Collaborations for Sustainable Water Use

Curt Brown, Director
Research and Development
Mr. and Mrs. Brown
Altus Air Field, Altus, OK
1944

Mr. and Mrs. Hardy
Guthrie, OK
1945
Topics

• WaterSMART Program
  – Emphasis on the Basin Studies Program

• Advanced Water Treatment activities

• Thanks to our Oklahoma-Texas Area Office!
WaterSMART Program

Improve water conservation and sustainability.

http://www.usbr.gov/WaterSMART
WaterSMART Water and Energy Efficiency Grants

- Available to States, Indian tribes, irrigation and water or power districts

- 2011: 58 projects for a total of $25 million.

- 2012: 32 projects for a total of $11 million.

2013 applications are due on January 17, 2013.
In the past three years, Reclamation has allocated $63 million to 130 projects, with projected annual savings of about 600,000 acre-feet per year --- enough to meet Tulsa’s needs for about 5 years!
Examples of WaterSMART Grants

- **Three Sisters Irrigation District (Oregon)**
  - Replace open canal with pipe
  - 750 acre-feet/year saved annually

- **Fort Shaw Irrigation District (Montana)**
  - Replace open ditches with PVC pipe
  - 4,158 acre-feet/year saved annually

- **Saved water marketed by Districts for instream flow**
Reclamation Basin Studies Program

• http://www.usbr.gov/WaterSMART/bsp/
Basin Studies

• **Purpose**
  – evaluate the ability to meet future water demands within a river basin and identify sustainable strategies.
  – Special focus on potential impacts of climate change.

• **Eligible Applicants**
  – States, tribes, water districts, cities, and other local governmental entities with water delivery or management authority located in the 17 Western States
West-Wide Climate Risk Assessments

- Reconnaissance-level water supply and demand analyses in eight Reclamation river basins
- Projections of climate change impacts to water supply and demand
- Baseline for more in-depth analyses performed through Basin Studies
- [http://gdo-dcp.ucillnl.org/downscaled_cmip3_projections/dcpInterface.html](http://gdo-dcp.ucillnl.org/downscaled_cmip3_projections/dcpInterface.html)
Temperature increase by 2100 (30-year mean)
Colorado River Basin Study

Reclamation in partnership with the seven basin states.

http://www.usbr.gov/lc/region/programs/crbstudy.html
Historical Supply and Use

- Water Supply (10-year Running Average)
- Water Use (10-year Running Average)

Projected Future Supply and Demand

- Projected Demand
- Projected Water Supply (10-year Running Average)

Year

Volume - Million Acre-feet

150+ options for sustainability of water use

**Reduce demand**, e.g.
- Reduce Demand Municipal/Industrial Water Conservation
- Landscape Design Regulations

**Water management**, e.g.
- Aquifer storage and recovery
- Water banking and transfer

**Increase supply**, e.g.
- Salton Sea Restoration and Drainwater Reuse
- Weather modification to increase snowpack
- Coal Bed Methane Produced Water
Current Basin Studies

2009
- Colorado River Basin Study
- St. Mary and Milk River Basins Study
- Yakima River Basin Study

2010
- Henry's Fork of the Snake River Basin Study
- Niobrara River Basin Study
- Santa Ana River Watershed Basin Study
- Southeast California Regional Basin Study
- Truckee River Basin Study
2011

- Hood River Basin Study
- Klamath River Basin Study
- Lower Rio Grande Basin Study
- Santa Fe Basin Study

2012

- Los Angeles Basin Study
- Pecos River Basin Study
- Republican River Basin Study
- Sacramento-San Joaquin Rivers Basin Study
- Upper Washita River Basin Study
Upper Washita Basin Study

Oklahoma Water Resources Board, and the Foss and Fort Cobb Reservoir Master Conservancy Districts.

Bureau of Reclamation, Oklahoma-Texas Area Office
Upper Washita Basin Study

- quantify surface and groundwater resources
- project of how climate change may impact future water needs;
- determine the amount of groundwater available for future appropriations;
- Develop a surface water allocation model to evaluate various water management options
Reclamation expects to initiate the FY 2013 Basin Studies selection process in late November or early December 2012.

