

Fall 2017

WESTERN WATER

**The Colorado River:
Living with Risk, Avoiding Curtailment**

Published by the Water Education Foundation



WATER EDUCATION
FOUNDATION

Board

President

Robert W. Johnson, *Water Strategies*

Vice President

Scott A. Morris, *Kronick Moskowitz, Tiedemann & Girard*

Secretary

Celeste Cantú, *Water Education Latino Leaders*

Treasurer

Michael T. Savage, *Brown and Caldwell*

Directors

John Algots, *Fort Mojave Indian Tribe*

Jennifer P. Allen, *Contra Costa Water District*

Thomas M. Berliner, *Duane Morris, LLP*

Thaddeus L. Bettner, *Glenn-Colusa Irrigation District*

Roberta Borgonovo, *League of Women Voters of California*

Gwendolyn M. Buchholz, *CH2M*

Mike Chrisman, *Chrisman Ranches*

JaNell Cook, *HDR, Inc.*

Ane D. Deister, *California Council of Land Trusts*

Kim Delfino, *Defenders of Wildlife*

Danielle Duncan, *Sustainable Conservation*

Phil Dunn, *GEI Consultants*

Gary J. Freeman, *Pacific Gas & Electric Company*

David J. Guy, *Northern California Water Association*

Maurice Hall, *Environmental Defense Fund*

Thomas Harter, *University of California*

Cynthia Koehler, *WaterNow Alliance*

Mark Larsen, *Kaweah Delta Water Conservation District*

Mary Aileen Matheis, *Irvine Ranch Water District*

Cannon Michael, *Bowles Farming Company*

William R. Mills, *Groundwater Consulting Engineer*

Christopher Park, *CDM Smith*

Jennifer G. Persike, *ACWA*

Thomas S. Philip, *MWD of Southern California*

Sara Reid, *CoBank*

Ronald B. Robie, *Court of Appeal, 3rd Appellate District*

Peter S. Silva, *Silva-Silva International*

Gary Weatherford, *California Public Utilities Commission*

Peter C. Wijsman, *ARCADIS*

Staff

Jennifer Bowles, *Executive Director*

Brian Brown, *Project WET Coordinator*

Kasey Chong, *Executive Assistant*

Sue McClurg, *Deputy Executive Director*

Vanessa Morganstern, *Programs and Publications Coordinator*

Gary Pitzer, *Writer*

Dan Scott, *Tour Director*

Beth Stern, *Development Director*

Patty Wong, *Office Clerk*

Editor's Note

Cooperation Over Conflict

International sharing of rivers and lakes has always intrigued me. Perhaps it's because I was born on the edge of Lake Ontario, one of five Great Lakes shared between the U.S. and Canada, driving the imagination of a youngster about what and who was on the other side.

In California, we share a handful of major rivers with other states, including the Truckee, Carson and Walker rivers with Nevada and the Klamath with Oregon. But perhaps none are as storied and historic as the mighty Colorado River that California shares with six other Western states and Mexico. The lifeblood of the Southwest, some 40 million residents depend on it.

Earlier this year, in the waning hours of the Obama administration, the U.S. and Mexican governments failed to reach their latest agreement on the river, as hoped for. The lack of agreement caused concern because they were so close and with any change of administrations – whether the same political party or not – the process could be delayed even more.

But, after two years of negotiations, agreement between the two countries was indeed reached. And it was an honor to have representatives from both countries put their final signatures to paper, placing the agreement – known as Minute 323 – into full force and effect at our biennial Colorado River Symposium in Santa Fe in late September. You can read more details about Minute 323 in this issue of *Western Water*.

Suffice it to say, the New Mexican capital plays an important role in milestones for the river. It was here that the 1922 Compact dividing the river between the seven U.S. states was negotiated and signed.

“It's a beautiful day in Santa Fe,” Edward Drusina, the U.S. Commissioner of the International Boundary and Water Commission, said in announcing Minute 323, a new agreement to the 1944 U.S.-Mexico Water Treaty. “For generations water scarcity and drought in the West has translated into conflict. I'm proud that our countries' water leaders have chosen cooperation over conflict here in the Colorado River Basin.”

Roberto Salmón, Drusina's Mexican counterpart, signed his letter and ended his speech with this: “Having a guide or map of what to do and how to do it is our responsibility to future generations. It can't be said that our generation sat with our arms crossed.”

And there was the answer to my childhood question of who was on the other side: People who care just as much about the water. ❖

– Jennifer Bowles



The invitation-only, biennial Santa Fe symposium is part of our Colorado River Project, which also includes a tour of the Lower Colorado River. In 2018, **it will be held April 11-13**. For more information, you can check our website:

www.watereducation.org/general-tours.

Happenings...

Applications Being Accepted for 2018 Water Leaders Class



Applications are now being accepted for the 2018 William R. Gianelli Water Leaders Class. The one-year program began in 1997 to help participants foster a deeper knowledge of water issues and develop greater leadership skills.

Class alumni have gone on to achieve top positions at the state Legislature, government agencies, nonprofit organizations and leading private companies involved in water.

Each class works on a presentation and written report about a specific water topic. Members work together in group meetings, and individually are assigned a top-level policy-maker or academic as a mentor with whom they spend one day “shadowing” and later conduct a one-on-one interview on the class topic.

Applications are due Dec. 5. Visit www.watereducation.org/water-leaders to learn more about the criteria for acceptance and the participant requirements as well as to download an application form.

Popular Water 101 Workshop Set for Feb. 22

One of our most popular events, Water 101 details the history, geography, legal and political facets of water in California as well as hot topics currently facing the state in a workshop setting. For the first time, we will offer an optional tour of the Delta on day two.

Taught by some of the leading policy and legal experts in the state, the one-day course gives attendees a deeper understanding of the state’s most precious natural resource. In 2018, the event will be held at McGeorge School of Law in Sacramento on Thursday, Feb. 22.

