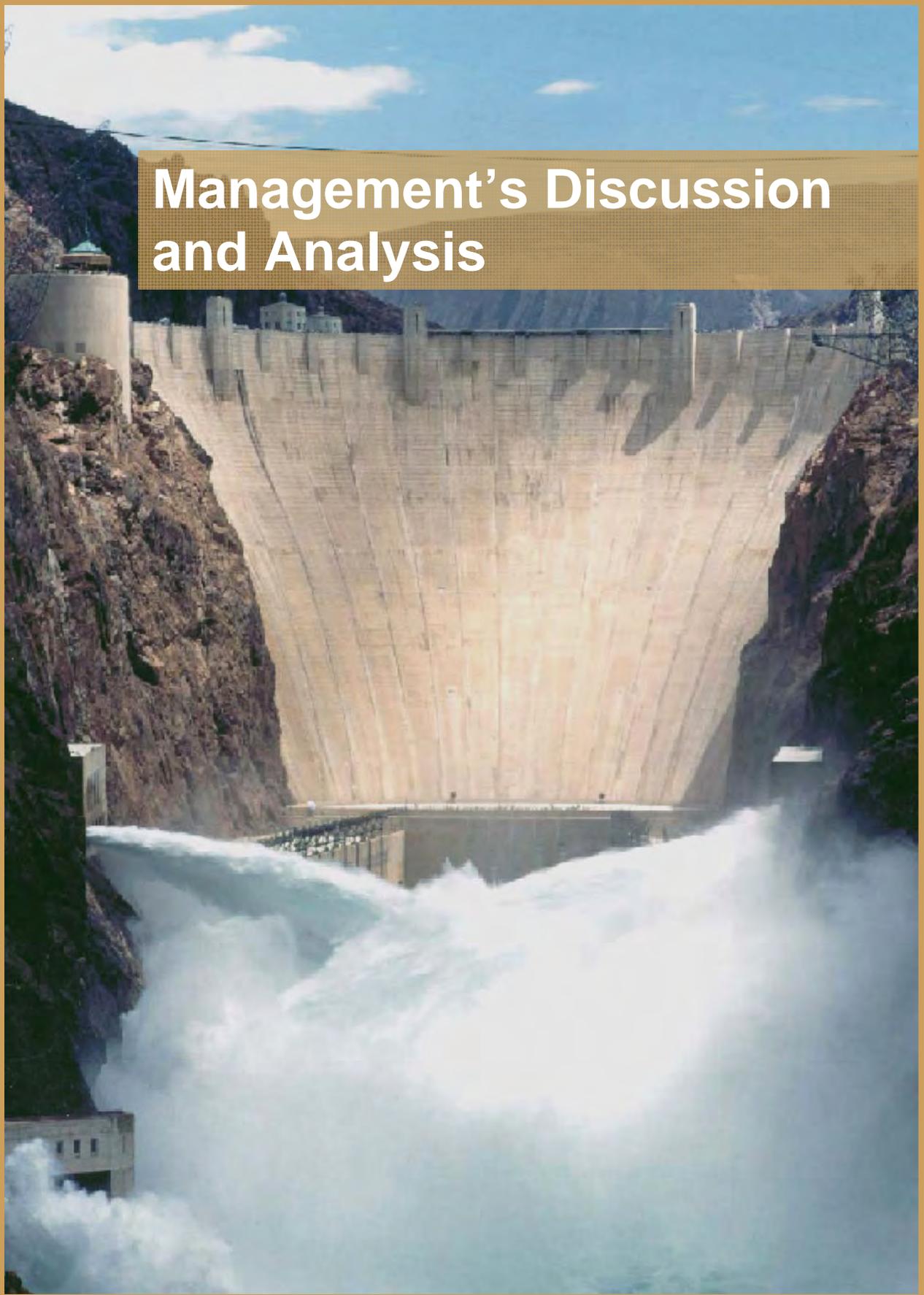


# Management's Discussion and Analysis



Fiscal year (FY) 2008 held many important milestones for the Bureau of Reclamation (Reclamation). The next several sections present our most significant accomplishments in our signature fields: water delivery, power generation, other programs, and benefits and management. Each section of this report concludes with a “FY 2008 Accomplishments” and “Future Challenges” synopsis.

## Mission and History



Since 1902, Reclamation projects, including Hoover Dam, have helped meet the needs of a growing Western population.

Reclamation was created in 1902 to build water projects to “reclaim” the arid American West. The Reclamation Act of 1902 authorized Reclamation (then the “Reclamation Service”) to assist local communities to build water development projects. Since then, we have completed 196 projects and spent \$21 billion as directed by the Congress through project specific authorizing legislation. These projects, including Hoover Dam on the Colorado River and Grand Coulee Dam on the Columbia River, have helped meet the needs of a growing Western population.

Reclamation is the Nation’s largest wholesale water supplier. We bring water to more than 31 million people and provide 20 percent of western farmers (140,000) with water to irrigate 10 million acres of farmland that produces 60 percent of the Nation’s vegetables and 25 percent of its fruits and nuts.

