



River REPORT

Fall 2007

A project of the Water Education Foundation

URBAN GROWTH AND WATER: States Seek New Supplies

By Sue McClurg

The ability to capture, store and deliver water from source to tap – often over great distances – helped create the West we know today. Much of the region's natural desert landscape has been transformed into vast acreages of irrigated farmland and sprawling metropolitan areas.

The Colorado River is a major source of water supply for many of these farms and cities. But a prolonged drought has taken its toll. Seven of the past eight years have been dry. Calculations of natural flow for the river at Lees Ferry, Ariz., show that since 2000, the average annual flow is the lowest eight-year average in 100 years of record keeping. System storage is

currently about 56 percent of average. In comparison, storage capacity on Oct. 1, 1999 was 97 percent.

The Colorado River system has proved to be remarkably resilient during this dry period, but the ongoing drought, continuing population growth and uncertainties about climate change have prompted water officials throughout the basin to seek innovative ways to stretch current water supplies and in some cases tap into new sources of supply.

Nevada is one of the fastest growing states in the nation, but is entitled to the smallest share of the Colorado River, 300,000 acre-feet per year. To help stretch that supply, the Southern Nevada Water Authority

(SNWA) has spent millions of dollars on water conservation – including paying homeowners to remove their lawns. The agency's top managers also have pursued developing new sources of water, including tapping in-state groundwater aquifers.

"Flexibility of resources is going to be key to managing water in the future," said Kay Brothers, assistant general manager for SNWA, an umbrella organization of seven water districts in the Las Vegas area.

SNWA will benefit from the proposed "intentionally created surplus (ICS)" credits designed to augment Colorado River supplies. ICS credits create "flexibility for the potential storage of additional conserved Colorado River water or non-Colorado River water in Lake Mead in the future," U.S.

"We can't create water or increase the supply. We can only hold back and redistribute what there is."

– Wallace Stegner, Living Dry

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Dear Readers

We have been exploring issues related to growth and water in the Colorado River Basin this year and it's been a very interesting learning experience. For this River Report, Sue McClurg looked at water supply, water demand and forecasted growth in the basin states, and proposals to develop new sources of water beyond water conservation, water recycling and other efficiency programs. Different agencies, cities and states are approaching these challenges in different ways, but all share the added complexity of trying to plan for the uncertain effects of climate change.

Earlier this spring, we worked with Rita Maguire on a joint project that addressed the question of how elected officials and water managers might successfully approach the interstate transfer, use and management of surface water and groundwater in the future. You can read about this topic and the viewpoints of seven Colorado River Basin water managers in our May/June Western Water, which was written by staff writer Gary Pitzer.

We remain committed to doing education programs in the Colorado River Basin and we appreciate your support for our Colorado River Project.



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The mission of the Water Education Foundation, an impartial, non-profit, organization, is to create a better understanding of water issues and help resolve water resource problems through educational programs.

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Basin Briefs

Upper Basin

Rick Gold Retiring

Throughout a career that has spanned 38 years, Rick Gold has seen many changes and faced many challenges in managing water in the Southwest. The Regional Director for the U.S. Bureau of Reclamation's (Reclamation) Upper Colorado Region, Gold will retire in September.

He began his career in 1969 working on the Central Utah Project. After stints in the Upper Missouri Regional Office in Billings, Mont., and Washington, D.C., Gold returned to the Upper Colorado Region's Durango office in 1983. In 1990 he was named deputy regional director, and assumed the role of regional director in 2000.

He points to many accomplishments, including the ongoing construction on the Animas La Plata Project (ALP), which began in 2002. When completed, ALP will fulfill the water rights settlement of the Ute Mountain Ute Tribe and the Southern Ute Indian Tribe. Gold said he first worked on the ALP in 1983 on issues related to Indian water rights settlement and cost-sharing agreements to allow the project to move forward.

"It gives you great understanding of what it takes to put a project together from planning to actually seeing a project constructed," Gold said.

Cooperation and compromise were important in two other programs in which he played a leading role – development of the Upper Colorado Endangered Fish Recovery Program and the San Juan River Fish Recovery Implementation Program. They were initiated in the late 1980s and early 1990s after the big river fishes of the Colorado River Basin were listed under the Endangered Species Act. The programs brought federal and state agencies, water and power agencies and public interest groups together to craft a



plan to recover the fish and provide for future water development for agricultural, hydroelectric and municipal uses.

The ALP and fish recovery programs are illustrative of how Reclamation's mission has changed and broadened in

the last three decades to include more focus on protecting and improving environmental resources.

The extended drought is one of the biggest challenges now facing the Colorado River Basin. Since 2000, seven out of eight years have been dry. "Drought is the nature of the beast in the water world. That's the very nature of the Reclamation program since its inception," Gold said, pointing the resiliency of the system's storage. "You build reservoirs to hold water for times of drought."

For the future, Gold believes there will be continued pressure on power generation and water supply as the Colorado River Basin continues to address the challenges of growth, sustainability and stretching the resource. •

Lower Basin

Invasive Mussels Spreading Throughout Southwest

Eight months after quagga mussels were discovered in Lake Mead, populations of the invasive mollusk have spread – most recently to Lake Powell. Previously they have been found in Lake Havasu, the Colorado River Aqueduct and the Central Arizona Project. Quagga mussels, like their cousin, the zebra mussel, multiply rapidly and can clog water delivery pipes and other mechanical equipment, causing millions of dollars in damages.

The Metropolitan Water District of Southern California (MWD) discovered about 800 mussels in the Colorado River Aqueduct in March and implemented weekly shock chlorination in early April at Copper Basin to help reduce larvae in the system. In July MWD closed down the aqueduct for 10 days for inspection

and to dry out – and destroy – mussel larvae.

