

RECLAMATION

Managing Water in the West

Great Plains Region Year in Review 2011



U. S. Department of the Interior
Bureau of Reclamation



From the Regional Director



Mike Ryan
Regional Director

Reclamation provides water and power to the people of the American West in an economically and environmentally sound manner.

We encounter many new challenges, and work with our partners to provide the greatest benefit possible from the natural and fiscal resources we manage.

This work includes a variety of construction-related activities to enhance our projects and their value to the public, working to meet the challenges of a 100-year flood, and assisting with water recycling to mitigate the worst drought in Texas state history.

In 2011, the Great Plains Region continued efforts to meet the needs of thousands of rural residents through construction of rural water supply projects. We protected public investment in our facilities by keeping them safe and reliable, and continue to provide critical habitat for fish and wildlife.

Our priority is to accomplish these tasks while continuing to supply cities and farms with clean, affordable water, while also providing renewable power to businesses and homes in the West. This directly reflects Reclamation's historic mission to support local economies.

The Annual Year-in-Review provides a glimpse into our work and the broad range of issues we deal with every day. For more information about these issues and the projects we manage visit <http://www.usbr.gov/gp>.

Michael J. Ryan, PE
Great Plains Regional Director

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QUICK FACT

The name Reclamation was used because the intent was to reclaim arid lands (by irrigation) to make them suitable for settlement.

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Front Cover:
An engineer inspects the spillway of Altus Dam in Feb. 2011.

Back Cover:
Drillers explore foundation material for replacement of the flood damaged Pryor Creek Crossing structure on the Huntley Project Canal. For more see page 3.



Budget & Staffing

The Great Plains Region strives to be prudent stewards for taxpayers by using funds wisely to manage infrastructure for the public.

2011 Summary

The 2011 Great Plains regional budget was more than \$180 million. Significant amounts were designated for rural water project development, operation and maintenance of completed tribal rural water systems. More than 99 percent of the budget was obligated during the year.

The region also received \$11.3 million power customer funding in fiscal year 2011. These funds helped offset appropriations by sustaining activities that ensure power system reliability.

Workforce

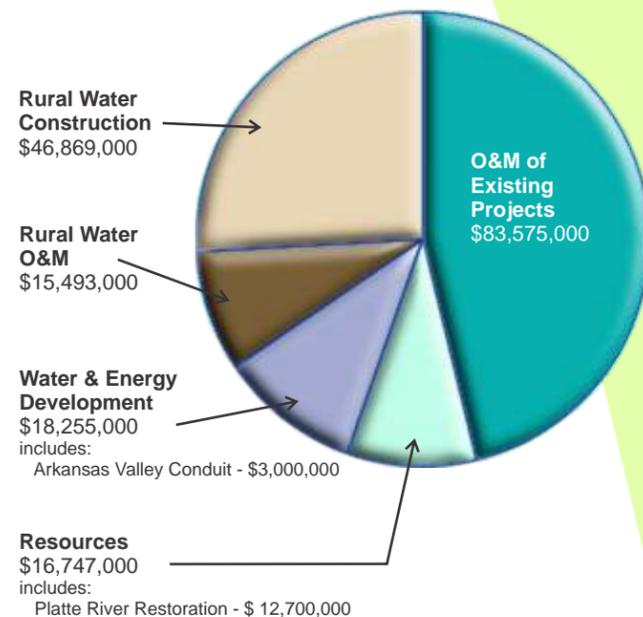
The Great Plains Region is committed to developing sound budgets and managing the workforce to maximize accomplishment. In 2011, we continued a two-pronged approach that included building budgets from the ground-up, with input from employees, power customers, water users and other partners.

Budget Development

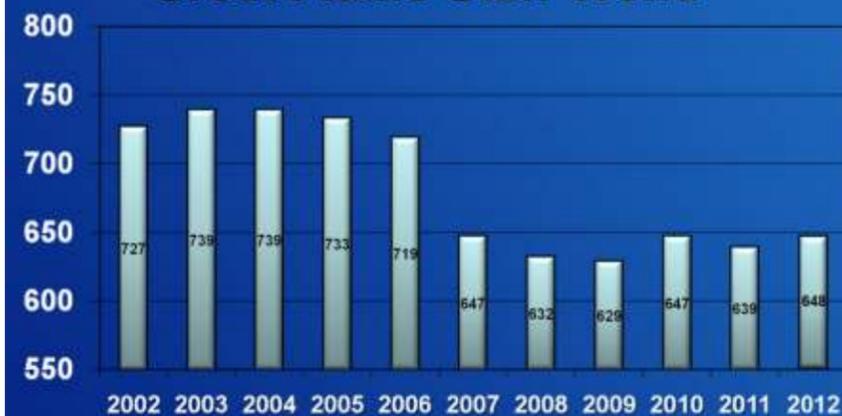
Development of a budget is an extensive process which progresses for years from planning by Reclamation to actual appropriation. When Congress passes a budget, target figures are made available to Reclamation and it becomes our responsibility to accomplish the work identified in the wisest manner possible.

Successfully completing tasks identified in our budget requires staff and expertise. Each manager is responsible for staffing their organization and accomplishing work while staying within their budget. A manager is responsible for ensuring they will not get in a position where negative personnel actions must occur due to declining budgets. As a result, great care is being exercised in planning and executing work activities at all levels within the region.

2011 Spending Plan \$180,939,000 total

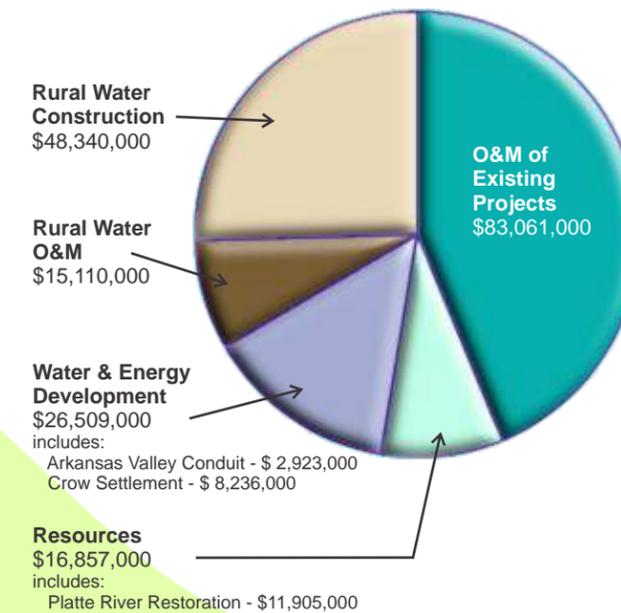


Great Plains Staff Trend



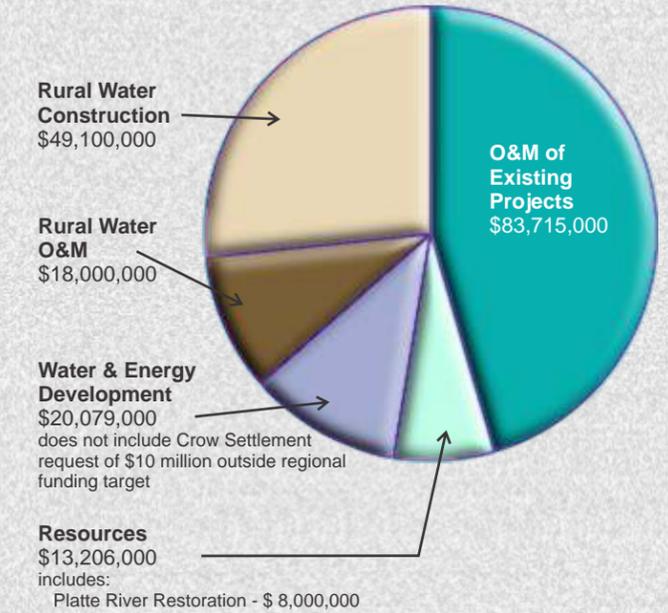
2012 Regional Budget

\$189,877,000 total



2013 President's Request

\$184,100,000 total



GP Challenges

The Great Plains Region comprises the majority of three earlier Reclamation regions that were combined in 1988. Reclamation's largest region, Great Plains, encompasses a significant portion of facilities managed by the agency.