Reclamation is a world leader in engineering and constructing water storage and delivery projects. Increased population demands for domestic water, recreational activities, and water to maintain ecosystems have resulted in increased demands on existing water supplies. Water is still the most valuable and scarce resource in the West, and Reclamation plays a key role in ensuring water is available to meet the growing needs of the West.

Reclamation is also the Nation’s second largest producer of hydroelectric power. Our 58 powerplants provide more than 40 million megawatt hours (MWh) of energy each year—equivalent to the energy provided by 73 million barrels of crude oil and enough to meet the needs of over 5 million households.

*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.*

# Goals and Accomplishments

Reclamation has outlined four overarching goals that emphasize our mission to deliver water and generate hydropower while addressing other water use requirements and planning for future water needs to avoid crisis and conflict:

- Ensure the reliable delivery of water and generation of hydropower under Reclamation contracts.
- Optimize hydropower generation consistent with project purposes.
- Incorporate other considerations, such as recreation, fish and wildlife, environment, and Native American trust responsibilities, into our water and power operations.
- Identify and plan for future consumptive and nonconsumptive water supply needs by identifying unmet needs in the next 25 years.

To meet these goals in FY 2008, Reclamation accomplished the following:

- Delivered 28 million acre-feet of water (1 acre-foot supplies enough water for a family of four for 1 year).
- Generated more than 40 million MWh of hydroelectric energy.
- Optimized hydropower generation with the Yellowtail Power Optimization package, a 3-year project partnered by the Great Plains Region and Western Area Power Administration's Rocky Mountain Region.
- Optimized hydropower generation by developing new processes for Central Valley Project generator schedules to produce greater values to power production without compromising water deliveries.
- Managed, with partners, 289 recreation sites that have more than 90 million annual visits.

- Completed the fish passage at the Price-Stubb Diversion Dam, which was the last remaining obstacle to restoring fish passage from Lake Powell to the Colorado River headwaters.
- Awarded \$4.5 million in *Water 2025* Challenge Grants to fund 15 water conservation or development projects in the West.
- Presented 12 System Optimization Review (SOR) awards, resulting in a total investment of \$4.1 million to identify ways to improve delivery efficiency or operations of regional or basin water systems.

## **Future Challenges, Future Solutions**

As drought, growth, and economic concerns continue across the Western United States, Reclamation faces new challenges in its many projects and operations. Those new challenges in resource management, project maintenance, water supply, and hydropower provide an opportunity for Reclamation to develop new technologies, innovations, and solutions. As we move further into the new century, however, our guiding principles and priorities remain consistent.

Reclamation's priorities are to:

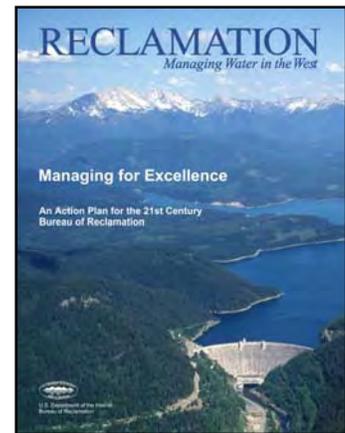
- Ensure the continued delivery of water and power benefits in conformity with contracts, statutes, and agreements.
- Operate and maintain projects in a safe and reliable manner, protect the health and safety of the public and Reclamation employees, and improve financial accountability and transparency to our contractors.
- Honor State water rights, interstate compacts, and contracts with Reclamation users; further the Secretary of the Interior Dirk Kempthorne's Indian trust responsibilities; and comply with all environmental statutes.
- Plan for the future using *Water for America* and other programs that focus Reclamation's financial and technical resources on areas in the West where conflict over water currently exists or is likely to occur in the coming years.

- Enhance the business operations of Reclamation in accordance with the *Managing for Excellence* Initiative.
- Implement the newly authorized Loan Guarantee Program that can assist districts with large operation and maintenance/replacement projects on Reclamation facilities and facilities used to deliver Reclamation supplies.

## Managing for Excellence

An important catalyst for Reclamation's evaluation effort was the National Research Council (NRC) report, *Managing Construction and Infrastructure in the 21st Century Bureau of Reclamation*, which examined several facets of our organization, practices, and culture.

Reclamation's *Managing for Excellence* Action Plan incorporated suggestions and recommendations from the NRC report. From these suggestions and recommendations, Reclamation developed 41 action items, which were assigned to teams of Reclamation employees and divided among 8 functional areas, each with an executive sponsor. The eight functional areas are: Relationships with Customers and Other Stakeholders, Policies and Organization, Engineering and Design Services, Major Repair Challenges, Project Management, Asset Sustainment, Research and Laboratory Services, and Human Resources/Workforce.



## FY 2008 Accomplishments

In FY 2008, Reclamation completed the original 41 action items. The action item teams made more than 100 recommendations, scheduled to be implemented by December 2008. Reclamation is undergoing many positive changes as a result of the *Managing for Excellence* Initiative.

Reclamation sought feedback on its implementation efforts from its stakeholders. In February 2008, Reclamation held its final *Managing for Excellence* public meeting in Las Vegas, Nevada. The final report was released in October 2008.

