

River REPORT

Fall 2008

A project of the Water Education Foundation

How is the Colorado River Shortage Agreement Working?

By Sue McClurg

A year ago, the Colorado River Basin was enduring the seventh dry year of the past eight. Inflow into Lake Powell was 68 percent of average and combined storage of Powell and Lake Mead was roughly 50 percent of capacity. Federal officials were finishing a plan establishing drought-related storage and deliveries for the reservoir system. And the seven basin states were negotiating agreements among themselves to address potential shortages and augment water supplies.

The federal plan came to fruition in December when Interior Secretary Dirk Kempthorne signed off on the Record of Decision (ROD) for the "Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated

Operations for Lake Powell and Lake Mead." The states, in turn, inked agreements designed to help meet new water demands while protecting water rights. It was a historic moment. As Kempthorne said then, "This is the most important agreement among the seven basin states since the original Colorado River Compact of 1922."

Flash forward to August 2008. While storage in the Colorado River Basin remains at drought levels, above-average precipitation in the Upper Basin resulted in higher-than-average runoff into Lake Powell. The level of the massive reservoir, which has a capacity of 27 million acre-feet, rose nearly 50 feet to a peak elevation of 3,634 feet in mid-July. And

under terms of the new coordinated reservoir operations, Lake Mead will benefit, too, because Powell is required to release more water to Mead.

No one expected the new Powell-to-Mead release requirement to take effect this soon, but it is a welcome development for a drought-stricken river system that supplies water to more than 25 million people and 3.5 million acres of farmland. "Even though we didn't think equalization would happen out of the box, the good news is we're prepared to manage it," said Lorri Gray, regional director of the U.S. Bureau of Reclamation's (Reclamation) Lower Colorado Region. "If we didn't have the agreement, we'd be very engaged [right

Continued on page 4



Lake Powell's elevation rose this year.

Dear Readers

The Colorado River is a fascinating study of water in the arid Southwest. Its waters are shared by seven states, dozens of Indian tribes and the Republic of Mexico – but those uses are strictly regulated and managed under the “Law of the River.” In December, a new document was added to this collection of compacts, an international treaty, legislation, U.S. Supreme Court decisions and federal administrative actions – the “Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead.”

This historic agreement set new equalization guidelines for storage in Lakes Powell and Mead, established shortage criteria for the Lower Basin and launched a program to encourage Lower Basin states to implement creative measures to stretch water supplies. That this agreement came on the heels of the 85th anniversary of the 1922 Colorado River Compact adds to its significance.

In this issue of River Report, Sue McClurg takes a look at what has happened in the months following the landmark agreement. Helped along by a wetter-than-normal winter, water users throughout the Colorado River Basin are implementing new programs to stretch existing supplies and researching projects to augment the river’s flows. Binational discussions are underway on water conservation and other projects that can benefit both the United States and Mexico. Major challenges remain, including shortage sharing rules for Mexico and restoring the environment, but it is encouraging to see the Colorado River’s many stakeholders working to find common ground.



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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

Lake Powell Pipeline Estimated to Cost \$1 Billion

The estimated cost of constructing the Lake Powell pipeline project to southern Utah cities is now \$1 billion, state officials announced in July. Prior estimates were \$800 million. The Utah Division of Water Resources (DWR) said higher costs, including fuel and steel prices, are the main reason for the increase.

Approved in 2006, the 139-mile pipeline will transport about 100,000 acre-feet annually from Lake Powell to Sand Hollow Reservoir – supplying

communities in and around St. George. An additional 35 miles of pipeline will be built from Sand Hollow Reservoir to Cedar City. The project will include pumping facilities at Lake Powell (as well as booster pumping stations along the way), seven hydropower facilities, and associated reservoirs and power transmission lines.

The 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 while others question whether sufficient supplies will exist in Lake Powell given drought conditions and climate change.

Dennis Strong, executive director of the Utah DVW, said the project will provide southern Utah residents with an unparalleled level of water-supply security when it is completed in 2020 and that it will be seen as a “worthy investment” when costs are amortized over a very long lifetime of pipeline service. •

Lower Basin

Arizona Subdivisions Must Prove Adequate Water Supplies

The Arizona Legislature has granted local governments the authority to require developers of new subdivisions to have a state certificate that assures that the water supply will last 100 years.

