- Increased interest in desalination in State of California and the MBNMS area
- Currently more than 20 proposed plants in CA
- Many of these proposed plants are within the MBNMS region



Existing Monterey Bay Plants

- **Moss Landing Power Plant**
- **Sand City**
- **Monterey Bay Aquarium**



Numerous Proposed Desalination Plants

- ✓ **City of Santa Cruz**
- ✓ **Monterey Regional Desalination Project**
- ✓ **DeepWater Desal**
- ✓ **Monterey Peninsula Water Management District**
- ✓ **Ocean View Plaza**
- ✓ **Cambria**



Overview of Negative Impacts

- Impacts are highly variable from site to site; cannot generalize
- Primary negative impacts include:
 - ✓ construction
 - ✓ intake and discharge
 - ✓ energy use and emissions
 - ✓ land use
 - ✓ socioeconomic impacts
- Impacts can be mitigated through proper site design and operation



Positive Impacts of Desalination

- Water supply augmentation
- Reclamation of impaired sources
- Drought resistant reliable water supply
- Diversification of water supply options
- Provides high quality drinking water free of contaminants
- Potential future environmental benefits



MBNMS Desalination Involvement

- **Regulatory/Permitting**
- **Joint Management Plan Review—Desalination Action Plan**
- **Commenting on desalination proposals**
- **Public education—Workshops/conferences**
- **Multi-Agency partnerships**
- **MBNMS Desalination Guidelines**

MBNMS Desalination Involvement

- **Regulatory/Permitting**
- **Joint Management Plan Review—Desalination Action Plan**
- **Commenting on desalination proposals**
- **Public education—Workshops/conferences**
- **Multi-Agency partnerships**
- **MBNMS Desalination Guidelines**



Relevant Sanctuary Regulations

- **It is unlawful for any person to discharge or deposit any material; or other matter except:...**
- **It is unlawful to discharge or deposit from beyond the boundary of the Sanctuary any material or other matter that subsequently enters the Sanctuary...**
- **It is unlawful to drill into dredge, or otherwise alter the seabed, or construct, place, or abandon any structure, material or other matter on the seabed...**



MBNMS Desalination Involvement

- **Regulatory/Permitting**
- **Joint Management Plan Review—Desalination Action Plan**
- **Commenting on desalination proposals**
- **Public education—Workshops/conferences**
- **Multi-Agency partnerships**
- **MBNMS Desalination Guidelines**

JMPR Priority Issues--MBNMS

- ❖ **Administration**
- ❖ **Big Sur Coastal Ecosystem Coordination**
- ❖ **Coastal Development**
 1. Coastal armoring
 2. **Desalination**
 3. Dredge disposal
 4. Submerged cables
- ❖ **Ecosystem Protection**
 1. Benthic habitats
 2. Davidson Seamount
 3. Emerging issues
 4. Fishing Research and Education
 5. Krill harvesting
 6. Marine reserves
- ❖ **Interpretive Facilities**
- ❖ **Exotic Species**
- ❖ **Multicultural Outreach**
- ❖ **Water Quality**
 1. Beach closures
 2. Protect riparian habitat
 3. Revise MOA
 4. WQPP Implementation
- ❖ **Wildlife Disturbance**
 1. Tidepool protection
 2. Marine mammal disturbance
 3. Motorized Personal Watercraft

MBNMS Desalination Involvement

- **Regulatory/Permitting**
- **Joint Management Plan Review—Desalination Action Plan**
- **Commenting on desalination proposals**
- **Public education—Workshops/conferences**
- **Multi-Agency partnerships**
- **MBNMS Desalination Guidelines**

Regulatory Agencies Involved

Federal:

- **Army Corps. Of Engineers**
- **US Coast Guard**
- **National Marine Fisheries Service**
- **US Fish and Wildlife Service**
- **Monterey Bay National Marine Sanctuary**

State:

