

## **REFLECTIONS ON TWO TUMULTUOUS DECADES IN THE COLORADO RIVER BASIN**

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As the basin states gear up to critically review and then revise the Interim Guidelines, those of us in the Colorado River Research Group (CRRG) have chosen this moment to reflect upon the massive changes that have occurred in the basin thus far this century. This is not only helpful in identifying the agenda that should guide the renegotiation efforts, but other negotiating processes that undoubtedly will prove necessary to bring lasting stability and security to the full community of Colorado River interests.

### ***Coming to Terms with the New Hydrologic Realities***

The hydrologic changes that have befallen the Colorado River, while not unprecedented when viewed through the lens of the paleo records, demand that we revisit our notions of both what's normal and what's possible moving forward. The 19-year period from 2000 to 2018 was the driest in the basin since the Bureau of Reclamation began estimating natural runoff in 1906. This period was recently declared a "megadrought" and by one measure (reconstructed soil moisture) is the 2<sup>nd</sup> worst 19-year period in 1200 years. Reduced streamflows, paired with chronic overuse in the Lower Basin, has decimated reservoir storage: in October 1999, the basin's reservoirs were at 92% of storage capacity; as of September 2019, these reservoirs were at 53% of capacity. The initial freefall of reservoir storage in 2000-2004 has been effectively mitigated, as the basin has rallied to impose a variety of emergency and interim measures. That is a success story worth revisiting—as we do below. Many of these actions were implemented in the spirit of buying time for more clarity to emerge regarding the changing hydrology, and more discussion to occur regarding lasting solutions. To a large extent, that has happened. We now know that increasing drying (or "aridification" as we've dubbed it) should be expected and that extreme megadroughts seem inevitable; we have also learned that tremendous conservation, cooperative management, and overall "belt-tightening" is also possible and is much less daunting than the socioeconomic fallout that could accompany empty reservoirs.

### ***A Brief Chronology of Basin Responses***

At the beginning of the new millennium, the other basin states were primarily concerned with getting California to reduce its uses from 5.1 (the average consumptive uses and losses for 1995-1999) to 4.4 million acre-feet (maf/yr), an action that took on new urgency as the completion of the Central Arizona Project in the 1990s had doubled that fellow Lower Basin state's consumption of mainstem supplies. The 2001 Interim Surplus Guidelines envisioned a gradual process (a "soft landing") for California to achieve this goal, but the extremely low runoff of 2002 and the associated hit to reservoir water storage prompted a dramatically accelerated schedule. This was provided by the 2003 Quantification Settlement

Agreement resolving long-standing disagreements among California water users and establishing voluntary reallocations of portions of this entitlement from agricultural to urban water users. Rapidly reducing California's consumption to 4.4 maf/yr was a huge step forward for the basin, but it did not provide a lasting solution to tightening water supplies. By 2004, Upper Basin states raised concerns about the amount of water annually released from Lake Powell, questioning their legal obligation to make up any deficiency in the water to be provided to Mexico under the 1944 Treaty. In 2005, Secretary of the Interior Norton initiated a public process to review reservoir operations and deliveries of water when watershed runoff and reservoir storage approached critically low conditions. This negotiation process produced the 2007 Interim Guidelines. These guidelines tied releases from Lake Powell to reservoir elevations at both Mead and Powell, provided for reductions in deliveries of water to the Central Arizona Project and the Southern Nevada Water Authority whenever the elevation in Lake Mead dropped to 1075 feet above mean sea level, and authorized the storage of "intentionally created surplus" water in Lake Mead.

Soon thereafter in 2009, Reclamation and the seven basin states joined together in a comprehensive study of the basin. The report, the Colorado River Basin Water Supply and Demand Study (the "Basin Study"), published in 2012, found that average annual consumptive uses and losses of water in the basin already exceeded annual average water additions, with this gap expanding to several million acre feet (depending upon the scenarios) by 2060. The Basin Study included an array of options and strategies to address the gap.

On a different front, the U.S. and Mexico took an important step towards better transboundary management of the Colorado River with Minute 319 in 2012. Mexico agreed to share shortages in water deliveries under specified conditions and extended its ability to store water (Intentionally Created Mexican Allocation) in Lake Mead. In addition, Minute 319 established the framework governing the delivery of environmental water, including an experimental "pulse" flow of water from Morelos Dam into the Colorado River Delta. Minute 323, adopted in 2017, expanded cooperative arrangements between the U.S. and Mexico both regarding water management and ecological restoration in the Colorado River Delta.

A further effort to reduce consumption was begun in 2014 after two very poor runoff years, when the basin states, some large water users, and the Bureau of Reclamation initiated a Drought Contingency Planning (DCP) process, and launched the Pilot System Conservation Program in 2014. With funding from the Central Arizona Water Conservancy District, the Metropolitan Water District, the Southern Nevada Water Authority, and Denver Water as well as from the Bureau, the program generated "system" water from a variety of sources through conservation and temporary forbearance of use to help bolster reservoir storage levels, especially in Lake Mead.

As water levels in Lake Mead flirted with a shortage declaration, the DCP (the Agreement Concerning Colorado River Drought Contingency Management and Operations) agreements were adopted by Congress in late 2019. The Lower Basin DCP includes commitments of water to Lake Mead annually from the three states in the Lower Basin and the Bureau of Reclamation, dependent on reservoir storage elevations. The agreement will reduce deliveries to the Central Arizona Project and the Southern Nevada Water Authority when Lake Mead reaches the level of 1090 feet above mean sea level (rather than 1075), and California will share shortages when Mead's elevation drops to 1045 feet. The focus of the Upper Basin DCP is to protect critical elevations at Lake Powell, perhaps through a still conceptual Demand Management Program that would bank conserved water in Lake Powell.