A water adequacy certificate will only be granted by the Arizona Department of Water Resources if the water supply is physically, legally and continuously

available for the next 100 years. In addition, water quality standards must be met, and the developer must demonstrate the financial capability to construct any necessary water shortage, treatment and delivery systems.

Before the new ordinance, a county board of supervisors was able to approve final plans as long as the first buyer was

aware that the water may run out. The new rule is a way of helping potential buyers from inheriting risks regarding the water supply available to their homes in their subdivisions, according to the legislation. •

Yuma Wetlands Restoration Receives \$1.4 Million

The U.S. Bureau of Reclamation (Reclamation) has awarded a \$1.4 million grant to continue Yuma East Wetlands restoration work in Arizona. The grant, announced in June, will initiate the fifth phase of the eight-year restoration and concentrate along the north side of the river channel on the Quechan Indian Tribe reservation.

The Yuma East Wetlands is a restoration site in Arizona covering

about 1,400 acres worth of native riparian, wetland and aquatic habitats along the lower Colorado River. The project includes reshaping the river channel, altering flows and removing non-native trees and replacing them with native cottonwood, willow and mesquite. The on-site work is expected to be completed by September 2009. •

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FEATURE

Continued from front page

now] in discussions on how to manage the additional runoff instead of implementing the agreement.”

Under the new rules, this year Powell released approximately 719,000 acre-feet additional water to Lake Mead. Normally, Powell releases 8.23 million acre-feet every year under terms established by the Coordinated Long-Range Operating Criteria that have been promulgated in conformance with the 1922 Colorado River Compact and the 1944 Mexican Water Treaty.

Even with the additional water from Powell, Lake Mead’s level will still drop after it meets its delivery requirements for the 2008 calendar year. However, Mead won’t decline as much as it would have without the new operating guidelines, easing concerns about the possibility of a shortage declaration for the Lower Basin.

“We thought a shortage [declaration] might be just two to three years out”

given drought conditions, said Roger Patterson, assistant manager for strategic water initiatives for the Metropolitan Water District of Southern California (MWD). “The additional supply for Mead has pushed that back.”

The Upper Basin “had a much better year than it’s had for a long time,” said Don Ostler, executive director of the Upper Colorado River Commission, noting that the last ski day at Utah’s Snowbird resort was June 18. The negotiations for the new tiered operating criteria were driven by drought conditions so it was somewhat surprising that the first year of implementation of the ROD turned out to be an equalization year.

Ostler said it is a positive development because “we are dealing with a system that is on the rise and it provides insurance that the Lower Basin will receive more than the normal objective release from Powell, facilitating normal water deliveries from Mead.” But he said the Upper Basin is closely watching how much water Mead releases to the Lower Basin water users because “the level in

Lake Mead now [directly] affects the level in Lake Powell.”

Of particular interest to the Upper Basin, Ostler said, is insuring the success of Lower Basin efforts to stretch Colorado River supplies through the creative measures known as “intentionally created surplus” (ICS). The ICS allows Lower Basin entities to create water credits through conservation measures such as land fallowing and lining canals and take delivery of those water credits from Lake Mead at a future date.

Under terms of the agreement, entities in the Lower Basin states have the opportunity to store up to 2.1 million acre-feet of ICS water in Lake Mead for their future use; with 5 percent of that amount credited to the overall system. “The ICS is an opportunity for the water users to proactively plan for their future,” Gray said.

With the agreement in place and Mother Nature providing a bit of relief this year, federal officials and the states have now turned their attention to implementation of ICS projects and further study of ways to augment the Colorado River system. But some of the conservation programs underway in the United States will reduce groundwater seepage to Mexico while others have the potential to reduce over deliveries to Mexico in excess of the Treaty requirements. The question of how Mexico will share in any drought-related shortage was not settled with the ROD and all these issues have heightened tensions between the two countries.

In an effort to find common ground, the Department of the Interior announced a year ago that the United States and Mexico had agreed to begin meeting to discuss “a number of issues of mutual concern to both nations related to the Colorado River” through a process to be managed by the International Boundary and Water Commission (IBWC). IBWC subsequently established a Binational Core Group to explore cross-border issues related to the Colorado River to identify actions and projects that could benefit both

Interior Secretary Dirk Kempthorne signed the interim shortage guidelines in December 2007.



countries. The group met in March in Phoenix and set up four work groups to focus on new water sources, with a particular interest in binational desalination; conservation, especially irrigation projects; system operations, seeking efficiencies in how the Colorado River system operates; and the environment. The work groups have been meeting approximately once a month.