- **California Coastal Commission**
- **Dept. of Fish and Game**
- **Department of Health Services**
- **Dept. of Transportation**
- **Dept. of Water Resources**
- **Public Utilities Commission**
- **State Lands Commission**
- **State and Regional Water Boards**

Local & Regional:

- **City governments**
- **County government**
- **Water management districts**

MBNMS Desalination Involvement

- **Regulatory/Permitting**
- **Joint Management Plan Review—Desalination Action Plan**
- **Commenting on desalination proposals**
- **Public education—Workshops/conferences**
- **Multi-Agency partnerships**
- **MBNMS Desalination Guidelines**

MBNMS Desalination Guidelines

Background: These Guidelines were developed to help ensure that any future desalination plants in the sanctuary will be properly sited, designed, and operated in a manner that results in minimal impacts to the marine environment.

- Based on a non-regulatory collaborative approach
- Address numerous issues including:
 - site selection
 - construction and operational impacts
 - plant discharges, and intake systems.
- Intended to assist regulatory agencies in reviewing proposals and ensure that project resource protection concerns are addressed.

MBNMS Desalination Guidelines

Development of Guidelines

- Multi-agency Collaborative Process—
MBNMS, Coastal Commission, RWQCB, NMFS
- Based on science established in AMBAG/MBNMS study
- Input and review by numerous stakeholders



Desalination Guideline Categories

Guidelines For:

- Regional Desalination Approach
- Desalination Alternatives and Need
- Plant Site Selection and Structural and Engineering Considerations



Desalination Guideline Categories



Environmental Impacts Guidelines:

- Guidelines Regarding Cumulative Impacts
- Entrainment and Impingement
- Brine Discharge
- Energy Use and Greenhouse Gas Emissions
- Co-location with Power Plant
- Co-location with Sewage Treatment Facilities
- Chemicals for Treatment and Cleaning
- Other Environmental and Socioeconomic Impacts
- Guidelines for Desalination Plant Construction Phase

Desalination Guideline Categories

Monitoring Guidelines: Develop/implement a monitoring program focused on:

- Developing a statistically acceptable baseline for project area
- Monitoring source water for potential contaminants
- Monitoring effluent prior to discharge
- Monitoring effects of effluent on marine organisms within the plume
- Monitoring impingement/entrainment effects, if applicable
- Monitoring any required mitigation for unavoidable impacts

Existing Monterey Bay Plants

- **Moss Landing Power Plant**
- **Marina Coast Water District**
- **Monterey Bay Aquarium**



