

# WaterSMART Programs: Colorado River System







In February 2010, the Secretary of the Interior issued Secretarial Order 3297 establishing the WaterSMART (Sustain and Manage America's Resources for Tomorrow) program. The goal of the WaterSMART initiative is to help ensure adequate water supplies for drinking, economic activity, recreation, and ecosystem health.

Through the WaterSMART program, the Department of the Interior (Interior) works with states, tribes, local governments, and non-governmental organizations to secure and stretch water supplies for existing and future generations to benefit people, the economy, and the environment.

The WaterSMART program elements include improved coordination among the Interior's bureaus, a web-based water information sharing clearinghouse, integration of energy and water policies, emphasis of the role of water in bringing communities together, and utilization of sound science to support sustainable water supply policies.

In November 2011, Interior's WaterSMART Task Force finalized the WaterSMART Strategic Implementation Plan which provides a framework for continued federal coordination in moving toward a sustainable water resource future.

The Strategic Implementation Plan calls for the development of a pilot project within the Colorado River Basin to demonstrate the effectiveness of the WaterSMART program. This report summarizes Interior's WaterSMART activities within the Colorado River Basin and provides highlights within the context of Interior's high priority initiatives:

- Tackling Water Challenges
- The New Energy Frontier
- Climate Change
- America's Great Outdoors
- Empowering Native American Communities
- Youth

**Water is our most abundant and essential resource – it is imperative that the federal government provide leadership on the path toward water sustainability.**

The Colorado River and its tributaries provide municipal and industrial water and recreation opportunities to approximately 27 million people and irrigation water to nearly four million acres of land in the basin states of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming. The river also serves approximately 2.3 million people and 500,000 acres in Mexico.

Interior's efforts within the Colorado River Basin support the WaterSMART objectives of sustaining and stretching the water resource for people, local and regional economies, and the environment; and coordinating those efforts with states, tribes, local governments, and non-governmental entities. This report documents Interior's progress toward achieving WaterSMART program goals and fulfilling the missions of Interior's bureaus within the Colorado River Basin. These efforts are in addition to, and complement, the ongoing role of Interior in water distribution, power generation, and federal land management within the Colorado River Basin.

## **Water Challenges**

Tackling water challenges is one of Interior's high priority initiatives. Through the WaterSMART program, Interior continues to help communities improve conservation and increase water availability, restore watersheds and resolve longstanding water conflicts.

### **Basin Studies**

A key element of the WaterSMART program is the Bureau of Reclamation's (Reclamation) Basin Study initiative. The Basin Studies highlight the need to develop information and science to assist local communities and water and resource managers in addressing ongoing challenges associated with water supplies.

Within the Colorado River Basin, Reclamation is partnering with the Colorado River Basin States on an analysis of the supply and demand within the basin. The study also includes additional major stakeholders and will explore adaptation options under climate change scenarios. Reclamation gathered input and information from other Department bureaus, such as the U.S. Fish and Wildlife Service (FWS) and the National Park Service (NPS), and has also conducted extensive outreach to the Tribes within the Colorado River Basin.

The Colorado River Basin Study began in January 2010 and is scheduled to be completed in July 2012. The Study will result in the identification of recommended adaptation strategies to address climate change and future water supply and demand imbalances within the Basin. At the conclusion of the Study, a Final Basin Study Report outlining these recommendations will be prepared.

In June 2011, Reclamation released the first Colorado River Basin Study Interim Report. The interim report documents the progress of the Study through January 31, 2011, and provides a quantified assessment of four water supply scenarios incorporating future climate projections from global climate models.

It is anticipated that there will be two additional interim technical memoranda released during the course of the study that will address the water demand

*The Colorado River Basin Supply and Demand Study will not result in the selection or funding of a particular proposed option. Rather, the Study is intended to explore a broad range of options to help address future imbalances.*

assessments and system reliability and analyses. On November 29, 2011, Reclamation announced the initiation of Phase 4 of the study which will focus on options to meet supply and demand imbalances.

The United States Geological Survey (USGS) is contributing support to the Basin Study and initiated a pilot project for its Water Availability and Use Assessment program for the Colorado River Basin. The USGS will support the ongoing Basin Study by providing information that is not being generated from other sources, such as groundwater analysis.

The USGS developed a work plan for a 3-year \$1.5 million study to compile and analyze data on the current water-use, which includes in-stream uses, groundwater supplies, and hydroclimatic components of water use such as evapotranspiration, seasonal snowpack distribution and sublimation.

The National Park Service provides support to and participates in interagency basin-wide assessments of aquifer sustainable yields in water scarce areas such as the Great Basin and southern Nevada, and conducts site-specific aquifer drawdown assessments of proposed water developments to determine the potential for impacts to park water resources. NPS also conducts and supports studies to quantify instream flow needs for flow-dependent park resources potentially influenced by water developments or the operation of water storage projects.

## **Cooperative Water Program**

The USGS's Cooperative Water Program provides partnering opportunities for state, tribal, and local water management organizations to develop reliable and timely water resource information. In February 2012, the Cooperative Water Program and several partners including the Interstate Council on Water Policy, Western States Water Council and the Upper Colorado River Commission will host a Colorado River Cooperator's Roundtable workshop. The goal of this workshop is to identify opportunities to enhance USGS water data and science programs and receive feedback from cooperators on program improvements. Feedback on the WaterSMART program will also be solicited.

## WaterSMART Grant Programs

The WaterSMART program includes four separate grant categories: water and energy efficiency grants; system optimization review grants; advanced water treatment and pilot and demonstration project grants; and grants to develop climate analysis tools.

