

The Water Conservation Initiative and Implementation of the Secure Water Act

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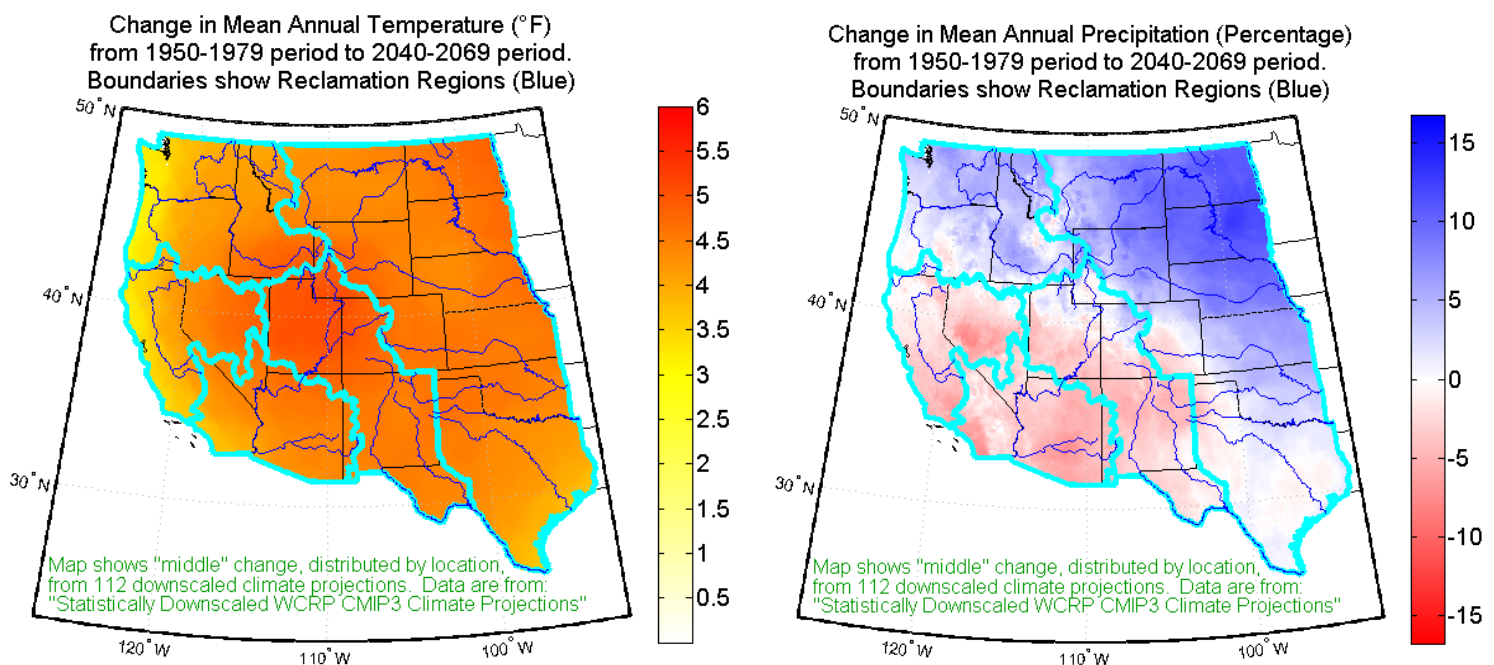
Climate Change and Water Resources

As our climate changes and the earth warms, the most immediate impact is on the hydrologic cycle. Warming impacts where precipitation falls, how much falls, and in what form. These changes directly affect the water supply available for drinking, irrigating crops, generating electricity, supplying industry, and filling our lakes and rivers.

In the Western United States, these changes are not just anticipated for the future, but are being measured today:

- Average temperatures are rising, thereby increasing evaporation and perhaps increasing the severity of recent droughts;
- A greater portion of winter precipitation is falling in the mountains as rain rather than snow, reducing the winter snowpack;
- Winter low temperatures are rising, and the snowpack is melting earlier in the spring; and
- Collectively, these trends for precipitation and temperature are producing earlier runoff, making it harder to use the winter precipitation later in the summer.