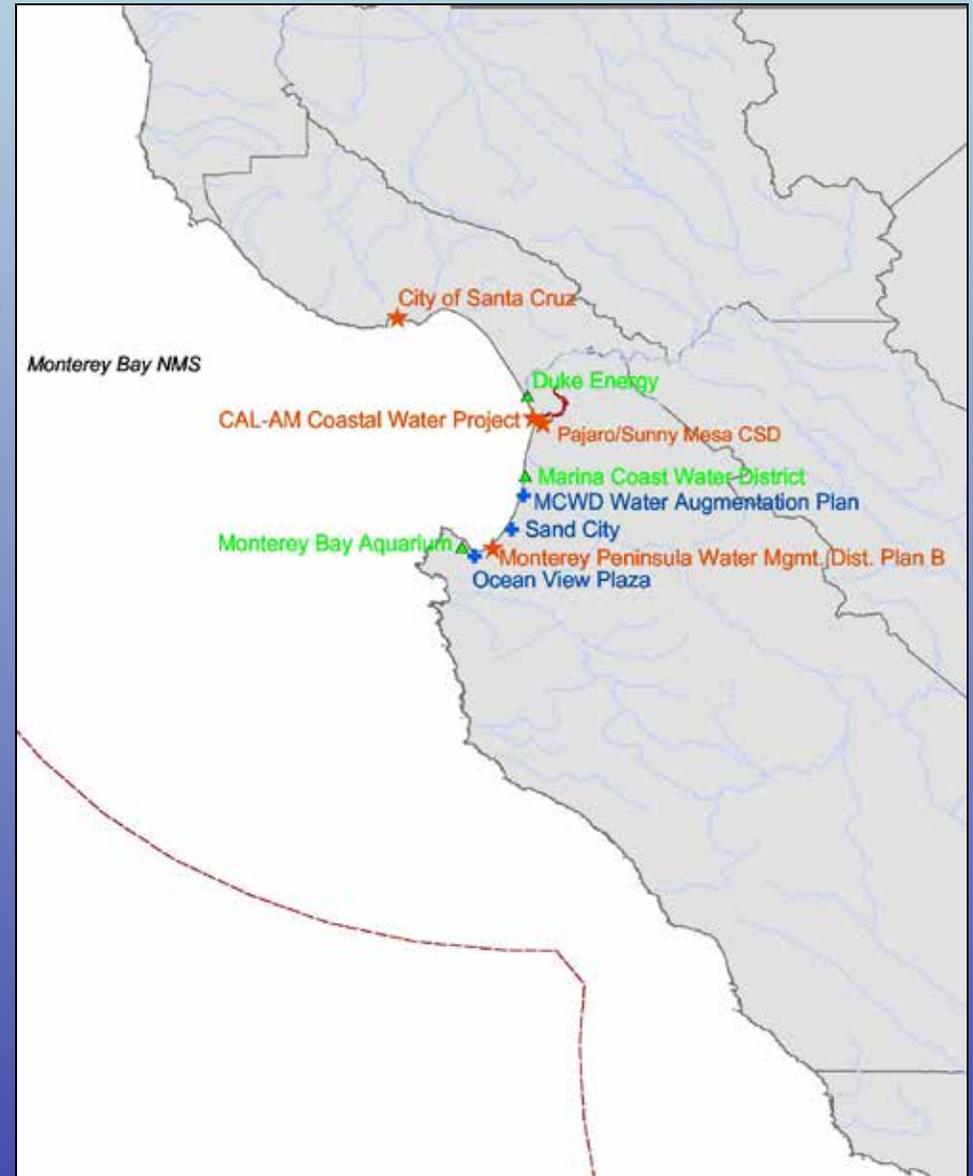
Sand City Water Supply Project

- ✓ **0.4 MGD RO plant was approved in 2005**
- ✓ **Beach well from brackish water aquifer beneath beach for intake**
- ✓ **Horizontal beach well for brine discharge**
- ✓ **To be operated by CalAm**
- ✓ **Proposals now being sought for plant design, engineering, and construction**



Proposed Plants

- ✓ **Santa Cruz/Soquel Creek WD**
- ✓ **Monterey Regional Water Project**
- ✓ **Deep Water Desal**
- ✓ **Monterey Peninsula Water Management District**
- ✓ **Ocean View Plaza**
- ✓ **Cambria**



Santa Cruz/Soquel Creek Water Districts

- ✓ **EIR has been certified by City**
- ✓ **2.5 MGD Desal plant proposal in response to drought shortages**
- ✓ **Would retrofit unused pipeline for intake**
- ✓ **Collaboration with Soquel Creek Water District**
- ✓ **Pilot plant operated for 1+ year**
- ✓ **Entrainment and discharge studies underway**



Regional Water Project

- ✓ Desal proposed in response to State Order 95-10
- ✓ The Regional Project will desalinate brackish water from an intruded groundwater aquifer instead of taking seawater directly from the ocean.
- ✓ Product water conveyed to cities of the Monterey Peninsula
- ✓ HDD wells for intake
- ✓ EIR Released 2/09
- ✓ Brine/effluent to be discharged to the MRWPCA outfall
- ✓ Plant to be located on property owned by MCWD
- ✓ Project to be overseen by an Advisory Committee