Reclamation is dedicated to ensuring that employees have a consistent understanding of *Managing for Excellence*. A Reclamation-wide manager's meeting was held in February 2008 to inform managers of *Managing for Excellence* implementation progress and related efforts.

Reclamation uses the Intranet and Internet for internal and external communications. The Web site, <http://www.usbr.gov/excellence>, was developed to provide *Managing for Excellence* public access. All implementation draft documents for public review are posted, and comments can be submitted and viewed on the Web site. Reclamation uses a list server to notify subscribers about *Managing for Excellence* news or events and when draft or final products are posted. Anyone can join the list server by sending a blank e-mail, with no text, to [m4e@listserver.usbr.gov](mailto:m4e@listserver.usbr.gov).

Reclamation also developed the Efficiency, Transparency, and Accountability (ETA) Web site to allow the public and Reclamation staff to receive current information on Reclamation's efforts to implement the recommendations of the *Managing for Excellence* Initiative, as well as other activities at Reclamation. This Web site, along with other media avenues, such as the newsletter, press releases, reports, and e-mail, will keep stakeholders and employees up to date with the latest ETA information. It can be found at <http://www.usbr.gov/eta/>.

In 2008, through the *Managing for Excellence* effort, Reclamation developed and submitted legislation to the Congress to authorize the establishment of a title transfer program to identify and analyze potential for public benefits from the transfer out of Federal ownership of Reclamation Projects, parts of projects, facilities, and associated lands. Second, the proposed legislation would, without further authorization from the Congress, authorize the Secretary of the Interior (Secretary) to convey all right title and interest in any facility that is determined to be eligible based upon a set of specific criteria. If enacted by the Congress, this program will facilitate the transfer of title to eligible facilities to promote more efficient management of water and water-related facilities at a lower cost.

## **Delivering Water**

One of Reclamation's primary missions is delivering and storing water throughout the 17 Western States. In an average year, Reclamation projects deliver approximately 28 million acre-feet of water. Reclamation uses funding to implement projects that stretch existing water resources and partners with State, local, and other entities to expand existing water supplies. Ongoing droughts and burgeoning Western populations make this job ever more challenging. We continuously evaluate our management strategies and incorporate new technologies to develop new water supplies

and use water more efficiently. In FY 2008, Reclamation's enacted amount for Water and Related Resources was \$949 million to benefit 202 programs and projects.

### **Operating, Maintaining, and Upgrading Facilities to Store and Deliver Water**

Operation, maintenance, and rehabilitation of Reclamation's facilities are essential to the delivery of water. Beginning construction in 1902, Reclamation built facilities throughout the 20<sup>th</sup> century. Today, older systems and facilities constructed before current design and construction practices present special challenges, including increased costs for operation, maintenance, and rehabilitation. We operate, maintain, and rehabilitate our facilities to minimize costs and service disruptions.



Reclamation evaluates management strategies and incorporates new technologies to develop new water supplies and use water more efficiently.

Reclamation completed the repair and replacement of concrete in the spillways of three dams on the Colorado-Big Thompson Project: Dille Diversion Dam, Flatiron Dam, and Rattlesnake Dam. The work came in on time and within budget. These dams play an important role in storing and conveying water for delivery to over 720,000 people in northeastern Colorado.

### **Water 2025 Program: Preventing Crises and Conflict**

Water is the lifeblood and the foundation of the American West's economy. It is also one of the most limited resources in some of the fastest growing areas of the country. *Water 2025* focuses attention on the realities of major conflicts among competing uses of water, including the explosive population growth in Western urban areas, the emerging need for water for environmental and recreational uses, and the national importance of the domestic production of food and fiber from Western farms and ranches.

The *Water 2025* program provides a basis for public discussion of the realities that face the West so that decisions can be made at the appropriate level in advance of water supply crises. The program also sets forth a framework to identify the problems, solutions, and a plan of action as the U.S. Department of the Interior (Interior) works with States, tribes, local governments, and the private sector to meet water supply challenges.

In some areas of the West, existing supplies are, or will be, inadequate to meet competing demands for water, even under normal water supply conditions. The *Water 2025* Challenge Grant Program is an important aspect of *Water 2025* that recognizes that States, tribes, and local governments should have a leading role in meeting these challenges and that Interior should focus its attention and resources on areas where scarce Federal dollars can provide the greatest benefits to the West.

Challenge Grant funding is provided on a minimum 50-percent, non-Federal cost-share basis to irrigation and water districts, Western States, and other entities with water delivery authority. These entities use the funding to implement projects that stretch existing water resources. Challenge Grant projects focus on modernizing aging water delivery infrastructure, improving water use efficiency and conservation, and marketing water. Projects are selected through a competitive process that emphasizes projects that will achieve demonstrated results within 24 months from the date of award.

Since its inception in 2004, the Challenge Grant Program has funded 137 projects that represent approximately \$128 million in water system and water management improvement across the West, including non-Federal cost-share contributions of approximately \$98 million and a Federal investment of approximately \$30 million.