The IBWC is a treaty-based bilateral organization responsible for applying the boundary and water treaties between the United States and Mexico and settling differences that arise in their application. Before the formal work groups were established by the IBWC, stakeholders on both sides of the border had been meeting informally to discuss common needs and goals in an effort to find potential cooperative solutions.

“We want to come up with some good recommendations for the IBWC because the IBWC is the vehicle to changing Colorado River management at the border,” said Jennifer Pitt, senior resource analyst with the Environmental Defense Fund. Pitt is chair of the environment work group and was active in the informal cross-border stakeholder discussions.

This issue of *River Report* provides an overview of steps underway to implement the new guidelines to better manage Colorado River water not only during drought, but over the full range of reservoir operations, stretching existing supplies and finding ways to augment what is often described as the most controversial and regulated river in the United States. For more background on the Colorado River, please refer to the Foundation’s *Layperson’s Guide to the Colorado River* and back issues of *River Report* and *Western Water*.

Background

Over the course of the two years it took to develop the interim shortage guidelines and coordinated reservoir operations, Reclamation staff attended more than 75 meetings with representatives of the seven basin states and other



Thanks to abundant snowfall, Utah’s Snowbird resort, above, was open for skiing until June 18.

stakeholders. The states’ representatives, in turn, held dozens of meetings of their own to analyze various options and reach agreement on how to address controversial issues related to water allocations.

When negotiations began in 2005, the Colorado River Basin was reeling from five consecutive years of drought. Some feared Interior would declare the first official shortage in the Lower Basin. With Powell at a record-low 33 percent of capacity in April 2005, the Upper Basin feared that Lake Powell could run out of water and the Lower Basin might push for a “Compact call,” forcing the Upper Basin states (Colorado, New Mexico, Utah and Wyoming) to reduce post-Compact uses or release water from reservoirs upstream of Lake Powell to avoid depleting the flow at Lee Ferry to the Lower Basin and Lake Mead.

Litigation seemed imminent.

Interior Secretary Gale Norton

stepped in, calling upon the states and other stakeholders to work through a public process to help develop shortage guidelines for the Lower Basin (Arizona, California and Nevada) and Upper Basin/Lower Basin reservoir operations during drought conditions. She held firm to the Upper Basin’s normal 8.23 million acre-feet release for 2005 – releases helped along by higher-than-average inflow into Powell that spring. But she also asserted authority to adjust future Powell releases under the Annual Operating Plan to perhaps release less water if conditions warranted. Even as attorneys from both basins argued about her order, representatives from the seven states began meeting in earnest to produce an agreed-upon coordinated operation scenario for consideration by federal officials as Reclamation began to develop an Environmental Impact Statement (EIS) to address shortage criteria and coordinated operation for

Lake Powell and Lake Mead under low water level conditions.

Ultimately, much of what the states proposed was included in the final EIS for the “Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead” adopted on Dec. 13, 2007. The interim guidelines took effect immediately and will remain in effect through 2026 and potentially beyond.

Observers say litigation was the likely outcome if the states had not been able to agree on how to address drought-related shortages. For now, negotiation will continue to dominate over litigation because in the ROD, the states “agreed to mandatory consultation provisions to address future controversies on the

Colorado River through consultation and negotiation, as a requirement, before resorting to litigation. With respect to the various interests, positions and views of each of the seven Basin States, this provision adds an important new element to the modern evolution of the legal framework for the prudent management of the Colorado River.”

“The best thing is the rules for the Colorado River are pretty well understood now. The agreement provided a really good foundation for us and caused us to move ahead with what’s next and implement what’s next,” Patterson said. “People are being creative to find ways

“We thought a shortage [declaration] might be just two to three years out. The additional supply for Mead has pushed that back.”

– Roger Patterson

under the Law of the River to do things that we’ve never been able to do before.”

Michael Cohen, senior research associate with the

Pacific Institute, agreed. “The guidelines are a tremendous step forward; a marked change in how the river is managed. They provide far more flexibility,” he said.