Through the water and energy efficiency grants, the Reclamation provides 50/50 cost share funding to irrigation and water districts, Tribes, States and other entities with water or power delivery authority. The program is designed to fund projects that conserve and use water more efficiently, increase the use of renewable energy, protect endangered species, or facilitate water markets. In 2010 and 2011, Reclamation provided grants to fifteen entities within the Colorado River Basin through the WaterSMART program to improve water and energy efficiency and to develop climate change analysis tools. A summary of the water saving projects enabled by WaterSMART grants is provided below:

### Colorado River Basin WaterSMART Program Projects (2010 and 2011)

- Big Bend Water District, NV (2010) -- The Big Bend Water District addresses existing losses in water delivery to the Town of Laughlin through system improvements, including lining pond sites at the District's treatment plant, and service line upgrades. The project is expected to conserve 450 acre-feet of water annually.
- Dolores Water Conservancy District, CO -- The Dolores Water Conservancy District is installing a geomembrane liner in 2,800 linear feet of earthen canal. The project is expected to save approximately 246 acre-feet of water annually.
- Ute Mountain Ute Tribe, CO -- The Ute Mountain Ute Tribe Farm & Ranch Enterprises is installing automated irrigation management systems and soil moisture monitoring stations, which will be integrated into a Supervisory Control and Data Acquisition system. The project is expected to save approximately 1,327 acre-feet of water annually.
- Uintah Water Conservancy District, UT -- This project is a water measurement and Supervisory Control and Data Acquisition (SCADA) system upgrade. The upgrade will conserve water and address several critical endangered fish issues in the Green River. The project is expected to save approximately 1,830 acre-feet of water annually.
- Big Bend Water District (2011): Leak Detection and Filter Flow Meter Project, NV The Big Bend Water District will conserve and sustain water resources by identifying and minimizing water leakage in Laughlin, Nevada. The project also includes the installation of filter flow meters at

an existing water treatment plant. The project is expected to save approximately 225 acre-feet of water annually,

- City of Surprise, AZ: Vadose Recharge Wells Capital Improvement project, AZ -- The City of Surprise is expanding its existing recharge system by constructing 10 new recharge wells and additional conveyance pipelines to directly recharge an aquifer with 3.6 million gallons of excess reclaimed water daily. This project is expected to save 4,000 acre-feet of water annually.
- Imperial Irrigation District: East Highline Power Plant Flow Meter, CA -- The Imperial Irrigation District will automate hydropower plants along the All-American Canal by replacing existing governor controls with digital control systems to improve accuracy of inflow measurements to the power plant. This project is expected to save 1,460 acre-feet of water annually.
- Southern Nevada Water Authority, NV (2011) -- The Southern Nevada Water Authority will expand its existing rebate landscape rebate program, which provides a financial incentive for residential property owners to replace turf with water efficient landscaping. The expansion of the program is expected to result in replacing approximately 4.6 million square feet of turf with an expected water savings of 790 acre-feet per year.
- Dry Gulch Irrigation Company, Hancock: State Road Salinity Reduction Project, UT -- The Dry Gulch Irrigation Company is replacing 9,250 feet of open canal with enclosed pipe and installing a Parshall flume to improve water management in an area where drought is a continuing concern. By reducing seepage, the project is expected to reduce diversions from the Lake Fork River by 2,450 acre-feet of water annually.
- Florida Farmers Ditch Company, Water Loss Reduction Project: Phase II Ditch Lining Project, CO -- The Florida Farmers Ditch Company, in Durango, Colorado, will line 1.8 miles of open canal with concrete to address seepage losses. The project is expected to save 2,020 acre-feet of water annually.
- University of Arizona: Arid Cities in Changing Climates, AZ -- Urban irrigation accounts for half or more of all municipal and industrial water demand in cities such as Tucson, AZ, which is broadly representative of growing arid cities in the Desert Southwest. This project provides physical and social science support for decision-making by water users, utilities, municipal and county governments.
- Southern Nevada Water Authority: Impacts of Climate Change on Water Quality and Sediment Transport in Lake Mead, NV -- The Southern

Nevada Water Authority will use previously developed water quality models to examine the impacts of climate change on the water quality of Lake Mead and the San Vicente Reservoir; and sediment transport within Lake Mead.

- Southern Nevada Water Authority: Impacts of a Changing Climate on Water Resources in the Eastern Great Basin, NV -- The Southern Nevada Water Authority is evaluating the potential future additional use of water resources in the Eastern Great Basin.
- Utah State University: Effective Assessments for Climate Uncertainties in Dynamical Downscaling over the Colorado Regions, UT -- Utah State University will provide more accurate projections of seasonal precipitation cycles within the upper Colorado River basin.

Reclamation issued notices for additional WaterSMART funding opportunities for fiscal year 2012, which, depending on appropriations, will continue the progress toward developing more secure water supplies, especially in the context of a changing climate.

## **River Restoration and Species Recovery Efforts**

Interior places a high priority on restoring and protecting rivers, particularly through the America's Great Outdoors program. The success and challenges of many of Interior's efforts were highlighted during a conference hosted by Reclamation in Albuquerque, New Mexico on September 14-15, 2011, which brought together more than 100 Reclamation field staff, academic experts and representatives from other Department bureaus and federal agencies, state-based agencies, water users, NGOs, tribes, and private interests. As part of the effort, Reclamation prepared a report summarizing restoration programs and created a web page of restoration programs so that information can be shared across the restoration community, promoting collaboration and sharing expertise. A report for the conference will be completed during December 2011.

