

Californians Support Economically and Environmentally Feasible Desalination Projects



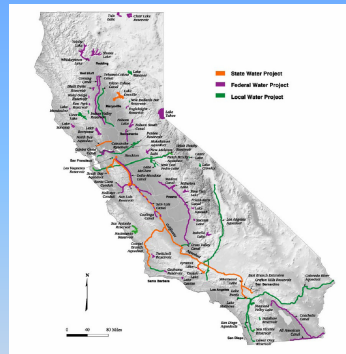
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California Department of Water Resources

For the
National Salinity Management and Desalination Summit
December 8-9, 2005
Albuquerque, New Mexico

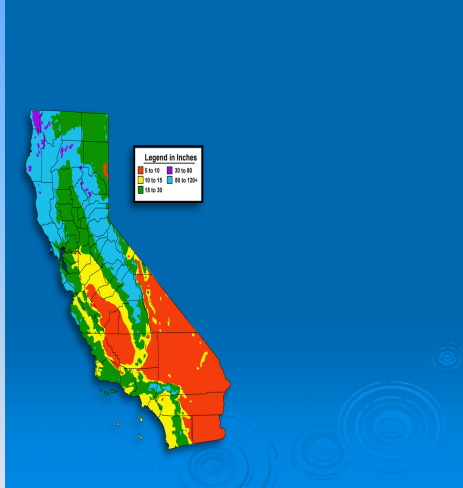
California Water Background:

The Challenge:

*water in the right places,
at the right times*



California Water Background



- Population:
 - 2005 36.5 million
 - 2030 48 million
- Irrigated Acreage: 9.5 million
- About 2/3 of the State's surface water runoff occurs north of Sacramento
- About 2/3 of the State's water needs occur south of Sacramento

Desalination in the World and US

- Currently, over 17,000 Desalination Plants across 120 countries produce 7.8 MAF of fresh water each year (3% of drinking water)
- 3.7 MAF per year is in US (<1% of the freshwater used).

Sources: News articles and Wade Miller, JWR&DTF Workshops, Oct.2005



Figure 3-4 California population, 1960–2030

Future Needs

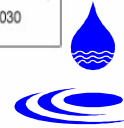
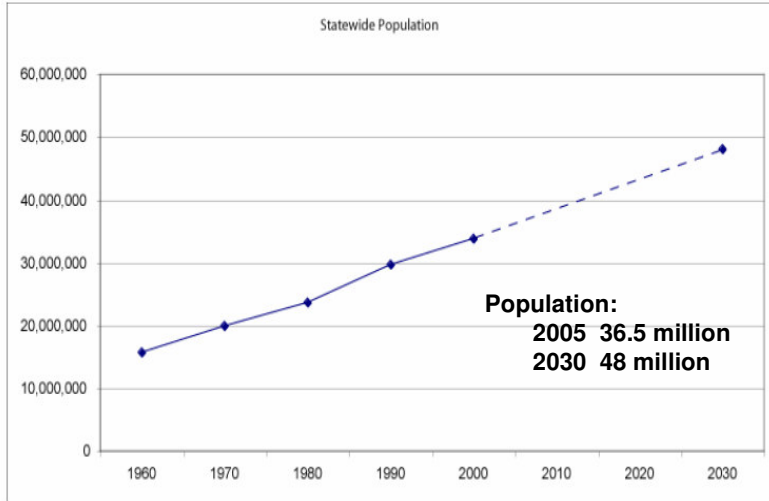
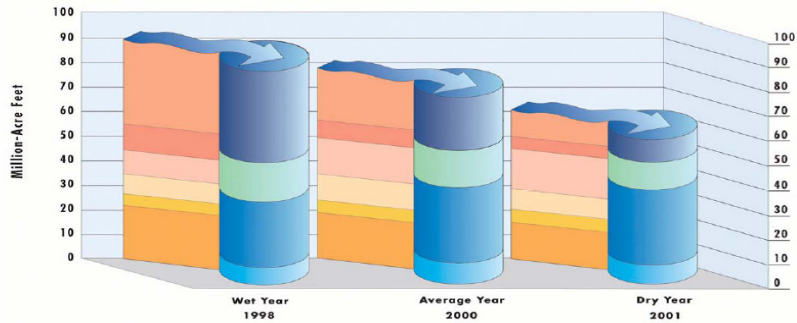


Figure 3-5 California water balance (water source and applied water uses) for water years 1998, 2000, and 2001



California's water balance can vary significantly from year to year. Three recent years show a marked change in the amount and relative proportion of the following: water delivered to urban and agricultural sectors and water dedicated to the environment (applied water use); where the water came from (water source); and how much water was reused among sectors. Each year, applied water is only a portion of California's total precipitation and inflows. The rest—about 120 maf in an average year—either evaporates, is used by native vegetation, provides rainfall for agriculture and managed wetlands, or flows out of state or to salt sinks.