In addition to wreaking havoc on water delivery systems, marinas and boat engines, quagga mussels alter the natural ecosystem. They can filter up to a liter of water per day, impacting the food chain of native fish and other aquatic wildlife by decreasing the food supply. The mussels are nearly impossible to totally eradicate.

Officials believe the mussels discovered in the Colorado River system were transported overland from the Great Lakes on a boat. Native to Eastern Europe, quagga mussels and zebra mussels were dumped into the Great Lakes in the 1980s along with ships' ballast water. They have caused more than \$1 billion in damages and clogged water pipelines and disrupted water distribution systems. •

FEATURE

Continued from front page

Bureau of Reclamation (Reclamation) officials said in a June 18 press release announcing the selection of a preferred alternative for proposed operational guidelines of Lake Powell and Lake Mead. Under the guidelines now being developed, the total volume allowed to be “credited” in Lake Mead, according to Reclamation, would initially be 2.1 million acre-feet, but this amount could be increased up to 4.2 million acre-feet in future years. A decision by the secretary of the Interior whether to adopt these new operational guidelines is expected in December.

Among other potential ICS projects, SNWA is considering providing funding for the Drop 2 Project, a regulating reservoir to be built adjacent to the All-American Canal in California to reduce over-deliveries to the Republic of Mexico. In exchange for funding the regulating reservoir, SNWA would receive at least 280,000 acre-feet of water and, depending on the cost of the Drop 2 Project, perhaps as much as 440,000 acre-feet; these details are still under discussion among the states that share the Colorado River.

And new water could come into the Colorado River system by way of seawater desalination plants. Colorado water users in the Lower Basin, includ-

ing SNWA, have expressed interest in evaluating the potential to construct desalination plants in Mexico in exchange for a similar amount of Mexico’s Colorado River water.

“We’re looking at augmentation – getting new water into the system,” Brothers said, adding that SNWA might consider paying for new water recycling plants in other cities that could, in exchange, provide “new” water for Southern Nevada and enhance Colorado River system water supplies.

“We need it. We need it for our economy,” she said. “We need it for a vibrant economy.”

Las Vegas is not the only city and Nevada is not the only state in the Colorado River Basin seeking more water.

In the Upper Basin, St. George, Utah – the nation’s fastest growing city in 2006 according to the U.S. Census Bureau – is pursuing plans to build a 130-mile pipeline and pumping system from Lake Powell to help meet new demands related to future growth. In Colorado, a private businessman has proposed building a pipeline to tap into the Colorado River at Flaming Gorge Dam on the Utah-Wyoming border to move water from the Green River (a tributary to the Colorado River) to cities on the Front Range.

“Colorado’s Front Range communities need water,” said Jeff Fassett, former

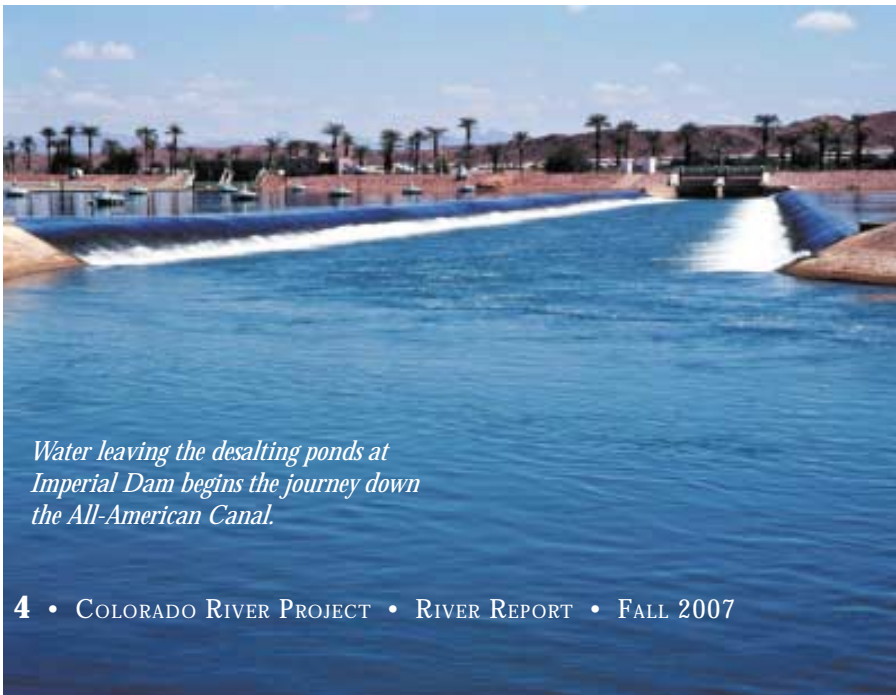
Wyoming state engineer and now director of water resources for HDR Engineering. The firm is representing project proponent Aaron Million. “Some of the communities that are potential customers are on deep non-tributary groundwater right now, which is not sustainable. They need to diversify their supply. The only other real option is converting ag land (and) Colorado is losing hundreds of thousands of acres of farmland every year with transfers from ag to urban uses.”

Fueling interest in projects such as the ones in Nevada, Utah and Colorado is the nation’s never-ending Westward expansionism. From 1900 to 1990, the region’s population increased some 1,500 percent, according to the U.S. Geological Survey (USGS) – nearly seven times the nation’s growth rate those same 90 years. From 1940 to today, the population of the seven Colorado River states (Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming) has increased from roughly 10 million to nearly 60 million. The Colorado River supplies water to 25 million people.