- ◆ 80 Reservoirs (23% of Reclamation total)
- ◆ 21 Powerplants (36% of Reclamation total)
- ◆ 93 Recreation Areas (24% of Reclamation total)
- ◆ 526 Recreation Sites (55% of Reclamation total)

The region's dams and powerplants tend to be smaller and more widely dispersed, but require the same attention as Reclamation's iconic structures such as Hoover or Grand Coulee.

QUICK FACTS

The GP Region continues to employ video teleconferencing (VTC) technology to reduce travel costs and carbon footprint while increasing employee participation in decisions.

The Regional Office and each Area Office has VTC capability and we will expand to other locations if analysis indicates organizational value.



2011 Water Operations



The Great Plains Region experienced a record year of challenges but succeeded in managing record runoff.

Spring 2011 was historic and challenging for Reclamation's Great Plains Region. The northern part of the Great Plains Region received a year's worth of precipitation in a two week period, following the buildup of an unprecedented combination of winter snowpack and a storm system that lingered over the northern basins for weeks, delivering excessive rainfall.

Gary Campbell, Great Plains Deputy Regional Director, said, "Records were shattered across the northern tier of the region. This event really shows the impacts of allowing construction in the 100-year flood plain, and the negative impacts to peoples' lives."

The water year began as usual with Reclamation managers in Montana, Wyoming and the Dakotas creating space in reservoirs for spring runoff. Unfortunately, much of the storage space was filled by slow moving rainstorms leading to spring and summer floods in the four states.



Homes built in the flood plain of the Bighorn River below Yellowtail Dam as seen during the 2011 flood. Note the well casing exposed by the river near the brown house.

North Platte

Wyoming's North Platte River Basin was facing snowpack conditions that topped 200 percent of normal in 2011. The Wyoming Area Office had begun preparing reservoirs for the anticipated runoff two months earlier than usual, even though additional water had been released in 2010. Inflows into Seminoe Reservoir during the 2011 runoff season were 242 percent of the 30-year-average.

James

Perhaps the hardest hit in 2011 was the Dakotas. Snowmelt runoff into Jamestown Reservoir would just be the beginning of a record water year. Jamestown Dam released 416,144 acre-feet of water during the 2011 Water Year (Oct. 1 to Sept. 30), beating the previous record of 303,067 acre-feet from 2009.

Missouri

At the Mni Wiconi Rural Water Project, an intake pump station was threatened by record releases from Oahe Dam on the Missouri River at Pierre, S.D. An emergency protective dike and sump pumps for the intake station were installed to maintain delivery water. Other rural water system intakes were threatened by high water levels, as well as shoreline erosion at Lake Sakakawea in N.D. and Lake Oahe in S.D. (see page 7 for more).



Yellowtail Dam spillway as seen from the crest of the dam, June 2011.

Bighorn

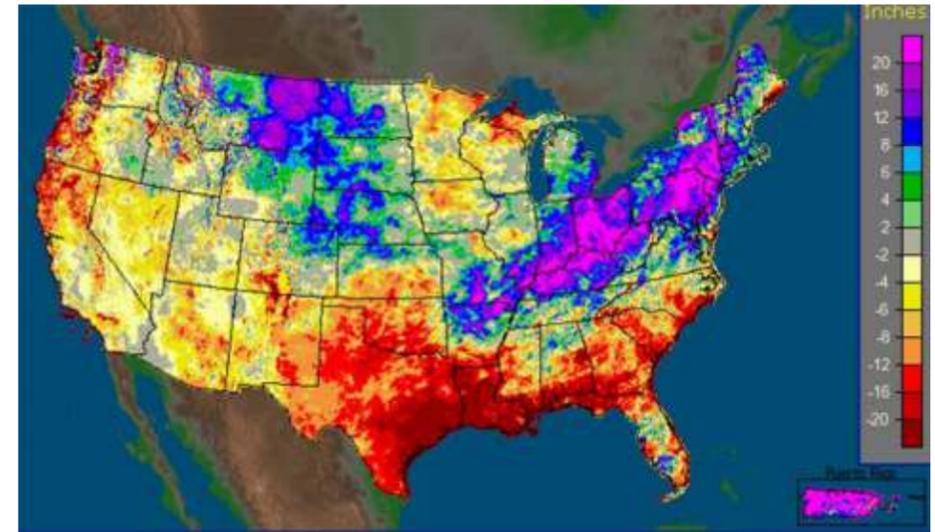
The Bighorn River Basin in Montana and Wyoming was under threat for most of the season. At one point, the elevation of Bighorn Lake jumped an unprecedented eight feet in three days. Adding to the complexity, tributaries downstream of Yellowtail Dam contributed significantly to high water conditions. In response, the Montana Area Office reduced flows dramatically from Yellowtail Dam to compensate for the deluge downstream, and carefully monitored inflows and storage conditions to ensure safe operation of the facility.

States of Extreme

The Great Plains Region is so large that flood and drought are often experienced concurrently.

While the northern tier of the region encountered record spring rainfall, the southern states suffered continued drought. Reclamation in Texas continued funding wastewater recycling, conservation, and desalinization projects to help alleviate future drought impacts (see pages 16 and 17 for details).

The map at right shows precipitation for 2011 when portions of Montana and North Dakota received more than 20 inches above normal, while the gulf coast of Texas was more than 20 inches below normal.



National Weather Service 2011 Precipitation map with deep red indicating 20 inches below average, violet indicating 20 inches above average and gray indicating average.

Southern Montana (at Billings) normally receives about 15 inches of precipitation annually, but received more than that during the months of May and June alone. The Texas Gulf

(at Victoria) averages about 40 inches of rainfall per year, but received less than 13 inches in 2011.

Pryor Creek Crossing

Huntley Irrigation District's canal crossing at Pryor Creek near Huntley, Mont., was washed out by record flooding in June, as seen below. The aerial image at right

shows additional damage. The structure was repaired for use during the summer, but required replacement. The photo at lower right shows construction of a new crossing using emergency funding.





2011 Construction Activities

Construction continues to provide infrastructure to meet contemporary needs such as drinking water, wildlife habitat and safety.



Fort Peck - Dry Prairie (Mont.)



Garrison Diversion (N.D.)



Lewis and Clark (S.D., Iowa, and Minn.)



Mni Wiconi (S.D.)



Rocky Boys / North Central (Mont.)

Rural Water Projects

Large swaths of the Great Plains Region have inadequate supplies of water for small towns and rural homes. Available groundwater is often of very poor quality or in limited supply. As a result, Congress passed legislation authorizing Reclamation to design and build water systems serving rural areas and small municipalities. For the Great Plains Region, these projects are in Montana, North Dakota and South Dakota on both tribal and private lands.

Some projects have been completed beginning with the WEB Rural Water System in South Dakota in 1991. The American Recovery and Reinvestment Act of 2009 provided funding toward completing other systems.

The five rural water systems currently under construction in the region are identified by the photos at left and the chart below. Mni Wiconi is scheduled to be complete in 2012. About one billion dollars are needed to complete the remaining authorized projects. As a result, Reclamation developed criteria for allocating available funds in the most efficient manner toward completion.

Completed tribal water systems are operated and maintained with financial and technical assistance from Reclamation as a part of our trust responsibilities.



A water main is installed as a part of the Lewis and Clark Rural Water System. Construction was accelerated by American Recovery and Reinvestment Act funding.