The workshop will cover the historical, legal and management aspects of water in California, and the key water issues facing the state such as drought, groundwater management and the Delta. Hop aboard our bus the next day, Friday, Feb. 23, to visit the heart of California water policy – the Sacramento-San Joaquin Delta – to get a better understanding of the region, plans that could shape its future and how water moves through the state.

Visit our website www.watereducation.org/conferences for more information and a registration form.

Learn more about Project WET and see a list of coming workshops organized by California WET coordinator Brian Brown at www.watereducation.org/projectwet.



Mark Your 2018 Calendar

If you want to hit the road in 2018, the Foundation will be offering six of its popular water tours. First up is the Central Valley Tour, March 14-16, which highlights the San Joaquin Valley. Other tour dates for 2018: Lower Colorado River Tour, April 11-13; Bay-Delta Tour, May 16-18; Headwaters Tour, June 28-29; Northern California Tour, Oct. 10-12; and the San Joaquin River Restoration Tour, Oct. 31-Nov. 1.

Watch our website, www.watereducation.org/general-tours, for more information and registration forms. Opportunities to sponsor one or more tours are now available. Check out the benefits of being a tour sponsor, www.watereducation.org/become-tour-sponsor.



Water Leaders - Where Are They Now?

Newsha Ajami

Director of Urban Water Policy

Water in the West, Stanford University

Appointed by Gov. Brown in 2012 to the San Francisco Bay Regional Water Quality Control Board

Class Year: 2011

Class Research Project: Delta Plan

What was your job when you were in the Water Leaders class?: Science and technology fellow for the California Council on Science & Technology.

What do you do on a day-to-day basis?

I direct a research group at Stanford University on urban water policy and innovation. A lot of the projects we are working on have an intersection between science, engineering and policy, and have relevance to today's water challenges. I have students working on a wide variety of issues, from big data and water management, to building decision-support tools, financing for alternative water supply portfolios, green infrastructure, permitting and regulatory challenges and how they can be modernized.

What is the most pressing water issue that you are dealing with?

That's a very tough question; they are all very important. Resiliency has always been at the heart of the work I do and my team does, and has an umbrella effect for a lot of these projects. How can we improve and enhance resiliency of our water use system from supply to quality, from shortage to flooding. I like resiliency because it is, in a way, forward looking



and in a way highlights the fact that part of being resilient is being able to adapt and be flexible.

Did you learn anything during the Water Leaders class that is helping you now?

We worked on the Delta Plan and looked at what self-reliance means for different regions. That does in some way still guide a lot of my thinking and understanding of the tools that need to be applied to manage water and improve portfolios. At the time I was not conscious of it, but it helped me. Everything we do is a step toward being more efficient and effective in how we manage our water resources. And the Delta Plan was an example of that. It was the 5th edition and had very valuable issues within it like groundwater management to conjunctive use. We're still talking about the Delta, but we've come a long way.

Who was your mentor and what valuable advice did you get?

My mentor was Sen. (Michael) Machado (D-Linden). First off, he's a farmer, and that was extremely valuable to me, being urban-raised and an urban-living water wonk, to have spent time with someone who has such a close relationship with the

land and water. I learned so much from him about farming and its relationship with water and land conservation. I also learned people look at water from their own perspective and it was a deliberate decision to match mentors who are not necessarily from the water leader's point of view, which I very much appreciated. Sen. Machado was very generous with his time, lots of good conversations; it was a great experience. That's the beauty of the program – people put so much time and energy into it and it makes for such a valuable experience.

What advice do you have for young professionals in the water world?

Keeping an open mind is extremely important, hearing everyone's perspective and being able to relate to other people's perspectives. At the end of the day, every solution that will eventually come needs to be multidimensional and that won't happen unless you have a broad engagement with a variety of stakeholders. This may be a cliché, but the reality is consensus is not easy to reach and it may not be a beautiful process, but it is the best path forward if you spend the time and energy and effort to make it happen.

Our one-year Water Leaders program began in 1997, and many graduates have gone on to achieve great things. We profile alums here so you can see where they are now and what they learned during their time with us. Applications for the 2018 class are now being accepted. The deadline to apply is Dec. 5. For more information on our program, visit www.watereducation.org/water-leaders

Sense of Place

Grand Canyon

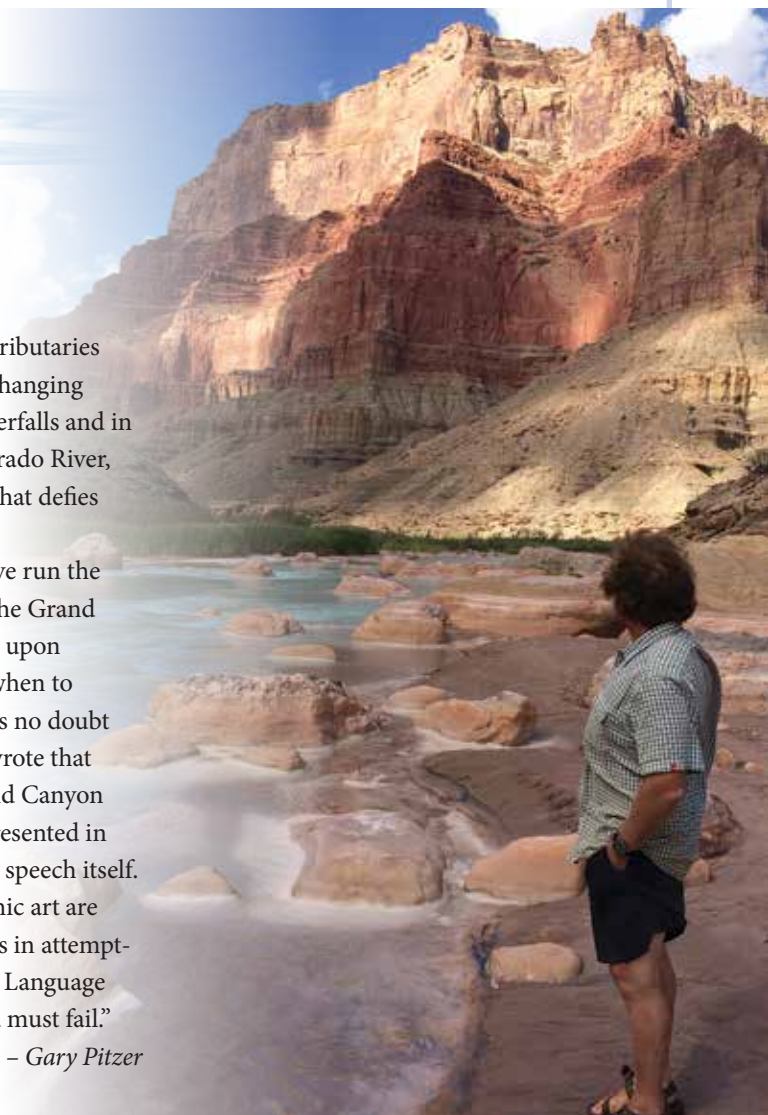
Most people see the Grand Canyon from thousands of feet above where the Colorado River winds through it for nearly 300 miles. But to travel it afloat is to experience the wondrous majesty of the canyon and the river's cold water while gaining perspective about geology, natural beauty and the passage of time.