Supply varies by year



Why Desalination in California?

- Much of the population lives in coastal regions
- Water supply reliability through droughts
- Cost and environmental impact of new dams, conveyances
- Reduction of some current sources
- Increasing urban demand
- Need for high water quality
- We like to stay a head of the curve....



The main driving force for the renewed interest in water desalination is the remarkable technological advancement in desalination processes particularly membrane technology and energy recovery equipment which has recently led to a much lower cost of desalinated water than 15 years ago.

In addition, the cost of new conventional water supplies, if they are even available, equals or exceeds the cost of desalination.



Challenges Facing Desalination

- Environmental impacts
- Cost
- Energy use
 - ✓ Energy recovery techniques
 - ✓ Co-generation
- Brine disposal / Feedwater intake
- Planning and regulatory issues
 - ✓ Permitting/Regulations (e.g., water rights)
 - ✓ Growth inducement



Estimated Unit Cost

Brackish Water Desalination

The total cost for brackish water desalination, including the amortized costs for planning, designing, and constructing such a facility and the costs for operation (e.g., energy, chemicals, disposal etc) will be based on site-specific conditions and range from **\$130 to \$650 per acre-foot***. (**\$430-\$650**)**

Oceanwater Desalination

The total cost for new Oceanwater and estuarine water desalination, including the amortized costs for planning, designing, and constructing such a facility, and the costs for operation (e.g., energy, chemicals, disposal etc), will range from **\$700 per acre-foot to \$1,300 per acre-foot*** (assuming retail energy costs of 5-11 cents per kWh). (**\$860-\$1,300**)**

In addition, there are distribution costs of **\$100 - \$300 per acre-foot.**

*- Operation and maintenance may vary from 50% to 70% of total cost

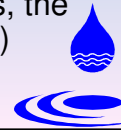
Source: California Desalination Task Force report, October 2003