Throughout the Colorado River Basin, various bureaus within Interior and their partners recognized the need to balance various different and competing demands for water, including irrigation use, domestic and industrial purposes, for power generation, and for the environment, recreation, and fish and wildlife. In the Colorado River Basin, many examples of successful restoration and species recovery programs are ensuring continued water supply use and development and fostering compliance with Endangered Species Act requirements.

One of the major ongoing activities is the development of a Long Term Experimental and Management Plan for the Operation of Glen Canyon Dam. Reclamation and NPS recently published notice of the start of the scoping process for the Environmental Impact Statement that will consider various alternatives for



operation of the Dam. Seven public meetings were held at various sites within the Upper and Lower Colorado River Basin. The FWS is a partner in these efforts and, among other things, is developing a biological opinion for the plan. The USGS, through the Grand Canyon Monitoring and Research Center, serves as the primary science provider for the Environmental Impact Statement and Biological Opinion to capitalize on lessons learned from the past fifteen years of dam operations and experiments.

Specific efforts are underway in four different programs within the Colorado River Basin designed to achieve the dual goals of protecting water supplies and power production, and enhancing conditions for the natural environment and protected and endangered species. These programs also rely heavily on the support and assistance from several non-federal partners including the Colorado River Basin states, Indian Tribes, and non-governmental organizations. Recent highlights from the programs are described below.

### **Upper Colorado River Recovery Program**

The Upper Colorado River Endangered Fish Recovery Program (Recovery Program) is a multi-stakeholder group formed to recover the four endangered fish of the Colorado River: the Colorado pikeminnow, razorback sucker, bonytail, and humpback chub. This program was formed in 1987 and involves federal and state agencies, water development interests, power customers and environmental organizations in Colorado, Utah and Wyoming.

Recovery actions include developing and implementing stocking programs, reconnecting floodplains, protecting flows, and conducting research on life history and habitat needs of the fishes. Major habitat improvements completed include construction of fish passages at diversion dams, installation of fish screens to prevent fish from becoming trapped in irrigation canals, and development of floodplain wetland areas. Downlisting for Colorado pikeminnow may occur as early as 2013 if populations do not decline.

In June 2011, Recovery Program researchers discovered endangered razorback sucker larvae for the first time in the White River in eastern Utah. This clearly documents successful razorback sucker reproduction in that reach of critical habitat, most probably by hatchery-raised and stocked fish and is in addition to spawning in the Green River.

Secretary of the Interior Ken Salazar, Colorado Governor Bill Ritter, Jr., former Utah Governor Jon Huntsman, Jr., Wyoming Governor Dave Freudenthal, and Western Area Power Administration Administrator Timothy Meeks renewed their commitment to the Upper Colorado River Basin program by signing an extension of a cooperative agreement for the Recovery Program extending the program through 2023. This ensures continued cooperative work to recover the endangered bonytail, humpback chub, Colorado pikeminnow and razorback sucker while water development continues for agricultural, hydroelectric and municipal uses in the Upper Colorado River Basin.

As a result of the cooperative effort, there are signs of recovery of the endangered fishes. Hatchery-raised, stocked razorback sucker are spawning in Upper Basin rivers and there is evidence that their larvae are surviving. Colorado pikeminnow and humpback chub populations fluctuate and, in some, cases are increasing. Stocked bonytail are being recaptured in several locations throughout the Green and upper Colorado rivers. Since 1988, FWS has consulted on 1,693 projects depleting more than 2.3 million acre-feet of water per year in the Upper Colorado River Basin. The Recovery Program is part of the Endangered Species Act compliance for these projects.

### **San Juan River Recovery Implementation Program**

The San Juan River Basin Recovery Implementation Program (SJRRIP) is an established collaborative partnership of federal, state, and local agencies, tribes, water users, and environmental interests. These partners are working together to achieve the SJRRIP's two goals of recovering the listed fish species and allowing water development in the San Juan River Basin, including tributaries in Colorado, New Mexico, and Utah.

Highlights of recent collaborations include FWS and Reclamation working together on flow-related recovery actions to plan for the future and promote sustainable water strategies. Their activities include implementing SJRRIP's flow recommendations through Navajo Dam operations, and updating the San Juan River Basin Hydrology Model to accommodate various hydrology scenarios, including those projected in response to climate change.

The FWS provided biological input and information on SJRRIP flow recommendations to Reclamation for Colorado River Storage and Supply modeling, and to assist the SJRRIP's water-user partners' water shortage sharing agreement. Both efforts are contributing to greater efficiencies in water management and in balancing economic and environmental water supply needs.

### **Lower Colorado Region Multi-Species Conservation Program (MSCP)**

The Lower Colorado Region MSCP was authorized in 2009 through P.L. 111-11 and is designed to recover endangered species and protect wildlife habitat on the lower Colorado River in the United States, and ensure the certainty of continued water and power operations. The FWS supports MSCP efforts to benefit an array of endangered species and other species of concern occupying backwaters, marshes, and riparian areas along the lower Colorado River. The program is realizing benefits from restoring habitat as evident by increasing use of restored and newly established areas by native fish, water-dependent marsh birds, and Neotropical migratory songbirds.



At Havasu National Wildlife Refuge, the MSCP and FWS jointly funded a new water delivery system for the refuge. The old dirt-lined intake structure was inefficient, subject to seepage loss and the seasonal needs of other users. The new, lined and pump-operated system eliminated seepage losses and is dedicated for the sole use of the refuge, so that water can be more precisely delivered when needed.