Populations for Rural Water Projects Under Construction

	Current Served (On Reservation)	Current Served (Off Reservation)	Current Served (Total)	Served When Completed (On Reservation)	Served When Completed (Off Reservation)	Served When Completed (Total)
Mni Wiconi Project	32,983	11,692	44,675	40,000	12,000	52,000
Garrison Project	14,000	155,000	169,000	52,000	233,000	285,000
Fort Peck Reservation/Dry Prairie Rural Water System	365	2,333	2,698	16,995	10,439	27,434
Lewis and Clark Rural Water System	0	12,053	12,053	0	300,000	300,000
Rocky Boys/North Central Montana Rural Water Supply	750	100	850	14,000	29,000	43,000
TOTAL - Rural Water Projects under construction	48,098	181,178	229,276	122,995	584,439	707,434

Lower Yellowstone Intake

The Army Corps of Engineers, Fish and Wildlife Service, EPA, Montana Department of Environmental Quality, Montana Department of Natural Resources, Reclamation and others participated in modifying an historic irrigation diversion to benefit endangered species.

The new intake is part of modifications to the Lower Yellowstone Project constructed by Reclamation more

than 100 years ago to irrigate approximately 54,000 acres. Water from the Yellowstone River is now diverted through state-of-the-art fish screens eliminating the loss of fish into the canal.

Construction was completed under the 2007 Water Resources Development Act, which authorized the Corps to use funding from the Missouri River Recovery and Mitigation Program to assist Reclamation.



The new Lower Yellowstone Intake

Safety of Dams

Reducing risk to people, property, and the environment

Red Willow Dam

A \$15,346,900 contract to extensively modify of Red Willow Dam in Nebraska is in progress. Red Willow, located ten miles northwest of McCook, was slated for repair after examinations by Reclamation crews discovered a sinkhole on the face of the dam. Subsequent investigations revealed embankment cracking and prompted Reclamation managers to evacuate most of the water from Hugh Butler Lake, which is impounded by Red Willow Dam. The reservoir created by the dam is a popular fishing and recreation site and provides water for irrigation.



Glendo Dam Modification showing auxiliary spillway excavation in progress looking from the right spillway abutment.

Glendo Dam and Dikes

A \$16,777,777 contract for modifying Glendo Dam on the North Platte River in Wyoming is a result of updated flood loading and overtopping risk models. Under the planned modification, a 540-foot auxiliary spillway will be constructed, three existing dikes will be raised by six feet and the dam will be raised by three feet and an additional three-foot parapet wall will be added. With these modifications, the reservoir will be capable of withstanding a 100,000-year flood.



Red Willow Dam looking north at the downstream face of the dam being excavated.





Dakotas Area

The Dakotas Area Office manages facilities of the upper Missouri River Basin in North Dakota and South Dakota as well as Keyhole Reservoir in eastern Wyoming.

Northwest Area Water Supply, Supplemental EIS

Reclamation entered into a contract for services with Cardno ENTRIX, an environmental and engineering consulting firm, to assist in the preparation of a supplemental EIS. A draft supplemental EIS is anticipated in the spring/summer of 2012. The State of North Dakota continues to construct portions of the project's distribution system, as approved by the District Court.

Blunt Reservoir and Pierre Canal Land Conveyance Act of 2006

Pursuant to the act, Reclamation's Dakotas Area Office and the Great Plains Regional Office completed the transfer of all associated lands December 13, 2011.

Angostura Unit Bank Stabilization and Road Repairs

The new connector road provides park users with the ability to access all park facilities, decreases maintenance and operation costs for recreation management partners, decreases emergency response times, and improves awareness of Angostura Reservoir's wildlife and associated habitat.

Treatment plant for the Lewis and Clark Rural Water System, South Dakota.



Turtle Lake pump station, North Dakota.

Garrison Diversion Unit Irrigation

Water was delivered from the McClusky Canal to approximately 3,000 acres (Phase 1) in the Turtle Lake Irrigation Area. A long term water service contract and project use power contract will be executed with Garrison Diversion Conservancy District before the 2012 irrigation season.

Rural Water Funding

Twelve different entities were allocated \$159 million of American Recovery and Reinvestment Act (ARRA) funding. Six of the ARRA projects were completed substantially completed by the end of the year with approximately 80 percent of the funding expended. Construction includes five new water treatment plants and the expansion of three others to serve an additional 350,000 people in North Dakota and South Dakota.

Garrison Diversion Unit Tribal Rural Water/Missouri River Flooding

High reservoir levels caused excessive erosion to five intakes at Fort Berthold and the Standing Rock Reservation. Contractors were mobilized to place riprap and other erosion control measures. Approximately \$900,000 was spent on shoreline protection and erosion repair.



The new Standing Rock Water Treatment Plant about 15 miles north of Mobridge, South Dakota.

Rural Water Construction

Fourty-four million dollars was appropriated for rural water construction at Mni Wiconi, Lewis & Clark, Garrison Indian MR&I, and Garrison State MR&I projects. Approximately 100 construction contracts were administered across six reservations and six regional rural water systems in the Dakotas.



Mni Wiconi Intake/Missouri River Flooding

Record flooding on the Missouri River threatened several rural water system intakes during 2011. At the Mni Wiconi intake near Fort Pierre, South Dakota, Reclamation coordinated berm construction to prevent the record releases from Oahe Reservoir from flooding the plant. River levels reached 2.5 feet higher than the pump station floor. Reclamation provided 24-hour monitoring and operation of the intake pump station for more than one month and emergency operations for 80 days. Approximately \$300,000 was spent on protecting the intake pump station.





2011 Power Generation

Providing clean, affordable and efficient electrical energy for a growing population.



Canyon Ferry



Flatiron



Mount Elbert



Shoshone



Green Mountain



Yellowtail



Casper Control Center

Power Generation is a core activity for the Great Plains Region. The value of hydropower generated in fiscal year 2011 was nearly \$153 million. But the revenue from power generated is only one benefit to the American taxpayer. System reliability, the ability to quickly respond to changing demand, and generation without pollution contribute to the economies of the West.

In addition, Great Plains continues to work with power customers to reduce the impact of major maintenance projects and to secure private funding for activities beyond the capability of the regional budget. The region received \$11.3 million in power customer funding in fiscal year 2011.

The chart below lists Great Plains Region powerplants and basic information about them.

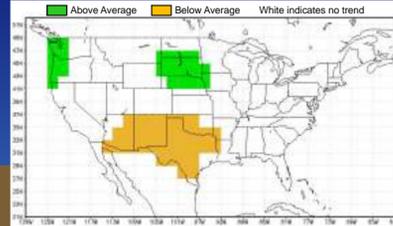
- **Seasonal** units typically generate during the irrigation season when higher flows are released from reservoirs.
- **Gross generation** is the total amount of electrical energy produced by measuring at generator terminals.
- **Net generation** subtracts power used by Reclamation facilities and is the amount available for consumers.

Summary of Generation for 10/1/2010 through 9/30/2011

Powerplant (state)	Seasonal	No. of Units	Nameplate Capacity (MW)	Gross Generation (MWh)	Net Generation (MWh)	Generation Value @ 41.42mills/kWh (0.04142 / kWh)
Alcova (WY)		2	41.40	166,138	164,847	\$6,827,946
Big Thompson (CO)	*	1	4.50	10,488	10,354	\$428,871
Boysen (WY)		2	15.00	63,827	62,653	\$2,595,091
Buffalo Bill (WY)		3	18.00	80,029	79,889	\$3,308,993
Canyon Ferry (MT)		3	50.00	437,038	434,217	\$17,985,273
Estes (CO)		3	45.00	110,571	109,688	\$4,543,294
Flatiron (CO)		3	96.50	255,885	254,214	\$10,529,530
Fremont Canyon (WY)		2	66.80	291,545	290,280	\$12,023,381
Glendo (WY)	*	2	38.00	162,550	161,494	\$6,689,065
Green Mountain (CO)		2	26.00	77,939	77,222	\$3,198,535
Guernsey (WY)	*	2	6.40	26,159	25,875	\$1,071,744
Heart Mountain (WY)	*	1	5.00	16,080	15,816	\$655,086
Kortes (WY)		3	36.00	118,434	117,754	\$4,877,386
Marys Lake (CO)		1	8.10	41,796	41,451	\$1,716,895
Mt. Elbert (CO)		2	200.00	384,356	381,135	\$15,786,612
Pole Hill (CO)		1	38.24	196,937	196,466	\$8,137,613
Seminole (WY)		3	51.75	191,820	191,515	\$7,932,564
Shoshone (WY)		1	3.00	18,495	18,358	\$760,378
Spirit Mountain (WY)	*	1	4.50	13,854	13,748	\$569,450
Yellowtail (MT)		4	250.00	1,045,531	1,041,835	\$43,152,793
GP Region		42	1,004.19	3,709,472	3,688,734	\$152,787,362

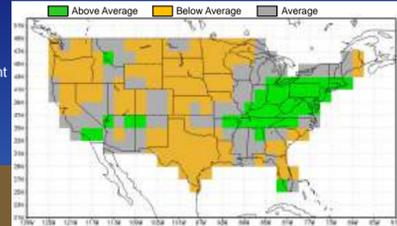


Sept. to Dec. 2011 - 90 Day Precipitation Forecast



National Weather Service maps highlight the uncertainty of predicting future precipitation and resulting inflows to reservoirs.