System Optimization Reviews are also an important aspect of the *Water 2025* Program. SOR grants are intended to identify and examine ways to improve delivery efficiency or improve operations of water systems on a regional or water basin basis. SORs result in a written plan of action to implement those improvements. The requirements to receive funding are similar to the *Water 2025* Challenge Grant Program. Applicants include irrigation and/or water districts, tribal water authority, State governmental entity with water management authority, or entities created under State law with water delivery authority (within the 17 Western States). Applicants must include a 50-percent cost share. The Federal share is capped at \$300,000, and the overall project must be completed within 24 months.

***FY 2008 Highlights of Water 2025 Challenge Grants and System Optimization Review Grants***

Reclamation received more than 68 applications in response to the FY 2008 funding opportunity announcement; funding was provided

for 15 projects, totaling \$4.5 million in Challenge Grants for projects across the West. Including the matching contributions of non-Federal partners, the selected projects represent a combined investment of more than \$31.8 million in water management improvements.

The projects are projected to result in 1 mile of canal lined, 21.7 miles of canal piped, 6 projects that include water marketing, and 8 projects to install water measurement, Supervisory Control and Data Acquisition systems, or automatic water delivery systems. These projects will stretch existing water resources.

The first ever awards for SORs were announced in May 2008. Twelve SORs were selected, resulting in a total investment of \$4.1 million. Of that total, the Federal investment was \$1.9 million.

### ***Water 2025 Beyond FY 2008***

In the future, the most successful elements of *Water 2025* will be incorporated into Interior's *Water for America* Initiative, which focuses on addressing 21st century water challenges and securing water resources for future generations.

### **Water for America**

In February 2008, Secretary of the Interior Dirk Kempthorne announced the *Water for America* Initiative, which includes \$31.9 million in FY 2009 to address critical water supply issues in the West, including chronic drought and climate change.

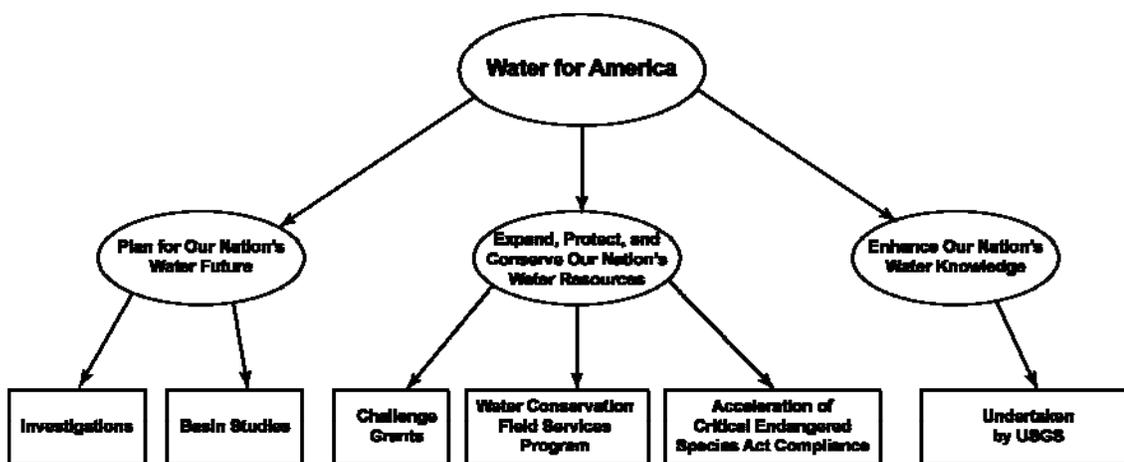
Watersheds in the West are experiencing chronic water supply shortages, dramatic population growth, climate variability, and heightened competition for finite water supplies by cities, farms, and the environment. "As this competition escalates during a time of chronic drought and changing climate," the Secretary noted, "water conflicts are occurring within States, among States, between States and the Federal Government, and among environmentalists and State and Federal agencies."

To respond to these 21st century water realities, Reclamation is expanding partnerships with the U.S. Geological Survey (USGS) beginning in FY 2009 to implement the *Water for America* Initiative (Initiative). Reclamation's efforts under the Initiative include an expansion of the Challenge Grant Program that was initiated under *Water 2025* to include funding for endangered species concerns and

to test advanced water treatment technology, in addition to the grants to improve water management.

Additionally, Reclamation will emphasize water management planning under the Initiative through the continuation of its Investigations Program and the introduction of a new Basin Studies Program. The basin studies will recommend strategies to meet growing demands for water in major watersheds in the West where there are significant imbalances in supply and demand. Finally, the Initiative will provide increased funding to accelerate Reclamation's critical Endangered Species Act (ESA) compliance activities. For its part of the Initiative, the USGS will conduct the first water census in 30 years.

The Initiative includes three strategies: Plan for Our Nation's Water Future; Expand, Protect, and Conserve Our Nation's Water Resources; and Enhance Our Nation's Water Knowledge. The following figure depicts the three strategies and their relationship to the Initiative. Reclamation's efforts and this implementation plan focus on the first two of the Initiative's three strategies. USGS will undertake the third strategy. Reclamation is coordinating closely with USGS on implementing the Initiative. Wherever possible, Reclamation will incorporate data made available by USGS through the Initiative into Reclamation's efforts.