At Imperial National Wildlife Refuge, the Imperial Ponds were constructed to provide habitat for native fish species. Water management at the ponds has been compromised by poor water quality and the need to pump large volumes of water into the ponds to maintain depths and quality, resulting in high energy use and significant evaporation rates.

The MSCP is finalizing a 5-year study plan assessing "natural" (supported by sub-surface inflows from the adjacent river) water levels and re-charge rates in the ponds and how these factors affect water quality. The goal is to minimize unneeded pumping to save both water and energy costs and determine the best methods to achieve suitable water quality for the native fishes.

At Cibola National Wildlife Refuge, with the creation of the new Hart Mine Marsh, significant improvements to the water distribution system were made, providing for more efficient drainage and improved water quality of return flows to the river. The new system also allows water levels to be controlled and minimizes overflows that waste water.

At Cibola, Havasu, and Imperial National Wildlife Refuges, riparian restoration efforts are ongoing within mesquite and cottonwood-willow communities. The MSCP designs the most efficient water distribution systems for these areas including laser-leveling and distributed inflows to minimize the amount of water needed. Efforts are underway to more precisely determine restoration water use within the context of overall refuge water needs, as part of a larger effort to identify long-term water needs for future refuge and MSCP projects.

Endangered razorback sucker have been naturally reproducing and increasing in population size in Lake Mead National Recreation Area. The Lake Mead population has recently been named as one of the core populations in the Lower Colorado River Basin as part of the Recovery Goals.

## Glen Canyon Dam Adaptive Management Program

The Glen Canyon Dam Adaptive Management Program (GCDAMP) provides an organization and process for cooperative integration of dam operations,



downstream resource protection and management, and monitoring and research information. The Program goals also include improving the values for which the Glen Canyon National Recreation Area and Grand Canyon National Park were established.

The FWS provides technical support to the (GCDAMP) to conserve the endangered humpback chub and other native fish, and riparian-dependent Neotropical songbird species including the endangered southwestern willow flycatcher. These cooperative efforts are in accordance with the Grand Canyon Protection Act and various water laws that pertain to water releases and hydropower production.

### **Draft Environmental Assessment of Non-Native Fish Control Downstream from Glen Canyon Dam**

Reclamation's Upper Colorado Region proposes to control non-native fish downstream from Glen Canyon Dam in an effort to help conserve endangered fish species in the area. The non-native fish control efforts would be located within Glen Canyon National Recreation Area and Grand Canyon National Park, Coconino County, Ariz. The purpose of the action is to minimize the negative impacts of competition and predation on an endangered fish, the humpback chub in Grand Canyon. Rainbow trout and brown trout are not native to the Colorado River Basin and are managed as sport fish. An additional purpose of this Environmental Assessment is to evaluate, in an adaptive management framework, the effectiveness of conducting these nonnative fish control actions in conserving the endangered humpback chub and other native fishes.

## **Draft Environmental Assessment for the Development and Implementation of a Protocol for High-flow Experimental Releases from Glen Canyon Dam**

Reclamation is also developing an Environmental Assessment regarding a protocol for high-flow experimental releases from Glen Canyon Dam to better determine whether and how sand conservation can be improved in the Colorado River corridor downstream of Glen Canyon Dam including areas within Grand Canyon National Park.

Under the concept of high-flow experimental releases, sand stored in the river channel is suspended by high-volume dam releases and a portion of the sand is redeposited in downstream reaches as sandbars and beaches, while another portion is transported downstream by river flows. These sand features and associated backwater habitats provide key wildlife habitat, protect archaeological sites, enhance riparian vegetation, and provide camping opportunities along the Colorado River in Grand Canyon National Park. This protocol for high-flow experimental releases from Glen Canyon Dam is part of the ongoing implementation of the Glen Canyon Dam Adaptive Management Program.

## **Invasive Species Control**

In addition to the many recovery and restoration efforts in the Colorado River Basin, Interior has recognized the importance of addressing the threats associated with invasive species.

The spread of zebra and quagga mussels cause significant impacts and damage to operation and maintenance of water storage, water delivery, and hydropower structures and systems and will negatively impact recreational uses and aquatic ecosystems. Reclamation is concentrating on proactive measures to help reduce the post-introduction spread and impacts of the mussels to



Reclamation facilities and structures. These efforts reduce the need for time-consuming and more costly eradication measures.

In the lower Colorado River, Reclamation is working with partners to share information and coordinate the response to the current infestation. Additionally, Reclamation is reaching out to inform the public how to prevent the spread of mussels and implementing an action plan for mussel detection strategies. Reclamation is also incorporating preventive maintenance activities and implementing internal control measures to prevent Reclamation employees from spreading mussels while working on the River. Reclamation also completed a risk assessment of invasive mussel infestation for Willow Creek Reservoir, Granby

Reservoir, Shadow Mountain Reservoir, Grand Lake, and Lake Estes of the Colorado-Big Thompson Project.

In connection with its general research activities, Reclamation has redirected research and development funding to study potential operation and maintenance and control measures. These activities include testing anti-fouling and other coatings, evaluating biocides (new, experimental bacterial biocides as well as traditional chemicals), investigating other repelling and operational techniques, assessing mechanical removal methods, experimenting with exclusion of larvae through filtration of intake water, and supporting foreign exploration for natural enemies. Researchers are also improving ways of monitoring and detecting mussels in western waters.