Sept. to Dec. 2011 - Measured Precipitation



Challenge of the Future

Great Plains seeks to proactively meet 21st century challenges in three broad areas:

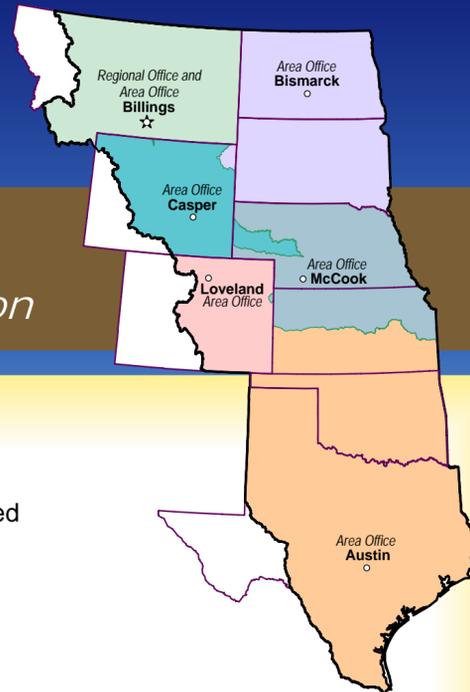
Facility Life Cycle Costs: Some of the Region's projects are among the first constructed by Reclamation. Most are more than 50 years old. The need for increased maintenance, structural changes and operational flexibility increases cost.

Competing Demands: Water is a finite resource with competing demands for supply. Changing demographics and economic realities impact Reclamation projects. Meeting new or increased water needs without adversely impacting others is our goal.

Hydrologic Uncertainty: Forecasting future water supplies and demands is an uncertain science. Reclamation facilities were constructed to overcome limited supplies for irrigation by storing runoff from spring and winter storms for use during dry months. Changing weather trends alter how well existing reservoirs will continue to meet that need.

Shoshone Powerplant near Cody, Wyoming, is the oldest in the Great Plains Region. Two retired original units are in front of a single modern generator with the capacity of the three original ones.

Regional Organization



Great Plains Areas

- Montana
- Dakotas
- Wyoming
- Eastern Colorado
- Nebraska-Kansas
- Oklahoma-Texas

The Great Plains Region is managed from the regional office in Billings, Montana, and six area offices located across nine states.

The Regional Director in Billings is assisted in managing the region by two Deputy Regional Directors and six area managers. This group, along with the heads of Engineering and Infrastructure, Business Resources and Resource Services, comprise the Regional Leadership Board.

The board localizes policy, makes budget decisions, and establishes vision and goals for the region.

Contact Information

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RECLAMATION

Managing Water in the West

The Great Plains Region and Reclamation States Since 1902



Reclamation Regions

- Great Plains
- Pacific Northwest
- Mid Pacific
- Upper Colorado
- Lower Colorado

As a Department of the Interior agency, the Bureau of Reclamation oversees hundreds of dams, reservoirs and other water projects that Reclamation built during the 20th century. These dams, powerplants and canals are managed to balance the economic and ecological priorities of communities in 17 Western states ranging from Washington to Texas.

The 17 Western Reclamation States* are divided administratively into five regions based primarily upon river basins. The Great Plains Region is the largest and most ecologically diverse of the five regions and covers all or part of nine of the 17 states east of the Continental Divide extending from the Canadian border adjoining Montana and North Dakota, to the southern tip of Texas.

*16 Western states were originally named to be served by Reclamation. Texas was added in 1906.



In 1902, President Theodore Roosevelt signed legislation creating the Reclamation Service (later renamed the Bureau of Reclamation).

Belle Fourche Dam, 1908



Lower Yellowstone Canal, 1907



Angostura Dam, 1947



The Great Plains Region

The Great Plains Region is vast. It includes 856,000 square miles - more than half the area Reclamation serves. It covers most of nine states and encompasses a wide range of ecosystems from alpine tundra to the gulf coast. Facilities in the region face challenges unique to their location and demands on their operation. Because of geographical diversity, the region is typically impacted by drought and flooding at the same time.

Many of the first projects built by Reclamation are in what is now the Great Plains Region. These early projects are often called "single purpose" because their primary function was to store water for irrigation. Flood control, hydropower, recreation, fish and wildlife enhancement and municipal water evolved as the West was settled and demands on water supplies grew.

In the Great Plains Region there are 80 Reclamation reservoirs with a total capacity of 22.9 million acre-feet of water. Reclamation's assets, including canals, power and pumping facilities, dams and support buildings, have a current value of about \$20 billion.

Boysen Dam and Powerplant in Wyoming is a unit of the Pick-Sloan Missouri Basin Program, a comprehensive basinwide development plan authorized by the Flood Control Act of 1944.



RECLAMATION

Managing Water in the West

Great Plains Region Delivers Benefits to Nine States

MONTANA • NORTH DAKOTA • SOUTH DAKOTA • WYOMING • COLORADO • NEBRASKA • KANSAS • OKLAHOMA • TEXAS

Facility Operation



Preparation for blasting for Pathfinder Dam's spillway modification. Pathfinder Reservoir now can store more water to meet the needs of Wyoming and to provide habitat along the Platte River in Nebraska.



Engineers inspect excavation of the embankment at Red Willow Dam in Nebraska as repairs begin under the Safety of Dams Program.

Increasing Efficiency and Reliability: Water management in the 21st century demands flexibility. Many Great Plains Region facilities have been modified from their original design to allow a wider range of water storage and release options. Wherever possible, powerplants generate electricity as water is released for irrigation and other uses (often through multiple generation units).

Meeting New Demands: Reclamation evaluates how facilities can meet the demands placed upon them. A classic example is historic Buffalo Bill Dam in Wyoming. It was built early in the 1900s to provide storage for irrigation. Power generation was added in the 1920s and has grown since. In the 1980s, the dam was raised to increase water supplies for more generation, new municipal needs and for environmental considerations. The reservoir is a state park and provides recreational opportunities for residents and tourists, including a privately run visitor center at the dam. Throughout these changes, farming in the original irrigation project continued.

Ensuring Safety: Keeping facilities safe and reliable is the function of the Safety of Dams Program. Facilities are routinely inspected and investigations conducted if deficiencies are identified. Structural improvements to dams and associated structures are made as necessary. Currently Red Willow Dam in Nebraska and Glendo Dam in Wyoming are being modified to ensure they continue to provide benefits safely.

Drinking Water



Samples of residential well water from an area served by a rural water project.

Reclamation delivers 10 trillion gallons of water to more than 31 million people each year.

Municipal, industrial and rural water projects in the Great Plains Region serve nearly three million people.

Many of the Region's reservoirs were authorized to provide water to nearby communities. In some cases, projects were constructed to pipe water hundreds of miles to homes and businesses. The northern tier of the Region hosts rural water projects that meet human and livestock needs in areas where groundwater supplies are limited or of poor quality.

Recreation



Sailing on Canyon Ferry Reservoir in Montana.

Reclamation manages 289 recreation sites through partnerships with state and local entities.