The three strategies of the *Water for America* Initiative.

In FY 2008, Reclamation developed an implementation plan and a Web site for the Initiative. The plan and additional information about the Initiative are available at <http://www.usbr.gov/wfa>.

The Plan for Our Nation's Water Future strategy will include Reclamation's long-standing Investigations Program and the new Basin Studies Program, which will consist of comprehensive water supply and demand studies to assess the impact of increased water demands on finite water sources. The Expand, Protect, and Conserve Our Nation's Water Resources strategy incorporates the most successful elements of two existing water conservation programs: *Water 2025* and the Water Conservation Field Services Program. Through these two programs, Reclamation will increase water conservation, improve efficiency, and help secure future water supplies through competitive grants and technical assistance. Also under this component of the Initiative, Reclamation will accelerate critical ESA compliance activities to maintain and improve existing populations of listed or proposed species and critical habitat affected by Reclamation's projects and programs.

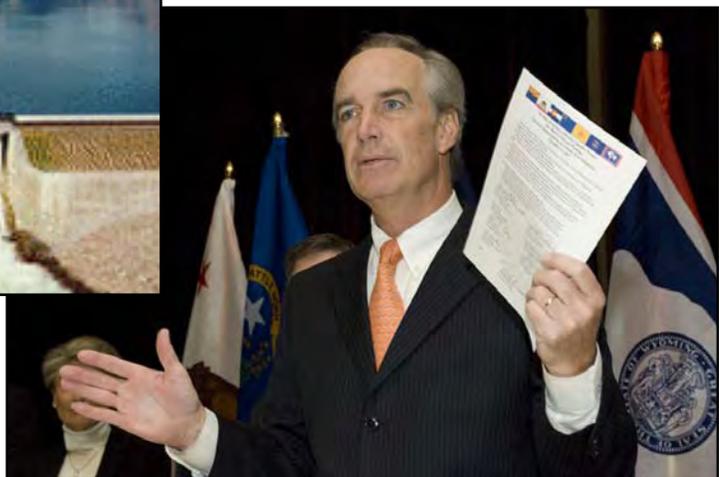
Through these strategies and programs, the *Water for America* Initiative will provide the vision and leadership necessary to help ensure sustainable water supplies in the West for the 21st century.

### Expanding Water Supplies

In addition to work done with *Water 2025*, Reclamation works to reduce crises and conflict over water by increasing flexibility in



Reclamation will emphasize water management planning under the *Water for America* Initiative through its Investigations Program and the introduction of a new Basin Studies Program. Photo shows Jackson Lake Dam in northern Wyoming.



"In 2006, the National Science and Technology Council reported that abundant supplies of clean, fresh water can no longer be taken for granted," Secretary of the Interior Dirk Kempthorne said in announcing the *Water for America* Initiative.

water supplies and managing scarce water resources through water transfers, rural water projects, water conservation, and using alternative sources of clean water, like desalination of brackish water.

### ***Water Transfers***

To ensure the continued delivery of water benefits in conformity with contracts, statutes, and agreements, Reclamation uses water transfers—the selling or exchanging of water or water rights among individuals or agencies—to enhance the availability of water for municipal use. An example of effective water transfer is the eastern side of the Rocky Mountain Divide in Colorado, commonly called the Front Range, an area of rapid population growth and the subsequent need for municipal water supplies.

From Ft. Collins to Pueblo, Colorado, Reclamation utilizes water transfer initiatives to negotiate and execute contracts for water exchange, storage, and conveyance, using excess capacities in the existing Colorado-Big Thompson and Fryingpan-Arkansas Projects. The Colorado-Big Thompson Project provides water for 725,000 people and 620,000 irrigable acres. The Fryingpan-Arkansas Project provides water for 650,000 people and 200,000 irrigable acres.

### ***Rural Water***

In December 2006, the President signed Public Law 109-451. Title I of the Act authorized Reclamation to establish a Rural Water Supply Program to enable us to work with rural communities in the West to conduct appraisal and feasibility studies for rural water projects. The act requires Reclamation to develop priority and eligibility criteria, as well as criteria governing the conduct of appraisal and feasibility studies. The Interim Final Rule setting forth these criteria was published in the *Federal Register* in the fall of 2008, and the final rule is expected to be published in early 2009. The President's budget requests \$1 million to begin implementation of the program in FY 2009. The Mid-Dakota Rural Water System is an example of expanding rural water supplies.

During 2008, a total of \$62.7 million was spent on construction of rural water projects in North Dakota, South Dakota, and Montana. These projects will provide high-quality drinking water to thousands of Indian and non-Indian residents of rural areas that have lacked good water for home use. The recently

completed Mid-Dakota Rural Water System in South Dakota provides water to a 7,000-square-mile area, roughly 10 percent of the total land area of the State.