The FWS and NPS are also addressing issues relating to the invasive mussels. For example, the rapid proliferation of non-native quagga mussels in Lake Mead has adversely affected operations at Willow Beach National Fish Hatchery (NFH) located downstream of Hoover Dam. To address the quagga mussel threat to razorback sucker rearing operations, Willow Beach NFH is converting its water supply from river inflow to well water to provide a quagga-free water source. The FWS is also making hatchery infrastructure modifications to prevent the presence of quagga mussels in its razorback sucker rearing facilities. In addition, Willow Beach National Fish Hatchery is partnering with Reclamation to test filtering methods for eliminating veligers from water supplies. At the Dexter National Fish Hatchery and Technology Center, in New Mexico, research on methods of chemical elimination of veligers, the larval stage of the quagga mussel, from hatcheries is ongoing. The National Park Service has actively worked to prevent the spread of aquatic invasive species (ANS). The NPS has developed specific invasive mussel containment and prevention strategies for protecting water resources in National Parks with the Colorado River Basin. Education and outreach efforts inform boaters to Clean, Drain, and Dry their boats before moving to a new location.

## **Salinity Control Efforts**

The threat of salinity and other water quality degradations is a major concern in both the United States and Mexico. Salinity affects agricultural, municipal, and industrial water users. Reclamation and the Bureau of Land Management (BLM) have undertaken salinity control work within the basin through various ongoing initiatives.

In June 1974, Congress enacted the Colorado River Basin Salinity Control Act, Public Law 93-320, directing the Secretary of the Interior to proceed with a program to enhance and protect the quality of water in the Colorado River for use in the United States and Republic of Mexico.

In October 1984, Congress amended the original act by passing Public Law 98-569. Public Law 104-20 of July 28, 1995, authorizes the Secretary of the Interior, acting through Reclamation, to implement a basin-wide salinity control program. The Secretary may carry out the purposes of this legislation directly, or make grants, enter into contracts, memoranda of agreement, commitments for grants, cooperative agreements, or advances of funds to non-federal entities under such terms and conditions as the Secretary may require.

The objective of the salinity control program is to minimize salt loading in the Colorado River System. Historically, total annual salt loading to the Colorado River was - approximately 9 million tons. About one half of the present salt load is attributed to natural sources such as erosion of lands and saline springs. The remainder of the salt load is human-induced, originating from irrigation practices and municipal and industrial sources.

Quantified economic damages resulting from salt loading and the concentrating effects due to the consumptive use of water could exceed \$400 million annually. These impacts accrue mainly to municipal, industrial, and agricultural water users in the Lower Basin of the Colorado River.

The BLM plans to expend \$750,000 in 2012 for Colorado River Basin Salinity Control Program activities. The funding will be used for on-the-ground projects that reduce erosion and sediment transport to Colorado River tributaries, as well as to support an ongoing collaborative study with USGS, Pacific Northwest National Laboratory, and universities using remote-sensing analyses to assess impacts to watersheds from climate-induced changes to plant communities.

On October 21, 2011, Reclamation awarded \$20.1 million to four irrigation districts in western Colorado to improve irrigation delivery systems and reduce the amount of salinity in Colorado River water. The grants will fund installation of more efficient water delivery infrastructure, including lining of canals and laterals, and conversion of existing laterals into pipe delivery systems and will prevent more than 20,000 tons of salt from entering the Colorado River system each year.

In May of 2010, Reclamation and water agencies in the three Lower Colorado River Basin States of Arizona, California and Nevada began the year-long pilot run of the Yuma Desalting Plant in Arizona to collect performance and cost data as the plant desalts or reclaims irrigation drainage water. The project was completed in March 2011 ahead of schedule and under budget. The plant operated effectively and efficiently and recycled approximately 30,000 acre-feet of irrigation return flow water which was included in Colorado River water deliveries to Mexico, allowing more Colorado River water to remain in Lake Mead.

## **WaterSMART Clearinghouse**

The WaterSMART Clearinghouse established through the Executive Order establishing the WaterSMART program has proven to be a successful repository for documents and information regarding the WaterSMART program, and has included documents, events and publications that relate to the Colorado River Basin. See <http://www.doi.gov/watersmart/html/index.php>. The Clearinghouse serves as a public resource to provide leadership and assistance to state and local governments, tribal nations, and others in coordinating and integrating water conservation and sustainable water strategies. The Clearinghouse provides an opportunity for interested governmental entities, water user and supplier organizations, conservation and scientific organizations, and others to identify best practices in water conservation incentives and the most cost-effective technologies that stretch existing water supplies, and actions that integrate energy and water policies. Through the WaterSMART Clearinghouse, Interior also facilitates access to and information sharing for relevant grants and funding opportunities and other programs. With respect to the Colorado River Basin, the Clearinghouse provides an opportunity to highlight Interior's activities in the Upper and Lower Basin and allows stakeholders to provide input as well.

## **WaterSMART connections to the America's Great Outdoors Initiative within the Colorado River Basin**

Through efforts such as the America's Great Outdoors initiative, Interior is emphasizing the value of connecting people to the outdoors and the role that recreational opportunities play in providing benefits to local communities. Interior recognizes the importance of the recreational values that support healthy economies within the Colorado River Basin. Projects were recently identified in all 50 states. Colorado River Basin projects include the Rio Salado Urban Park in Phoenix, Arizona, including the development of a new recreation area near the shore of Lake Pleasant Regional Park on lands managed by the BLM, Reclamation and Maricopa County Parks, and building and maintaining 18 to 20 miles of trails within the Rio Salado Habitat Restoration Area.

Similarly, an America's Great Outdoors project at Lake Havasu provides boating, fishing, camping and other outdoor recreation opportunities for approximately 2 million visitors a year. A proposed new trail along the lakeshore will connect the city to two national wildlife refuges, three state parks, fishing facilities, and camping facilities. A Youth Conservation Corps team will conduct restoration work at the project in 2012.



