



scwd² Desalination Program Update

18 February 2009

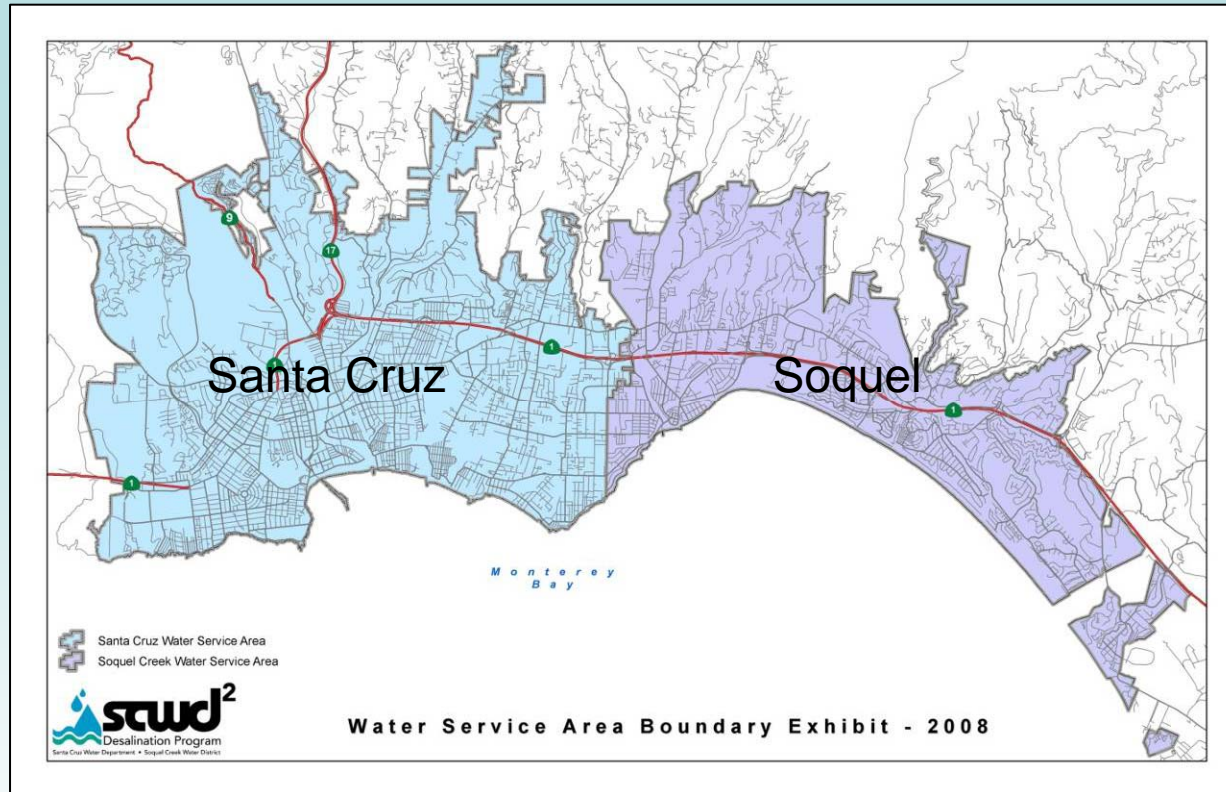
Heidi R. Luckenbach



Presentation Outline

- 💧 **scwd²** & Our Water Supply Problem(s)?
- 💧 Our Integrated Water Plan.
- 💧 Where we are today, and where we are going?

scwd² is a collaboration between the Santa Cruz Water Dept. & Soquel Creek Water Dist.



- ◆ Together we serve over 135,000 people
- ◆ Similar values and objectives
- ◆ Our different needs lead us to a collaborative approach for sustainable water resources

Santa Cruz's water comes primarily from rainfall into local streams and reservoirs



If the City of Santa Cruz were to experience a drought of a magnitude similar to 1976-77 now, the water shortage could approach 45%.



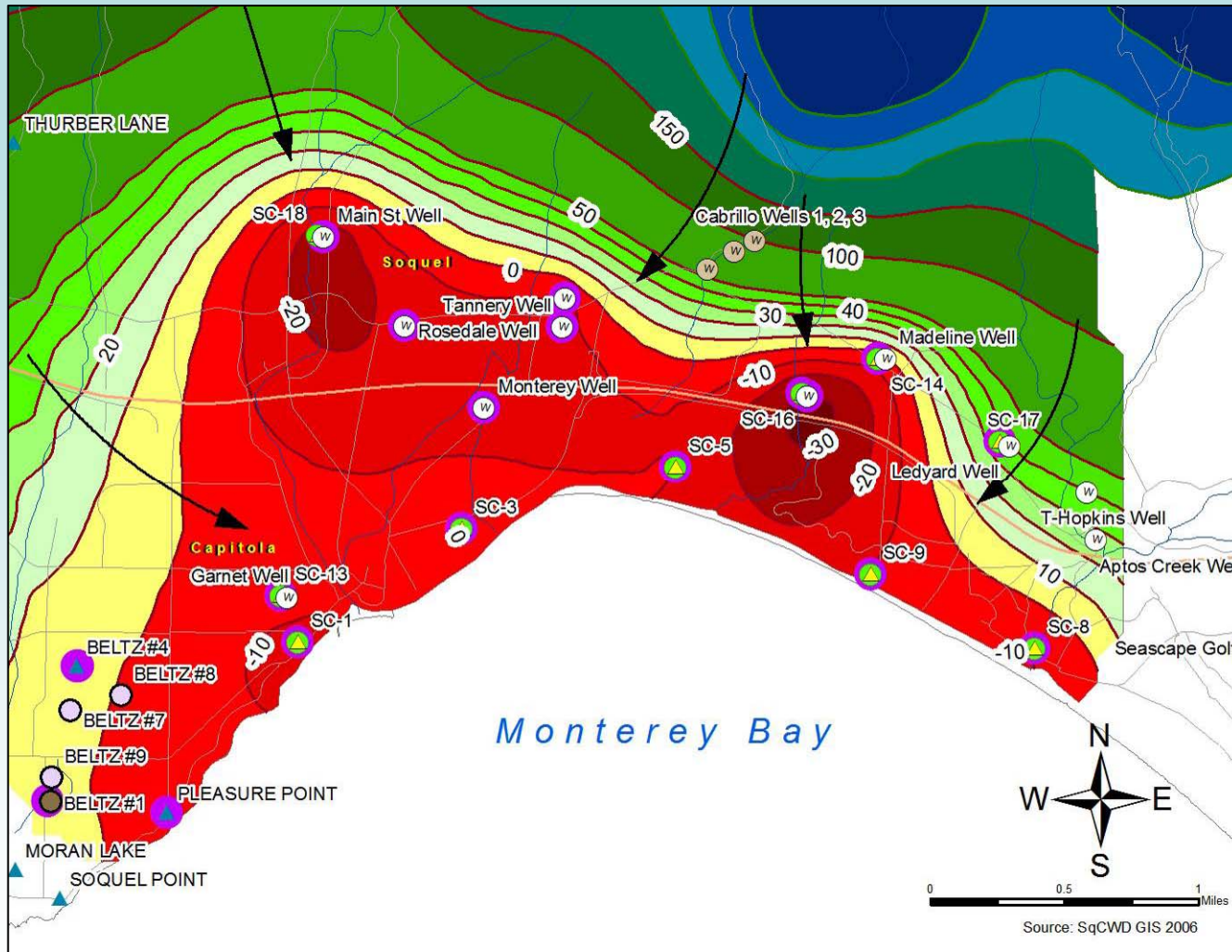
- Severe water rationing for all residents, with penalties for overuse.
- Extreme limits on outdoor use; gardens and landscaping sacrificed.
- Water rationing for business and industry leading to loss of income, reduction in employment, or possible closures.
- Use of recreation facilities (parks, pools, sports fields) reduced or shut down.