The canyon is a harsh, unforgiving place and the potential pitfalls are many. There are stretches of thunderous, pitching rapids that test the stamina of the most seasoned boatman. It is through these rapids and their memorable monikers – Hermit, Sockdolager, Upset and Lava Falls – that the traveler is reminded of the historic 1869 journey John Wesley Powell undertook into what he called the “great unknown.”

The side canyons and tributaries are a marvel as well, with hanging gardens, plummeting waterfalls and in the case of the Little Colorado River, a turquoise-colored flow that defies description.

Many of those who have run the Colorado River through the Grand Canyon have one thought upon completion of their trip: when to return. Their motivation is no doubt inspired by Powell, who wrote that “The wonders of the Grand Canyon cannot be adequately represented in symbols of speech, nor by speech itself. The resources of the graphic art are taxed beyond their powers in attempting to portray its features. Language and illustration combined must fail.”

– Gary Pitzer



To read more about the Grand Canyon and the Colorado River, visit Aquapedia, our online encyclopedia at www.watereducation.org/aquapedia and access the term “Colorado River”.

Credits

Executive Editor | Jennifer Bowles
Editor-in-Chief | Sue McClurg
Writer | Gary Pitzer
Editorial Assistance | Vanessa Morganstern
Graphic Design & Layout | Sig-1

Photos

Bureau of Reclamation
Central Arizona Project
Denver Tourism
Joanna Nurmis
David Pitzer
Water Education Foundation

On the Cover

As 2017 segues into 2018, there is an intense focus on the Colorado River to ensure its sustainability as a water supply source that endures among the challenges of a structural deficit and the climate change forecast of a drier future.

The Water Education Foundation thanks all the sources and experts who reviewed this magazine for balance and accuracy.

The mission of the Water Education Foundation, an impartial, nonprofit organization, is to create a better understanding of water resources and foster public understanding and resolution of water resource issues through facilitation, education and outreach.

Western Water is published by the Water Education Foundation, 1401 21st Street, Suite 200, Sacramento, CA 95811 (916) 444-6240, fax (916) 448-7699.

An annual subscription to this quarterly magazine is \$50. The balance of the Foundation's information program may be supported by larger amounts, which are tax deductible. Printed on recycled paper with soy-based ink.

© 2017 Water Education Foundation

E-mail: dbeeman@watereducation.org
Web page: www.watereducation.org

ISSN: 0735-5424

President: Robert W. Johnson
Executive Director: Jennifer Bowles



The Colorado River: Living with Risk, Avoiding Curtailment

by Gary Pitzer

There is a timelessness to the Colorado River as it makes its ancient run from the headwaters in the Upper Basin through the arid Lower Basin states and to the farm fields, wildlife habitat and urban environment that make up the Southwest.

There also is a sense of urgency regarding how an overallocated river is managed for its many competing uses in the face of looming shortages and a grim climate change forecast that predicts much less river flow in the years to come.

People who have dealt with river management issues for decades are girding for a heightened degree of activity that calls upon years of trust and collaboration to compose a plan for equitably sharing a vital resource.

The alternative, it's said, is an undesirable outcome that sends the available water to the places that can afford to pay the most for it.

"If the system crashes, there will be winners and losers, and I believe the biggest losers will be agriculture and the environment," said Ted Kowalski, senior program officer with the Walton Family Foundation at the Water Education Foundation's invitation-only Colorado River Symposium, held in late September in Santa Fe, N.M. "We need to start thinking about it now, because if we end up in interstate litigation or in front of the Supreme Court or if there are front-page stories about the Southwest running out of water, it damages our economies, it damages all of what we have worked for and really damages our entire community, from the U.S. down to Mexico."

Kowalski is a veteran of Colorado River policy issues, having spent time with the Colorado Attorney General's office working on water rights and later the Colorado Water Conservation Board working on instream flow issues and interstate issues. Before moving to the Walton Family Foundation, he was a senior negotiator on federal, interstate and international issues related to the Colorado River.

Major water suppliers in the Lower Basin from Arizona, Califor-

nia and Nevada are working on the terms of a Drought Contingency Plan (DCP) that would overlie the existing shortage criteria in the 2007 Interim Guidelines. The 2007 Interim Guidelines were enacted in part to determine who gets what level of shortages based on elevations in Lake Mead. The first shortage trigger occurs when Lake Mead falls below 1,075 feet above sea level by the end of any year.

Kowalski likened completion of the DCP to the moving of a heavy rock and the need to not drop it.

"We don't have a specific back-stop and I'm worried we don't have the strong sense of urgency that we need," he said. The year 2018 "is the right year to keep up that momentum and we need to keep lifting that rock."

Unprecedented drought in the Colorado River Basin resulted in the 2007 Interim Guidelines, which include a milestone shortage sharing agreement in the Lower Basin and provisions for intentionally created surplus (ICS) in Lake Mead.