The Southwest remains a popular place in the 21st century, ranking as the fastest growing region in the country in 2006, according to the U.S. Census Bureau, with a projected population increase of 29 million more people by 2030. Within the region, Nevada, Arizona and Utah rank 1, 2 and 5, respectively, on the list of the five fastest growing states. Nevada and Arizona are projected to double their populations while Utah is expected to see a 50 percent increase by 2030.

New growth brings demands for more houses, more jobs, more schools and more water. But Nevada, Arizona and Utah rank as Nos. 1, 2, and 3, respectively, as the driest states in the nation. And coming in at No. 4 and No. 5 are two more Colorado River Basin states: New Mexico and Wyoming.

The region’s natural aridity has been overcome – to some extent – by development of myriad water projects,



Water leaving the desalting ponds at Imperial Dam begins the journey down the All-American Canal.

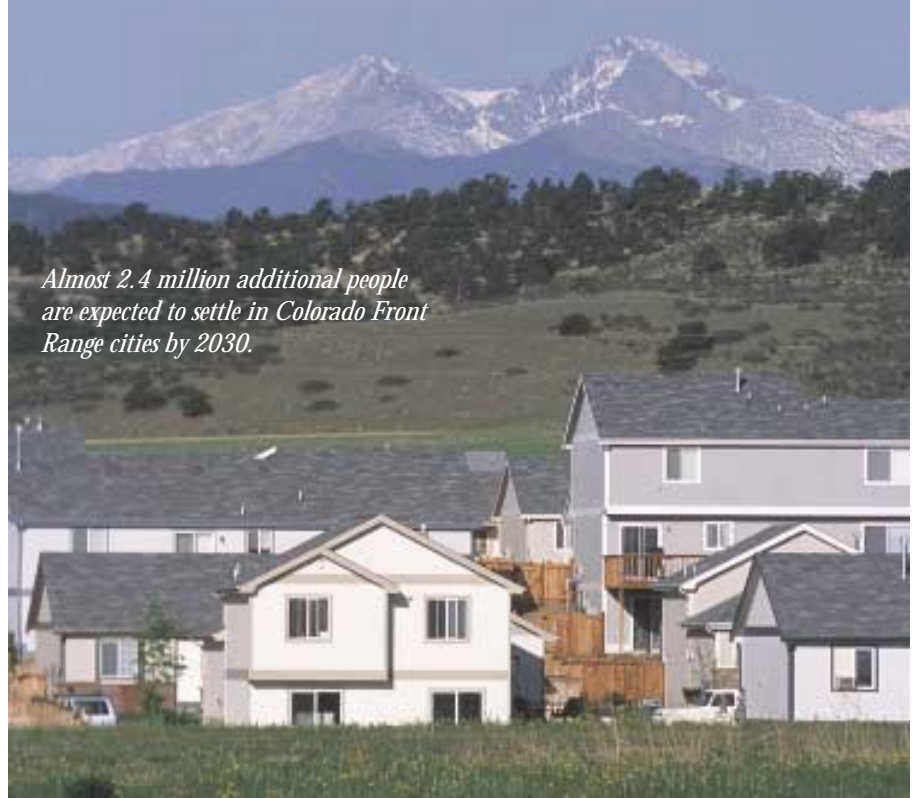
including major ones along the Colorado River. But as students of the river well know, the annual water supply as presumed in 1922 when the river was divided between the Upper and Lower basins later proved to be based on an unusually wet period.

The multiyear drought has helped bring that fact home, and climate change has raised the specter of less water. The reality of future climate change, however, is that its short- and long-term effects are uncertain, which makes planning for future supplies all that more difficult.

In general, climate models show a future of dry areas being drier and wet areas being wetter, said Brad Udall, director of the Western Water Assessment, a joint effort of the University of Colorado and the National Oceanic and Atmospheric Administration. In the Southwest, this generally means less precipitation in the deserts but the same or perhaps even more precipitation in the relatively wet headwaters of the Colorado. Unfortunately, Udall said, warmer springs along with decreased fall soil moisture from long dry summers may substantially reduce any runoff that results from increased precipitation.

"There have been seven major studies on how climate change will affect the Colorado River Basin since 1979 including three in the past three years," he said. "Adjusted for what we now think about our future climate in the basin – namely increasing temperatures and either slight decreases or increases in precipitation – all of these studies indicate that climate change will result in less runoff. The real question is how much less. The most recent credible studies show a range from a 10 percent reduction by 2100 to 50 percent less by 2050."

Current water uses, projected population and the potential for less runoff because of climate change lead to the perennial water and growth debate: Is there enough water to supply growth? Does having a supply of water encourage growth? Should growth be limited?



Almost 2.4 million additional people are expected to settle in Colorado Front Range cities by 2030.

But the link between growth and water is tenuous at best, according to Dan Luecke, an environmental consultant. "Few would contest the assertion that the availability of natural resources has a role in facilitating regional economic growth," he said. "But time and again, a careful review of empirical economic data leads to a surprising, but irrefutable, conclusion: investments in water supply systems do not have a noticeable impact on a region's growth."

While championing water use efficiency to help stretch supplies, the environmental organization Western Resource Advocates says one of the key issues is *how* (emphasis added) the West grows. "Patterns of urban and suburban growth on the landscape are closely connected to water use. Over a specific geographic area, water-efficient land development can save significant quantities of water while less efficient land development – sprawl – often results in wasteful use," the organization said in its 2003 report *Smart Water: A Comparative Study of Urban Water Use Across the Southwest*. The study's authors said their findings show that "water use efficiency improves through 'smart development.' Municipal zoning ordinances, land development standards, comprehensive plans, and intermunicipal regional plans all play key roles in creating sustainable

development and, as a result, more sustainable water use."