** Desalination applications submitted to DWR



Desalination Task Force: Background & Objectives

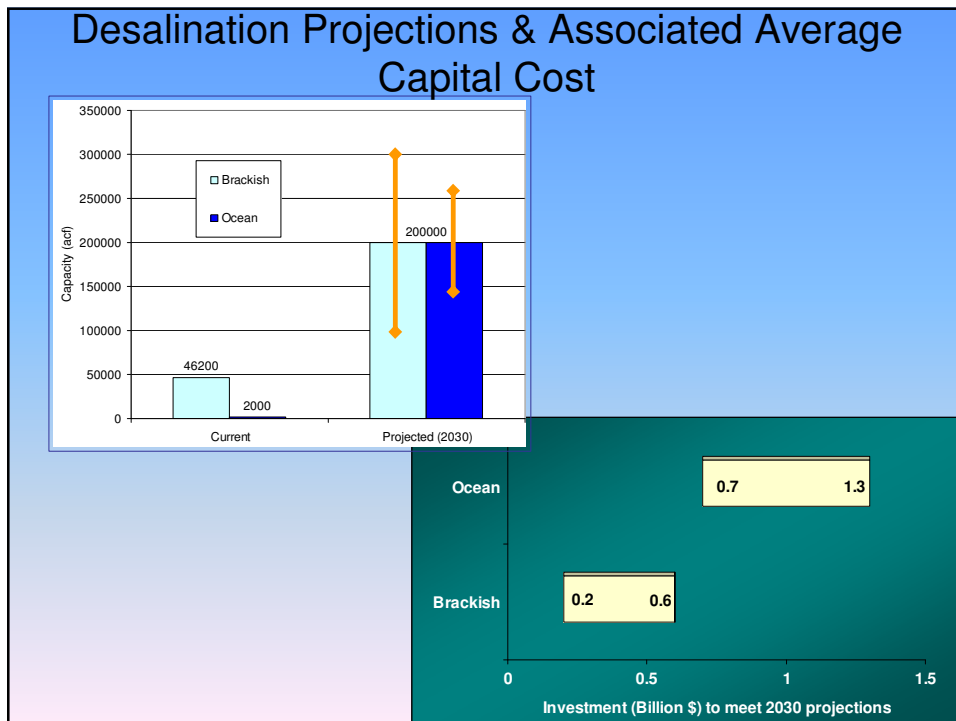
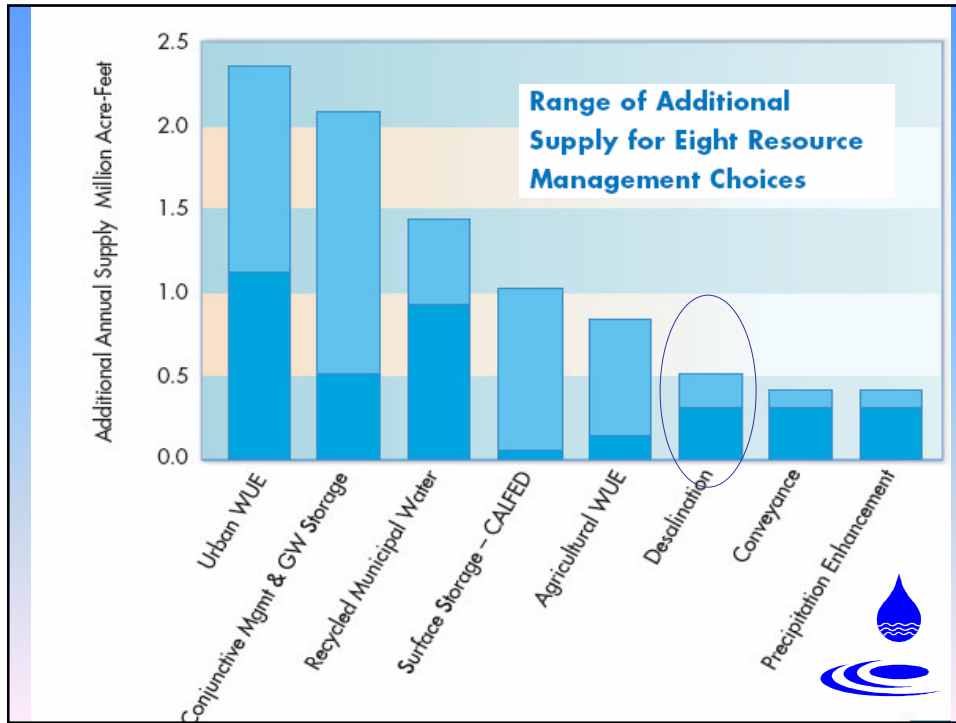
- **AB 2717, Hertzberg – Signed 09/26/2002**
- **Objectives:**
 - Identify potential opportunities and impediments for using desalination
 - Examine what role, if any, the State should play in furthering the use of desalination
- **Task Force Formed by DWR**
 - Convened 05/29/2003
 - Report to Legislature 10/09/2003
 - 29 recommendations (a working tool to guide the legislature, State government, public agencies, the public and all water desalination stakeholders)



Among the Task Force's 29 Major Recommendations:

- ✓ Include desalination, where economically and environmentally appropriate, as an element of a balanced water supply portfolio, which also includes conservation and water recycling to the maximum extent practicable
- ✓ Provide funding for research and development projects
- ✓ Evaluate all new water supply strategies including desalination based integrated planning, growth and water supply/demand projection
- ✓ Ensure desalination projects are designed and operated to avoid, reduce or minimize environmental impacts
- ✓ Ensure adequate public involvement

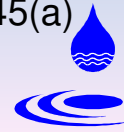




Desalination Grant Program

Description

Developing new local potable water supplies through the construction of brackish water and ocean water desalination projects and help advance water desalination technology and its use by means of feasibility studies, research and development, and pilot and demonstration projects as authorized by Proposition 50, Chapter 6, Section 79545(a)



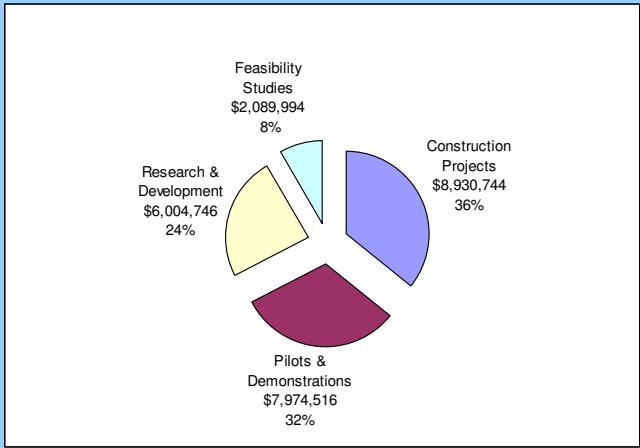
Eligible Project Type

Received & Eligible

Feasibility studies	\$250,000 / project	9	\$2,089,994.00
Research & development	\$1.0 million / project	11	\$9,261,898.00
Pilot or demonstration projects	\$2.5 million / project	14	\$21,360,205.00
Construction projects	\$5.0 million / project	8	\$38,594,249.00