After a decade of living with shortage criteria under the 2007 Guidelines, there is momentum in advance of negotiating the next round of shortage sharing and ICS criteria.

"We will need a broader, more flexible ICS in Lake Mead and broader trading arrangements," said Anne Castle, senior fellow at the Getches-Wilkinson Center for Natural Resources, Energy and the Environment. Castle served as assistant secretary for water and science at the U. S. Department of the Interior (Interior) from 2009 to 2014. "It will require a lot more creative thinking ahead of the reconsultation for the next set of operational guidelines."

It also will take financial contributions from the federal government

and water users as a down payment for ensuring a measure of stability and sustainability on the river.

Today's increased sense of sharing the resource extends to American Indian tribes and their need to pursue and receive their water entitlements. "It is important from an equitable standpoint to settle Indian water rights claims," said Mike Connor, former Interior deputy secretary during the Obama Administration. "All of these agreements are intended to bring more reliability and less uncertainty to the system."

Margaret Vick, special counsel for the Colorado River Indian Tribes (CRIT), said there are barriers be-

"If the system crashes, there will be winners and losers, and I believe the biggest losers will be agriculture and the environment."

— Ted Kowalski, Walton Family Foundation

tween Indian water rights claims and the actual allocation of a supply.

"The biggest issue with decreed water rights is if you have a decree, you don't have a settlement," she said. "If you don't have a settlement, you don't have the flexibility in the way you can use that water."

Composed of the Mohave, Chemehuevi, Hopi and Navajo tribes, CRIT has more than 4,200 active members on 300,000 acres of land on the California and Arizona sides of the Colorado River.

Darryl Vigil, water administrator for the Jicarilla Apache Nation in New Mexico, said 2.4 million acre-feet of water are available to tribes in the Upper and Lower basins, "which is absolutely substantial in terms of

being a major stakeholder of water in the Colorado River.”

The Jicarilla are part of the Ten Tribes Partnership that leapt into action because of its perceived “exclusion” from the Bureau of Reclamation’s (Reclamation) 2012 Colorado River Basin Water Supply and Demand Study (Basin Study), Vigil said. That concern led to the initiation of the Colorado River Basin Ten Tribes Partnership Tribal Water Study (Tribal Water Study) that will include details of each settlement and decree, what happens with full development and how it impacts the rest of the Basin.

“We see the Tribal Water Study as the platform and the foundation and a jumping-off point for us to really get into the process,” Vigil said. “How do we move this? Is it legislation, litigation or collaboration? Obviously, our preference is collaboration.” But he cautioned that each tribe has different rights, interests and goals and that the other stakeholders need to keep that in mind.

At the Symposium, officials from the United States and Mexican governments celebrated implementing an agreement to the 1944 Water Treaty between the two countries called Minute 323. The Minute essentially extended 2012’s Minute 319 that gave Mexico greater flexibility in managing its Colorado River allotment, which provides mechanisms for increased conservation and water storage in Lake Mead elevation to help offset the impacts of drought and prevent a shortage from being triggered.

“This agreement provides certainty for water operations in both countries and mainly establishes a planning tool that allows Mexico to define the most suitable actions for managing its Colorado River waters allotted by the 1944 Water Treaty,” said Roberto Salmón, the Mexican commissioner of

the International Boundary and Water Commission.

Carlos de la Parra, professor and researcher at the Colegio de la Frontera Norte in Tijuana, said Minute 323 reflects the improved climate of trust and understanding.

“Prior to this, the negotiations were a bilateral process with both countries looking out for themselves,” he said. “The U.S. and Mexico were in an adversarial relationship that has melted before our eyes. It’s now about regional water management when it comes to the Colorado River. Mexico no longer considers itself a victim of manipulation and the partnership is gelling.”

An overarching message from the Symposium, “Taking Action on the Colorado River: Are We Up to the Challenge?” was that the agreements reached beginning in the early 2000s through the 2012 Basin Study need to be followed up with more action.

Jim Lochhead, chief executive officer and general manager of Denver Water, said it’s crucial that stakeholders not rest on their laurels and expect the upcoming winter to adequately replenish the snowpack. The river has been in a drought since 2000.

“This river is not in good shape today, despite the fact we have made progress and despite the fact this year was a somewhat normal year,” he said. “We are at a tipping point where we can achieve another spectacular success, or we can fail miserably if we don’t pull the pieces together and the pieces are sitting, frankly, right in front of all of us.”

The history of the Colorado River is full of conflict, compromise and resolution regarding water use, from the 1922 Colorado River Compact to the momentous 1964 Supreme Court decision in *Arizona v. California*. More recently, the Palo Verde Irrigation District sued Metropolitan

Water District of Southern California (MWD) because of issues related to MWD’s purchase of farmland in Palo Verde so that some Colorado River water could be moved to urban Southern California.

Despite the disputes, people from Wyoming to Mexico realize that it often takes detailed funding agreements to make water available to regions when it’s needed for a specific purpose.

“Conservation-wise, solutions that make economic sense will stand the test of time and so we believe strongly in markets [though] markets by themselves won’t be a panacea,” Kowalski said.

Ever-increasing and detailed study results data are pointing to a dramatically altered hydrologic future on the river, one that portends a new reality that will require the most stringent of drought contingency planning and most likely a change in water use practices.

Leading climate change scientist Brad Udall with the Colorado Water Institute told Symposium attendees that everyone must up their game to do more with less.

“Despite all the great work that’s been done on drought contingency planning, this Basin is not doing enough to deal with the risk,” he said. “We can adapt, we can reduce greenhouse gas emissions, and to the extent we do neither we will suffer.” Udall’s 2017 report, co-authored with Jonathan Overpeck, *The 21st Century Colorado River: Hot Drought and Implications for the Future*, said the period of drought from 2000 to 2014 was the worst 15-year drought since 1906 and that increased temperatures sparked by climate change are causing “hot droughts” that diminish the river’s flow.