This issue of *River Report* explores the issue of water supply, water demand and forecasted growth in the Colorado River Basin. For more information on growth and water use in the Southwest, please see the May/June 2007 issue of *Western Water*.

Developing More Water for Colorado

Passage of the 1902 Reclamation Act resulted in a major federal investment in water infrastructure as Reclamation built more than 472 dams to capture, store and deliver water. The majority of those projects were designed to irrigate and help settle the West. But today, Reclamation is more focused on managing water projects and stretching supplies than constructing new projects.

With little to no federal funding forthcoming for major new dams and reservoirs, most new projects are being funded by state and/or local agencies. Some see private dollars as a potential financing mechanism. "An increasing number of people think the day and age of federal funding of water projects is long gone and that private funding is the way to go," said Don Ostler, executive director of the Upper Colorado River Commission.

In Colorado, private funding has been proposed as a way to bring to fruition a long debated and controversial idea – further tapping into the state’s Colorado River supplies and moving more water from the less-populated Western Slope to the rapidly growing Front Range cities.

Colorado’s population is currently 4.7 million, a 10 percent increase since 2000 according to census figures. From 2005 to 2006, Colorado was the eighth fastest growing state in the nation. According to the Colorado Water Conservation Board, its population is expected to increase 2.8 million by 2030. Almost 2.4 million of these additional people are expected to settle along the Front Range in cities such as Denver, Fort Collins, Colorado Springs and the South Metro area. The South Metro area, which includes the communities of Englewood, Littleton, Centennial, Highlands Ranch, Lone Tree, Parker and Castle Rock, now relies on deep bedrock aquifers for much of its water – and there is concern that this groundwater supply is not sustainable.

“We have the South Metro area growing at a very rapid pace and there currently is not a sustainable water

supply,” said Don Glaser, former executive director of the Colorado Foundation for Water Education and former deputy commissioner of Reclamation.

Glaser said it was originally thought that the bedrock aquifers held enough water to last at least a century. Studies have since determined it is more likely only a 20- to 50-year supply – and it is considered nonrenewable.

“We have to solve this problem as a state,” Glaser said. “We must find a way to support the South Metro area water supplier as officials work to implement a plan.”

In June the South Metro Water Supply Authority (SMWSA), comprised of 13 water providers in Douglas and Arapahoe counties, approved a regional master plan to reduce dependency on deep groundwater and meet future demands in Denver’s South Metro Area through renewable water sources. Among the measures identified include water conservation, water recycling and reuse and new sources of supply. There are two potential sources of supply for this area: transferring additional water

“Seven major studies indicate that climate change will result in less runoff. The real question is how much less.”

– Brad Udall

from farms – agriculture currently uses 90 percent of the state’s water – or further tapping into the state’s Colorado River supplies.

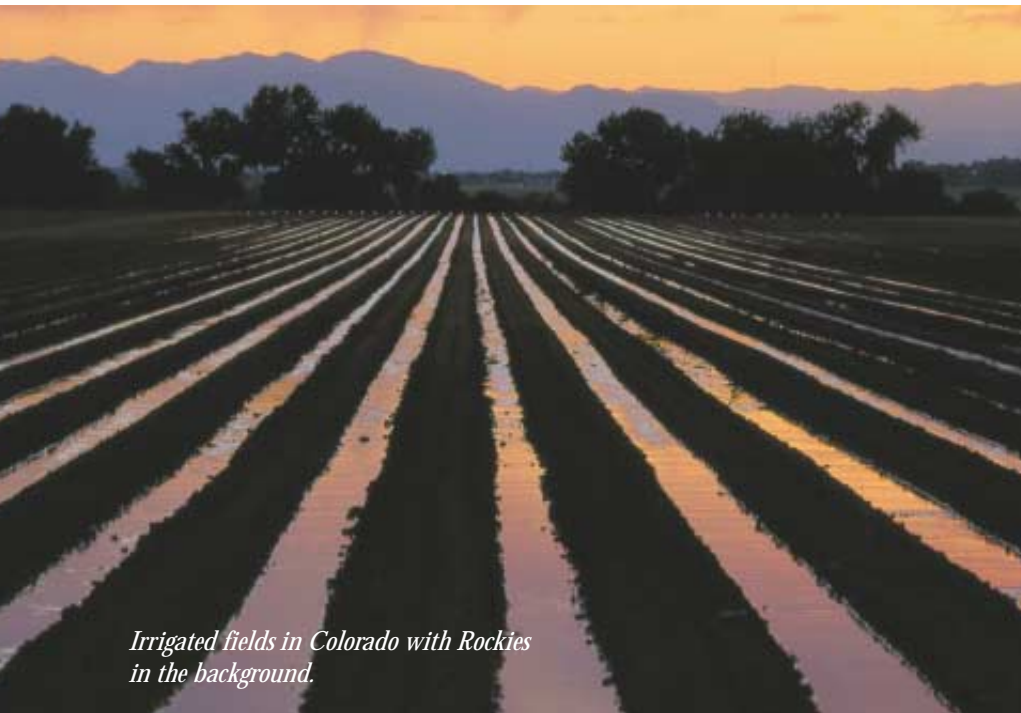
Large water projects designed to transfer Colorado River water across the state have been proposed and debated for many years. The most recent proposal by Million involves construction of a 400-mile, \$2 to \$3 billion pipeline from Flaming Gorge Dam to Colorado’s Front Range cities east of the Rocky Mountains.