## **What Has Worked**

The 21<sup>st</sup> century has arguably seen the most innovative and collaborative period of Colorado River water-supply management in basin history. Some of the most notable features include:

***A commitment to collaboration.*** Initially, the basins seemed to be moving toward litigating their differences. Instead they worked together through the Interim Guidelines process—and in separate agreements with Mexico—to revise operations of basin reservoirs and to provide a mechanism for allocating shortages in the Lower Basin. They joined together with Reclamation in the pathbreaking basin water study, establishing a shared understanding of basin supply and demand conditions. When it became clear that the Interim Guidelines were not sufficient, they joined in the Drought Contingency Planning process, resulting in additional modifications to the guidelines.

***Practical modifications to the Law of the River.*** Among the important changes to the Law of the River made during this period were the Interstate Banking Agreement, direct involvement of the states in developing the Interim Surplus and Interim Shortage Guidelines, creation of Intentionally Created Surplus water and its storage in Lake Mead, authorization for Mexico to store water in Lake Mead, authorization for the Upper Basin to store conserved water in Lake Powell, and California’s commitment to sharing shortages. Each of these agreements represented a significant change of existing law and procedure, demonstrating an unparalleled degree of flexibility in basin governance.

***Broadened participation in basin decision making.*** Historically, basin decision making has been the province of the states and the federal government. During this period, many of the decision processes opened up to include the Republic of Mexico, environmental interests, and Indian tribes. For example, Mexico negotiated to share shortages with the Lower Basin states. Environmental interests helped shape the Interim Guidelines negotiations with their “conservation before shortage” proposal. Through the International Boundary and Water Commission, Mexico, states and environmental interests negotiated additions to the Treaty that included the delivery of environmental water to the Delta. Most recently, the Ten Tribes Water Study (2019) marked an important step forward in tribal participation in basin water studies.

***Reductions in consumptive water use.*** In 2001, the Bureau of Reclamation estimated annual consumptive uses and losses of basin water totaled about 18.3 maf; today, that value is approximately 17 maf. Despite rapid population growth, virtually every major city in the Southwest is using the same or less water today than in the late 20<sup>th</sup> century. Similarly, agricultural water use basinwide has also been stable while productivity has increased significantly. The transition from supply management to demand management is well underway.

## **Some Challenges Ahead**

Despite these accomplishments, the agreements that are now in place have not balanced the water supply/demand budget, and the reduced water deliveries specified by the Interim Guidelines and Lower Basin DCP only limit consumption when reservoirs are critically low. Arizona and Nevada face the first such cutbacks in 2020. Additionally, the Interim Guidelines (and several supporting agreements) that provide the overarching guidance on how to manage the declining water supply expire after 2026, and

new agreements must be negotiated. The following items—many discussed in detail in other CRRG publications—are priority actions:

**Reach agreement on replacing the 2007 Interim Guidelines and the Drought Contingency Plan.** The scope of the issues that will be considered in this process already is the subject of debate. At a minimum, the discussions will consider the effectiveness of the coordinated operating criteria for Lakes Powell and Mead and whether there are better measures than reservoir volume (such as yearly inflows) for managing releases and deliveries from these two massive reservoirs. No doubt the process also will revisit the commitments made in the 2019 DCP for sharing shortages in the Lower Basin and whether to implement a demand management program in the Upper Basin. The relationship between these operating regimes and environmental resources is also a notable omission that should be addressed.

**Eliminate the “structural deficit.”** As detailed in earlier CRRG publications, a gap of about 1.2 maf exists between minimum annual required releases of water from Lake Powell and normal uses and losses in the Lower Basin. While the curtailments specified in the Lower Basin DCP provide for cutbacks of a similar magnitude during crises, an agreement is needed to address this problem on an ongoing basis.

**Satisfy existing but unused tribal water rights.** The unquestioned legal right of tribes to someday put their very senior rights to use casts a shadow on efforts to bring the basin water budget into balance. Justice demands that tribes have control over, and receive value for, these rights.

**Address continued water development in the Upper Basin.** Upper Basin states continue to pursue projects to increase consumptive use of basin water. Such increased consumption without offsets raises the risk of the Upper Basin defaulting on its obligation not to deplete the flow at Lee Ferry below 75 maf in consecutive 10-year periods. Such new uses would unfairly threaten critically important established water uses and also run counter to Upper Basin demand management efforts to protect those uses.

**Clarify sources of water to meet the Mexico Treaty obligation.** As the flareup between the basins in 2004 illustrated, there is sharp disagreement respecting responsibility for meeting water delivery obligations to Mexico. It is time to resolve this long-standing source of conflict by reaching agreement about specific sources of water that will satisfy this requirement.

**Develop a long-term strategy for the Colorado River delta.** There is considerable binational support for continued efforts to restore a modified version of some parts of this shared ecosystem. Minute 323 takes an important step toward that end, but a continuing agreement among the countries, states, tribes, and NGOs that sets out clear goals and provides the means for their achievement is needed.

**Reconcile climate change water science and basin water use.** In the more than 50 papers published since 2000, climate scientists agree that the basin is already much warmer and will continue to get warmer (over 1°C since the mid 20<sup>th</sup> century and potentially 2°C or more by mid century), resulting in reduced streamflows and increased system losses. This is a continuing trend, not a one-time perturbation to the status quo. This overarching issue makes solving *every challenge* in this list more difficult. Water users throughout the basin need to come to terms with this reality, fighting aggressively to halt climate change while preparing for unrelenting long-term reductions in water availability. A reckoning is overdue.

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