

# RECLAMATION

*Managing Water in the West*

**Reclamation's Perspective on  
Salinity Management  
MWD Headquarters  
Los Angeles, CA  
June 1, 2012**



U.S. Department of the Interior  
Bureau of Reclamation

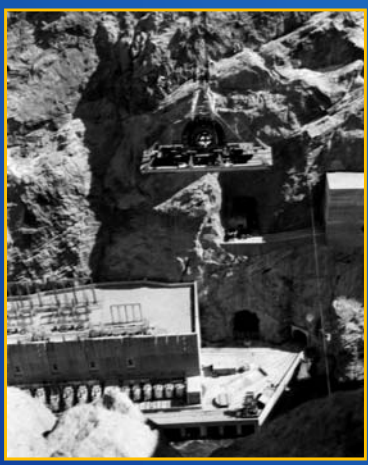
## Reclamation Act of 1902



Agricultural Project,  
1910



Concrete canal lining  
project, 1913



Boulder Canyon Dam, 1946

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## Bureau of Reclamation

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.



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## Bureau of Reclamation



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## Lower Colorado Region



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## Southern California Area Office Challenges

- Providing Water for Future Needs
- **Salinity Control for Effective Water Management**
- **Brine Concentrate Management**
- Environmental Needs
- Implementing the Colorado River Plan
- Implementing CALFED/Bay Delta
- Tribal Needs



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## New Water Supply Challenges



- **Water quality**
- Population growth
- Increased Water Demands
- Endangered species
- Climate change

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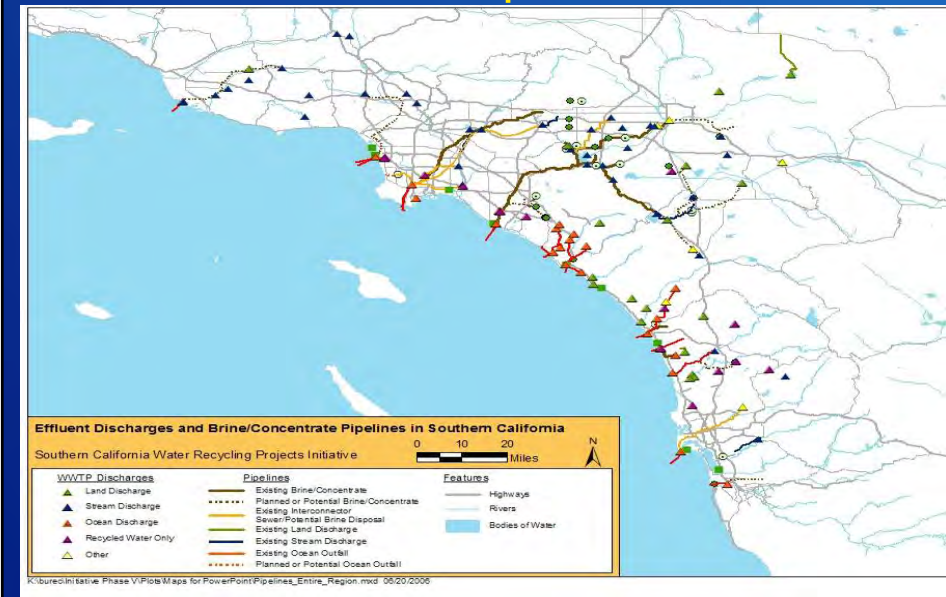
## Future Water Supply Portfolio

- **New Water Supplies**
  - Seawater/Brackish Water Desalination
  - Reclaimed Water Projects
  - Storm water Augmentation
- **Improved Use of Existing Supplies**
  - Water Conservation
  - Ground/Surface Water Conjunctive Use
  - Watershed/Integrated Resources Plans
- **Reallocation of Existing Water**
  - Water Banking/Water Transfers
  - Indian Water Right Settlements