Soquel Creek relies on well-water from local groundwater basins

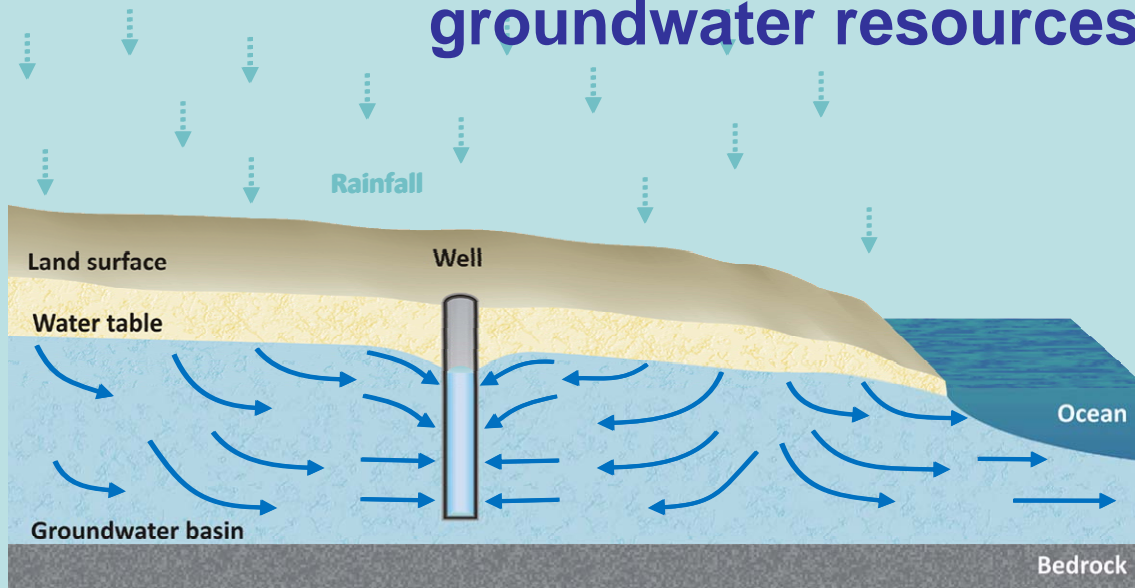


- ◆ Local groundwater (wells) is the only water source
- ◆ No State or regional water
- ◆ No water from creeks or rivers (surface water)

Currently, our groundwater basins are over-drafted

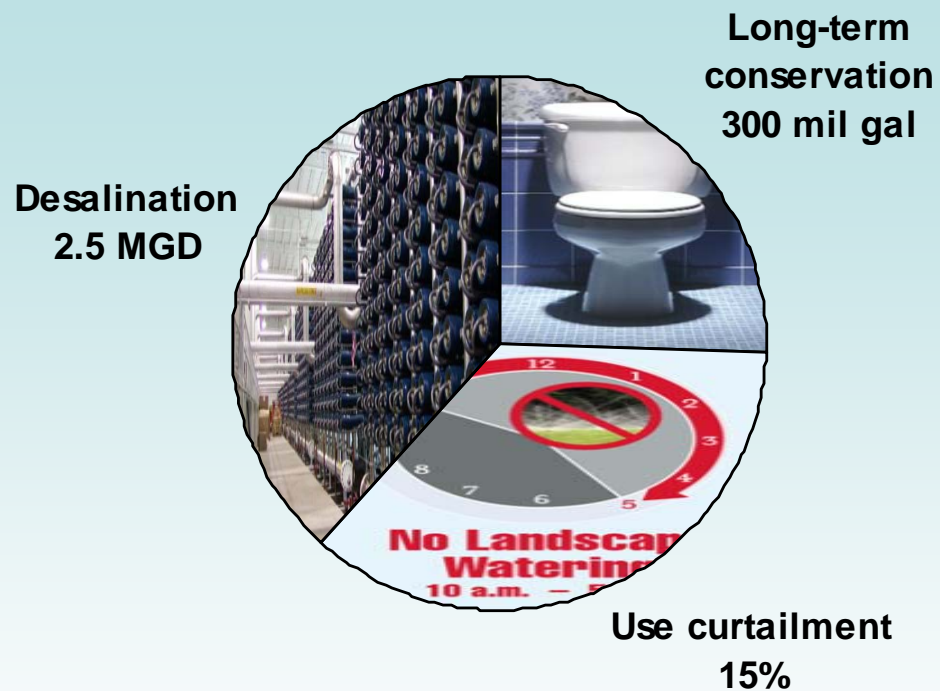


Saltwater intrusion would contaminate groundwater resources.