“It’s an interesting proposal,” said Dennis Strong, director of the Utah Division of Water Resources. “It indicates a change in water development; it’s a mega development of the type in the past, but funded this time by private parties rather than public funds.”

The proposed project would be one way for Colorado to develop a portion of its remaining Colorado River allocation.

Flaming Gorge Reservoir can store up to 3.8 million acre-feet of water. Completed in 1963 by Reclamation, the dam generates power and provides recreation. Considering the need for instream flow releases for endangered fish and other recreation and hydro-power uses, Dave Trueman, manager of the Resource Management Division for Reclamation’s Upper Colorado Region, said Reclamation has determined that about 165,000 acre-feet from Flaming Gorge would be available for potential marketing and use as authorized under the Colorado River Storage Project Act. This is roughly between 25 percent and 35 percent of Colorado’s remaining unused allocation under the compacts.

The Flaming Gorge pipeline proposal is not the only major Colorado water development project suggested in recent years. The Colorado Aqueduct Return Project, known as the “Big Straw,” proposed to divert up to 750,000 acre-feet of water from the Colorado River near the Utah border and transport it over the Rocky Mountains to Front Range cities.



Irrigated fields in Colorado with Rockies in the background.

First proposed in 1988, the Big Straw was resurrected in 2003 when state lawmakers approved a \$500,000 feasibility study, estimating construction costs of \$3.7 billion to \$15.4 billion, depending on the route chosen and delivery capacity. The proposed pipeline project was defeated by voter referendum in 2003.

Meanwhile, the Northern Water Conservancy District has proposed development of the Yampa River pumpback plan, which would withdraw Yampa River water and send it through a 250-mile network of pipelines, pumps and reservoirs to the Front Range; providing 300,000 acre-feet annually. The district, which includes eight counties on the Front Range and in northeastern Colorado, said a study shows that the \$3.2 billion plan is technically feasible. Three proposed pipeline routes are being studied. Reservoirs at both ends of the project would hold more than 500,000 acre-feet of water.

The proposed projects have raised many political issues related to the state's ongoing West Slope-East Slope water debate and the common practice in recent years of transferring water from farms to cities to meet new demands for water. In 2000, population on the eastern slope of the Rockies, including the Front Range, was 3.8 million; irrigated acreage was 2.2 million. The West Slope, in contrast, has a population of 467,000 and 880,000 irrigated acres.

"The growth and water debate is long running," Fassett said. "The defeat of Denver's Two Forks Project 20 years ago was based in part on anti-growth forces. If you look at the population changes along the Front Range of Colorado, I don't think this project defeat slowed growth at all."

But Luecke, a major opponent of Two Forks, said he and others opposed it for environmental and economic reasons, favoring water

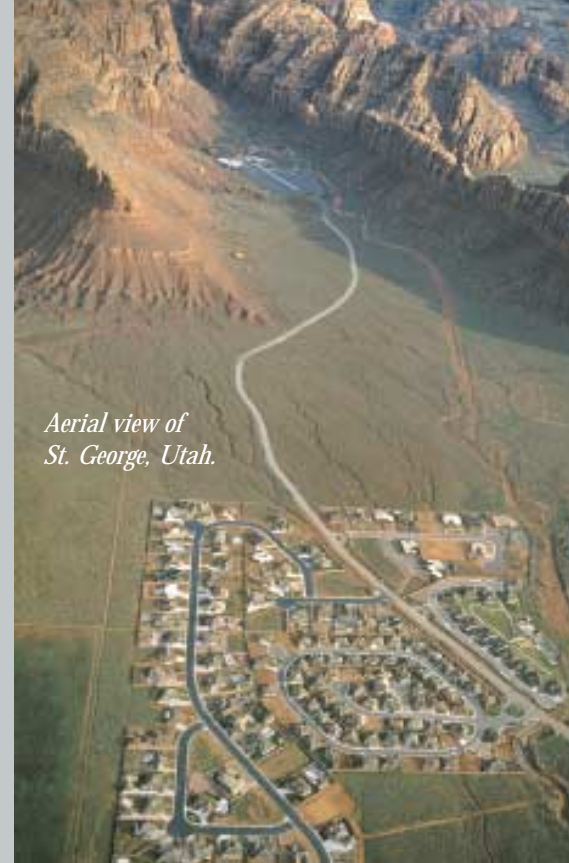
Tapping into Lake Powell

Located in the southwestern corner of Utah near the Arizona and Nevada borders is the city of St. George. Surrounded by mountains and red sandstone buttes and close to Zion National Park and Bryce Canyon Park, St. George is a popular tourist destination. Although it has some of Utah's hottest temperatures in the summer, the city's mild winter temperatures are favored by retirees and wintertime residents known as "snowbirds."

St. George and the surrounding region have experienced rapid growth. In 2005, the St. George metropolitan area had 126,000 people and, according to the U.S. Census, ranked as the fastest growing metropolitan area in the nation – with a 39.8 percent population increase between 2000 and July 1, 2006. Its economy also has boomed.

Meanwhile, average annual precipitation for this area – Washington, Kane and Iron counties – is about 8 inches per year, according to USGS. The Utah Division of Water Resources says current water projects will only meet water demands in these three counties until 2020.

Last year, the Lake Powell Pipeline Development Act was authorized, paving the way for a \$500 million, 120-mile pipeline that will ultimately deliver around 70,000 acre feet of water annually to Washington County (St. George), with some water also planned for Kane County (10,000 acre-feet) and central Iron County (20,000 acre-feet). Water for the pipeline is expected to come out of Utah's allocation of Colorado River water. Utah was allocated 23 percent of the Upper Basin's Colorado River water, 1.7 million acre-feet based on the 7.5 million acre-feet basic allocation; 1.38 million acre-feet based on the 6 million acre-feet commonly used as amount of water available for Upper Basin development. Cur-



Aerial view of St. George, Utah.

rently, Utah is using about 950,000 acre-feet of Colorado River water annually. State officials expect it will take until 2020 to complete the pipeline.