Stretching the Resource

The documents that comprise the “Law of the River,” including the 1922 Colorado River Compact and 1944 Mexican Treaty, established 16.5 million acre-feet in annual allocations: 7.5 million acre-feet to each basin and 1.5 million acre-feet to the Republic of Mexico. But the estimated average annual flow of the Colorado River is closer to 15 million acre-feet. Previous years of high runoff, storage reservoirs in the Upper Basin states, storage in Lakes Powell and Mead, and the fact that the Upper Basin uses only about half its river allocation have allowed the river to overcome this dichotomy – even during the worst drought in decades.

The Upper Basin has not fully developed its allocation, but the Lower Basin has. And even without the supply pressures from the multi-year drought, water usage and continuing urban growth in the Lower Basin – especially in water-short Nevada – were the major driving forces behind the 2007 agreement. Nevada has the smallest share of the Colorado – 300,000 acre-feet. But beginning in the 1990s as Las Vegas consistently ranked as one of the nation’s fastest growing cities, the Southern Nevada Water Authority (SNWA) pushed aggressively for the type of programs included in the ICS to stretch its water supply to meet its demands.

The Las Vegas area has little in the way of local groundwater and is highly reliant on the Colorado River. Under terms of the agreement, SNWA will now be able to develop a portion of its pre-

Lake Mead in 1999.



Compact water rights on the Virgin and Muddy rivers (tributaries to the Colorado) and convey this water through Lake Mead – forestalling the need to build a pipeline and other infrastructure to develop and convey these supplies. SNWA also will use the river system to transport groundwater from rural Nevada counties to the Las Vegas area.

In addition, SNWA will receive water from the new 8,000 acre-feet Drop 2 reservoir. The reservoir will be built adjacent to the All-American Canal in California's Imperial Valley to capture water that irrigators don't end up using after it is released from upstream reservoirs. Currently, this water flows to Mexico but is not included in Mexico's annual allocation. According to Reclamation, these non-storable flows have averaged 70,000 acre-feet per year over the past 30 years.

SNWA paid Reclamation \$172 million toward construction of the reservoir and in return received 600,000 acre-feet of water under the "system efficiency" ICS category. SNWA also agreed to pay any additional project cost increases up to a total of \$206 million in exchange for additional water. Subsequently, MWD and the Central Arizona Water Conservation District (CAWCD) each paid approximately \$28.6 million to SNWA to exercise their options to participate in the Drop 2 funding agreement. Both agencies received 100,000 acre-feet for this funding, reducing SNWA's total share to 400,000 acre-feet. SNWA will be able to take delivery of a maximum of 40,000 acre-feet a year between 2011 and 2036. MWD will take 34,000 acre-feet of ICS water this year, and may take a like amount through 2010. Between 2011 and 2026, it can take up to 25,000 acre-feet per year until it reaches its 100,000 acre-feet limit. The CAWCD can take its ICS water at a maximum of 65,000 acre-feet a year from 2016 through 2026, although Arizona's share will be reduced by the amount of credits delivered to SNWA and/or MWD in any given year.

The reservoir's construction was authorized in the congressional rider signed in December 2006 that required the lining of the All-American Canal to proceed. A contract for the project was awarded on Aug. 21 to Ames Construction, Inc. of Phoenix and Coffman Specialties, Inc., of San Diego. Construction is set to begin in October. The reservoir is scheduled for completion in 2010. "This project will make history for the American Southwest," Reclamation Commissioner Robert Johnson said in a press release. "This contract award signals the next phase of a significant water storage project near our nation's southern border."

Although the environmental community is a strong advocate of water conservation, environmentalists and

Mexican officials opposed the Drop 2 project because those over-deliveries currently help to sustain riparian habitat below Morelos Dam. In recent years, Cohen said, 80 percent of the time there has been no flow below Morelos Dam. With Drop 2, he said, there will be zero flow below Morelos Dam 97 percent of the time.

In addition, Cohen says the Drop 2 project is contrary to the concept of the ICS program. "All the other ICS programs are designed so that the district has to demonstrate that the water was actually conserved before it can take it out [of Lake Mead]," he said. "This year, MWD will receive 34,000 acre-feet of Drop 2 ICS even though the reservoir hasn't even been constructed yet."