42	\$71.3 million
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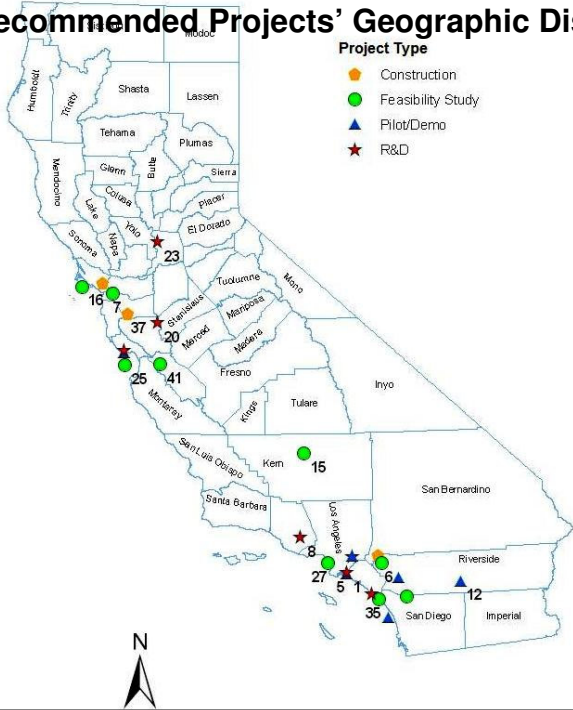




**Proposition 50 Desalination Grants – 2005 Cycle:
Fund Distribution by Project Category**



1st Cycle Recommended Projects' Geographic Distribution



Awarded Projects as a Result of the Prop 50 PSP

- ***Mix of R&D, pilot/demonstrations, and construction projects***
- ***Ocean / Bay water and Brackish water desalination projects***
- ***Statewide***
 - ***Northern California Salinity Coalition***
 - ***Southern California Salinity Coalition***
 - ***Universities / Research institutions***
- ***Generates at least 20,000 AF of new potable water.***



Desalination Grants Funds Available

- **Funds available 2005-06**
 - \$21.5 million (second of two funding cycles)
 - Feasibility Studies - \$250,000 per project
 - Research & Development - \$0.5 million per project
 - Pilot or Demonstration - \$1.5 million per project
 - Construction - \$3.0 million per project
 - 50% matching funds required.



Desalination Grant Application Anticipated Schedule

- Applications due – February 2006
- Review process completed – April 2006
- Public workshop to present funding recommendations – May 2006
- Final funding decisions made – May 2006
- Contract negotiations begin - June 2006
- Contracts signed – December 2006



Current DWR Desal R&D Activities (1/3)

***Oceanwater Desalination Demonstration Project
(Participant with \$45,000 in \$1.5 M Project)***

Main Objectives: 1. Evaluate the water quality implications for large-scale applications of Micro Filtration/Reverse Osmosis treatment for oceanwater desalination
2. Direct comparison and assessment of economic benefits of nanofiltration/ultra-low RO compared to regular RO for recycled water treatment

Anticipated Results: Increase recovery rate by at least 10%, reduce fouling problems of membranes, chemical and biological evaluation of the system, and economic evaluation.

Location: West Basin Municipal Water District desal research facility

Partners: Local Water Agencies; USBR; Research Institutions; Consulting firms.

Status: In progress



Current DWR Desal R&D Activities (2/3)

Affordable Oceanwater Desalination Demonstration Project (Participant with \$50,000 in \$580,000 Project)

Main Objective: *Test energy recovery efficiency, pump efficiency, and low pressure reverse osmosis membranes.*

Location: *Naval Facilities Engineering Service Center in Port Hueneme.*

Partners: *Cal. Energy Commission; Local Water Agencies; USBR; US Navy; Research Institutions; Consulting firms.*

Anticipated Results: *Reduction of total energy consumption by at least 20% over the commonly used technology.*

Status: *Under development*



Helpful Links

Department of Water Resources

www.water.ca.gov

Recycling and Desalination Branch

www.owue.water.ca.gov/recycle/