Figure 1. Precipitation and Temperature Trends in Western States



Climate projections published by the Intergovernmental Panel on Climate Change (IPCC) indicate these changes will continue or even accelerate during the twenty-first century. Particularly in the Southwest,

there is strong agreement in climate forecasts toward higher temperatures and less runoff into reservoirs. Increased temperatures will also mean increased water demands and increased rates of evaporation.

Climate change will add to the challenges we face today in managing our water supply, water quality, flood risks, wastewater, aquatic ecosystems, and energy production. These new stresses are likely to be felt first in the fastest growing region of the nation – the West. The Western States accounted for 50% of the nation’s population growth from 1990 to 2000, with some of the fastest growth in the driest areas.

It has often been said that "water is the lifeblood of the West." This part of our nation is critically dependent upon water for its economic health. To illustrate, the Bureau of Reclamation water projects in the West provide economic benefits conservatively estimated at \$21 billion annually. These benefits come from the range of water uses that Reclamation projects support, shown below:

Project Purpose	Total Estimated Benefit Value (2008 \$\$)
Hydropower	\$3.7 billion
Flood Control	\$16 million
Irrigation	\$11.5 billion
Municipal and Industrial	\$4.6 billion
Recreation	\$1billion
Total	\$21 billion

As the largest wholesale water provider and the second largest producer of hydroelectric power in the West, Reclamation is vitally interested in how climate and other stressors will affect the supply of water in this water-short region.

The Secure Water Act

The fundamental purpose of the Secure Water Act is to provide authority so that the Federal water and science agencies can work together with the States and local water managers to plan for climate change and the other threats to our water supplies, and take action to secure our water resources for the communities, economies, and the ecosystems they support.

Reclamation’s strategy for implementing the Secure Water Act includes **collaboration among agencies to enhance climate change science**, which will allow us to better **assess the threats to our water systems** and **implement mitigation strategies**. This approach will help us to maintain:

- Water supply, including both surface storage and groundwater aquifers;
- Generation of hydroelectric power;
- Cooling water for thermal power plants;
- River flows to maintain ecosystems and water quality;
- Recreational use of lakes and rivers; and
- Protection from floods and rising sea levels.

Collaboration Among Agencies

The Secure Water Act supports increased collaboration among the Federal water agencies. Reclamation will work together with the lead science agencies in the areas of climate and water, namely the USGS and NOAA, and the Regional Integrated Sciences and Assessments (RISA) university centers to ensure that the best information and science is available for water management.

These partnerships will build on collaborations that have already begun:

- Reclamation has formed, with the USACE, NOAA, and the USGS the Climate Change and Water Working Group (C-CAWWG) to bring the water managers and climate scientists together to create efficient R&D collaborations and information sharing across the federal agencies toward understanding and addressing climate change impacts on Western water supplies and water use.
- Reclamation, the USACE, NOAA and the USGS collaborated to write: *Climate Change and Water Resources Management: A Federal Perspective*, USGS Circular 1331. This report represents the two primary "operating agencies" and the two primary water "science agencies" collaborating to address the need for a comprehensive assessment of approaches for including climate change in water resources management.
- As part of CCAWWG coordination, Reclamation and the USACE are developing detailed descriptions of information and tools that water managers need from the science agencies and other researchers. Perspectives from both State and local water managers will also be sought and included in this report.
- Reclamation is working with the USGS, NOAA, and the RISA program to develop a Climate Change Training program for water managers. In discussions with water managers, a credible, consistent source of climate information and training is always one of the highest priorities identified.
- Reclamation is providing input to NOAA as they plan for the next generation of Global Circulation Models (GCMs) to define the types of outputs that will be of most value to water managers.
- Reclamation is participating in the Postdocs Applying Expertise (PACE) Fellowship program with NOAA to sponsor research activities focused on water management needs. There are currently three active postdocs participating in this program -- two focused on water supply questions for the Colorado River Basin and one studying potential changes to in extreme precipitation events.