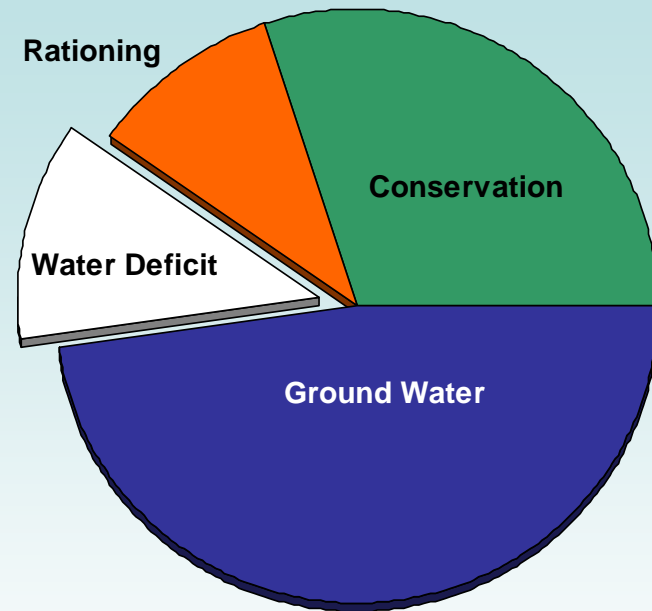
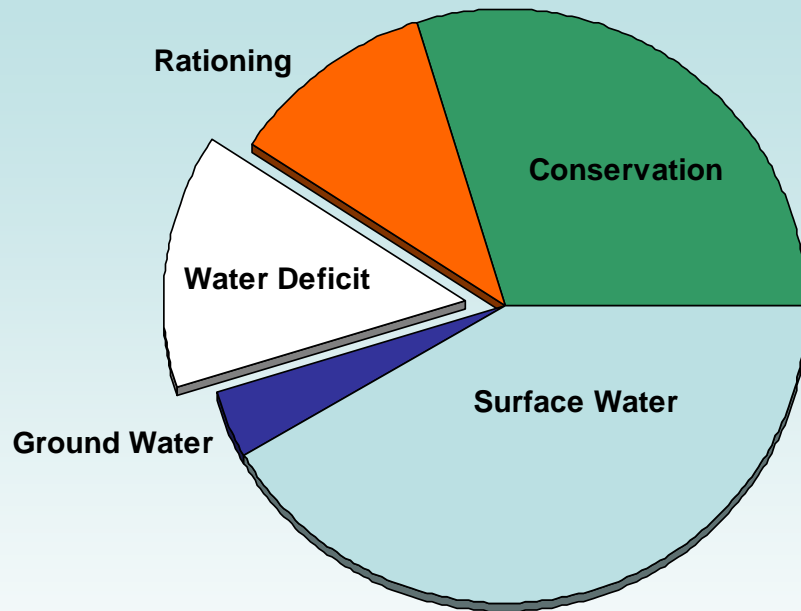


What's Our Solution

The Integrated Water Plan



Conservation and rationing alone, will not meet our water needs.



**Additional water is needed to preserve our current water
resources and to sustain our communities.**

We have evaluated and eliminated over 30 different supplemental water supply options.



- ◆ New on-stream dams and reservoirs
- ◆ New off-stream dams and reservoirs
- ◆ Additional surface water sources
- ◆ Additional groundwater wells
- ◆ Imported water
- ◆ City-only Desalination
- ◆ Regional Desalination

Supplemental Supply Project: Cooperative Desalination Facility

Conceptual Design:

💧 Location

- Facility would be located in Santa Cruz

💧 Size

- 2.5 million gallons per day (MGD)

💧 Intake

- Open Ocean Intake or subsurface

💧 Brine Disposal

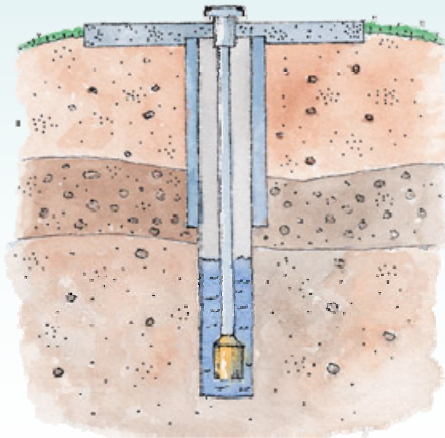
- Through current wastewater outfall



Sharing Desalinated Water



- Would use 2.5 million gallons per day
- Operate primarily during droughts, approx. 1 in 6 years



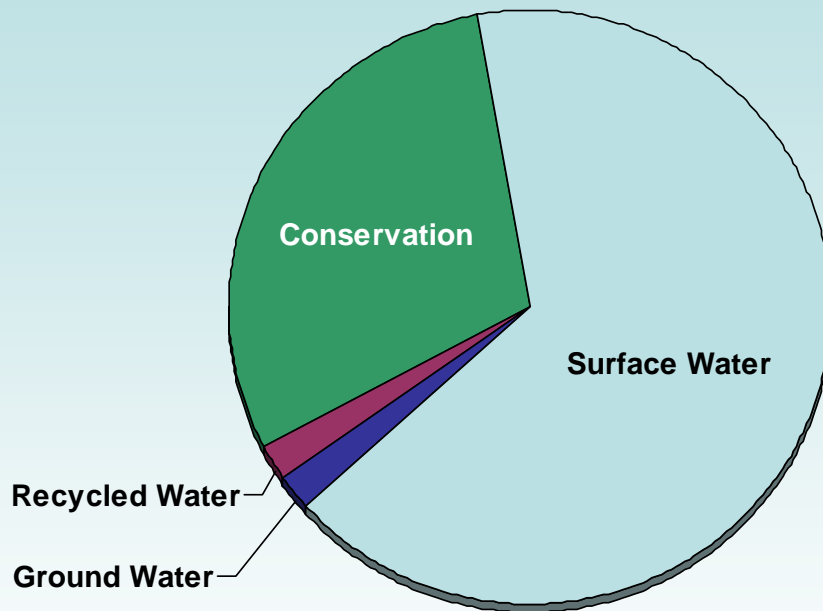
- Would use up to 2.5 million gallons per day
- Operate to augment groundwater supplies & to bank water, approx. 5 in 6 years