But Reclamation Regional Director

Lake Mead in 2006.



“The Upper Basin saw great importance for the Lower Basin to find more ways to increase its supply and meet its growth and decrease the potential for shortage.”

– Don Ostler

Gray said “because [the regulating] reservoir is a system conservation opportunity – providing benefits to the entire system long into the future – a deal was put together for a schedule of [water] delivery.”

In addition to system conservation, the other categories of ICS water are extraordinary conservation, tributary conservation or the importation of non-Colorado River System water.

One of the primary purposes of the ICS is to help minimize or avoid shortages to water users in the Lower Basin. The secretary of the Interior has the authority to declare a shortage in the Lower Basin if there is not enough water to meet the full 7.5 million acre-feet annual mainstream allocation; to date a shortage has never been declared. The interim guidelines give the water users in Arizona, California and Nevada specific understanding of when Lake Mead’s elevation would trigger a shortage and how much deliveries would be reduced to Arizona and Nevada. (California maintains the highest priority of rights

under terms of the Colorado River Basin Project Act of 1968 and would continue to receive its full 4.4 million acre-feet mainstream allocation in all but the most severe of drought conditions.)

But Ostler is concerned that the ICS restrictions might be too tough because they do not allow some ICS credits to be used during a shortage. “The Upper Basin saw great importance for the Lower Basin to find more ways to increase its supply and meet its growth and decrease the potential for shortage,” he said. “We really want to see [the ICS] work. We want to see the Lower Basin states find ways to meet their needs.”

The federal ROD does include another category of water – developed shortage supply – that could be used, with some limitations, in a shortage. This water would include purchasing documented pre-June 25, 1929, water rights on Colorado River System tributaries within the contractor’s state and/or introducing non-Colorado River System water in that contractor’s state

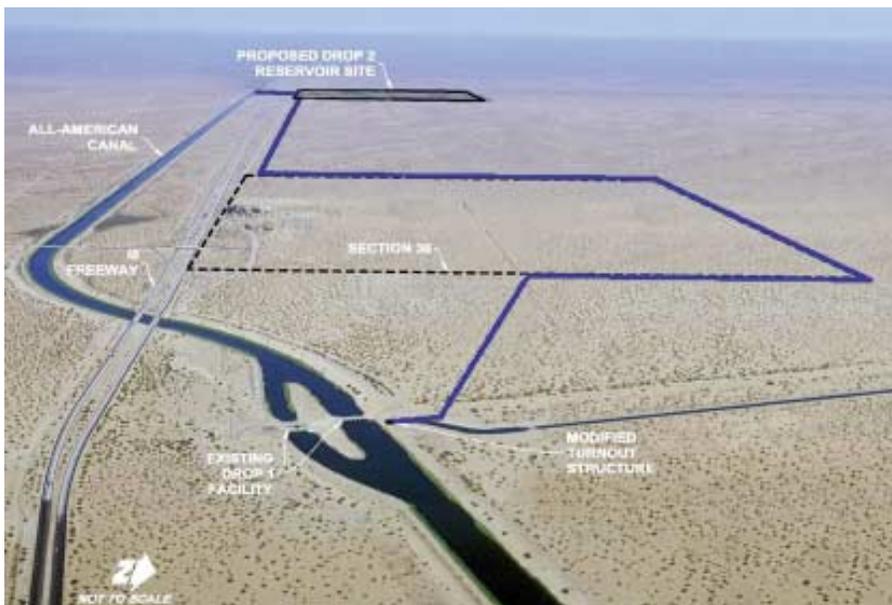
into the mainstem under certain criteria for use during shortages.

As for the ICS supplies, while water from the Drop 2 reservoir and other system efficiency water would not be available during an official shortage, Bill Hasencamp, with MWD, said the guidelines are silent on his agency’s ability to recover ICS water it stores in Lake Mead during a shortage. MWD wants that right, but Arizona officials believe it violates the Supreme Court decree. “To resolve the issue,” Hasencamp said, “Arizona and MWD reached a verbal agreement to not decide the issue in the guidelines and instead resolve it if and when [MWD] would need to recover its ICS water during a declared shortage.”