Enhancing Climate Change Science

Reclamation will expand its research into the effects of climate change on the water cycle and how that may be managed for now and in the future. Some highlights of the research program and research underway include:

- Creation of a downscaled climate projection archive. This is an archive of GCM projections downscaled to spatial scales useful for water management analyses;
- Evaluations of global climate model projections to determine how flood frequencies may change in the 21st century;
- Evaluation of whether our ability to predict water supply is being diminished by climate change, and identification of possible new, more accurate methods; and
- Evaluation of how various hydrologic forecast models perform under climate change, leading to more informed choices among models.

Assessing Threats to the Water Supply

West-wide Climate Change Risk Assessments

The research and development activities described above will be used to undertake *West-wide Climate Change Risk Assessments*. These assessments will provide consistent projections for all of the major

river basins in the west of how climate change will affect:

- Temperature and precipitation;
- Water supply;
- Water demand and consumptive use; and
- Aquatic habitats.

These assessments will also include reconnaissance-level analysis of how water project operations may be affected. This information will provide a sound and consistent foundation for the Basin Studies and other planning activities that will formulate local and regional mitigation strategies to address climate change and other threats to our water supplies.

Basin Studies

Through the Basin Study Program, Reclamation will partner with basin stakeholders to conduct comprehensive studies to evaluate the impacts of climate change and define options for meeting future water demands in river basins in the West. The Basin Studies will identify adaptation strategies to resolve basin-wide water supply issues, including changes to the operation of water supply systems, modifications to existing facilities, development of new facilities, or non-structural changes. The Basin Studies will build on the West-wide Risk Assessments to develop basin-specific strategies to help meet water demands. By encouraging input from basin stakeholders, the Basin Studies will also build capacity and collaboration in the process of identifying water management solutions.

In FY 2009, Reclamation provided funding to initiate the first three basin studies under this program, including:

- The Colorado River Basin Water Supply and Demand Study (\$1 million Reclamation, \$1 million matching) covering portions of Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming;
- Yakima River Basin Study and Associated Basin Restoration Implementation Plan, covering south central Washington (\$1.3 million Reclamation, \$1.3 million matching);
- Modeling for the Future of the Milk and St. Mary River Systems in north central and southern Montana (\$350,000 Reclamation, \$350,000 matching).

The Colorado River study provides an ideal example of the collaborative process that we will employ under the Basin Study Program. The study encompasses the Colorado River Basin (upper and lower) and those areas of the seven basin states -- Wyoming, Colorado, Utah, New Mexico, Arizona, Nevada, and California (Basin States) -- that receive Colorado River water. Cost-share partners include each of the seven Basin States. The proposal is to complete a comprehensive review of water supply and current and long-term demands through 2060 within the Colorado River Basin; to assess options for resolving water supply imbalances; and to develop recommendations for future consideration to address current and projected imbalances. Paramount to the study is an assessment of the potential impacts of climate variability and climate change on water supplies and demands, including impacts on hydropower.

Implementing Mitigation Strategies

The American West is now the fastest growing region of the country and faces serious water challenges. Adequate and safe water supplies are fundamental to the health, economy, security, and ecology of the country. With increased demands for water from growing populations and energy needs, amplified recognition of environmental water requirements, and the potential for decreased supplies due to drought and climate change, a water balance cannot be achieved without water conservation and water reuse. Federal leadership is critical to widespread acceptance and implementation of effective strategies to

mitigate the impacts of climate change. Reclamation will implement projects to help water users adapt to climate change through the Water Conservation Initiative (WCI).

The Water Conservation Initiative

The WCI includes the Basin Study Program, described above, which will help identify the impacts of climate change and identify potential adaptation measures. Climate change adaptation measures identified through the Basin Studies, West-wide Climate Change Risk Assessments, and other programs, can be implemented through the other two components of the WCI, including cost-shared grants for conservation and water management improvement projects, and funding of water reuse and recycling projects through the Title XVI Water Reclamation and Reuse Program. Reclamation will also partner with States, tribes and local entities under the WCI to develop incentives and best practices for implementing water conservation and water recycling projects. Together, these programs form an important part of Reclamation's implementation of the Secure Water Act.