Proposed Water Portfolio

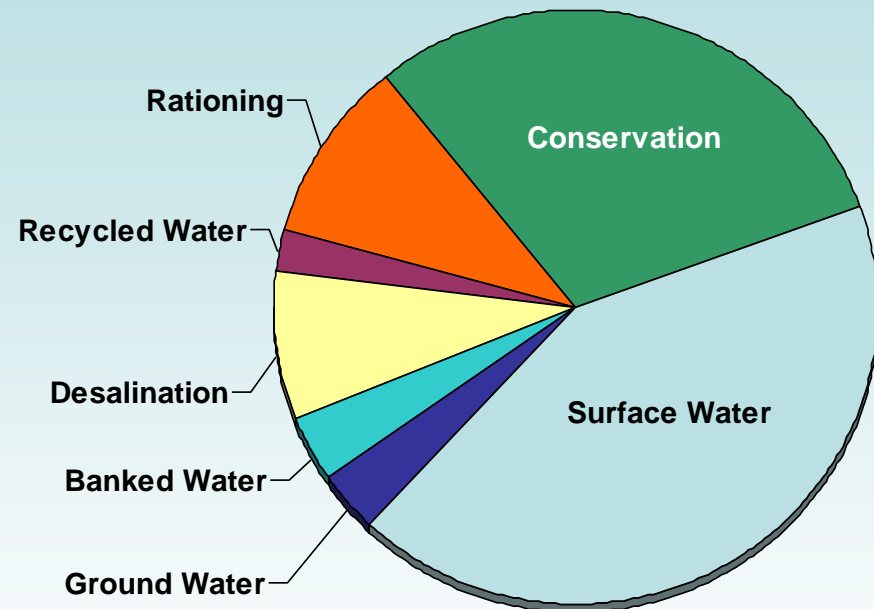
During a drought, the City would use the desalination plant during the summer months.



Normal Years



Drought Years



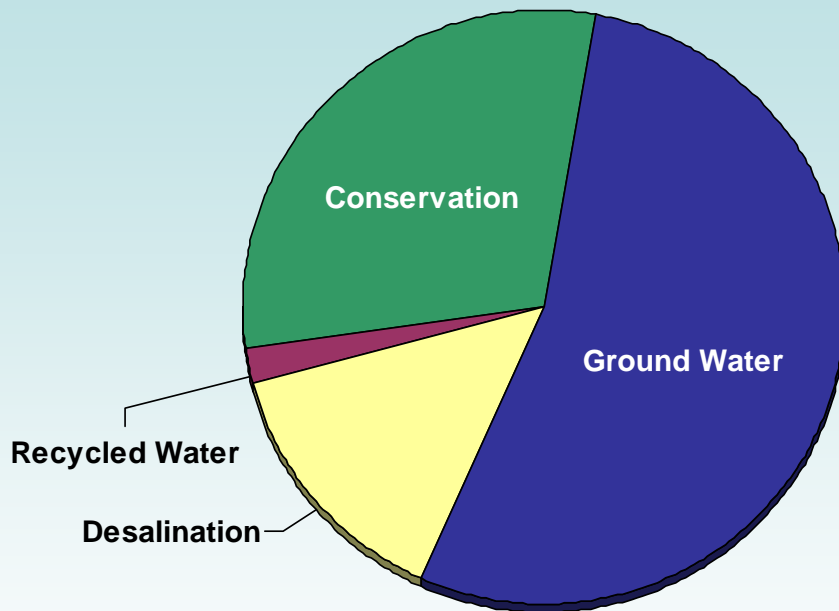
Desalination provides a reliable, drought-proof water resource.

Proposed Water Portfolio

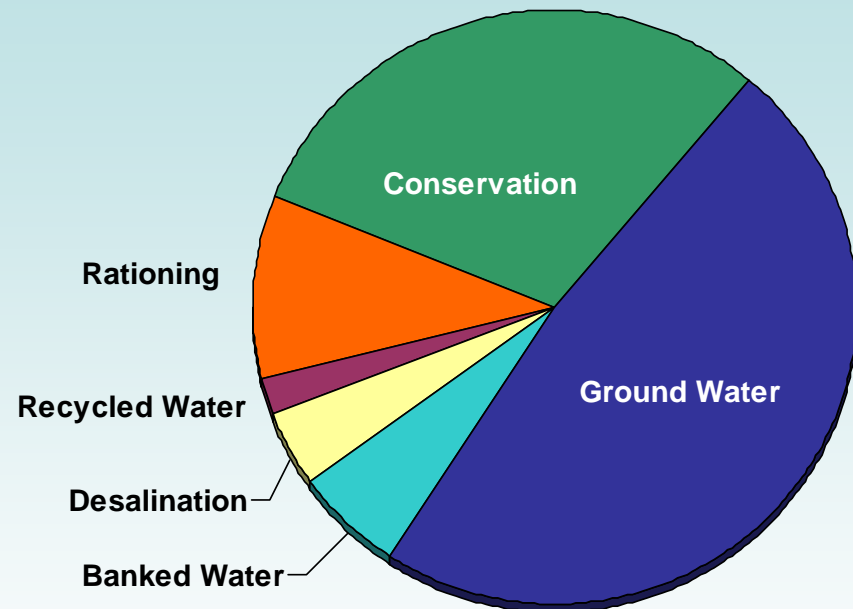
During normal years,
Soquel Creek would use the desalination plant.



Normal Years



Drought Years



Desalination provides a supplemental supply
to prevent seawater intrusion and restore groundwater levels.

How Do We Build a Desalination Facility?