ICS water is seen as a critical component of stretching supplies in the Lower Basin to meet continuing – and growing – demands. But such programs are seen as short-term solutions to fit within the interim nature (19 years) of this agreement. Thus, in 2006, the seven states agreed to a joint study of the potential to implement a broad range of long-range alternatives to augment the Colorado River. In March, the \$750,000 study, funded by SNWA and developed by CH2M Hill and Black & Veatch, was released. The “Study of Long-Term Augmentation Options for the Water Supply of the Colorado River System” provides a preliminary overview of the potential amounts of water and financial costs of 12 potential actions, and potential environmental issues.

Brackish water desalination is viewed as a viable option because discussions are already underway to perhaps use the now-idled Yuma Desalting Plant. One idea discussed in the report was to desalt the large volumes of brackish groundwater underlying the Yuma, Ariz., area for local/regional use in exchange for taking Colorado River water further upstream. The engineering consultants estimated desalting groundwater in this area and/or in inland Southern California communities could generate up to

Plan photo of the 8,000 acre-foot Drop 2 reservoir to be built next to California’s All-American Canal.



Calendar

50,000 acre-feet per year at an estimated cost of \$700 to \$2,000 per acre foot. Disposal of the brine generated by the desalting plant is listed as one environmental consideration.

However, since the report was issued, Pitt said the focus for possible use of the Yuma Desalting Plant has shifted from local groundwater to drainage return flows from the Wellton-Mohawk Irrigation and Drainage District. That water is now diverted around the idled plant through the Main Outlet Drain Extension and is a primary source of water for the Cienega de Santa Clara wetlands in the Colorado River Delta.

Water quality, acre-foot costs between \$900 and \$4,600 and a low quantity of potential supply are all concerns associated with **coalbed methane (CBM) produced water** and after its assessment, the consultants recommended against this potential source of augmentation.

The study recommended further exploration of interstate **conjunctive use** – jointly using groundwater and surface water – such as expansion of the Arizona Interstate Water Bank. Consultants believe this idea could be developed fairly quickly, although legal hurdles would have to be overcome. Costs per acre foot range from \$400 to \$700. The authors of the report do not expect significant environmental issues.

Many of the states' representatives have suggested **ocean water desalination** as a way to allow for direct delivery and/or exchanges of Colorado River water. There has been a lot of discussion of whether SNWA and other U.S. water utilities should pay to build a desalination plant in the Gulf of California to benefit water users in both the United States and Mexico. There would be environmental and permitting challenges for such a bi-national project, however, and there is some concern about the amount of energy it would take to desalt the water. The report estimates acre foot costs of such a project range from \$1,100 to \$1,800. As with brackish water desalination, brine

October

- 1-3 **Sustaining Colorado Watersheds**, sponsored by Colorado Watershed Assembly, Vail, CO • Contact: 970-872-2433
Web: <http://www.coloradowater.org/annualconference.php>
- 8-10 **WaterSmart Innovations 08**, sponsored by Southern Nevada Water Authority and U.S. EPA, Las Vegas, NV • Web: <http://www.watersmartinnovations.com>
- 15-17 **Western States Water Council Annual Meeting**, Oklahoma City, OK
Contact: 801-561-5300 • Web: <http://www.westgov.org/wswc/158mtg.html>
- 16-18 **Utah Water Law SuperConference**, sponsored by CLE International, Salt Lake City, UT • Contact: 800-873-7130 • Web: http://www.cle.com/product.php?proid=1018&page=Utah_Water_Law_SuperConference
- 30-31 **Arizona Growth & Water Supply**, sponsored by CLE International, Phoenix, AZ • Contact: 800-873-7130
Web: <http://www.cle.com/product.php?proid=1033&src=phxgwswef>
- 31-Nov.1 **The Fate and Future of the Colorado River**, sponsored by Huntington-USC Institute on Water and the West and Water Education Foundation, San Marino, CA • Web: <http://college.usc.edu/huntington>

November

- 13-14 **2008 Climate Change Summit**, sponsored by California DWR and Water Education Foundation, Long Beach, CA • Contact: 916-444-6240
Web: <http://www.watereducation.org/doc.asp?id=852>
- 18-20 **Colorado River Basin Science and Resource Management Symposium**, sponsored by USGS, Water Education Foundation and other organizations, Scottsdale, AZ • Contact: 916-444-6240
Web: <http://www.watereducation.org/doc.asp?id=1072>
- 19-21 **NWRA Annual Conference**, sponsored by National Water Resources Association, San Diego, CA • Contact: 703-524-1544
Web: <http://www.nwra.org>