The St. George pipeline was first proposed 15 years ago and it has generated considerable debate. Many people have pushed for more local water conservation rather than developing new supplies. According to the Utah Division of Water Resources, water use in Utah in 1995 was 321 gallons per capita per day. To help meet water demands, the state has set a goal of reducing consumption by at least 25 percent by 2050 to 240 gallons per capita per day. According to the Utah Foundation, water use in Utah in 2000 was 293 gallons per capita per day.

"Even with water reuse, water conservation and even ag land conversion, they need new water," said Eric Millis, deputy director of the Utah Division of Water Resources.

But environmental groups oppose the project, contending that climate change is likely to substantially reduce the amount of water available in Lake Powell and other Colorado River reservoirs. "There's not going to be water to feed the pipeline," said Richard Ingebretsen of the Glen Canyon Institute. "Where will the water come from?"



Flaming Gorge Dam.

transfers, water conservation and water recycling to help meet new demands. “Two Forks, proposed in the late 1970s, was the last dance of the dinosaurs,” he said. “It was proposed by those who believed in a water-growth link where none actually existed and for whom expansion was the only way to deal with natural resources supplies.”

Colorado’s Statewide Water Supply Initiative (SWSI) completed in 2004 found that overall, annual municipal and industrial demands are expected to increase by about 630,000 acre-feet between 2000 and 2030, an increase of about 53 percent over 2000 levels. The report also projects that the Front Range will continue to comprise over 80 percent of the state’s populace in 2030. According to SWSI, projects, including water conservation programs, being implemented by local districts have the ability to meet 80 percent of Colorado’s urban water needs through 2030 – how to supply the remaining 20 percent is the issue. Big water projects that tap into the Colorado River and/or its tributaries remain on the table, as do additional conservation programs and ag to urban water transfers.

When it comes to transporting Colorado River water to help meet growth demands on the Front Range, Jim Lochhead, an attorney with Brownstein Hyatt Farber Schreck and former director of the Colorado Department of Natural Resources, said one of the biggest questions is how much Colorado River water the state actually has.

The 1948 Upper Basin Compact set an annual 50,000 acre-feet apportionment for Arizona with the remaining water divided among the four Upper Basin states on a percentage basis. Colorado was allocated 51.75 percent. If the Upper Basin were to receive its entire 7.5 million acre-feet allocation, Colorado would receive approximately 3.9 million acre-feet a year. But because of hydrologic factors and delivery requirements to the Lower Basin and the Republic of Mexico, officials say the Upper Basin’s annual supply is closer to 6 million acre-feet, providing Colorado with about 3.1 million acre-feet per year; the state currently is using about 2.6 million acre-feet of Colorado River water a year.

“The reassessment of how much water Colorado has underpins all plans,” Lochhead said. One of the biggest uncertainties for the Upper Basin as a whole is the potential for a Compact call, a requirement that would force Upper Basin states either to reduce post-Compact uses or release water from reservoirs upstream of Lake Powell to fulfill their delivery obligation to the Lower Basin. “If Colorado ever were asked to curtail use under the Compact – how much water should remain ‘undeveloped’ as a hedge against such a situation?” Lochhead asked.

Citing similar concerns, the Colorado River Water Conservation District Board voted in July to seek a delay in federal review of Million’s proposed project “at least until Colorado can determine first

how much water the state can develop under the Colorado River Compacts of 1922 and 1948, and what demands exist for that water.” The Board also said the state “must better define how compact curtailment would work during a shortage before Million’s project should move forward.”

Finding More Water in the Lower Basin

Arizona, Nevada and California have long been the driver of growth and water development in the Colorado River Basin. Unlike the Upper Basin, the Lower Basin has fully developed its supply.

Growth is expected to continue and water shortages loom as a possibility – especially given the prolonged drought and the uncertainties about potential impacts of climate change. In response to these issues, the Department of the Interior initiated development of guidelines setting conditions under which a shortage would be declared in the Lower Basin as well as a plan to coordinate the operation of Lakes Mead and Powell under low-water conditions.

These guidelines also will allow Lower Basin water users the ability to conserve and store water in Lake Mead and take delivery of this water at a later date.

Already, two California entities, the Metropolitan Water District of Southern California (MWD) and the Imperial Irrigation District (IID), are taking part in an ICS demonstration program. In 2006, MWD banked 50,000 acre-feet from its conservation/fallowing/crop rotation program with Palo Verde Irrigation District. This year, MWD can create an additional 50,000 acre-feet of water for storage in Lake Mead. Five percent of the water will immediately become system water, which will benefit all the Basin states. IID also entered into an agreement with Reclamation for a pilot program to create credits of 1,000 acre-feet each in 2006 and 2007. MWD and IID have stored this water in anticipation of Interior adopting guidelines to allow for the delivery of these credits.

Calendar

The states thought “outside the bucket” when they decided the system could be used like a bank account, said Herb Guenther, director of the Arizona Department of Water Resources (ADWR). “The ICS provides that the water belongs to the entity that created it. Usually Interior would divide the surplus.”

In 2006, the states also agreed to a joint study of the potential to implement a broad range of alternatives for augmenting river flows. The \$750,000 study, being financed and managed by SNWA, is to compile and review all practicable means for long-term augmentation of the Colorado River, including cloud seeding in the Upper Basin and, in the Lower Basin, ocean and/or brackish water desalination. The states also agreed to allow new water transfers.