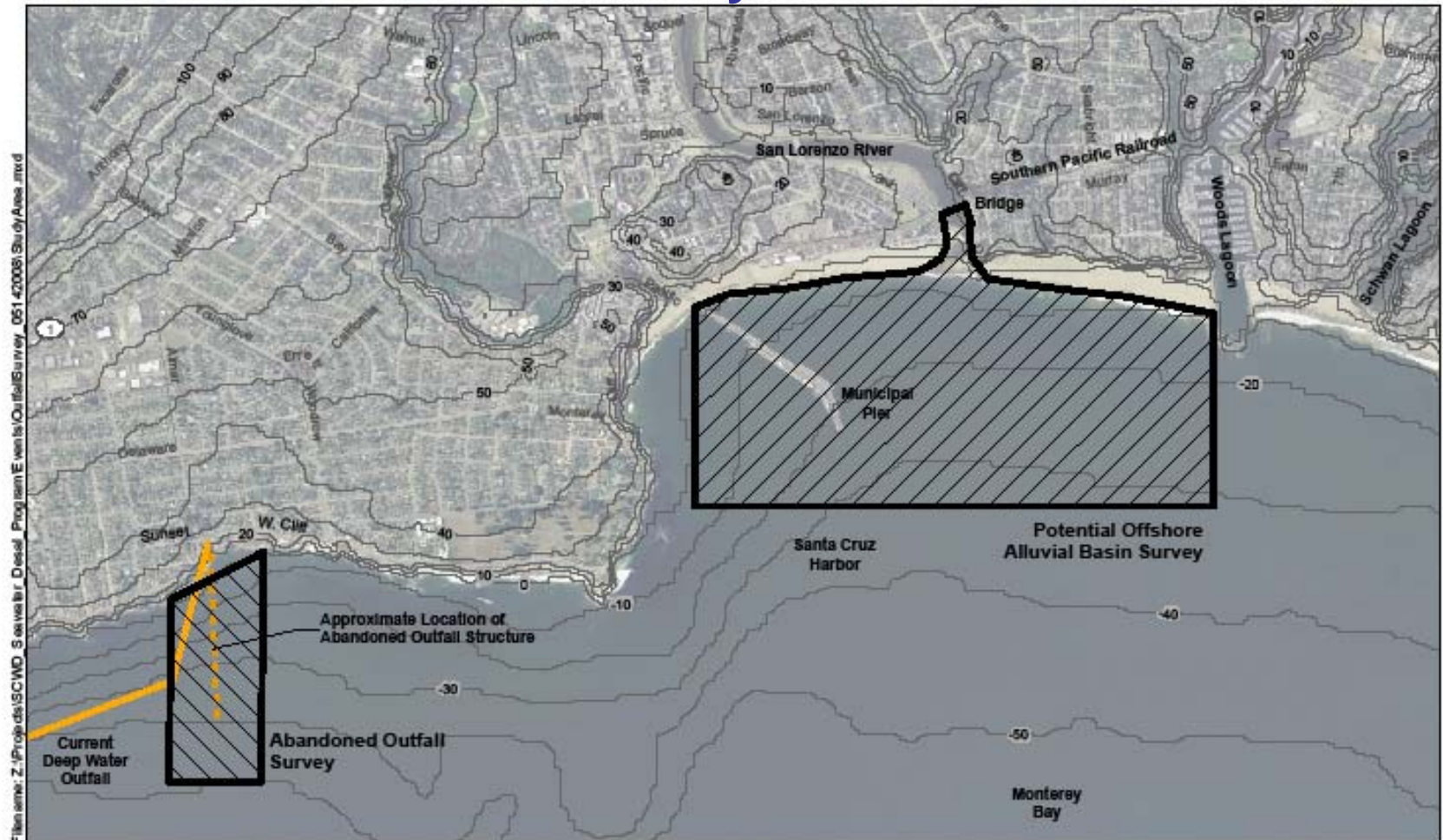
- Pilot Plant
- Intake Study
- Watershed Sanitary Survey
- Brine Studies
- Energy Minimization & GHG Reduction Planning

Pilot Plant Facility

- 2,400 square-foot temporary building
- Up to 50 gallons per minute flow treatment
- Custom fabricated pilot-scale treatment units
- Source seawater from Long Marine Laboratory's existing seawater intake
- Investigating...
 - Pretreatment Technology
 - RO Membranes
 - Chemical Use
 - Energy Use
 - Brine Disposal



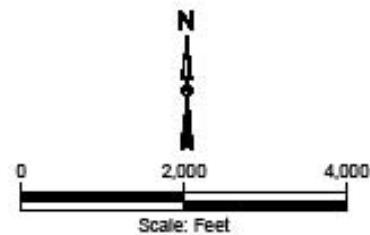
Intake Study Areas



Legend

- Approximate Location of Abandoned Outfall
- Topographic/Bathymetric Contour (10-foot interval)

Note: Bathymetric and Topographic data source: Monterey Bay Aquarium Research Institute (MBARI), publication date 11/1/2000.



Kennedy/Jenks Consultants

City of Santa Cruz and Soquel Creek Water District
Seawater Desal Program
Santa Cruz, Santa Cruz County, California