“These results, combined with the

increasing likelihood of prolonged drought in the river Basin, suggest that future climate change impacts on the Colorado River flows will be much more serious than currently assumed, especially if substantial reductions in greenhouse gas emissions do not occur,” the report said.

Udall acknowledged the thorny issue of perhaps reallocating or redistributing water in a Basin where the Law of the River is sacrosanct.

“Most people in this community have shied away from promoting greenhouse gas reductions, thinking it’s too politically sensitive, that it’s somebody else’s problem,” he said. “Greenhouse gas reductions are everyone’s problem. We have the policy tools and the technology to begin solving this meaningfully.” Colorado River water users are acutely aware of the precarious situation, having spent the last several years going to extraordinary measures to prevent Lake

Mead from dropping low enough to trigger the shortage declaration in the Lower Basin – the official process by which the first round of reduced water deliveries would occur for Arizona and Nevada.

Under the terms of the DCP, the Lower Basin states, U.S. and Mexico are required to put water in Lake Mead or reduce deliveries at certain triggers, with each state subject to a different trigger. In an interview, Bill Hasencamp, manager of Colorado River resources for MWD (a signatory to the DCP), said the DCP “provides flexibility” for water users to take ICS water from Lake Mead.

As would be expected, forging the means of taking voluntary cuts is a controversial issue and there remains the question of when such a deal can be made, given the political vagaries associated with Colorado River water use, one of which is approval of the DCP by the Arizona Legislature.

Hasencamp said “we haven’t gotten to the point of ultimatums yet,” and that the idea is to have a completed DCP by next summer in time for the 2019 Annual Operating Plan for the river.

Completion of the DCP is critical because Minute 323’s binational water scarcity contingency plan between the two countries is contingent on the Upper Basin and Lower Basin states ratifying their own DCP agreements.

The Minute has two separate sections related to shortage and drought. There is one section that requires Mexico to take shortages when Lake Mead drops to 1,075 feet above sea level that tracks the Lower Basin shortages under the 2007 Guidelines. That is the shortage-sharing part of the Minute and that became effective on Sept. 27.

The Minute’s Binational Water Scarcity Contingency Plan (BWSCP) has certain reductions applicable to

The Colorado River as it flows through the agricultural landscape in western Arizona.





Denver receives half of its water from the Colorado River.

Mexico but only if the Lower Basin adopts a DCP.

Upper Basin water use in the states of Colorado, New Mexico, Utah and Wyoming is overseen by an interstate commission that is working on a suite of actions designed to create a form of water banking while honing a system to shepherd water to Lake Powell to comply with the Colorado River Compact, which requires a flow at Lee Ferry of not less than 75 million acre-feet during any period of 10 consecutive years. The parameters differ from the Lower Basin, where the Secretary of the Interior serves as the watermaster responsible for distributing all Colorado River water below Hoover Dam.

“From an Upper Basin perspective, we need assistance from Interior and the Lower Basin states to recognize the complexities and help move us forward,” Lochhead said.

In the Lower Basin, where water rights are fiercely guarded, forging a voluntary agreement among large water supply entities is a tricky enterprise infused with political ramifications, not the least of which is California’s first priority to Colorado River water.

Arizona, the junior user, has the most at risk in terms of shortage and must carefully craft its approach to voluntary use reductions.

“Within Arizona, it is the issues regarding the impacts to various water user groups - homebuilders and developers, agricultural tribes and cities - who are all disproportionately impacted by the additional reductions that will occur in Arizona,” Arizona Department of Water Resources Director Tom Buschatzke said at the Symposium.

Those issues will have to be resolved before the state finalizes a deal with California and Nevada.

Building Another 20-Year Vision

The decision to officially allocate Colorado River water nearly a century ago occurred during one of the Basin’s wet swings. The Colorado River Compact was founded upon hydrologic data that showed the annual average flow at Lee Ferry to be about 17 million acre-feet. It is now well known that the flow is much less than that, on average about 15 million acre-feet annually, with fluctuations from a historic low of 5.4 million acre-feet in 1977 to more than 24 million acre-feet in 1984 at Lee Ferry, Arizona.

Major water suppliers today know

they are working with what’s known as a structural deficit.

“The math is simple,” the Colorado River Research Group noted in 2015. “Under what has traditionally been considered normal conditions, Lake Mead receives about 9 million acre-feet of water annually from Lake Powell and downstream tributaries. To supply users in the three states and Mexico, and because of evaporation, Lake Mead loses at least 10.2 million acre-feet per year. The resulting deficit of about 1.2 million acre-feet produces a 12-foot drop in Lake Mead storage levels each year.”

Add drought to the mix and conditions can quickly deteriorate from troublesome to severe. Writing on June 13 in the online publication *The Conversation*, Udall and Overpeck noted that Lake Powell and Lake Mead were “brim full” in 2000, but that by 2004 “they had lost enough water to supply California its legally apportioned share of Colorado River water for more than five years.”

This downturn prompted water users to agree to the 2007 Interim Guidelines for water deliveries from the Upper Basin to the Lower Basin and within the Lower Basin.

Among other things, the Guidelines aimed to clear up some disputes about certain aspects of the Colorado River Compact of 1922 and other pieces of the Law of the River that had threatened to boil over into litigation.