### ***Water Conservation Field Services Program***

The Water Conservation Field Services Program (WCFSP) was created in 1996 to encourage water conservation by the recipients of Reclamation project water. The WCFSP is a decentralized program managed by Reclamation's five regions and implemented at the local level through area offices to address local water conservation priorities, as well as Reclamation-wide goals. Through this program, Reclamation has established long-term partnerships with water contractors in the 17 Western States by providing financial assistance for planning activities, on-the-ground efficiency improvements, demonstration projects, and education and training, as well as technical assistance from Reclamation staff.

In 2008, Reclamation provided both financial and technical assistance to water users. Financial assistance was provided for water conservation and efficiency improvements, including planning activities for water districts. Reclamation activities in 2008 included support for Geographic Information Systems; construction of water measurement and telemetry systems; installation of automated gates; development of a digital water rights transfer application system; and construction of pipelines, canal lining, and small regulation ponds.

### ***Water Conservation***

Water conservation is an important management tool to help meet both current and future water needs. As the principle operator of Federal water projects throughout the Western United States, Reclamation strongly encourages efficient water use through a variety of programs. Working in partnership with local, State, and regional water managers, Reclamation's water conservation programs range from funding support for small projects to major undertakings that involve the rehabilitation of older systems or construction of new projects to conserve water, as well as innovative strategies to support major conservation efforts by other entities.



The All-American Canal project will conserve water now lost to seepage and will use that water to settle tribal water rights and help California reduce reliance on surplus water from the Colorado River.

The All-American Canal Lining Project, located just north of the United States-Mexico border in southern California's Imperial Valley, is scheduled for completion in spring 2010; the project will conserve an estimated 67,700 acre-feet of water per year that is now lost to seepage. The project is being financed by a California State bond and by the San Diego County Water Authority, which will receive a portion of the conserved water. The Imperial Irrigation District is performing the construction management. To date, 17 of the 23 miles to be lined have

been completed, and water is flowing in 11 of those miles. The remaining lining will begin in October 2008.

Reclamation, under the Southern Arizona Water Rights Settlement Act, improved and extended the irrigation system at San Xavier Indian Reservation of the Tohono O'odham Nation to the San Xavier Cooperative Farm south of Tucson, Arizona. The farm expects to use to 10,500 acre-feet annually when the rehabilitation and extension project is fully completed. With about half of that amount available now, the farm has already produced 900 acres of alfalfa and traditional crops (e.g., squash and beans). The project also included extensive land leveling, constructing floodways and other flood control features, stabilizing the Santa Cruz River bank, and constructing a new farm maintenance building. In July 2008, Reclamation awarded a \$985,000 contract for the final component—to design and construct an administration building complex at the farm headquarters.

In 2006, Reclamation established a demonstration program for system conservation of Colorado River water. Under the program, Reclamation would enter into voluntary agreements with eligible holders of Colorado River water entitlements to conserve a portion of their approved annual consumptive use of Colorado River water. Water entitlements would be one means for providing an interim, supplemental source of water to replace approximately 100,000 acre-feet of irrigation drainage water that

is bypassed around the Yuma Desalting Plant instead of being treated and delivered to Mexico. Reclamation accepted an offer from the Yuma Mesa Irrigation and Drainage District to fallow 500 acres of land, which will save 3,500 acre-feet of consumptive use of Colorado River water.

***Using Alternative Sources of Usable Water: Desalination and Water Reuse***

Desalting seawater and inland brackish waters and increasing water reuse offer new drought-proof water supplies that can help Reclamation manage water more effectively. Desalination projects and research in 2008 helped Native Americans, rural areas, and municipal and industrial water use. Reclamation's investments in desalination come through various budget line items and programs: the Desalination and Water Purification Research and Development Program, the Science and Technology Program, the Water Reuse Program – Title XVI, *Water 2025*, and the Yuma Desalting Plant – Title I.

***FY 2008 Accomplishments***

The National Academy of Sciences study on *Desalination: A National Perspective*, cosponsored by Reclamation and the U.S. Environmental Protection Agency, was published in 2008. This report assesses relevant up-to-date desalination technologies and factors such as cost and implementation challenges. It also describes reasonable long-term goals for advancing desalination technology, provides recommendations for action and research, estimates the funding necessary to support the proposed research agenda, and identifies appropriate roles for governmental and nongovernmental entities. Reclamation will use the report's recommendations of what is needed to make desalination a competitive option among other water supply alternatives to help guide future work in this area. See the report at [http://www.nap.edu/catalog.php?record\\_id=12184](http://www.nap.edu/catalog.php?record_id=12184).

Reclamation's Research and Development Office funded 12 science and technology research projects on advanced water treatment, including development of more durable reverse osmosis membranes; opportunities for powering desalination with wind energy; and low-cost, low-tech systems for pretreatment of brackish and saline waters.

Reclamation has also funded the WaterReuse Foundation to manage a nationwide, competitive research program on water reuse and desalination. In 2008, more than 20 new research reports were published; topics included research on membrane bioreactors, a salt management guide, impacts of membrane residuals on wastewater treatment, a national database of water reuse facilities, improved sampling procedures for pathogen detection, disposal of brine concentrate, design of seawater desalination facilities, and several methods for improving the efficiency and reducing costs of desalination technologies.