December

- 15-17 **Annual Colorado River Water Users Association Conference**, sponsored by the CRWUA, Las Vegas, NV. • Contact: 760-398-2651
Crystal Thompson cthompson@cap-az.com Web: <http://www.crwua.org>

January

- 15-16 **National Salinity Summit**, sponsored by Multi-State Salinity Council and Bureau of Reclamation, Las Vegas, NV
Web: <http://wri.nmsu.edu/conf/NSS.pdf>
- 28-30 **51st Annual Conference**, sponsored by the Colorado Water Congress, Denver, CO. • Contact: http://www.cowatercongress.org/default2.asp?active_page_id=89

February

- 5-6 **Nevada Water Law**, sponsored by CLE International, Reno, NV
Contact: 800-873-7130 Web: http://www.cle.com/product.php?proid=1068&page=Nevada_Water_Law

Contact Sue McClurg with your calendar items from December 2008 through June 2009 for inclusion in the Summer issue of River Report, smcclurg@watereducation.org or 717 K Street, Suite 317, Sacramento, CA 95814

"The guidelines are a tremendous step forward; a marked change in how the river is managed."

– Michael Cohen

disposal was identified as a potential environmental issue along with energy requirements and construction impacts.

Reducing the amount of **consumptive use at thermoelectric power plants** could generate up to 160,000 acre-feet annually at a cost of \$1,000 to \$4,000 per acre foot by replacing evaporative cooling systems with air-cooled systems; but, such measures would reduce the efficiency of those power plants. Subsequently, the technical committee determined that this option should be addressed by the individual states.

The consultants determined that it is difficult to determine how much water might be conserved by controlling **reservoir evaporation** and that the methods available would be impractical for use on Lakes Mead and Powell and recommended no further consideration.

The study released in April noted that more refinement is needed of another option: **river basin imports** from several different rivers, including the Mississippi, to determine the cost per acre foot. However, the study noted that numerous issues related to technical, environmental, legal and political obstacles would need more detailed analysis. A wide range of environmental issues were identified such as the effects of reduced river flows at the source and water quality impacts at points of discharge into receiving basins.

Stormwater collection on the Gila River system by storing it at Painted Rock Dam and Reservoir with a diversion canal to just upstream of Imperial Dam could generate up to 100,000 acre-feet of water per year for \$600-plus per acre foot, according to the report. But stormwater collection on the Gila River would capture the remaining potential source for flood flows into the Colorado River Delta and there are issues of water quality associated with such a project.

Already underway in some areas are efforts for **vegetation management** in

which invasive salt cedar (tamarisk) plants are removed from riparian areas. The report estimates that gains from salt

cedar control are estimated at 20,000 acre-feet annually on the Virgin River and 150,000 acre-feet annually on the Colorado River. Cost per acre foot is relatively low: \$30 to \$100. While there is concern about short-term impacts to endangered species from loss of habitat, the consultants say potential long-term beneficial environmental impacts include recreation and fire management.

Another method of **water imports using ocean routes** is estimated to cost anywhere from \$1,400 to \$4,000 per acre foot. The report looked at options ranging from towing icebergs to building an undersea pipeline from the Columbia River or Northern California rivers to the Colorado River. And while the potential quantity could be significant – up to 300,000 acre-feet – the report notes that the list of technical issues related with such a project, including permitting, also are significant.

The consultants included **water reuse** as one means of augmenting the long-term supply within the Colorado River Basin, but ultimately, the states' representatives determined that such programs should continue to be addressed by the individual states.

Weather modification also is a low-cost way to potentially create new water, \$20 to \$30 per acre foot, but the consultants noted it is hard to quantify how much additional precipitation such efforts generate. Several of the states are currently sponsoring weather modification programs. Wyoming is presently funding a research project with the National Center for Atmospheric Research to seek scientifically valid verification of the amount of new water produced by weather modification. There is some concern about environmental impacts from the disposition of the silver iodide used for cloud seeding.