The unprecedented 20-year agreement accomplished some noteworthy achievements, including a management plan for the two big anchors of Colorado River storage - Lake Powell and Lake Mead - that spelled out how coordinated operations would help to better balance storage in these two large reservoirs, and defining reductions in water deliveries if a

Recent Colorado River Agreements

2001	Interim Surplus Guidelines Record of Decision (ROD) signed.	2012	California Court of Appeal upholds QSA and Supreme Court leaves that decision standing.	2015	Reclamation's Moving Forward Phase 1 Report is released. It includes the recommendations from three workgroups focused on water use efficiency (urban and agricultural) and environmental and recreational flows.
2003	Quantification Settlement Agreement (QSA) signed, enabling water transfer between Imperial Irrigation District and San Diego County Water Authority and gradual reduction of California use to 4.4 million acre-feet.		U.S.-Mexico Minute 319 signed, creating binational framework to address shortages and allowing Mexico to store unused water in Lake Mead.		
2004	Metropolitan Water District of Southern California and Palo Verde Irrigation District sign 35-year deal to pay farmers to fallow and rotate crops, transferring saved water to urban Southern California.		Colorado River Basin Supply and Demand Study released. It finds there are likely to be "significant shortfalls" between projected water supplies and demand in the coming decades.	2017	U.S. and Mexico sign Minute 323, which continues the key elements of Minute 319, including, among other provisions, sharing in shortage and surplus, water storage in the U.S. reservoir system, water for the environment, and improved infrastructure for water conservation, with the shared goal of boosting the reservoir levels in Lake Mead to reduce the risk of shortage. Minute 323 commits U.S. water managers to invest \$31.5 million in water efficiency projects in Mexico to save more than 200,000 acre-feet of water. In return, the U.S. entities will receive a one-time water exchange, and over the long-term Mexico will benefit by generating additional water from these conservation programs and improved infrastructure. The Minute also obliges both countries to provide water and funding for continued habitat restoration and scientific monitoring in the Colorado River Delta through 2026.
2007	Seven States Agreement and federal ROD for the 2007 Interim Guidelines signed; includes Lower Basin shortage criteria, and Intentionally Created Surplus mechanism to store conserved water in Lake Mead, and criteria for coordinated operations of Lake Powell and Lake Mead to better balance storage in the Basin's two largest reservoirs.	2013	Federal officials establish working groups to explore concepts identified in Colorado River Basin Study.		
2010	Colorado River Basin Supply and Demand Study initiated. 7.2 magnitude Baja California earthquake occurs on Easter, damaging water infrastructure in the Mexicali area. Mexico and U.S. subsequently sign Minute 318, an interim agreement that allows Mexico to store part of its allotment in Lake Mead while repairs are made to infrastructure damaged during the April 2010 earthquake.	2014	The funding partners and Reclamation develop the basin-wide Pilot System Conservation Program to test voluntary, compensated water conservation concepts that reduce water use in the Colorado River Basin, create "system water" to benefit elevations in Lake Powell and Lake Mead, and partially mitigate the impacts of long-term drought. Reclamation, the Lower Basin States, and water agencies sign a Memorandum of Understanding for Lower Basin Drought Response Actions, which identified a goal of taking voluntary actions to store additional water in Lake Mead.		The Minute also obliges both countries to provide water and funding for continued habitat restoration and scientific monitoring in the Colorado River Delta through 2026.

shortage condition is determined in the Lower Basin.

Drought planning and heightened conservation measures are most often linked to the mega population of the Southwest – Las Vegas, Southern California and Phoenix (with Tucson not far behind). However, a system crash also would adversely impact the rapidly growing Front Range in Colorado.

“We get half of our supply from the Colorado River, so if there is an upset on the river – if Lake Powell and Lake Mead aren’t managed in ways that are sustainable and provide compliance with the Colorado River

will include historical streamflows for the most critical period of record and we know it will include the unprecedented 17-year drought.”

Recognition, Understanding and Respect

CRIT members collectively have rights with a priority dating back more than 150 years to divert 719,248 acre-feet a year from the Colorado River or the lesser of the amount needed to irrigate 107,903 acres. More than 60,000 acre-feet of those rights are in Arizona with the remaining 57,000 acre-feet in California.

In the universe of Colorado River water use, resolution of tribal water settlements is an important way to provide some certainty for tribal and nontribal water users. The issues can be very complex due to regional water scarcity and the need to reconcile federal environmental law with tribal and private water use. Implementation requires a cooperative effort to obtain enactment of water settlement legislation that typically must include some federal funding to make the agreement work.

“There are two perspectives when you work with the tribes – one is the full development, full economic utilization of their water rights, which were developed in 1963 and have yet to be fully realized,” said Vick, special counsel for CRIT. “From the Basin perspective, the tribes feel it is still a challenge for major water users and the states in the Basin to recognize, understand and respect the tribes that are in the Basin.”

The Tribal Water Study, expected to be rolled out in December, identifies many of the challenges to the transfer of tribal water, whether it’s Lower Basin tribes on the mainstem river or those in the Upper Basin with settlements. Vick said she is

“naively optimistic” about the study’s outcome “because the challenges of shortage open a lot of doors, especially to those entities that have the earliest and least likely to be shorted supplies within the Basin.”

Vigil, who noted that “for the most part, tribes are suspicious of everybody and everything,” said “one of the biggest challenges” in the relationship between tribes and other users “is an acknowledgement and an understanding.”

“There is a huge ignorance about tribes and future reserved water rights and settlements,” he said. “We took it [the Study] on to create a relatedness to the other stakeholders in the Basin because traditionally tribes there were the elephant in the living room. Everybody acknowledged they existed, but nobody knew what to do with them or how they fit in.”

With a new source of water inevitably comes calls for its use from outside tribal lands. The practicality, feasibility and acceptance of such water transfers is an open question.

“Are the tools available to do so today? No, they are not,” Vick said. “But I think there is a willingness among all the entities in the state of Arizona who are interested and see the value of a potential new supply to bring their energies to the table to work on that and to develop the tools.”

Adjusting to a New Playbook

The Udall/Overpeck report notes that “approximately one-third of the flow loss in the Colorado River is due to high temperatures now common in the basin, a result of human-caused climate change,” and that “as temperatures increase in the 21st century due to continued human emissions of greenhouse gases, additional temperature-induced flow losses will occur ... possibly exceeding 20 percent at mid-century and 35

“There is a huge ignorance about tribes and future reserved water rights and settlements.”

– Darryl Vigil, Jicarilla Apache Nation

Compact for the Lower Basin and there’s a curtailment in the Upper Basin – Denver Water’s stake in that for a growing population of a million and a half people and the entire Denver front range is at risk of losing one-half-plus of our water supply,” Lochhead said. “That’s not a shortage, that’s a curtailment. That’s done. We are over; we are out of water.”