Water Conservation Challenge Grant Program

Water Conservation Challenge Grants (previously Water for America Challenge Grants) provide cost-shared funding for the following types of on-the-ground projects: (1) water conservation and efficiency projects that allow users to decrease diversions and to use or transfer the water saved; (2) water marketing projects with willing sellers and buyers, including water banks, that transfer water to other uses to meet critical needs for water supplies; (3) projects that improve water management by increasing the use of renewable energy, by increasing operational flexibility (constructing aquifer recharge facilities or making system optimization and management improvements), or by addressing endangered species and other environmental issues; and (4) pilot and demonstration projects that address the technical and economic viability of treating and using brackish groundwater, seawater, impaired waters, or otherwise creating new water supplies within a specific locale.

Water Conservation Challenge Grants leverage Federal funding by requiring a minimum of 50 percent non-Federal cost-share contribution. Grants are available to States, tribes, irrigation and water districts, and other entities with water or power delivery authority. Beginning in 2010, Reclamation will also provide cost-shared assistance to universities, non-profits, and organizations with water or power delivery authority for research activities designed to enhance the management of water resources, including developing tools to assess the impacts of climate change on water resources, and research that will increase the use of renewable energy in the management and delivery of water and power. Additionally, to ensure that the most effective conservation and reuse approaches are employed, Reclamation will begin partnering with States, tribes and local entities to develop incentives and best practices in water conservation techniques and water recycling and reuse methodologies.

Since 2004, over 150 challenge grant projects have been funded, combining \$36 million in Federal funding with local partnerships to construct over \$140 million worth of water management improvements in 16 western states. Projects include such activities as converting leaky dirt canals to pipeline, eliminating water losses due to seepage and evaporation to result in substantial water savings; installation of measuring devices, including Supervisory Control and Data Acquisition (SCADA) systems to improve control over water deliveries and to reduce operational spillage; installation of automation technology to allow more precise, remote control of water diversions and deliveries; and projects involving water marketing such as a pilot water bank in the Deschutes River Basin in Oregon aimed at facilitating the voluntary transfer of water among users.

In addition to those projects funded through annual appropriations, in August 2009 Reclamation announced 13 new Challenge Grant projects that together will receive \$40 million in American

Recovery and Reinvestment Act funding to accomplish over \$96 million in water management improvements.

Title XVI Water Reclamation and Reuse Program

Title XVI of P.L. 102-575, as amended (Title XVI), provides authority for Reclamation's water recycling and reuse program, titled "Title XVI." The Title XVI program is focused on identifying and investigating opportunities to reclaim and reuse wastewaters and naturally impaired ground and surface water in the 17 Western States and Hawaii. Under the program, Reclamation makes available cost-shared funding for planning, design, and construction of water recycling projects, as well as research and demonstration projects.

For purposes of the Title XVI program, a water reuse project is a project (including the necessary facilities and features) that reclaims and reuses municipal, industrial, domestic, or agricultural wastewater and naturally impaired groundwater and/or surface waters. Consistent with State law, reclaimed water can be used for a variety of purposes, such as environmental restoration, fish and wildlife, groundwater recharge, municipal, domestic, industrial, agricultural, power generation, or recreation. Water reuse is an essential tool in stretching the limited water supplies in the West. Title XVI projects develop and supplement urban and irrigation water supplies through water reuse, thereby improving efficiency, providing flexibility during water shortages, and diversifying the water supply. In FY 2008, approximately 196,000 acre-feet of water was recycled through projects that have received Title XVI Program funding.

In July 2009, Reclamation announced 27 Title XVI projects to receive approximately \$135 million in American Recovery and Reinvestment Act funding. These 27 projects will team non-federal sponsors with local communities and the federal government to provide growing communities with new sources of clean water while promoting water and energy efficiency and environmental stewardship. Federal funding will be leveraged to construct a total of more than \$675 million in Title XVI projects.

Feasibility Study Authority

The Secure Water Act authorizes Reclamation to conduct feasibility studies to study the feasibility and impacts of constructing infrastructure necessary to address the effects of global climate change on water resources. New infrastructure could include the construction of water supply or water management facilities, or infrastructure to benefit environmental needs or enhance habitat. Once Reclamation has identified climate adaptation strategies in a particular basin through the completion of a Basin Study or other climate analysis, we will provide cost-shared funding for feasibility studies to non-Federal partners to pursue implementation of adaptation strategies. Funding for feasibility studies will be included under the Basin Study Program in future budget cycles.