– Each Reclamation region will send invitation letters to stakeholders to initiate the selection process
Advanced Water Treatment

- Using advanced technologies to make previously unusable water sources usable at reasonable cost
- Water Reuse
- Desalination

- http://www.usbr.gov/research/AWT/
Advanced water treatment concepts

• All types of water can represent a supply for certain purposes.
  – Sea water
  – Brackish water
  – Municipal sewage
  – Irrigation return flows
  – Industrial discharges

• Using these water sources can
  – Diversify the water portfolio
  – Reduce costs of water transportation by using local sources
  – Provide drought insurance
Water scarcity will intensify in the coming decades.

Desalination will have a niche in water management portfolios.

Practical potential dependent on economic, social, environmental and political factors.
De facto reuse is common: ‘we all live downstream’

Many engineered and managed natural treatments can be tailored to meet specific quality objectives
Arizona
California
Colorado
Florida
Georgia
New Mexico
North Carolina
Texas
Washington
Virginia
Wyoming

Oklahoma
-direct non-potable reuse
Oklahoma Water 2060

• work toward a goal of consuming no more fresh water in the year 2060 than is consumed statewide in the year 2012

• achieve this goal through utilizing existing water supplies more efficiently and expanding the use of alternatives such as wastewater, brackish water, and other nonpotable supplies.
AWT Challenges

• Capital costs
• Energy costs
• Environmental impacts of intake and discharge
• Societal understanding of risks and benefits
• Dealing with new types of contaminants
Taking a Solution from Idea to Commercial Adoption
Reclamation’s Yuma Complex

- Reclamation’s Yuma Desalting Plant is one of the largest reverse-osmosis desalination plants in the world.

- The Water Quality Improvement Center evaluates technology for possible use at the Plant

- One of the few bench-scale to production R&D facilities
Brackish Groundwater National Desalination Research Facility - NM

- Desalination of brackish groundwater
- Renewable energy sources for desalination
- Concentrate management
- Small-scale rural systems
- Treatment of produced waters
Desalination and Water Purification Research (DWPR) Program

• looking for innovations that will have a significant impact on how water treatment, desalting, and water purification is carried out.

• private industry, universities, water utilities, and others to address a broad range of needs.

• [www.usbr.gov/research/AWT/DWPR](http://www.usbr.gov/research/AWT/DWPR)

• Pre-proposal announcement yesterday on Grants.gov
GE’s new Integrated Pump and Energy Recovery (IPER) system – A new high pressure pump for seawater desalination reducing energy demands by at least 10 percent.
City of Scottsdale’s Water Campus - Comparison of 2.4 MGD train with 16-inch elements (left) to existing 1 MGD trains with 8-inch elements.
Variable Source Desalination Pilot

Texas Water Development Board, Brownsville Public Utilities Board, and the Reclamation Oklahoma-Texas Area Office,
Veolia’s ZDD can increase the potable water recovery rate from the typical 80% to as high as 97%.

Tested at Reclamation’s Alamogordo Lab

Now being field tested in Colorado
Brine Management, Foss Reservoir, Oklahoma

Evaluating options for dealing with brine discharge from municipal water treatment plant.

Figure 2.—Foss Reservoir and EDR flow diagram – volumes based on average usage in 2011.
Drought emergency rapid assessment of temporary water supplies

MAIN MENU
- Preparation
- Water Capacity Requirements
- Alternative Sources
- Treatment Needs
- Distribution Options
- Waste Management
- Permitting requirements
- Commercial Treatment System Resources
- Federal Treatment System Resources
- Mobile Treatment System Operators
- Potential funding sources
- Public relations

Computer based decision guide
Title XVI: Water Reuse Program

Projects since 1992:
• $556 million in Federal cost-share
• more than $1.7 billion in non-Federal funding
• More than 260,000 acre-feet of water reused annually.

Sonoma County, CA, Water Reuse Program Water Agency Federal Funding: $3,836,750
– provide recycled water to agricultural, environmental, industrial and landscape uses

City of Round Rock, Texas, Water Recycling and Reuse Project. Federal Funding: $954,083
– a direct, non-potable reuse project to deliver 13,400 acre-feet of highly treated wastewater effluent annually for irrigation purposes.

www.usbr.gov/WaterSMART/title
Quagga mussels