As 2026 approaches, stakeholders are gearing up for intensified activity as they prepare for the next iteration of the Guidelines. Probably the most managed river system in the world, the river is subject to a multitude of legislative and regulatory oversight, including the Colorado River Storage Project Act, the Boulder Canyon Project Act, and the Boulder Canyon Project Adjustment Act.

“No later than the end of 2020 will we start to reconsult under the Interim Guidelines,” Castle said. “It

percent at end-century.”

The scenario is not an attractive one for the Colorado River Basin, Udall said at the Symposium, calling a 6.5 degree Fahrenheit increase by 2100 a “living hell for water managers.”

While climate change policy is shrouded by political influence, Udall said circumstances will eventually compel actions that help stem the tide of the negative impacts.

“At some point in the next 10 years, we are going to wake up and go, ‘Oops, we are way overshooting a safe and livable planet,’” he said.

The extreme conditions could be met by techniques such as solar radiation management (SRM), which aims to artificially cool the planet, while also trying to remove carbon dioxide and other greenhouse gases. The problem with SRM, Udall said, is the possibility of the unintended side effects such as changes in the hydrologic cycle that lead to things such as decreased monsoon activity. There is now heightened scientific attention on removing carbon from the atmosphere through increased agricultural development, also known as negative emissions, though that would mean increased water use, Udall said, noting that both solar radiation management and negative emissions “are going to add another layer of stress to water management.” On the environmental restoration side, Udall said he’s moving away from the 1970s-era view of restoration that sought to return areas to pristine status.

“This is such a different world. We need to have a new vision of what we want and go make it happen,” he said. “We are not going back to a 1970s view of the environment. The California Bay-Delta is forever changed, and you are not going to restore it to what it once was and we probably should

admit the same with the Colorado River Delta, but that doesn’t mean it can’t have environmental value. We are playing God now, but we are doing a terrible job at it. We should figure out how to do this well.”

Minute 323

Several years in the making, the United States and Mexico added to their legacy of cooperative Colorado River use with the Sept. 21 signing of Minute 323. At the Symposium they signed paperwork that now implements the agreement to the 1944 Water Treaty, which charts the course for binational water use for the next 20 years.

Minute 323 dedicates 210,000 acre-feet of water over nine years for environmental restoration work in the Colorado River Delta. In 2014, an experimental flood release from Morelos Dam in Mexico saw the Colorado River flow into its Delta for the first time in 60 years.

Conservation groups will continue their focus on restoring about 4,300 acres of prime cottonwood, willow and mesquite habitat along the Limitrophe and Delta. As opposed to the previous pulse flow, Minute 323 water deliveries will focus on smaller volumes that will help preserve a baseline amount of water in the Delta ecosystems over a longer period.

Jennifer Pitt, Colorado River

program director with the National Audubon Society, said the effort to restore some of the Colorado River Delta’s legacy has paved the way for further progress by conservation groups.

“I think in the early years when some people heard us talking about putting water into the Delta, what they heard was a bunch of environmentalists saying take down the dams,” she said. “When my colleagues at the Sonoran Institute and Pronatura Noroeste starting planting trees in the Colorado River Delta, people could see what we were trying to do and understood that this had nothing to do with taking down dams and everything to do with trying to revive nature in a place where it was missing.”

Minute 323 broadens the way management of the river encompasses the needs of both countries with an eye toward keeping Lake Mead from falling to unacceptably low levels.

“One of the more ambitious, yet attainable, programs is the establishment of the Binational Water Scarcity Contingency Plan (BWSCP) to address shortages in the Colorado River

International Boundary and Water Commission members Roberto Salmón (Mexico) and Edward Drusina (United States) shake hands after signing papers to put Minute 323 into force.



system,” according to an analysis of Minute 323 by the Sacramento, Calif. law firm Somach Simmons & Dunn. “The BWSCP expresses the United States’ and Mexico’s shared vision on the need for continued actions to reduce the risk of reaching critically low water levels in Lake Mead.”

Minute 323 commits U.S. water users to fund conservation projects in Mexico in exchange for a portion of

“The challenges are going to continue ... The agreements are great, but we need to continue the process of collaboration amongst the states.”

– Mike Connor, former Interior Deputy Secretary

the water conserved by that practice in Lake Mead. The funding will come from MWD, Imperial Irrigation District, Southern Nevada Water Authority, Central Arizona Water Conservation District and Reclamation.

Averting Crisis on the River

After emerging from truly trying times, Colorado River water users could catch their breath after better-than-expected precipitation allayed fears of a Lake Mead shortage in 2017 and 2018. Implementation of special conservation programs to keep water in the reservoir also helped.

“The challenges are going to continue,” Connor said. “There is great progress – we put more than 17 feet in Lake Mead – no doubt that delayed shortages and it happened because of those collective activities done by everybody. The agreements are great, but we need to continue the process of collaboration amongst the

states.”

Whether the Lower Basin DCP comes together remains to be seen, with MWD’s Hasencamp noting that the improved hydrological conditions and a much fuller Lake Powell (40 feet higher) have removed some of the urgency that it be completed.

“I think most entities are saying the DCP is a good idea and let’s get it done, but it’s not as crucial as it was a few years ago and if it’s not done, it’s because the agencies think ‘Let’s focus on the big deal rather than this one, which really isn’t that critical.’”

Terry Fulp, Reclamation’s Lower Colorado regional director, said completing the DCP is part of an “incremental” approach to solving the water supply challenges.

“We have to put this DCP in place,” he said. “We have our Mexican partners who are fully in on it; it will help us manage that risk down to acceptable levels and will give us the stability in this Basin to enter into the long discussions and hard discussions that we will need to figure out what happens post-2026. If we have the DCP in place and the negotiations fall apart, we will still be in the position to figure it out.”

However, those entering the next round of negotiations related to the 2007 agreements for shortage sharing/ICS Guidelines believe it is not the time to pause the pursuit of a sustainable water supply.