Deep Water Desalination

- ✓ **Proposal for 20 MGD RO plant at Moss Landing**
- ✓ **Water would go to north Monterey County residents**
- ✓ **Joint Powers Authority (“JPA”) structure**
- ✓ **Would use rebuilt pier in Moss Landing for intake/outfall**
- ✓ **Intake would be located below photic zone (in 70-80’ of water)**
- ✓ **Preliminary proposal. Considering 10,000 or 20,000 acre feet per year**

MPWMD Desalination Project

- ✓ 2 MGD RO plant (2,000 AF/yr)
- ✓ Beach wells or open ocean intake



Ocean View Plaza

- ✓ Proposed mixed use development on Cannery Row
- ✓ 0.05 MGD RO plant proposed for development's water supply
- ✓ Sub-surface water intake/discharge off Cannery Row
- ✓ Community Services District formed
- ✓ Currently RWQCB Permit is being appealed



Cambria

- ✓ **Desal under consideration since 1993**
- ✓ **In response to serious drought issues and MTBE contamination of wells**
- ✓ **580 Acre-feet per year desalination plant proposed**
- ✓ **Subsurface intake and discharge being evaluated**
- ✓ **Plant would be operated only during certain conditions**
- ✓ **Water would not go to new development**

Brad.Damitz@noaa.gov





Essential Underlying Policy Considerations

- **Site-specific--requires case-by-case review**
- **Precautionary approach is essential**
- **Early and thorough involvement and collaboration between regulators and proponents and stakeholders**
- **Approach must be adaptable**





What Questions Should Policymakers Ask?

- Is desalination necessary/appropriate, or are there better alternatives available?
- Where will the desalinated water go?





What site-specific conditions exist with the project?

- **Plant capacity (small vs. large)**
- **Siting considerations**
- **Technology and design aspects**
- **Visual, recreational, and coastal access issues**
- **Huge variety of site-specific considerations**





What are the Environmental Impacts of Project?

- **Impacts Vary widely**
- **Construction impacts**
- **Impacts from brine discharge**
- **Impacts from seawater intake**
- **Cumulative impacts**
- **Growth inducing impacts**





More Considerations for Policymakers

- **What are the Socio-economic Impacts?**
- **What are the human health and safety concerns?**



Intake and Discharge Impacts

- **Brine Discharge**
- **Impingement**
- **Entrainment**



Construction Impacts

- **Similar issues to any other coastal development projects**
- **Potential impacts to seafloor, surf zone, and beach/dune ecology**
- **Wildlife disturbance**
- **Surface water quality degradation**
- **Impacts to recreational and commercial activities**
- **Impacts mitigated by using *Best Management Practices***



Energy Use and Emissions

- Desalination plants are energy intensive
- Desal plants will result in increased emissions which can:
 - ✓ impact human health and the environment
 - ✓ contribute to global climate change
- Mitigation measures include use of renewable energies, tradeoffs, and use of energy saving technologies and practices



Growth Inducing Impacts

- **Desalination plants have the potential to induce growth in the Monterey Bay area by:**
 - ✓ **removing an obstacle to growth**
 - ✓ **adding a new water supply**
- **Can strain existing community services and infrastructure**
- **Can cause indirect environmental impacts**
- **Significant public concern exists regarding growth inducement**
- **CEQA requires evaluation of growth inducement**
- **Desalination plant capacities should be limited by growth forecasts in local land use plans and policies**

Cumulative Impacts

Defined by CEQA as:

“an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts”

- **Includes environmental impacts, AND public access, visual, and a variety of other socioeconomic impacts.**
- **Includes impacts to water quality and the marine environment due to the intake and brine discharge**
- **More information/studies are needed**

Other Impacts and Issues

- **Power plant once-through cooling co-location issues**
- **Private vs. public ownership**
- **Affects on sensitive ocean monitoring efforts**
- **Coastal erosion and armoring**
- **Impacts to groundwater**
- **Cultural resources**
- **Visual impacts**