The Great Plains Region has 81 recreation areas that receive more than 14 million visits each year. Most of these recreation areas are managed by partners such as the USDA Forest Service, state game and parks agencies or local entities.

Recreation was not recognized as a purpose of Reclamation projects until the Reclamation Project Act of 1939. The Federal Water Project Recreation Act of 1965 reinforced the need to provide safe and healthy opportunities for public recreation at Reclamation projects.

Flood Control



A home threatened by the 100 year flood on the upper Missouri River in 2011.

Historically, Reclamation projects were not built for flood control, even though this is one of the many benefits provided by water storage facilities.

The Reclamation Project Act of 1939 expressly authorized flood control as a project purpose.

Since flood control records were kept, Reclamation facilities have prevented more than \$30 billion in flood damages in river basins throughout the West.

As of 2011, Great Plains Region facilities averted about \$3.3 billion in flood damages as computed by the Corps of Engineers.

Environment



Finishing the new concrete spillway crest at Pathfinder Dam.

Many Great Plains Region facilities were constructed in an era that placed less emphasis on impacts to the environment.

Today, Reclamation projects anticipate the needs of fish and wildlife and are operated to minimize adverse impacts to species and habitat.

The Region continues to lessen impacts to endangered fish by irrigation diversions such as the Lower Yellowstone Project in Montana. Reclamation also partners with the states of Wyoming, Colorado and Nebraska, in the Platte River Recovery Program. A major milestone was the modification of Pathfinder Dam in Wyoming, to provide storage for use by the program without affecting existing water users.

Irrigation



Irrigation in south central Nebraska.

Reclamation provides 1 out of 5 Western farmers with irrigation water for 10 million farmland acres that produce 60 percent of the nation's vegetables and one quarter of its fresh fruit and nuts.

Great Plains Region's 80 storage dams and 63 diversion dams provide water to more than 14,000 farms and irrigate 2.2 million acres. **The annual value of crops produced on those lands is nearly \$1 billion.**

Increasing water and energy conservation by irrigators has been promoted using water measurement, canal automation and more efficient water application. Reclamation's AgriMet system provides plant specific water and weather data to assist farmers.

Hydropower



Yellowtail Powerplant in Montana, near the Wyoming border.

Reclamation is the second largest hydropower producer in the United States and operates 58 hydroelectric powerplants that produce an average of 40 billion kilowatt-hours each year.

The Great Plains Region has 21 powerplants that **generated 3.7 billion kilowatt-hours of electrical power worth over \$150 million in fiscal year 2011.**

Many of the region's powerplants generate power when water is released for users. Others are available to provide power during periods of peak demand.

Working with Partners

WaterSMART Water and Energy Efficiency Grants: The SECURE Water Act authorizes federal water and science agencies to work with state and local water managers to plan for threats to water supplies and take action to secure water resources. Activities range from water conservation efforts and basin studies, to developing climate analysis tools and drought assistance.

Title XVI Water Reclamation and Reuse: Reclamation identifies and investigates opportunities to reclaim and reuse wastewater and naturally impaired ground and surface water. Texas communities are currently constructing and expanding facilities using Title XVI funds.

Native American Water Rights Settlements: Federal responsibility for negotiating and implementing tribal water rights settlements is facilitated by Reclamation. Implementation of the \$460 million Crow Tribal settlement in Montana is currently in progress. Negotiations and technical assistance are also underway with other tribes in the Region.

Rural Water Projects: Developing safe and reliable drinking water supplies for rural Americans uses about one half of the Great Plains region annual budget. Projects in Montana, North Dakota and South Dakota are currently under construction with matching federal funding from other sources. These projects have a federal cost share of \$1 billion remaining at the end of fiscal year 2011.

International Boundary Water Issues: The Milk, Souris and Red Rivers flow across the boundary with Canada. The Rio Grande flows from the United States and marks the boundary between Mexico and the state of Texas. Great Plains Region represents United States water interests in managing water under treaties with the two countries.



Regional Director Mike Ryan and Crow Tribal Chairman Cedric Black Eagle sign documents implementing the Crow Water Rights Settlement.



WaterSMART funded Rubicon gate and telemetry system for Cameron County Irrigation District No. 2 on the Rio Grande in southern Texas.



2011 Partnerships

Partnerships are a critical to successes such as meeting the needs of fish and wildlife on the Platte River without adversely affecting Reclamation water and power users.

With such a large region, diverse facilities, and increasing demand on limited water supplies, Great Plains Region relies on partnerships to address concerns and effectively manage at a local level.

For example, the region works directly with various conservation groups for the protection and enhancement of fish and wildlife resources. Most recreation facilities at Reclamation reservoirs in the region are operated cooperatively through partnerships with others. Power customers partner with regional staff in improving efficiencies and providing project-specific funding at powerplants and associated facilities.

Many of the successes contained in this publication are the result of the combined efforts of Reclamation and our partners. They include:

- Modification of the Lower Yellowstone Intake;
- Safety of Dams modifications at Glendo and Red Willow Dams;
- Flood operations and emergency replacement of the Pryor Creek Crossing;
- Small hydropower development;
- Rural Water Projects;
- Delivering water and power to the residents of the nine states of the Great Plains Region.

Native American Water Rights

Reclamation continues to take the lead for the Department of the Interior by negotiating native american water rights settlements. A major milestone for the region was the ratification of the Crow Tribal Compact by the tribe on March 19, 2011.



Great Plains Regional Director Mike Ryan (left) and Crow Tribal Chairman Cedric Black Eagle, sign the \$74M contract between Reclamation and the Crow Tribe. The funding will improve tribal irrigation facilities and develop a modern rural and industrial water system.

Platte River Recovery Implementation Program

In 1997, Colorado, Wyoming, Nebraska and the Department of Interior (represented by Reclamation) formed a unique partnership with the goal of developing a shared approach for managing the Platte River. Water users from the three states and local and national conservation groups joined the effort.

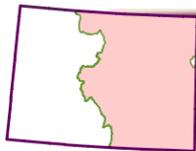


Sandhill cranes take flight after foraging near the Platte River.

Since that time, the program has made significant progress towards meeting its goal of conserving 10,000 acres of habitat for whooping crane, piping plover, least tern and pallid sturgeon. The Program's Water Action Plan includes the potential J-2 Reregulating Reservoir Project. The J-2 Project could have the ability to store and deliver about 40,000 AF of excess flows to benefit target species, and is vital to achieving the Program's milestone of providing at least an average of 50,000 AF per year for enhancing habitat.

A major milestone was met with completion of the modification of Reclamation's Pathfinder Dam spillway by the State of Wyoming (*see the inside back cover for more about Pathfinder*).





Eastern Colorado Area

The Eastern Colorado Area Office manages Reclamation projects and facilities in the Upper Colorado River basin on the west slope of the Rockies which serve as a source for diversions to the East Slope of the Rockies.

Windy Gap

The Final Environmental Impact Statement for the proposed Windy Gap Firming Project was made publicly available November 30, 2011. The FEIS capped an eight-year public compliance process under the National Environmental Policy Act.

Leadville Mine Drainage Tunnel and Treatment Plant

Process optimization changes based on recommendations from the 2010 Plant Condition Assessment have been implemented. Improvements increased safety and created cost savings by decreasing chemical requirements and extending overall service life of process components and sand media.

Water Operations and Maintenance

The Eastern Colorado Area diverted and delivered 98,000 acre-feet of water on the Fryingpan-Arkansas Project. This was the second largest import and delivery in the project's 50-year operating history.

The Pole Hill box culvert installation was completed successfully upgrading the canal from open-faced to closed conduit. Construction was completed a year ahead of schedule.