“There is a real temptation to say, ‘Well, we had kind of a normal year this year, system conservation and some of the conservation measures in the Lower Basin have done a pretty good job of keeping Mead afloat [so] we’ll just kind of skate through until 2026 and not deal with this stuff,’” Lochhead said. “To me, that’s clearly a short-sighted view. If you look at some of the years we have seen,

particularly in the early 2000s, we are only a couple years away, at current reservoir elevations, from a real crisis on this river. We can’t plan on continued average conditions, we can’t bank on another good year coming down the road.”

Castle said she believes the institutional oversight exists to help construct a set of guidelines that reflect the new changing face of Colorado River management.

“The Law of the River gives us the means to deal with this hydrological variability, the new hydrology that we are dealing with and that we expect to deal with,” she said. “It’s reasonable to assume the next set of guidelines will look different than what we have now.”

Water users “would benefit from doing some scenario planning” that contemplates the expected reduced river flow as well as considering possible changes to the institutional structure of the river and the circumstances under which those changes would be engaged, she said.

One of the factors inhibiting progress is the legacy of the concept that water not used is wasted water.

“We are flipping that now because we recognize we have to have a water savings account to deal with volatility, to deal with decreased supplies in the future, and so we are looking at non-use as beneficial as well and that sort of grinds against some of the legal structure in the Law of the River and that’s why it’s hard,” Castle said.

“We need to identify consistent revenue streams for incentivizing conservation, for funding tribal water settlements and for funding infrastructure that’s needed to increase the balance between supply and demand in the Basin,” she added.

Resetting the sphere of water use must be done carefully and with at-

tention to the intangible details.

“There should be a discussion about what we really want for the future of agriculture in this Basin; that could have some very fruitful outcomes,” Pitt said. “If we march forward in this Basin and our solution is simply to see, bit by bit, the disappearance of irrigated agriculture and we stop having water users who are directly neighbors to our rivers, I fear we would no longer have the best thing any river has, which is neighbors who want to be good stewards of the resource next door.”

Water users need to come to grips with the effects of climate change in a way that avoids perceived calamitous outcomes to the municipal and agricultural sectors.

“I think we need to think seriously about a future that’s got 10, 11 or 12 million acre-feet in it,” Udall said. “I don’t know if you can do that in a public setting. Difficult discussions like this need to be had behind closed doors before you can unveil things. It may be that we don’t need to unveil things for a while, but we at least need to be thinking about them. It’s the planning aspect that helps enhance our vision.” Despite the weighty challenge, Udall believes “we can solve this; we just have to make the decisions.”

“Amongst all the darkness out there,” he said, “I am optimistic about ‘us’ and this Basin.”

Heading into another water year, there is the understanding that while Colorado River stakeholders are often in a reactionary position, there is the opportunity for the states to get out in front and be in a position of strength.

“I tend to think that things happen because of action-forcing events,” said Bennett Raley, who served as assistant secretary for water and science



in the Bush Administration.

Federal legislation, drought and the renegotiation of the 2007 Guidelines are among those type of events, he said, noting that if drought returns, the pressure to respond comes back “extremely rapidly.”

“Critically important, I don’t want the drought to be an action-forcing event and I’m afraid that if we wait to deal with the next steps until the ’07 Guidelines are renegotiated, that’s a long time and I fear losing the time and the opportunity to take the next steps,” Raley said.

Raley said Interior needs to put “comparable levels of resources into helping the Upper Basin to solve its challenges.” The Upper Basin “needs some tools to deal with things if the hydrology turns bad and some of those tools (such as system reoperations and water banking) may make people in the Lower Basin uncomfortable,” he said.

Beyond the necessary planning for post-2026 is the need to incorporate American Indian tribes into the mainstream conversation of dealing with the current issues on the river, Vick said, noting that “until tribes are at all the tables for these discussions, we feel that the water security and the flexibility needed to move this Basin forward in the next 20 years is unlikely to occur because of the significance

Former top Interior officials Mike Connor, Jennifer Gimbel and Bennett Raley after their panel discussion on “The Politics and Policy Behind the Scenes” at the biennial Colorado River Symposium in Santa Fe, N.M.

of the tribal water rights.”

Vick stopped short of saying the resolution of tribal water rights opens a new door of water supply opportunity.

“I don’t think there’s an appetite in the Basin to have a blanket marketing of tribal or nontribal water within the states,” she said. “That would create a free-for-all of who has the most money has the most water, and that’s not necessarily in the best interest of the Basin.”

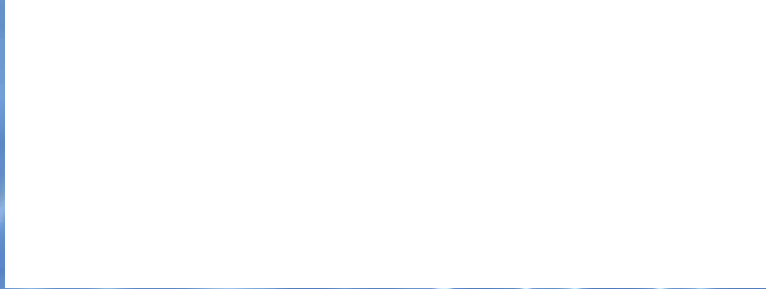
Water transfers, water marketing, increased conservation (some of it incentivized) are among the methods in play as the process of crafting another 20-year vision of river management unfolds. “Risk management is where we are at right now,” said Chris Harris, executive director of the Colorado River Board of California. Interior, he added, “needs to have skin in the game,” as things move forward. “This is not just the Basin states, it’s really the entire federal family, the states, the tribes, the NGOs and the Mexican government. We are all in this together.” ❖



WATER EDUCATION
FOUNDATION

1401 21st Street, Suite 200
Sacramento, CA 95811
www.watereducation.org

Non-Profit Organization
U.S. Postage
PAID
Sacramento, CA
Permit No. 430



Change Service Requested