Reclamation developed a process to allow low-pressure water desalination known as forward osmosis. Once proven, the membranes and technologies could be used to desalt water in a variety of areas. The technology could also be applied in a new, low-carbon-footprint energy generation process called osmotic power, which generates power by using the difference in salinity between sea water and fresh water.

### ***Managing Western Water as Climate Changes***

In the future, climate change has the potential to alter many aspects of the natural hydrologic cycle, affecting temperature, precipitation, snowpack, runoff timing, and water demand. The assessment of potential consequences of climate change for water management is a high priority. Actions underway by Reclamation include:

- Collaborating with the National Oceanic and Atmospheric Administration and the USGS to form a Federal Climate Change and Western Water Group (C-CAWWG) dedicated to providing scientific and research collaborations in support of Western water management as climate changes. More information about C-CAWWG and work underway is available at <http://www.esrl.noaa.gov/psd/workshops/mwwcc/docs.html>.
- Undertaking multiple research projects in collaboration with Western States, universities, and other Federal agencies. A notable accomplishment includes working with U.S. Department of Energy's National Energy Technology Laboratory, Santa Clara University, Lawrence Livermore National Laboratory, and University of California's Institute for Research on Climate Change and Its Societal Impacts, to bias-correct and spatially "downscale" a large collection of contemporary General

Circulation Models projections into finer-scale translations. More information is available at [http://gdo-cp.ucllnl.org/downscaled\\_cmip3\\_projections/](http://gdo-cp.ucllnl.org/downscaled_cmip3_projections/).

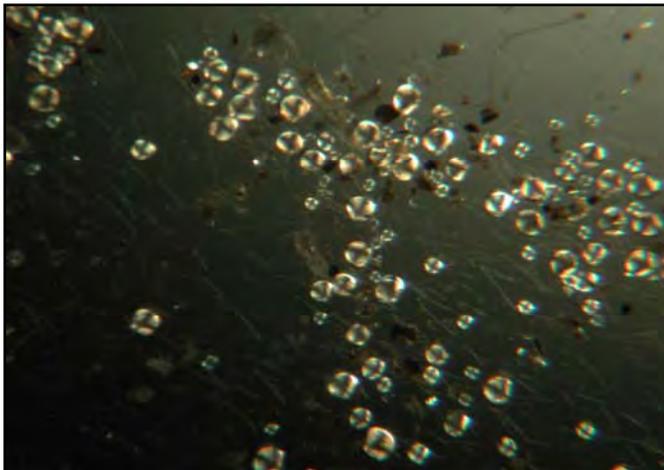
- Incorporating, where appropriate, information on climate variability and climate change into project planning. A notable example is the recently adopted *Colorado River Interim Operating Guidelines for Lake Powell and Lake Mead*, for which paleohydrologic (the study of ancient use and handling of water) data were used to explore the longer-term variability of Colorado River flows.

### **Controlling Invasive Species**

Reclamation maintains an active research program in a continuing effort to develop innovative ways to manage our water delivery and power generation systems and to address increased water demands in the West. Invasive species are a major challenge to our ability to provide efficient water delivery and power generation, because their growing presence can greatly impact water operations for related facilities, as well as increase maintenance costs and needs. We are currently focusing a larger portion of our research efforts on controlling invasive species, specifically quagga and zebra mussels. These invasive mussels reproduce in great numbers and have the ability to attach to structures. The adults can be spread by human transportation as a contaminant in boats and other water-related equipment. Their larvae are free swimming and can be spread by water currents for many miles. When these invasive mussels become attached, they affect Reclamation facilities by several means. They can impede or block flow of water in pipes and channels. Their dense colonies support bacteria which speed up corrosion to metallic structures. Quagga and zebra mussels also can severely damage the environment by competing with native animals for food and substrate.

In January 2007, quagga mussels were discovered for the first time west of the Mississippi River in Lake Mead on the Colorado River as well as at several other locations along the Colorado River. By summer 2008, many of the dam and powerplant facilities, including those associated with Hoover, Davis, and Parker Dams, were showing the presence of invasive mussels. As a result, Reclamation has undertaken investigations of the mussels' potential impact on specific dam and hydropower equipment and structures. Additional analyses are underway to develop a means to determine the presence and population growth of the mussel in specific conditions and

locations. Inspections conducted during the 2007-2008 maintenance season revealed mussel populations in some of the smaller piping used to supply cooling water to generators, compressors, transformers, and other equipment at these dams and powerplants. Reclamation also found increased colonization on some of the dam's exterior surfaces, such as intake tower walls, compared to that observed in 2007. While the water delivery and power generation functions at these dams have not been adversely affected, Reclamation has implemented aggressive management and research activities in early 2008 to address this mussel issue. In August 2008, preliminary testing on a freshwater bacterial product was conducted at Davis Dam to determine its potential effectiveness as a mussel control agent. The dam was selected as a test site by Reclamation, in coordination with the private sector and other governmental entities.