In March 2012, the USGS will co-host the Lake Mead symposium with the Nevada Water Resources Association to highlight the results of a Lake Mead National Recreation Area Aquatic Ecosystem synthesis report to be completed in March 2012 that summarizes existing information and research needs relating to water quality, wildlife and biological resources, and threats and stressors to the aquatic ecosystem. The report is a product of extensive cooperation involving the FWS, Reclamation, the NPS, the Southern Nevada Water Authority, the Nevada Division of Wildlife and universities.

Through its National Fish Hatcheries program, FWS employs reuse and recirculation strategies to rear native and mitigation sport fish. Other improvements within the hatchery programs include using net pens at the Willow Beach National Fish Hatchery and covering hatchery raceways to reduce evaporation rates in rearing units, allowing more spring water to leave hatchery property and flow to the Colorado River. These modifications create efficiencies in energy and water use for razorback sucker rearing.

In addition to recognizing the benefits associated with healthy ecosystems through the America's Great Outdoors initiatives, Interior is undertaking other efforts within the Colorado River Basin to protect land and water. For example, the BLM has developed a Healthy Lands Initiative, promoting partnerships with adjacent land owners and stakeholders to improve or maintain watershed function through focused vegetation treatments that restore desired plant communities which are resilient to climate-induced stressors. The BLM plans to expend about \$3,800,000 in Fiscal Year 2012 on Healthy Lands Initiative projects within the Colorado River Basin.

The BLM developed an Assessment, Inventory, and Monitoring Strategy and is implementing key provisions of the assessment. Internal working groups are establishing sets of terrestrial and aquatic core indicators and methodologies to ensure consistent and comparable data are collected for landscape and national monitoring efforts. The BLM and the Department of Agriculture's Natural Resources Conservation Service (NRCS) entered into a long-term agreement for collecting monitoring data from hundreds of sites on public lands using protocols developed for NRCS National Resource Inventory monitoring of non-Federal lands.

## **New Energy Frontier**

Energy development is one of Interior's major focus areas, emphasizing the important contribution of responsible energy development from conventional and renewable resources on our public lands. There are several examples within the Colorado River Basin of the integration of energy and water issues.

## Hydropower production



Hydropower is our nation's primary source of renewable energy and one of the primary and most obvious connections between energy and water. Reclamation is the second largest U.S. producer of hydroelectric power and annually generates more than 41 billion kilowatts of energy – which is enough to meet the electricity needs of 3.5 billion homes. Reclamation estimates it would take 33 average sized coal fired plants to replace Reclamation's hydropower production. Within the Colorado River Basin, revenue from the hydropower sales contributes over \$16 million per year to the Colorado River Salinity Control Program, the Glen Canyon

Dam Adaptive Management Program, and the Upper Colorado River and San Juan River Endangered Fish Recovery Programs. In general, Colorado River Storage Project facilities generate close to \$150 million in total revenues.

Reclamation is working to generate more power through efficiency improvements and operational optimization at existing hydropower facilities. In March 2010, Interior entered into a Memorandum of Understanding with the Department of Energy and the U.S. Army Corps of Engineers to improve hydropower production within the United States. Interior is actively participating in several hydropower initiatives which involve coordination with other federal agencies and non-governmental organizations and stakeholders.

In March 2011, Reclamation completed an assessment of additional hydropower potential at its existing structures and found economically feasible development potential at almost 200 sites, including several within the Colorado River Basin. See

<http://www.usbr.gov/power/AssessmentReport/USBRHydroAssessmentFinalReportMarch2011.pdf> Reclamation is currently evaluating additional hydropower potential within existing conduits and canals and anticipates a release of a summary report in early 2012.

In November 2011, Reclamation issued a draft of revised procedures for hydropower development on Reclamation-owned property through leases of power privilege. Public comments are being accepted through January 2012. The goal of the revisions is to make the process of developing power at Reclamation's facilities easier and more transparent.

## Other renewable energy potential

The WaterSMART program recognizes the connection between energy and water and encourages energy conservation. In November 2011, Reclamation issued a

funding opportunity announcement for WaterSMART Water and Energy Efficiency projects. The funding criteria reward projects that address energy conservation issues as well as water conservation. The most recent WaterSMART Water and Energy Efficiency Grant awards included 25 energy-water integrated projects.

In addition, within Reclamation's own projects it may be possible to add renewable energy components to existing projects such as solar panels or wind turbines that could provide power for normal operations such as pumping. In the Colorado River Basin, Reclamation recently partnered with the National Renewable Energy Laboratory to analyze renewable energy opportunities for the Navajo-Gallup Project.

## **Analysis of Water-Related Impacts of Conventional and Renewable Energy Development**

The WaterSMART program recognizes that energy production may have impacts on water supplies and Interior has taken steps to ensure that energy production occurs responsibly on our public lands. For example, the BLM uses its ongoing minerals leasing, land-use authorization, and land-use planning processes to address potential water impacts associated with energy production.

The BLM uses best-management practices to ensure compliance with the Clean Water Act, minimize erosion and storm-water runoff, protect water quality, and dispose of produced water. The BLM developed policies to incorporate pre-application and screening processes for renewable energy projects, including provisions for minimizing water demands and ensuring adequacy of water supplies.