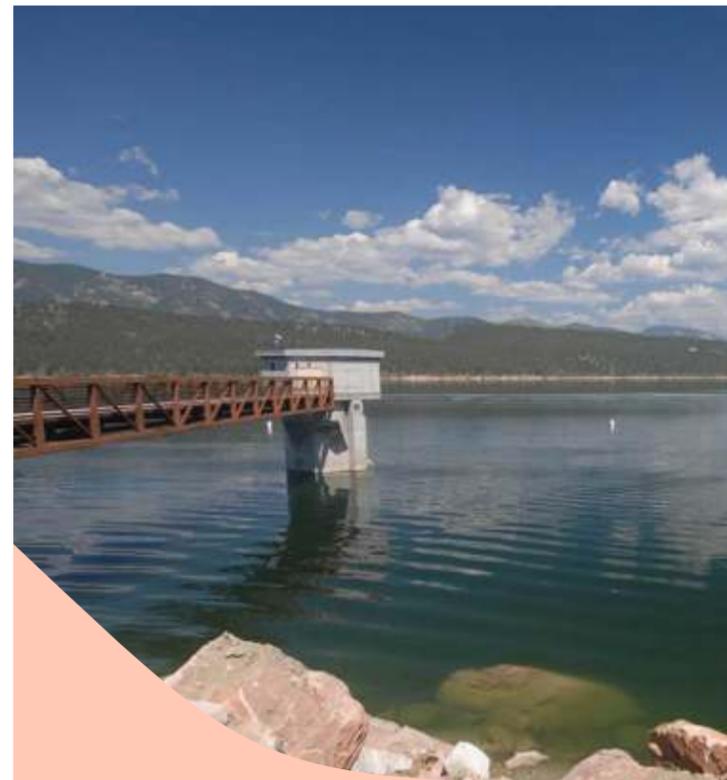
The area office enabled computer control and remote monitoring for all diversion sites on the West Slope Collection System of the Fryingpan-Arkansas Project.

Water Contracts Renewed

- Pueblo Reservoir: 23 contracts totaling \$1,042,122;
- General project C-BT and Fry-Ark: east slope totaling \$10 million;
- Ruedi (Fry-Ark West Slope): had 31 contracts totaling \$888,667;
- Green Mountain (C-BT West Slope): 81 contracts for \$289,592.



Interior of the Leadville Treatment Plant which cleans metals from water draining from a historic mine tunnel.



Hydropower

Carter Lake Development

A Lease of Power Privilege agreement was executed with Northern Water for a powerplant at Carter Lake. Construction has begun on a facility that will include two 1,300 kilowatt turbines, and a 2,000 square foot powerhouse with connectons to the Carter Lake Second Outlet and the St. Vrain Supply Canal.

Hydropower Production

Completed switchyard equipment upgrades at Mt. Elbert Powerplant. Work in coordination with Western Area Power Administration engineers included substantial rewiring of the plant's protective circuits. Generation capability was restored on time.

Unit 1 and 2 unit breakers were replaced at Estes Power Plant.

Carter Lake outlet, photo by Northern Water.

QUICK FACTS

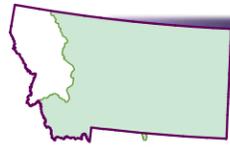
Transcontinental Diversions

- ◆ Great Plains Region projects and operations in Colorado are generally in eastern Colorado and the east slope of the Rocky Mountains, but the region has water diversion and storage facilities on the west slope as well.
- ◆ Because 80 percent of Colorado's precipitation falls on the west slope of the Rockies, and 80 percent of Colorado's population lives on the east slope, water is diverted from the west slope (Colorado River basin) for use on the arid east slope.
- ◆ Eastern Colorado Area's two largest projects are complex transcontinental diversions with hydropower, storage and water delivery facilities.
- ◆ The Colorado-Big Thompson Project serves the northern half of eastern Colorado (the South Platte River Basin), and the Fryingpan-Arkansas Project serves the Arkansas River Basin.



Releases from Granby Dam in Colo., finally peaked between the last week of June and Fourth of July weekend.





Montana Area

The Montana Area Office, manages facilities in Montana's upper Missouri River Basin.

Small Hydropower

Clark Canyon Hydro – The Federal Energy Regulatory Commission licensed the project in 2009, authorizing a 4.7 megawatt project. Activities have included evaluating dam safety risks, collecting design data, and developing technical construction documents. Reclamation and the developer are working towards a possible construction start in 2012.

Turnbull Hydroelectric – Turnbull Hydro LLC completed construction of two projects on Reclamation's Sun River Project in August 2011. Construction of the 5.3 megawatt Upper Turnbull and 7.3 megawatt Lower Turnbull projects began in fall 2010 at two large drop structures on the Spring Valley Canal. Greenfields Irrigation District partnered with Turnbull Hydro LLC and performed a significant amount of the construction work.



Turnbull Electric LLC headworks on the Spring Valley Canal.

Lower Yellowstone Diversion

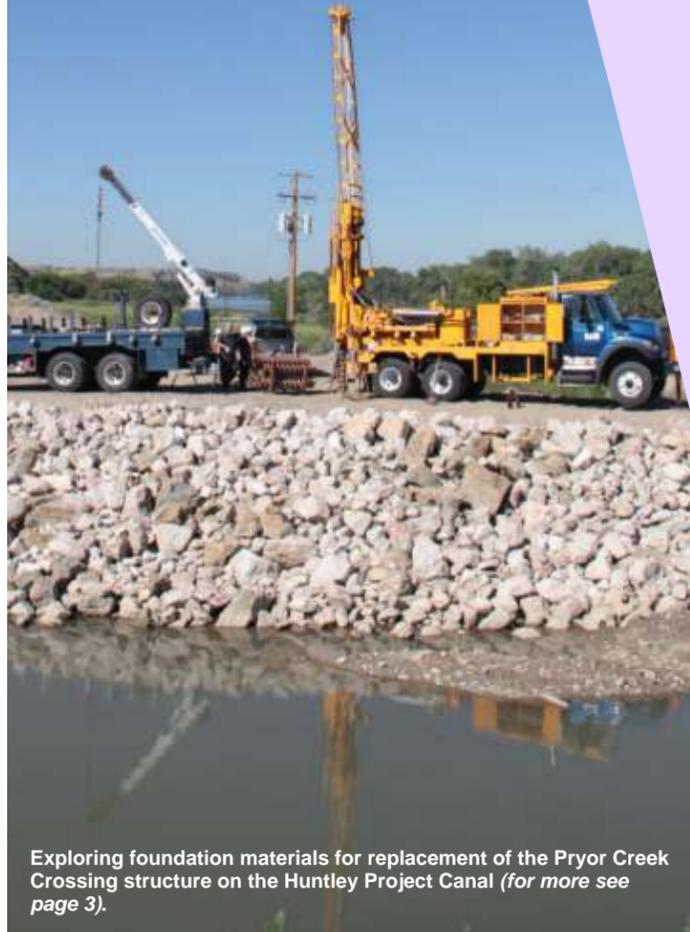
Cooperative efforts with the Corps of Engineers continued toward passage and entrainment protection for endangered pallid sturgeon at Intake Dam on the Yellowstone River. Fish screens and new headworks began operation for the 2012 irrigation season preventing the entrainment of approximately 500,000 fish per year as water is diverted for Reclamation irrigation projects (see photo on page 5).

Montana Water Rights Adjudication

Montana Area Office worked with other state and federal agencies to protect Reclamation water rights in Montana by conducting field visits, writing stipulations, reviewing claims, providing discovery questions and testifying at hearings.

St. Mary Canal

A joint effort between Reclamation and the Milk River Joint Board of Control removed and replaced the lower section of the Drop 4 structure on the St Mary's Canal. The partnership allowed completion of the construction during the limited time frame when the canal was not in use.



Exploring foundation materials for replacement of the Pryor Creek Crossing structure on the Huntley Project Canal (for more see page 3).

Rural Water Systems in Montana

Fort Peck/Dry Prairie – The water treatment facility was substantially completed in September 2011 and will be operational in 2012. The raw water line from the intake structure to the treatment plant was completed and contracts awarded for construction of treated water pipelines to serve Poplar, Wolf Point and Frazer. American Recovery and Reinvestment Act funding accelerated completion of the treatment plant and pipelines.