Off-Shore Survey Locations

Project Number 0868005
29 May 2008

Figure 1

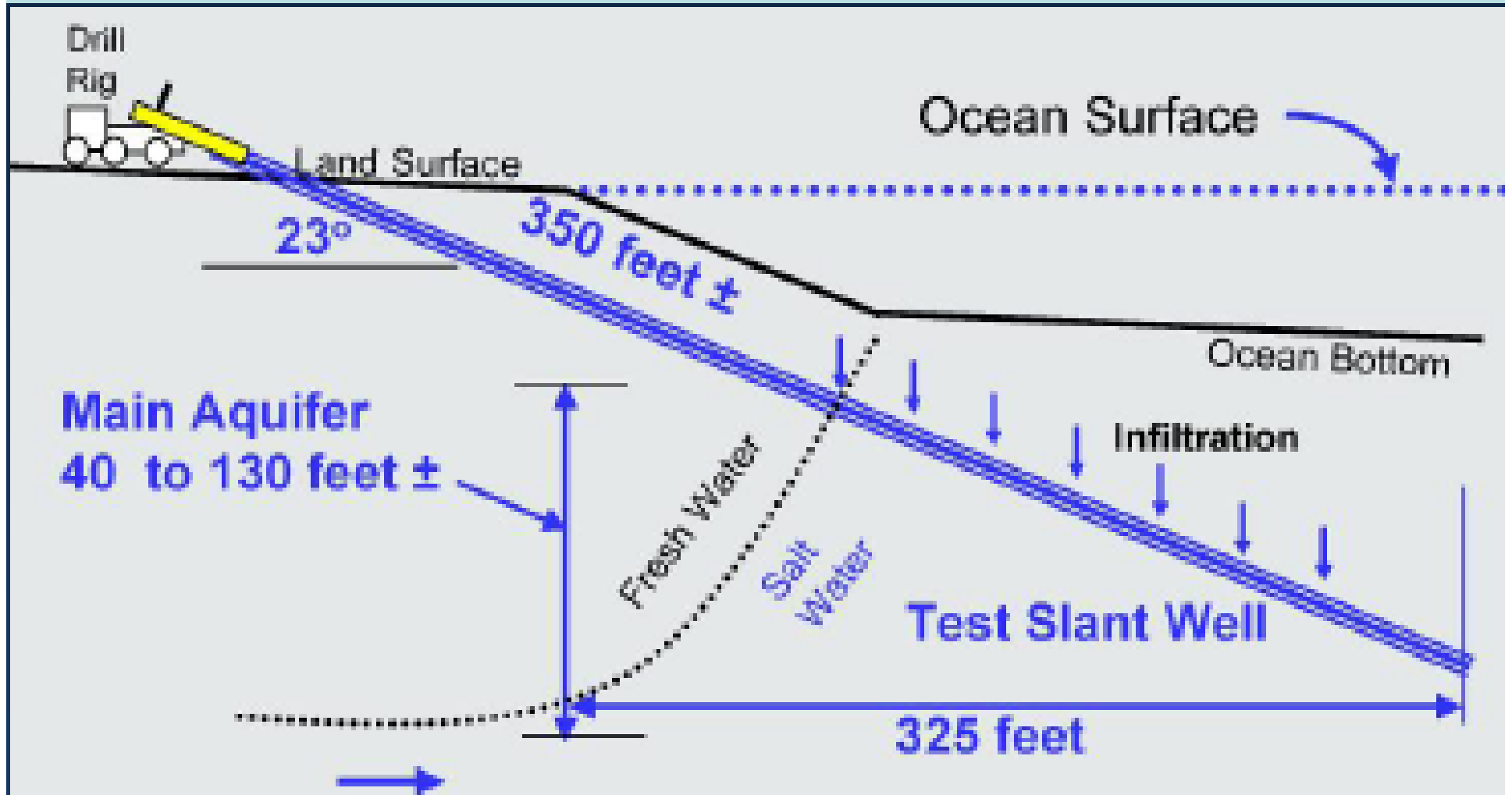
Screened Open Ocean Intake



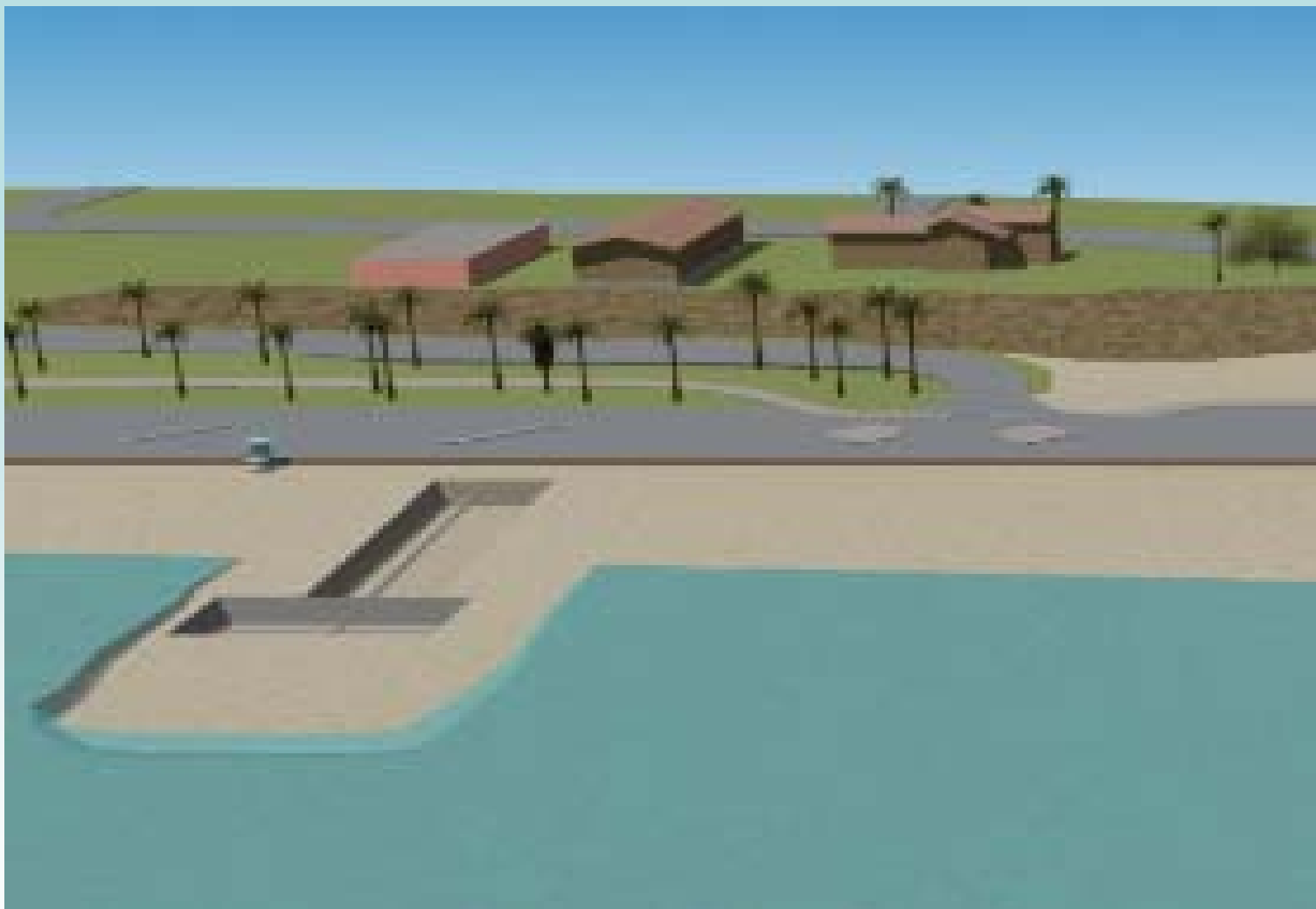
Screened Open-Ocean Intake Concept

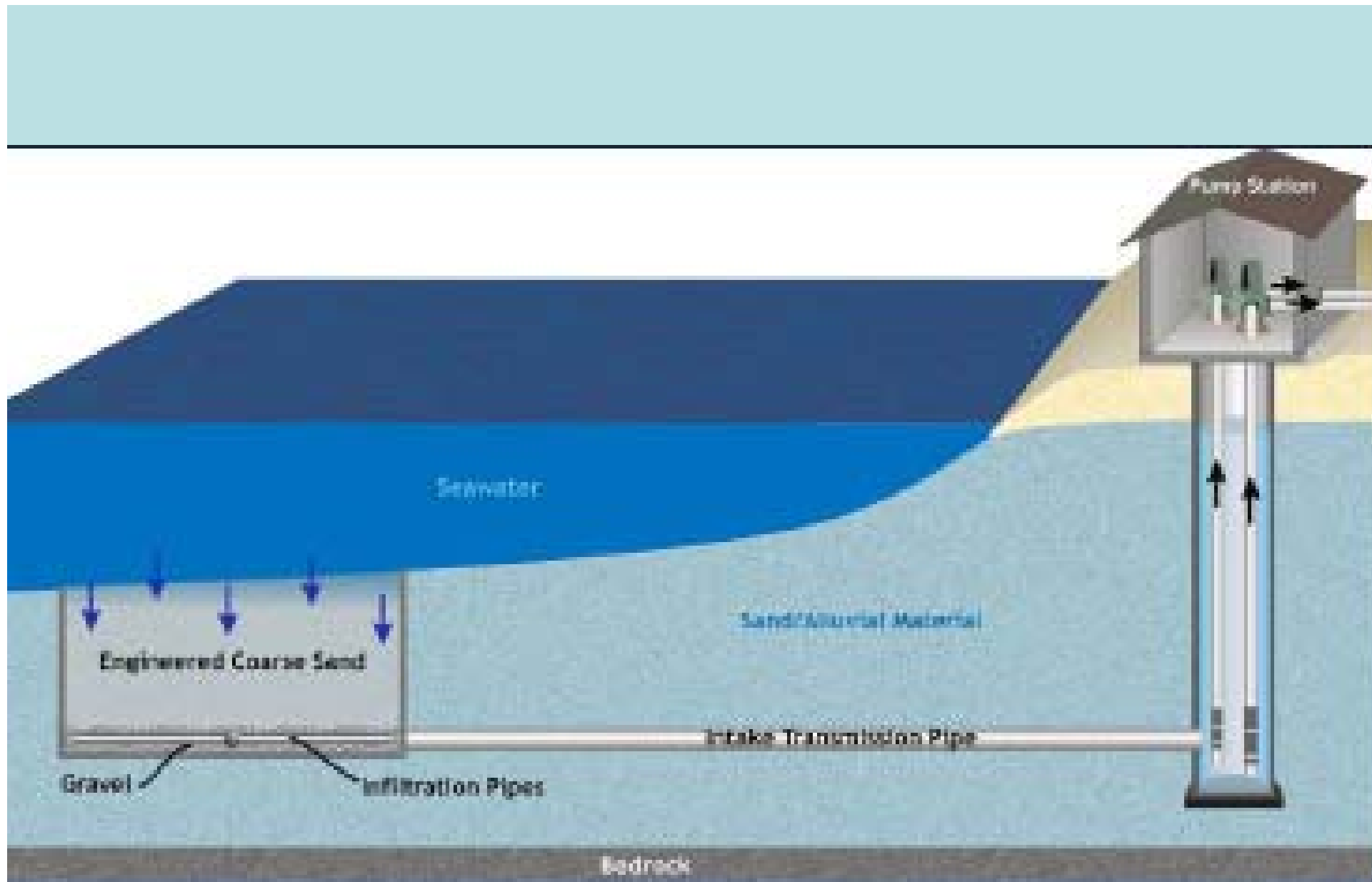


Slant Well

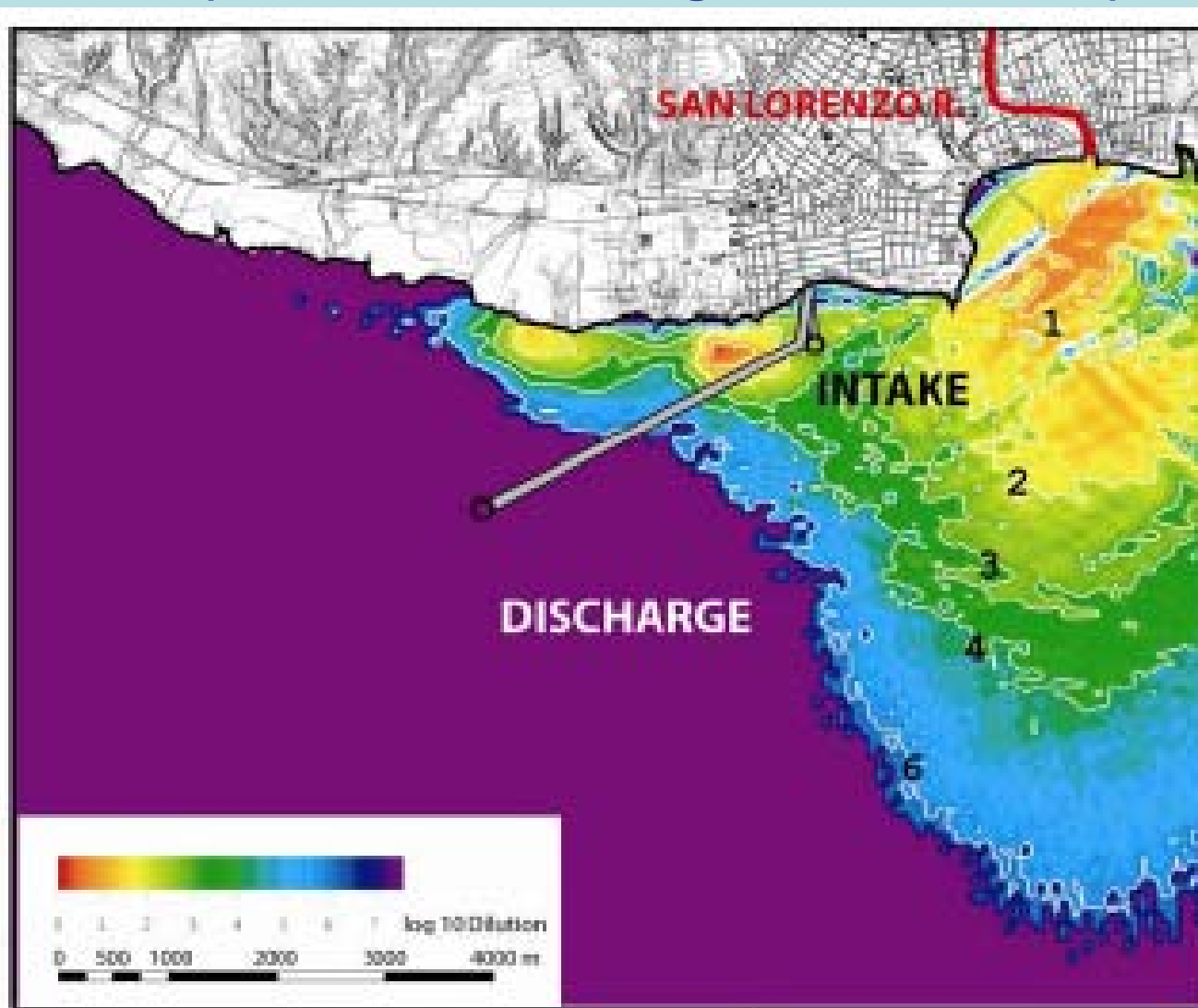


Engineered Infiltration Gallery





Dilution Analysis/WSS (Archibald Consulting/Scott A. Jenkins)



Brine Studies





Energy Minimization & GHG Reduction Plan

Anticipated scwd² Seawater Desalination Facility Operation

Season	Priority 1 User	Priority 2 User	Priority 3 User