In late 2007, zebra mussel larvae were identified in Pueblo Reservoir, Fryingpan-Arkansas Project, in eastern Colorado. Quagga mussel larvae recently were confirmed in Granby Reservoir, Colorado-Big Thompson Project, in central Colorado. To date, no adult mussels have been found in either of these reservoirs. However, in late 2007, adult zebra mussels were confirmed in San Justo Reservoir, Central Valley Project in California.

(Top) By summer 2008, many of Reclamation's dam and powerplant facilities were showing the presence of invasive mussels.

(Right) Quagga and zebra mussels are now impacting Reclamation and other water facilities in the Western United States—like this penstock gate at Davis Dam on the lower Colorado River.



Reclamation continues to work with partners, States, and other involved entities to limit the spread of the mussels from these water bodies. We also monitor the presence of nearby water bodies for mussels.

Throughout 2008, Reclamation utilized and created new partnerships in its ongoing cooperation with Federal, State, and local entities to educate the public about invasive mussels and their potential impacts to the Western States. In 2008, Reclamation developed a corporate mussel task force to provide additional focus and coordination necessary to address the control and prevention of the spread of these invasive invertebrates. The task force is focused on developing strategies and activities necessary for effective integration and involvement with other organizations and entities outside of Reclamation. A primary component is the outreach effort to effectively educate and communicate important information related to the presence of invasive mussels in Western waters and preventing their spread.

### **Drought Response**

Reclamation's approach to addressing drought conditions begins with storing water for times of shortage. During the recent, prolonged drought, our reservoirs have performed well in meeting water requirements of the West despite precipitation shortages.

Part of this advance planning involves interagency efforts such as the Drought Action

Teams developed in collaboration with the U.S. Department of Agriculture. Reclamation makes grants available under the *Water 2025* program and under our Water Conservation Field Services Program to help water users make more efficiently use water, particularly during times of drought.

Reclamation responds to drought emergencies by using its authority under Title I of the Reclamation States Emergency Drought Relief Act of 1991, as amended. In addition to funding provided through the regular appropriations process, Public Law 110-28, signed on May 25, 2007, contained \$18 million for drought assistance. Final



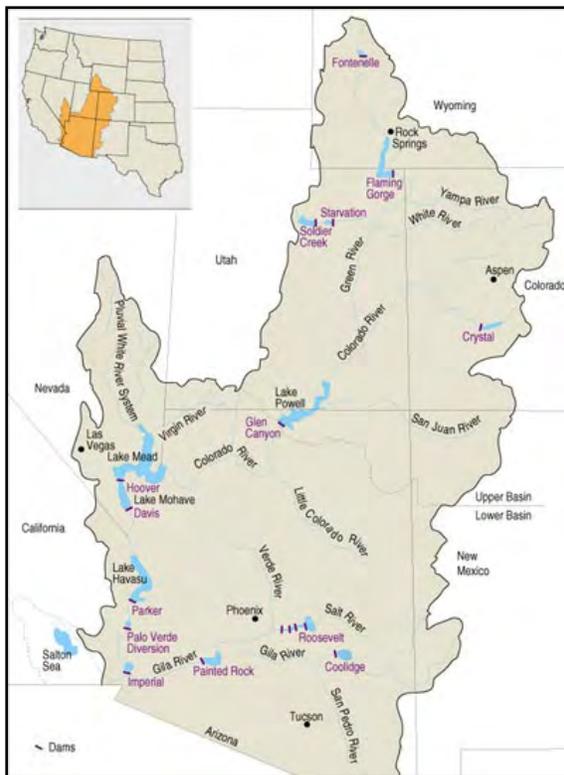
Reclamation actively engages in drought planning to prepare in advance to manage drought when it occurs.



Colorado River water supply is being affected by the worst drought conditions in nearly 100 years of recorded history.

allocations have been made, with \$6 million going to Garrison Project authorities for needed construction work resulting from drought conditions.

Reclamation has allocated approximately \$11.5 million of the remaining \$12 million for 42 projects in 8 different States (Hawaii, Idaho, Kansas, Montana, Nebraska, New Mexico, North Dakota, and South Dakota) and multiple Indian tribes (Navajo Nation, Hualapai Tribe, La Jolla Tribe, and the Round Valley Tribes).



The Colorado River basin will serve as one location in the pilot program to collect information on the key indicators of drought.

Reclamation is coordinating with National Oceanic and Atmospheric Administration (NOAA) Fisheries, USGS, U.S. Army Corps of Engineers (USACE), and other Federal agencies to develop a National Integrated Drought Information System (NIDIS). The NIDIS Act of 2006 authorizes NOAA Fisheries to develop a comprehensive system to collect and integrate information on the key indicators of drought to make usable, reliable, and timely drought forecasts and assessments and to communicate this information to Federal, regional, State, tribal, and local levels decisionmakers. The Colorado River Basin and locations yet to be determined in Montana will serve as a pilot for many of the tools and capabilities envisioned for NIDIS implementation. In 2008, Reclamation's Upper and Lower Colorado Regions and the Great Plains Region began participating in the coordination and initial planning activities for these pilot efforts, which are scheduled to start in 2010. More information is available at <http://www.drought.gov>.