Dry Prairie Rural Water Authority has installed interim water distribution systems on the east side of the project area from the Culbertson water treatment plant to serve Culbertson, Bainville, Froid, McCabe and Medicine Lake. On the west side, the interim water source is the water treatment plant located at the former air force base near Glasgow, supplying water to Nashua, and areas surrounding the Town of Glasgow.

Rocky Boy/North Central – Thirteen miles of 36-inch diameter core pipeline was installed in 2011. When the project is complete, the pipeline will deliver treated water to North Central Montana Project area, including the Rocky Boy Reservation. The raw water intake structure was also completed at Lake Elwell in preparation for construction of the treatment plant. Both activities were funded by the American Recovery and Reinvestment Act.



Installation of pipeline for the Rocky Boy/North Central Rural Water System.

See page 4 for more about rural water projects

QUICK FACTS

Many Great Plains projects were the earliest authorized by the Reclamation, and continue to provide benefits today. These include:

- ◆ Milk River Project, Montana, 1903
- ◆ North Platte Project, Wyoming, 1903
- ◆ Lower Yellowstone Project, Montana, 1904
- ◆ Belle Fourche Project, South Dakota, 1904
- ◆ Shoshone Project, Wyoming, 1904
- ◆ Huntley Project, Montana, 1905

\$42.5 million in flood control benefits computed by the Corps of Engineers for Great Plains Region Montana facilities in 2011

Reservoir	Local Damages Prevented	Main Stem Damages Prevented	2011 Total
Clark Canyon	\$880,700	\$683,800	\$1,564,500
Canyon Ferry Lake	\$7,155,100	\$8,312,100	\$15,467,200
Bighorn Lake	\$2,035,600	\$10,143,000	\$12,178,600
Lake Elwell (Tiber)	\$134,900	\$12,178,600	\$12,855,300
Fresno	\$476,200	\$0	\$476,200
Gibson	\$9,000	\$0	\$9,000
Lake Sherburne	\$0	\$0	\$0
MTAO Totals	\$10,691,500	\$31,317,500	\$42,550,800



An emergency contract to place rock riprap adjacent to the Yellowtail spillway stilling basin was completed in June 2011. Sustained spillway releases from record runoff caused erosion adjacent to the structure. Emergency repairs were required allow continued high releases through late August 2011.





Nebraska-Kansas Area

The Nebraska-Kansas Area Office manages facilities on tributaries of the Missouri River in Nebraska and Kansas, as well as Bonny Dam and Reservoir in eastern Colorado.

Design and Construction

More than four million dollars of construction work was completed, including one ARRA project and six others:

- Spillway concrete repairs at Glen Elder Dam;
- Soil cement repairs at Glen Elder Dam;
- Construction of two ramp flumes on the Courtland Canal;
- Bridge repairs at Enders Dam;
- Bridge repairs at Trenton Dam;
- Outlet works repairs at Cedar Bluff Dam;
- Riprap replacement at Trenton Dam.



Construction of a ramp flume on the Courtland Canal.

Water Delivery

Reclamation delivered more than 344,000 acre-feet of water to 11 irrigation districts, one municipality, and one rural water district.

Flood Control Operations

Controlled flood releases were made totaling about 292,000 acre-feet from three Reclamation reservoirs. 245,000 acre-feet were released from Waconda Lake, 14,500 acre-feet from Kirwin Reservoir, and 32,500 acre-feet from Lovewell Reservoir. An additional 116,000 acre-feet were released to prevent other reservoirs from encroaching into the flood pool.

Rural Water Supply

The Northeastern Nebraska Water Supply System Appraisal Report was completed in March 2011, recommending a feasibility study.

Two projects were selected for studies: the Northeastern Nebraska Water Supply System, and the South Sioux City Appraisal.

Water Conservation Field Services

Two projects were awarded:

- Kirwin Irrigation District – buried pipe;
- Mirage Flats Irrigation District – screening and metering.



Soil cement placement on the face of Glen Elder Dam.

WaterSMART

Four projects were awarded:

- Kansas Bostwick Irrigation District – buried pipe;
- Bostwick Irrigation District in Nebraska – buried pipe;
- Frenchman-Cambridge Irrigation District – pumping plant and buried pipe;
- Webster Irrigation District No. 4 – buried pipe.

QUICK FACT

The Nebraska-Kansas Area is combining two offices (Grand Island and McCook) in a move to reduce cost. The area office will be located in McCook close to major facilities operated by Reclamation where a building was recently constructed to replace a 70 year old structure.



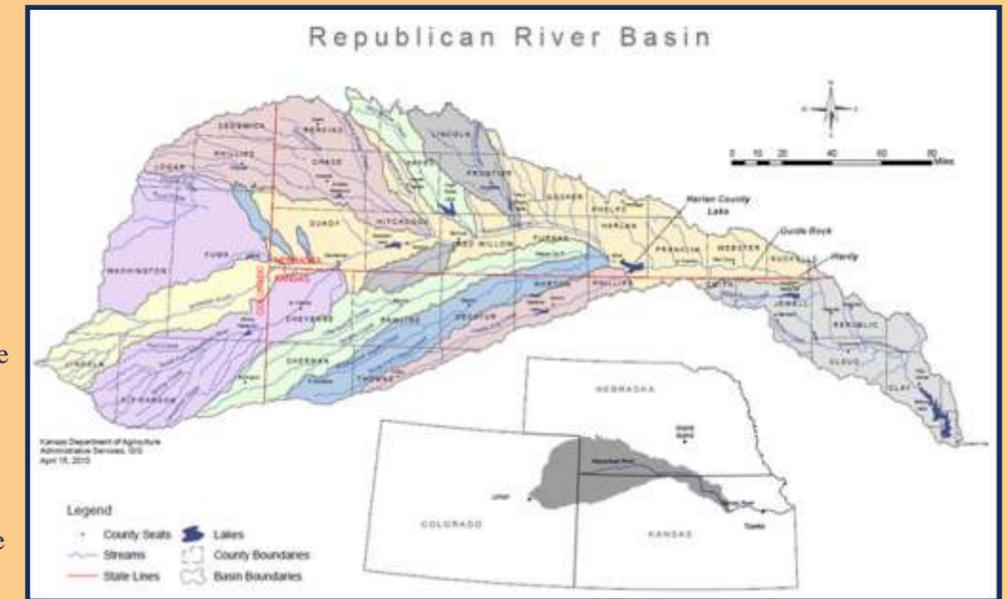
(Above) Spillway rehabilitation at Glen Elder Dam was completed using American Recovery and Reinvestment Act funding. The completed spillway is shown at left.

Republican River Compact

The Republican River flows from its headwaters in Colorado into northwest Kansas, through southern Nebraska, and back into north-central Kansas. The river drains approximately 23,300 square miles and supplies water for municipalities, industries, surface and ground water irrigation, recreation and wildlife.

On April 4, 2011, the U.S. Supreme Court granted Kansas' motion to file a petition regarding the Republican River Compact and appointed a Special Master in this case. Kansas believes that Nebraska has violated the Compact by failing to address ground water depletions in a meaningful way and failing to take actions to avoid future violations, especially during drought years.

The basin is subject to an interstate compact that was ratified in 1943. The three states have proposed a collaborative basin study that covers the entire basin down to the Clay Center stream-gauging station in northeast Kansas. The study will identify mitigation and adaptation strategies that address the impacts of climate change on water resources in the basin. On March 23, 2012, \$413,000 in WaterSmart grant funding, with a \$413,000 non-federal match, was announced for the study.



Reclamation administers seven reservoirs in the Republican basin: Bonny in Colorado; Enders, Swanson, Hugh Butler, Harry Strunk and Harlan County in Nebraska; and Keith Sebelius in Kansas.



Oklahoma-Texas Area



The Oklahoma-Texas Area Office is responsible for activities in the Arkansas River basin in Kansas, the Canadian River basin in Oklahoma and Texas, the tributaries of the Red River Basin in Oklahoma and river basins draining into the Gulf of Mexico.