In general, BLM, FWS, USGS and Reclamation work to improve communication and coordination with other federal agencies and the Western States Water Council through the WestFAST group. All of these practices benefit water supplies within the Colorado River Basin. WestFAST is collaboration among 11 Federal agencies with water management responsibilities in the West. WestFAST supports the Western States Water Council and the Western Governors Association and coordinates Federal efforts regarding water resources. WestFAST emphasizes proactive, voluntary, participatory, and incentive-based approaches to water resource management and conservation assistance programs through the Western States.

The USGS participates in collaborative efforts to evaluate and mitigate adverse impacts to water supplies as a result of energy development. Within the Colorado River Basin, USGS works with several federal and non-federal partners on a data assessment of the groundwater impacts associated with oil and gas development in the Piceance Basin in Western Colorado and an initial report is anticipated to be completed in December 2011.

## **Efforts to Reduce Interior's Energy and Water Footprint**

The WaterSMART initiative also encourages energy and water efficiency with respect to building operations and seeks to reduce the “water footprint” of Interior’s operations. Within the Colorado River Basin, Reclamation recently completed construction of a new office building in Boulder City, Nevada that received LEED Platinum certification. The building is 50 % more energy efficient than current operations and uses 30% less water due to reuse of cooling water for landscaping and toilets.

## **WaterSMART Programs Addressing Resource Management - Challenges Associated with Climate Change**

To help address the challenges associated with protecting natural resources from the impacts of climate change, on September 14, 2009, Secretary Salazar initiated a coordinated strategy to address current and future impacts of climate change on America’s land, water, wildlife, cultural-heritage and tribal resources. There are several climate-related actions underway within the Colorado River Basin.

### **Climate Science Centers**

The USGS established the South West Climate Science Center at the University of Arizona (U of A) in June of 2011. The U of A is working with a consortium of partners including the University of California – Davis, UCLA, University of Colorado, Desert Research Institute in Nevada and Scripps Institution. An interim director brought the center into operational status and approximately \$200,000 of science projects began this year.

### **Landscape Conservation Cooperatives**

The Southern Rockies Landscape Conservation Cooperative (LCC) and Desert LCC are two of 21 LCCs created pursuant to Department of the Interior Secretarial Order 3289 to address the impacts of climate change on America’s water, land and other natural and cultural resources. Each LCC formed a Steering Committee, which lead and direct all LCC activities.

The Southern Rockies LCC encompasses large portions of Arizona, Colorado, New Mexico, and Utah, as well as smaller parts of Wyoming, Idaho, and Nevada. A Steering Committee represents 11 Federal agencies, six State agencies, two tribes, and six NGOs. An Operating Plan includes an initial assessment of

stressors affecting natural and cultural resources, a general approach for identifying science needs, an initial description of science needs.

The Desert LCC covers portions of Lower Colorado River Basin within

### DOI Landscape Conservation Cooperatives



California, Nevada, Arizona and New Mexico and includes portions of Northern Mexico. A Steering Committee represents nine Federal agencies, five State agencies, five tribes, seven NGOs, and one international organization.

Areas of science and research at the Desert LCC may include the effect of long-term drought on the composition, abundance and distribution of species, the effect of reduced water availability on vegetation, wildlife and human populations, and the effects of soil dryness and increasing air temperature on wildfire susceptibility.

In 2011, Reclamation developed two funding opportunity announcements to provide financial assistance on a cost-shared basis for WaterSMART Applied Science Grants for the Desert and Southern Rockies LCCs. Seven projects received funding for the Desert LCC and two for the Southern Rockies LCC.

## SECURE Water Act Reports

In April 2011, Reclamation issued its Secure Water Act Section 9503 – Reclamation Climate Change and Water Report pursuant to Section 9503 of the SECURE Water Act, P.L. 111-11. See <http://www.usbr.gov/climate/SECURE/docs/SECUREWaterReport.pdf>. The report analyzed the potential impacts of climate change on several major river systems, and includes an extensive section on the Colorado River Basin.

The report synthesized existing peer-reviewed literature on climate change and also included an original assessment of climate change implications for snowpack and natural hydrology in the eight major Reclamation river basins. As required by the SECURE Water Act, Reclamation will submit another report in 2016

which will incorporate information generated through ongoing Basin Studies and West-Wide Climate Risk Assessments.

In August 2011, the USGS released its report pursuant to Section 9506 of the SECURE Water Act to analyze the existing information relating to climate change impacts on water and to identify where additional research is needed. (<http://www.doi.gov/news/pressreleases/loader.cfm?csModule=security/getfile&pageid=260567>)

## **Rapid Ecoregional Assessments**

In 2010, BLM launched seven Rapid Ecoregional Assessments (REAs) to improve the understanding of the existing condition of basin landscapes, and how conditions may be altered by ongoing environmental changes and land use demands. Two of the REAs impact the Colorado River Basin. The Colorado Plateau REA is underway and includes input from USGS and other agencies. The Sonoran Desert REA is also in progress.

REAs are called “rapid” assessments because they synthesize existing information, rather than conduct research or collect new data, and are generally completed within 18 months whereas preparation of a BLM land-use plan typically takes from 36 to 48 months to complete. REAs look across an ecoregion to more fully understand ecological conditions and trends, natural and human influences and look for opportunities for resource conservation, restoration, and development. They seek to identify important resource values and patterns of environmental change that may not be evident when managing smaller, local land areas.

The REAs provide regional information that will inform and benefit local management efforts and establish baseline ecological data to gauge the effect and effectiveness of future management actions. The REAs provide a science-based information platform for formulating coordinated, multi-agency strategies that can respond effectively to climate change, wildfire, and other environmental challenges that transcend local administrative boundaries.