In addition to stretching its share of the Colorado River, SNWA is developing in-state groundwater resources. In April, the Nevada State Engineer ruled that SNWA could pump 40,000 acre-feet of water annually from Spring Valley aquifers for 10 years, increasing to 60,000 acre-feet pending further environmental and hydrologic review. The agency had sought to pump 91,000 acre-feet each year from the rural area located 200 miles away near the Nevada-Utah border.

The project has generated its share of controversy from environmentalists and local ranchers who say pumping should not go forward absent a full understanding of the environmental consequences.

Brothers, however, said it is important to remember that Las Vegas accounts for 70 to 75 percent of Nevada’s economic engine and that SNWA is looking to only develop water that is not being used by local residents. SNWA left 8,000 acre-feet of water in the basin for the local residents to use in the future, Brothers said. For the Las Vegas region, the groundwater will buffer Southern Nevada from surface water droughts. “We don’t have an ag buffer like the other Colorado River

September

- 17-18 **Western Water Law SuperConference**, sponsored by CLE International, Las Vegas, NV, Contact: 800-873-7130 Web: <http://www.cle.com/>

October

- 1-2 **Utah Water Law SuperConference**, sponsored by CLE International, Salt Lake City, UT Contact: 800-873-7130 Web: http://www.cle.com/product.php?proid=874&page=Utah_Water_Law_SuperConference
- 2-4 **Sustaining Colorado Watersheds**, sponsored by Colorado Watershed Assembly, Breckenridge, CO. Contact: 970-872-2433 Web: <http://www.coloradowater.org/conference/index.htm>
- 10-12 **Water Policies and Planning in the West: Ensuring a Sustainable Future**, sponsored by Western Governors Association, Salt Lake City, UT Contact: 303 623-9378 Web: <http://www.westgov.org/wga/initiatives/water07.pdf>

November

- 7-9 **NWRA Annual Conference**, sponsored by National Water Resources Association, Albuquerque, NM Contact: 703-524-1544. Web: <http://www.nwra.org/meetings.cfm>
- 12-15 **Annual Water Resources Conference**, sponsored by American Water Resources Association, Albuquerque, NM Contact: 540-687-8390 Web: <http://www.awra.org/>
- 14-16 **Western States Water Council Annual Meeting**, Phoenix, AZ Contact: 801-561-5300 Web: <http://www.westgov.org/wswc/155mtg.html>
- 29-30 **52nd Annual New Mexico Water Conference**, sponsored by New Mexico Water Resources Research Institute Santa Fe, NM Contact: nmwrrri@wrrri.nmsu.edu Web: <http://wrrri.nmsu.edu/conf/conf07/conf.html>

December

- 12-14 **2nd Annual Colorado River Water Users Association Conference: Global Changes, Local Impacts**, sponsored by the CRWUA, Las Vegas, NV Contact: 760-398-2651 Crystal Thompson cthompson@cap-az.com Web: <http://www.crwua.org/>

January

- 14-15 **Nevada Water Law SuperConference**, sponsored by CLE International Reno, NV Contact: 800-873-7130 Web: <http://www.cle.com/seminars.php?page=2&ord=date&ordby=ASC>
- 24-25 **Rio Grande SuperConference**, sponsored by CLE International Albuquerque, NM, Contact: 800-873-7130 Web: <http://www.cle.com/seminars.php?page=2&ord=date&ordby=ASC>

February

- 15-18 **11th Annual Salton Sea International Bird Festival**, Imperial, CA Contact: 760-344-5359

Contact Sue McClurg with your calendar items from July 2007 through December 2007 for inclusion in the Summer issue of River Report, smcclurg@watereducation.org or 717 K Street, Suite 317, Sacramento, CA 95814



Interior view of the Yuma Desalting Plant.

Desalting the Colorado River

The Yuma Desalting Plant began desalting water for the first time in 14 years in March 2007. The plant ran at 10 percent capacity for 90 days to test its operation capabilities and study its effects on the Ciénega de Santa Clara wetlands south of the U.S.-Mexico border.

The plant desalted about 4,200 acre-feet of irrigation water during the demonstration run. The desalted water was returned to the river, but Jim Cherry, manager of Reclamation's Yuma Area Office, thinks the plant could help fill the water supply/water demand gap facing the Colorado River Basin.

"Can this plant be used as a tool to help?" Cherry asked. "It all gets down to how much water is worth."

The federal plant was built to desalt agricultural return flows from Wellton-Mohawk Irrigation and Drainage District. The \$158 million plant was completed in 1992, and is intended to annually reclaim between 70,000 and 85,000 acre-feet of irrigation drainage water per year. Once most of the salt was removed, the treated water would be blended back into the Colorado River upstream of Morelos Dam and be included in Treaty-required water deliveries to Mexico. This would reduce the volume of release from U.S. reservoirs to meet these deliveries.

Before this year's March to May test run, the plant previously had operated at only one-third its capacity for approximately eight months in 1992 and 1993; operations were halted when flooding on the Gila River washed out the canal that carries water from the Wellton-Mohawk

District. The plant has since been maintained by Reclamation in "ready reserve" status at a cost of about \$5 million per year. The water from Wellton-Mohawk farms, meanwhile, has been allowed to bypass the plant, flowing south of the border and replenishing the 14,000-acre Ciénega wetlands.

With the ongoing drought and concerns about potential shortages, Arizona water officials have lobbied to bring the plant back on line, pointing out that the annual 100,000 acre-feet of bypass water is not being counted toward the United States' Mexican treaty obligation. The goal is to operate the plant to reduce the amount of bypass water but to not harm the Ciénega.