Planning Investigations

The Oklahoma Comprehensive Water Plan Special Study and the Arbuckle-Simpson Aquifer Hydrology Special Study were completed. Work continued on the South-Central Regional Assessment Special Study (Okla.), Fort Cobb Water Supply/Demand Special Study (Okla.) and Innovative Water Technologies (Texas).

Native American Assistance Program

Work on six prior projects continued in 2011 along with six new projects having a federal cost share of \$201,000.

Projects Completed:

- Cherokee Nation - Technical Assistance in Water Planning;
- Alabama Quassarte Tribal Town - Needs Assessment;
- Chickasaw Nation - Beneficial use of Fracking Water;
- Seminole Nation Needs Assessment update - Mekusuky Mission;
- South Central Tribes - Sampling techniques and GIS training.

Ongoing projects:

- Cherokee Nation Water System Infrastructure Study;
- Caddo Nation Rush Springs Aquifer Study;
- Caddo Nation Ground/Surface water interaction (Rush Springs);
- Kickapoo Tribe of Oklahoma - Rural Water System;
- Delaware Nation - Water Supply Alternatives;
- Kickapoo Tribe of Oklahoma - Defining the extent of radionuclides and Trace Metals in Domestic Well water;
- Pawnee Nation - Chloride Concentration Investigation.

Water Conservation Field Services

Water Conservation Plans

Three water conservation plans were completed for Oklahoma: Fort Cobb Reservoir Master Conservancy District, McGee Creek Authority, and Lugert-Altus Irrigation District.

Grants

A grant was completed for the San Angelo Project in Texas for water management and conservation plan development and implementation. Three new projects in Oklahoma were initiated totaling \$347,911 in federal funds: Lugert-Altus Irrigation District, Mountain Park Master Conservancy District, and Fort Cobb Reservoir Master Conservancy District.



Fort Cobb Dam near Clinton, Okla. Part of the Washita Basin Project, the dam provides municipal water, recreation and flood control.

Science and Technology Program

Reclamation completed a study titled, “*Methodology to Evaluate the Influence of Joint Changes in Climate and Land Cover on Water Availability.*”

Reclamation awarded \$130,000 to continue pilot testing of the variable salinity project. This study moves toward development of the first flexible desalination system in the United States. Activities along the Gulf Coast of Texas included an evaluation of source waters, identification of pilot system features, and pilot testing of brackish groundwater. The next phase in 2012 will pilot test seawater at South Padre Island.

Reclamation was awarded \$89,500 to initiate a new study of nanofiltration treatment of recycled and potable water supplies. The study will compare the cost-benefits of nanofiltration and reverse osmosis in treating water supplies for use in the production of thermoelectric power and commercial cooling applications.

Special Authorizations

Lower Rio Grande Valley Water Conservation and Improvement - Congress appropriated \$50,000 in FY11. OTA0 made an additional \$319,000 available for payments. Twelve projects have executed cost-share agreements, nine of which are complete and under operation. The remaining three projects are still under construction. To date, \$23 million has been requested by the Districts, and \$19 million has been paid.



Rubicon gate and telemetry system installed for Cameron County Irrigation District No. 2 as part of the Lower Rio Grande Valley Water Conservation and Improvement Program.

Equus Beds Aquifer Storage and Recovery - Congress appropriated \$50,000 in FY 11. The City of Wichita continues to construct Phase IIb of the project. To date, approximately \$20 million has been requested, and \$4.1 million has been paid to the City. The current unpaid reimbursement requests total approximately \$15.9 million.



Pipeline tie-in to surge tank constructed for the Equus Beds Project.

WaterSMART in OTA0

Title XVI Program

A feasibility plan of study on the Dallas Trinity River Recycled Water Project was completed. The feasibility study is estimated to cost about \$2 million if Dallas Water Utilities chooses to proceed.

The City of Round Rock, Texas, continued construction activities of Phase I of its water recycling project.

Reclamation approved a Title XVI feasibility study for the San Antonio Water System on a brackish groundwater desalination facility.

Two WaterSMART Title XVI feasibility study grants were awarded totaling \$216,445: one for the Central Oklahoma Master Conservancy District evaluating Lake Thunderbird to regulate effluent from the City of Norman; and another for the City of Kyle, Texas, evaluating the market and infrastructure needs to convey treated effluent for irrigation.

Basin Study Program

A basin study on the Lower Rio Grande was initiated and awarded \$198,948 to match \$213,850 in non-federal funds. The study will be conducted in partnership with the Rio Grande Regional Water Authority and its 53 member entities.

WaterSMART Grants

Work on eight projects continued, and seven new projects were awarded, totaling \$2,069,505 in federal cost-share funds.

QUICK FACTS

- ◆ Congress passed the Reclamation Act of June 17, 1902, founding the United States Reclamation Service within the U. S. Geological Survey (USGS).
- ◆ Because Texas had no Federal lands, it was not one of the original Reclamation states. It was added in 1906 making the 17 Reclamation states known today.
- ◆ In 1907, the Secretary of the Interior separated the Reclamation Service from the USGS making it an independent bureau.





Wyoming Area

The Wyoming Area Office manages projects in the Bighorn River drainage in Wyoming and North Platte River drainage in Wyoming and Nebraska.

North Platte River Operations

For the second consecutive year, record snowpack in the mountains of the North Platte River Basin resulted in record spring runoff. High inflows resulted in early releases from the reservoirs, and high river flows throughout the summer from Seminoe all the way through Guernsey Reservoir. Reclamation maintained communication and coordination with the states of Wyoming and Nebraska, the Corps of Engineers, emergency management entities, our operating partners, and others regarding reservoir and river operations.



(Above) Flood waters of the North Platte River near Casper. (Left) installing new transformers at Boysen Powerplant.



Life Safety

Significant progress was made at Seminoe, Kortez, Alcova, Boysen, and Buffalo Bill Powerplants to address life safety code for employees including installation of new building egress, fire detection and alarm systems. The work was funded as part of the American Recovery and Reinvestment Act.

Quagga Mussels

Testing for Quagga and Zebra mussels was conducted for Boysen, Buffalo Bill and Glendo Reservoirs. The test results were negative, with no evidence of mussels.

2011 Water Supply

A full water supply was available to water users on the North Platte River, the Wind/Bighorn River and the Shoshone River in 2011.

Wyoming Hydropower

Boysen Powerplant transformers were replaced in 2011.

Emergency repairs were completed by area office staff to a generating unit at Buffalo Bill Powerplant to resolve a problem with the stator.

Supervisory Control and Data Acquisition (SCADA) systems continue to be upgraded for more efficient operation of Reclamation facilities.

Pathfinder Dam Modification

The State of Wyoming awarded a contract in July 2010 for construction of a new spillway crest at Pathfinder Dam. Construction was interrupted by high water conditions on the reservoir and resumed in August 2011. Work was substantially complete in December, with the raised crest ready to store additional water in the reservoir for use by Wyoming and the Platte River Recovery Program. By funding the modification, the state obtained rights to the increased storage, which restored reservoir capacity lost to sedimentation since the dam was built.



Forming the new spillway crest at Pathfinder Dam.

New Wyoming Area Manager



Coleman Smith, Jr.

Coleman Smith Jr. replaced John Lawson, who retired from Reclamation on December 31, 2011. Smith brings a depth of expertise in operations and management to Wyoming.

Prior to accepting the Area Manager position, Smith served as the Deputy Manager, Power Operations and Maintenance, for the

Pacific Northwest Region in Boise, Idaho. In that position, Smith coordinated work of the regional power office with other federal agencies, including the Bonneville Power Administration and the US Army Corps of Engineers.

QUICK FACTS

- ◆ Recreation sites at most of Reclamation's Great Plains Region reservoirs are managed through partnerships with others.
- ◆ The Wyoming Area administers recreation management agreements with Natrona County, Nebraska Game and Parks Commission, Wyoming Game and Fish Department, and Wyoming State Parks and Historic Sites for facilities at 12 reservoirs.
- ◆ A full water supply was available to water users on the North Platte River, the Wind/Bighorn River, and the Shoshone River in 2011.





MISSION STATEMENTS

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian tribes and our commitments to island communities.

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.