Although the report notes its intent was to develop projects beyond existing plans by individual states for such things as water conservation and water transfers, Cohen said he was still disappointed that the "one idea the augmentation study did not look at is urban conservation." As for desalination, he pointed out that it is extremely energy intensive and that there remain major issues in coastal communities over where to site such projects, potential fish entrainment and disposal of the brine.

Beyond these issues, Cohen said the states may need to reconsider how much additional water is needed to supply urban growth. He said even when the housing market rebounds, he believes the cost of energy and other current economic conditions might result in either less growth and/or smaller houses with less landscaping, which, in turn, could reduce future demands for water. Climate change is another wildcard as changes in water quantity or runoff could effect which ICS projects are most effective.

Binational Issues

The Mexican Water Treaty of 1944 committed the United States to deliver 1.5 million acre-feet of water to Mexico on an annual basis, plus an additional 200,000 acre-feet under surplus conditions. In addition, Mexico has benefited from flood releases in the 1990s and water overruns when water users do not use all the water they order – allowing additional water to flow across the border. The large flood flows of the 1990s helped to restore the wetlands of the Colorado River Delta and farmers in the Mexicali Valley have benefited from groundwater seepage from the All-American Canal.

The United States' decision to replace sections of this earth-lined canal with a concrete-lined channel to save an estimated 67,700 acre-feet per year sparked a lawsuit in 2005. The lawsuit was eventually decided in favor of the United States and the lining was allowed to proceed through the December 2006

congressional rider that also authorized construction of the Drop 2 reservoir. As discussed earlier, that project will reduce, if not eliminate, the excess flows from canceled water orders.

Although tension related to these projects remains, stakeholders on both sides of the border are now looking for ways to help Mexico improve its water use efficiency – perhaps allowing Mexico to store its water in Mead – and form partnerships to develop infrastructure to conserve water, increase supplies and restore the environment. When the four border work groups were established in March, the IBWC said the groups’ objectives are to “explore, identify and ultimately implement water conservation, shortage management, augmentation and environmental initiatives with binational benefits in the area of environmental, agricultural and urban water use.”

Patterson said water users in the United States, particularly the Lower Basin states, are looking for partnerships with Mexico for desalination, agricultural conservation and agricultural fallowing to help conserve water. He said the dialog through the IBWC work groups is going well, but that ultimately, the process will require a more formal “government-to-government negotiation.”

There is concern among some that this could forestall the groups’ progress, especially given the pending change in the U.S.’s presidential administration after the November election. Pitt said all the participants are aware of the time pressures. “I’m very optimistic. But we’re at the early stage and will need to show some progress to keep participation,” she said.

A key issue still to be addressed relates to shortage conditions on the river. The 1944 Treaty notes that Mexico’s share of the river (1.5 million acre-feet annually) will be reduced “in the event of extraordinary drought or serious accident to the irrigation system in the United States.” The term “extraordinary drought” has never been defined. And while the interim guidelines signed last December established guidelines for a shortage declaration for Arizona, California and Nevada, it did not include Mexico. Reclamation’s EIS said “the determination of deliveries to Mexico is not part of the proposed federal action. Any such determination would be made in accordance with the 1944 Treaty.” The State Department retains jurisdiction over this issue.

In its “Terms of Reference Legal Framework for the Binational Core Group” released in March, the IBWC emphasized that all “joint cooperative

projects and measures must be consistent with the 1944 Treaty.” Included on the list of eight U.S. objectives for this process is to “implement management procedures and programs that better enable affected parties to manage shortage conditions.” Mexico’s list of 11 items includes “implement management procedures for shortage conditions.”

Both countries also have a long list of other measures designed to address current water needs for cities and farms and the environment; evaluate efficiency improvements for water augmentation; determine the potential for development of new water; evaluate current and future climate conditions; manage salinity, and discuss ways in which new data can be exchanged and developed for research and investment programs.

Bill Rinne, director of surface water resources for SNWA, said Nevada and Arizona agreed to certain shortage numbers in the seven-state process and that they also “expect Mexico to share in any shortages.” But he said the main goal is to prevent and minimize the impacts of shortage on the Colorado River – including Mexico – and identifying projects that provide binational benefits. “We’re working to find projects we can rally behind,” he said. •

The Colorado River between Imperial and Morelos dams.





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