With completion of the test run, there is even discussion of using the plant to desalt drinking water instead of putting its desalted "product" water into the Colorado River. The Yuma area suffers from a high water table and that brackish groundwater is routinely pumped to manage this problem. Some have suggested the possibility of piping that brackish groundwater into the desalter and then somehow distributing it to Yuma and/or to other communities in the region. Those communities, in turn, would reduce their draw on the Colorado River allowing for more water to remain in Lake Mead. In turn, Wellton-Mohawk irrigation return flows would continue to flow to the Ciénega. •

states and aggressive water conservation reduces your ability to cut resources in a drought," she said. "It makes groundwater more important."

In 2006, Arizona assumed the title of the fastest growing state over neighbor Nevada, which had ranked first for 19 years. Arizona Department of Economic Security projections indicate that by 2050 an additional 6 million people will live in Arizona.

Central Arizona Water Conservation District officials say the Central Arizona Project (CAP) service area is in good shape for water supplies until 2050. Beyond that, individual communities are pursuing water conservation, water recycling, water transfers and potential new sources of water. Arizona also could benefit under the ICS portion of the new rules for managing the Colorado River.

When it comes to groundwater, Arizona has five regions with actively managed basins where state officials have established long-term management plans, conservation strategies, regulations and enforcement mechanisms. Outside these areas, the ADWR reviews new plans for the availability of a 100-year supply of water, but the finding is advisory only and does not halt construction. A disclosure of "inadequate water" does have to be included to the initial buyer of the property but not to subsequent buyers. In 2005, the Arizona Republic reported that 35 percent of the applications processed since 2001 had received an inadequate finding from ADWR.

Modeling the Future

When it comes to planning for population growth and water supplies in the arid Southwest, climate change adds to the challenge. Traditionally, projections of future water supply needs have been based on past hydrology using historic stream gauge records. Some say modeling for the future must incorporate the potential impacts of climate change. But the long-term effects of climate change are unknown – and difficult to model.

Current global climate change models, said Terry Fulp, area manager of Reclamation's Boulder Canyon Operations Office, are difficult to use to accurately forecast runoff because they compute temperature and precipitation values of areas of several thousand square miles. "To be able to translate these values into projected runoff in a specific river basin or sub-basin, we need this data at a much finer scale," he said, "maybe on the order of 4 to 5 square miles." (The Colorado River Basin covers 246,000 square miles.)

"The majority of the climate models show that the Southwest will likely be drier in the future, but differ in their estimate of how much drier. In order to accurately determine the effects of climate change and assess what measures we might need to take to adapt, we need to be able to project future runoff and precipitation in individual river basins or sub-basins," Fulp said. "The Upper Colorado River has four major drainages: the Green River, the mainstem Colorado, the Gunnison River and the San Juan River. We need runoff projections in each of these to simulate operation of their reservoirs to adequately calculate the effects on Lakes Powell and Mead because typically these sub-basins operate independently."

Fulp said work is progressing on refining climate change models to allow for more detailed analysis of specific streams and watersheds and that this information could be available within two to five years.

Reclamation did, however, incorporate tree-ring reconstruction data in the operations model during its analysis of the preferred alternative for the proposed operational guidelines of Lake Powell and Lake Mead under low-water conditions. The tree-ring reconstruction for the past 500 years extended the written record of the Colorado River's flows. The reconstructions show an even greater variance in flows than previously thought, with drought a more common occurrence, according to a February



Southern Nevada is one of the fastest growing regions in the United States.

2007 report released by the National Academy of Sciences.

"Water managers realize that the past hydrology is not the way to plan for the future. But what can you do? Either be conservative and plan for the worst or limit growth and not develop beyond this point," said Colorado's Lochhead.

"But," he added, "development and water supply are still separate. There is no real discussion on a regional scale as to what are the limits to growth related to water supply. People need to start thinking about limits because we're not going to have more water so you either need to do something about growth or get per household use way down. In the meantime, we need to do two things: increase flexibility by allowing access to agricultural water by cities without destroying the ag economy, and look for ways to augment the supply of the river."

In the NAS report, *Colorado River Basin Water Management: Evaluating and Adjusting to Hydroclimatic Variability*, researchers say the combination of climate change and growth point to a future of less reliable water and the potential for conflict among existing and prospective new water users.

"A future of increasing population growth and urban water demands in a hydroclimatic setting of limited – and likely decreasing – water supplies presents a sobering prospect for elected officials and water managers," the *Colorado River Basin Water Management* report reads. "If the region's water resources are to be managed sustainably and continue to provide a broad range

of benefits to an increasing number of users, the realities of Colorado River water demand and supply will have to be addressed openly and candidly."

The NAS report recommends completion of a "comprehensive, action-oriented study of Colorado River region urban water practices and changing patterns of demand to help provide a more systematic basis for water resources planning across the region." As envisioned, the study would address and analyze, among other things, demographic projections, local and regional water demand forecasting and contemporary urban water polices and practices – conservation, landscaping and water use efficiency technologies.

What role, if any, water providers should play in planning for future growth remains open to debate. "Typically water managers take the population numbers from city and county governments; they're told this is what we need," said Utah's Strong. "But it is a valid concern to consider whether there will be enough water for more growth with the changes in climate, and other changes."

Upper Colorado River Commission Executive Director Ostler concluded that: "It is also important to realize that incorporating planning assumptions for future water supplies that include more variability due to climate and other factors does not necessarily mean planning for less development. It may mean planning for the same level of development but accepting and having a reasonable means to deal with a higher risk of shortage." •



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