May - October (any year)	Santa Cruz up to 2.5 mgd	SqCWD up to 2.5 mgd	NA
November - February (any year)	SqCWD up to 2.5 mgd	Santa Cruz up to 2.5 mgd	NA
March, April (any year)	SqCWD up to 1.25 mgd	Santa Cruz up to 1.25 mgd	SqCWD up to 1.25 mgd

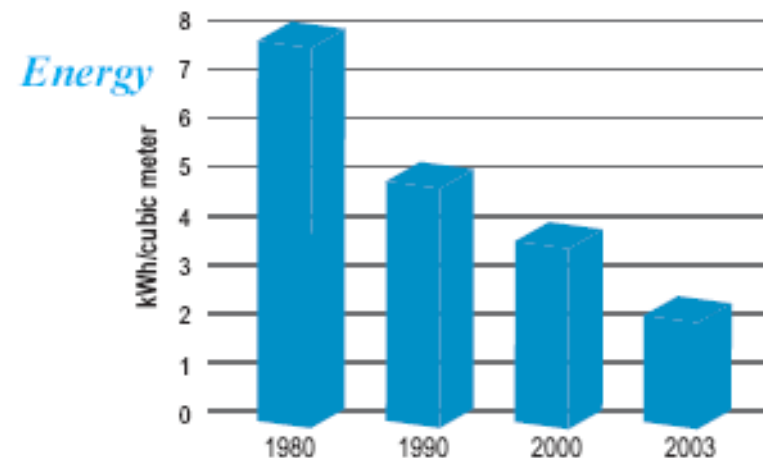
Desalination Energy Consumption is Declining

Advances in RO materials and energy recovery technologies have reduced the energy usage for desalination by 75% over the past two decades. A full-scale desalination facility would incorporate these advances to improve energy efficiency and substantially reduce operating costs.



Energy
Recovery
Device

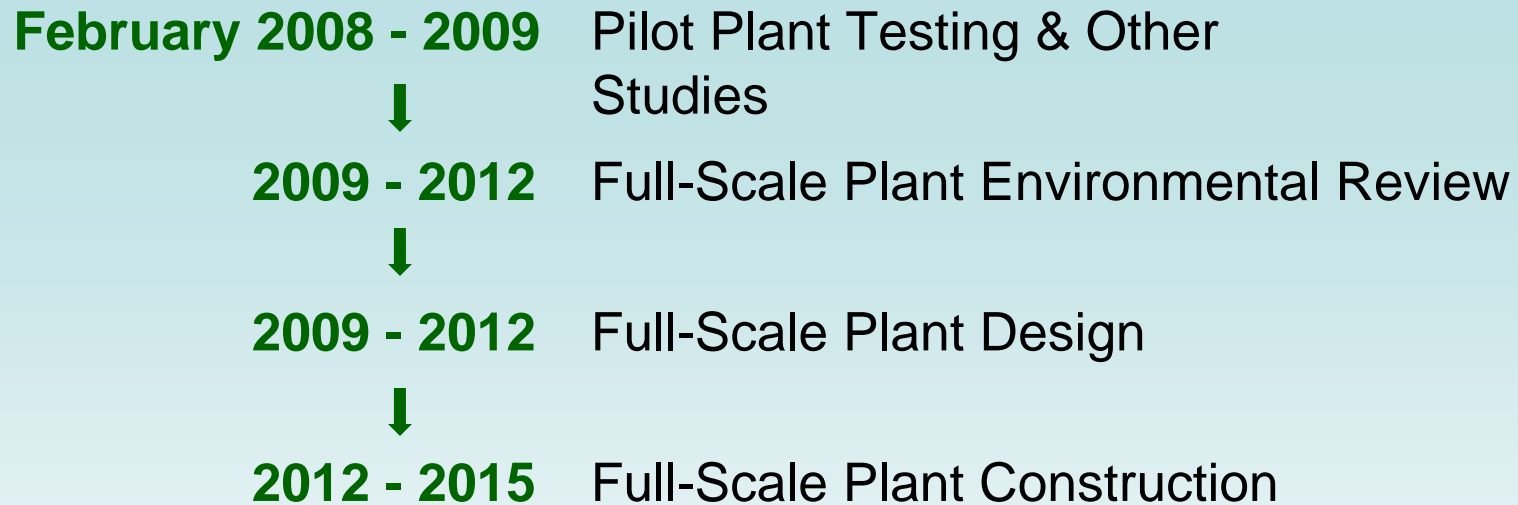
Energy recovery devices use the high pressure of the RO brine to provide boost to the incoming feed water—just like a turbo charger on an engine.



The amount of energy it takes to produce desalinated water is declining (reduced by 75% between 1980 and 2003)!



Project Schedule and Timeline



How to stay informed about the project

- 💧 E-mail Updates – sign up to receive email notices and project updates
- 💧 Visit the pilot plant at the Seymour Center at Long Marine Laboratory, UCSC
- 💧 For more info contact: Desalination Program Coordinator at (831) 420-5214

Visit our website:
www.scwd2desal.org

Questions?