## **Native American Nations**

Several recent Departmental efforts within the Colorado River Basin have highlighted the strong relationship between Interior and the basin Tribes and demonstrate ways Interior continues to closely coordinate with its Tribal partners in managing water supplies.

The Glen Canyon Dam Adaptive Management Program’s tribal liaison conducts significant outreach to the Tribes within the basin. The FWS coordinates with

Tribal partners within the basin, including using hatchery outflows to fill Colorado River Indian Tribes fishing ponds.

On the Colorado River Indian Tribes' Achii Hanyo Hatchery, raising fish in ponds is a more water efficient and successful practice than growing them in circulating water raceways. Pond outflows from the Achii Hanyo Hatchery are returned to the river to enhance back water habitats and associated riparian and wetland vegetation.



In addition to the ongoing efforts to address Tribal issues within the Colorado River Basin, recent significant progress in connection with Indian water rights settlements will bring stability and security to Tribal and non-Indian communities within the basin. The Animas-La Plata Settlement in Southwestern

Colorado resolves the water rights claims of the Southern Ute and Ute Mountain Ute claims within Colorado. Construction of the project was recently completed and recreation plans for the reservoir are under development.

In March 2009, President Obama signed the Omnibus Public Lands Management Act which included authorization of the Navajo Nation's water rights settlement agreement with the State of New Mexico which resolves the Tribe's claims to water rights within the Upper Colorado River Basin in New Mexico and provides for the construction of the Navajo-Gallup Pipeline Project that will deliver water to Indian and non-Indian communities in northwest New Mexico.



Resolution of the Navajo Nation's water rights claims within New Mexico's Colorado River Basin water apportionment protects water supplies within the other basin states. The legislation approving the settlement also provides a framework for a potential settlement between the Navajo Nation and the State of Arizona which would provide further certainty and security within the basin. In

October, 2011, the Navajo-Gallup project was identified as a high priority infrastructure project within the Colorado River Basin and construction will begin in the spring of 2012.

The Claims Resolution Act included approval of the settlement of the White Mountain Apache Tribe's water rights claims within the Colorado River Basin in Arizona. The settlement provides for the construction of the White Mountain Apache Tribe rural water system to greatly expand the current water delivery system to meet the critical drinking water needs of the reservation.



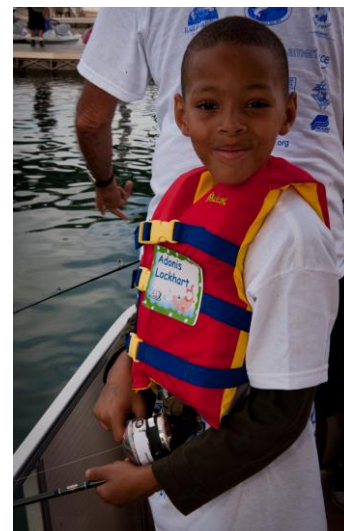
The Claims Resolution Act included over \$200 million in appropriations. On October 14, 2011 Interior Secretary Ken Salazar announced an initial award of \$11.8 million to the White Mountain Apache Tribal Government as part of a self-determination construction cooperative agreement to fund planning and design activities for the Miner Flat Project on the tribe's reservation in Arizona.

The Claims Resolution Act also included water rights settlements for five Pueblos within New Mexico. Those settlements rely on Colorado River Basin water from the San Juan – Chama Project and will provide water rights security and benefits to Indian and non-Indian communities.

Progress continues to be made to implement the Gila River Indian Community water rights settlement that was authorized in 2004 and provide other benefits to tribal members in Arizona.

## Youth Initiatives

Activities within the Colorado River Basin highlight Interior's priority initiative to empower and engage with young people. In November 2011, Assistant Secretary for Water and Science Anne Castle met with students and representatives of the Escuela Tlatelolco, a bilingual school in Denver, Colorado about WaterSMART programs within the Colorado River Basin such as the ongoing Basin Study. The students described their rafting trip along the Colorado River in Colorado where they learned about the importance of protecting the water quality of the river and preserving the river for future generations. The meeting was organized in connection with outreach efforts from Nuestro Rio, a group of Colorado River stakeholders that focus on the cultural importance of preserving the Colorado River.





Reclamation's C.A.S.T. (Catch a Special Thrill) for Kids program provides fishing and outdoor opportunities to disabled and underprivileged youth throughout the western states. In 2010 and 2011 successful Cast for Kids events were held within the Colorado River Basin at Lake Mead, Lake Powell, Lake Pleasant in Arizona, and Navajo Reservoir in New Mexico.

In 2011, Reclamation awarded nearly \$54,000 to the Great Basin Institute in Reno, Nevada for construction and restoration work on the Colorado Regional Heritage Greenway Trail Project and other trail systems by youth crews from the



Nevada Conservation Corps beginning in 2012. The restoration work will improve local recreation opportunities near the Colorado River and will provide young people an opportunity to work outdoors.

Reclamation, the City of Yuma and Quechan Tribe engaged a youth conservation corps to perform restoration work at the 350-acre Yuma East Wetlands located near downtown Yuma, Arizona. Through the project, the youth crews performed general trail maintenance, painted access gates, transplanted marsh, and cleaned out irrigation canals.



## Conclusion

This report represents a snapshot of Interior's WaterSMART activities within the Colorado River Basin and demonstrates the diversity and significance of several ongoing federal, state, tribal, local and non-governmental cooperative efforts that are underway. The report emphasizes the need to continue to coordinate efforts within the Basin to better sustain and manage water supplies for existing and future generations. The WaterSMART Task Force continues to evaluate the progress of the program and to address priorities as new challenges and opportunities arise.