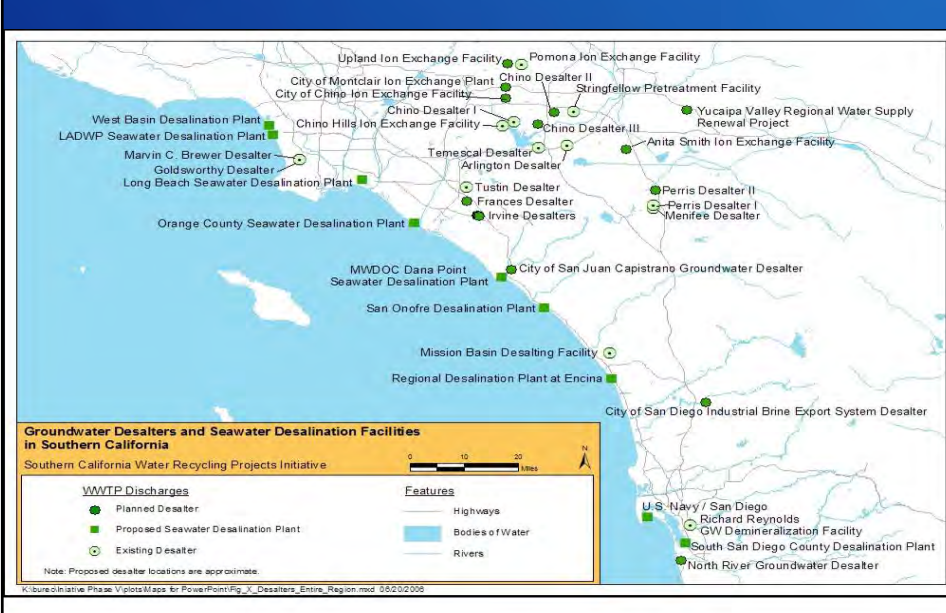


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# Effluent Discharge and Brine/Concentrate Pipelines



# Groundwater Desalter, Ion Exchange, and Desalination Facility Locations



## Reclamation Programs

- Colorado River Basin Project
  - Water Master
  - Water Quality – TDS Levels
- Colorado River Basin Salinity Control Act of 1974
  - Title I – Yuma Desalt Plant
  - Title 2 – Upper Colorado Salinity Project
- Title XVI
  - Water Recycling and Reclamation
  - Water Desalination
- Desalination and Water Purification Research & Development (DWPR) Program

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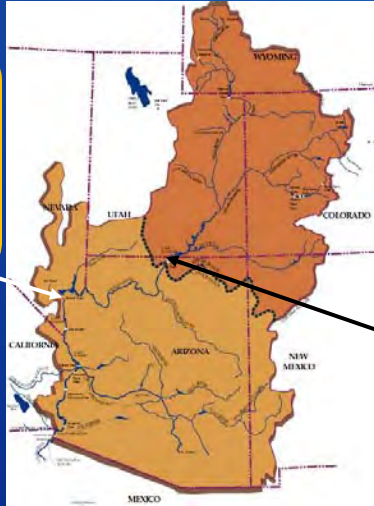
## Colorado River Basin Project

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## Colorado River Basin



Hoover Dam &  
Lake Mead



Glen Canyon Dam  
& Lake Powell

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Title XVI – Reclamation and Reuse  
Program

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## Water Reuse in the U.S.

- Three Reclamation states account for a majority of the water reuse in the U.S.:
  - California, Texas, and Arizona
- Three additional Reclamation States with growing water reuse programs:
  - Nevada, Colorado, and Washington

*Source: EPA, 2004 Guidelines for Water Reuse, August 2004*

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## Why Water Reuse and Recycling

- Reduce pressure to transfer water from existing Reclamation projects to other uses
- Reduce reliance on imported water
- Limited new local potable water supplies
- Development of a new local water supply
  - Owned and controlled by local water district
  - Minimum water rights issues
  - Reliable water supply
- Drought resistant water supply
- Provide water for environmental needs

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## Water Reuse in Reclamation States

- California
  - 2002: Reclaimed 525 mgd
  - 2010 Statutory Goal: Double 2002 figure
- Texas
  - 2002: Reclaimed approximately 230 mgd
- Arizona
  - 2002: Used approximately 200 mgd

*Source: EPA, 2004 Guidelines for Water Reuse, August 2004*

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## Benefits of Title XVI Projects



Sub-surface seawater barrier installation  
Long Beach, California



West Basin Recycling Plant,  
El Segundo, California

- Seawater Barriers
- Ground Water Recharge
- Landscape Irrigation
- Agricultural Irrigation
- Environmental Needs
  - Natural Treatment Systems
- Seawater Desalination
- Research and Demonstration Projects
- Industrial Water Supply
- Water Augmentation

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## Environmental and Recreational Reuse

- **Natural and man-made wetlands**
  - Create, restore, and/or enhance wetlands
  - Provide additional treatment of reclaimed water before discharge to streams/rivers
  - Provide wet weather disposal
- **Recreational and aesthetic impoundments**
  - Aesthetic
  - Non-contact
  - Boating and fishing
  - Swimming
- **Stream augmentation**
  - Maintain stream flow
  - Aquatic and wildlife habitat
  - Maintain aesthetic values



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Desalination

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# Desalination



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## Recent Reclamation Research

- Development of advanced technologies to treat previously unusable sources of water in order to increase usable water supplies
  - Brackish groundwater
  - Coastal waters
  - Irrigation drainage
  - Municipal wastewater
  - Other impaired waters
- Focus on two primary efforts
  - Support of cooperative research to move forward
  - Conduct development and demonstration activities to field-test technological advances, confirm economics, and gain public acceptance

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## Potential Gains Through Improved Technology Research

- **Beneficiaries**
  - Rural and Indian drinking water
  - Metropolitan areas
  - Industries requiring pure water
  - High value agriculture
  - Replace stream water diverted to environmental purposes
- **Sources**
  - Brackish – surface and ground water
  - Seawater
  - Produced water
  - Agricultural return flows

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## Potential Areas of Future Research

- Research on concentrate disposal or management
- System optimization
- Determination of water quality impacts
- New/Different technologies
- Economics of desalination
- Performance analysis

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## Potential Desalination Benefits

- Provides **additional** water supply to meet existing and projected demands
- **Local control** over water supplies
- **Replacing** water lost from other sources and relieving drought conditions
- Enhancing water **reliability** and supplying high quality potable water
- Reducing groundwater **overdraft** and restoring use of polluted ground water
- **Replacing** water that can be used for river and stream ecosystem restoration

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## Challenges Facing Implementation of Desalination

- Cost of construction - primarily seawater desalt
- Cost of energy
- Site specific environmental impacts
- Brine concentrate disposal – site specific
- Ecological impacts of entrainment - seawater
- Ecological Impacts of impingement – seawater
- Limited Federal and State funding
- Need for pilot plants to test in place pre-treatment processes
- Existing laws, regulations, and regulatory agency practices

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## Desalination and Water Purification Program

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### Desalination and Water Purification (DWPR) Program

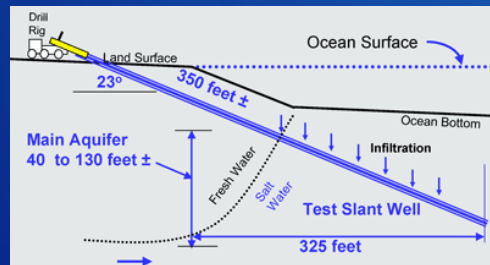
- Funds high priority, external, cost-shared R&D on advanced water treatment technology.
- Focus is on the priorities defined for Federal investment by the National Academy of Science in 2008:
  - 1) understanding and reducing environmental impacts and,
  - 2) reducing costs to make desalination technologies more broadly useful.

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## Examples of DWPR projects

- Testing of slant wells for seawater intake: This novel approach to seawater intake under the seafloor avoids environmental issues like fish entrainment and is planned for use in a new seawater desalination plant.



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- Zero discharge desalination (ZDD): The process aims to dramatically reduce the amount of concentrate that must be disposed from desalting plants. The complex process induces salts of low solubility to precipitate out in a fairly pure form for possible sale or reuse.



ZDD being tested at Reclamation's Brackish Groundwater National Desalination Research Facility

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**Thank You**



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