The Disappearing Colorado River

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Introduction

On October 17, 2010 storage in Lake Mead dropped to its lowest level since the Bureau of Reclamation (Reclamation) began filling the reservoir behind Hoover Dam in the 1930s. Further declines may trigger the first ever declaration of a "shortage" condition in the Lower Basin of the Colorado River, under which deliveries to Arizona and Nevada water users will be reduced.[2] Increased amounts of water will be released from Lake Powell to help maintain storage levels in Lake Mead, reducing the buffer protecting uses in the Upper Basin from being curtailed to meet delivery obligations to the Lower Basin established in the 1922 Colorado River Compact.[3] Earlier in 2010, Reclamation acknowledged for the first time that uses of basin water now exceed supply.[4] Lurking behind these rather dramatic events is growing scientific evidence that the physical supply of water annually available in the Colorado River basin is declining as a consequence of global warming.[5]

These events bring to the fore long-standing legal issues concerning rights and obligations of the states under the Law of the River.[6] Disputes about one or more of these issues could take the states into court. Alternatively, the states could decide to address the problems presented by these issues through negotiation. This article provides a brief summary of the major legal issues, followed by preliminary discussion of some possible ways negotiated resolution might be accomplished. By bringing these consideration together in a summary fashion, the article hopes to stimulate discussion of the difficult choices ahead in the Colorado River basin.

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[2] A shortage means there is insufficient water available in the Lower Basin to make possible the delivery to Arizona, California, and Nevada of sufficient water to enable consumptive use of 7.5 million acre-feet in a year. In 2007, the Secretary of the Interior issued interim guidelines governing the circumstances under which a shortage condition would be declared (tied to the elevation of water stored in Lake Mead). Secretary of the Interior, Record of Decision, Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead, December 2007, available online at http://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf. In an accompanying environmental impact statement, the Bureau of Reclamation provided an analysis of how these guidelines would be implemented. Final Environmental Impact Statement, Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead, Bureau of Reclamation, October 2007.

[3] The 1922 Colorado River Compact apportioned the beneficial consumptive use of 7.5 million acre-feet of water to an Upper Basin and a Lower Basin, divided at Lee Ferry in northern Arizona. Article III (a). It also placed a limit on uses in the Upper Basin that would reduce flows passing Lee Ferry during consecutive 10-year periods below 75 million acre-feet. Article III (d).

[4] *See* Bruce Finley, "Development in Colorado Going with the Flow of Water Deficit," Denver Post, June 20, 2010: "Federal data show that the average annual use of Colorado River water (15.4 million acre-feet) has surpassed the average annual supply (14.5 million acre-feet) in the river."

[5] *See, e.g.,* Climate Change in Colorado A Synthesis to Support Water Resources Management and Adaptation, Colorado Water Conservation Board, 2009, available online at http://cwcb.state.co.us/Home/ClimateChange/ClimateChangeInColoradoReport/

[6] The Law of the River refers to a number of legal documents that, collectively, establish rights to use the water of the Colorado River and its tributaries. Many of these documents are available online at http://www.usbr.gov/lc/region/pao/lawofrvr.html.

Legal Issues

Over the years, the basin states have debated the meaning of aspects of the laws governing uses of basin water as they perceived their interests were at risk. Presented here are three issues that have received the most attention.

1. Is the Lower Basin Using More Water than Authorized under the 1922 Colorado River Compact?

The 1922 Compact apportioned 7.5 million acre-feet of beneficial consumptive use to the Lower Basin (the states of Arizona, California, and Nevada, plus small parts of New Mexico and Utah) in perpetuity, together with the right to increase those uses another one million acre-feet until such time as another commission should meet to allocate remaining unallocated basin water.[7] The U.S. Supreme Court in *Arizona v. California*[8] determined Congress had allocated 7.5 million acre-feet of consumptive use from the main Colorado River among Arizona, California, and Nevada, raising questions about the status of tributary water that had been included in the Compact apportionment. Counting uses in the tributaries, consumption in the Lower Basin presently exceeds 10.5 million acre-feet.[9] This amount does not account for reservoir evaporation of approximately 1.5 million acre-feet and other losses of water that support consumptive uses in the Lower Basin.[10] The Upper Basin might decide to challenge the amount of consumption occurring in the Lower Basin on the basis it exceeds the amount authorized under the 1922 Colorado River Compact.

2. Must the Upper Basin provide at least 750,000 acre-feet annually towards meeting the Mexican Treaty obligation?

The 1922 Compact anticipated an agreement with Mexico that would ensure use of some amount of water from the Colorado River in that nation annually.[11] The 1944 Treaty committed the U.S. to an annual delivery of 1.5 million acre-feet. Under the Compact, this water was to come out of the "surplus" the commissioners believed existed beyond the 16 million acre-feet of consumptive use they allocated. Any insufficiency is to be equally borne by the two basins, with the Upper Basin to supply half of the deficiency at Lee Ferry.

Since there is not enough water to enable consumptive use of 16 million acre-feet annually in the U.S., Reclamation requires the Upper Basin to provide half of the 1.5 million acre-foot

[7] Colorado River Compact, Articles III (a), (b), & (f).
[8] 373 U.S. 546 (1963).
[9] Bureau of Reclamation, Consumptive Uses and Losses Report, 1996-2000. This is the most recent five-year report of Upper and Lower Basin uses and losses available. Arizona alone consumes about 2.6 million acre-feet from its tributaries, while Nevada, New Mexico, and Utah consume approximately 0.568 million acre-feet. Personal Communication, Jim Prairie, Bureau of Reclamation, Consumptive Uses and Losses Report, 2001-2005, Lower Basin Tributaries (preliminary).
[10] Such losses substantially increase the amount of water that must be available in the Lower Basin to support the 7.5 million acre-feet of consumption in the Lower Basin states and the delivery of 1.5 million acre-feet to Mexico.
[11] Colorado River Compact, Article III (c): "If, as a matter of international comity, the United States of America shall hereafter recognize in the United States of Mexico any right to the use of any waters of the Colorado River System, such waters shall be supplied first from the waters which are surplus over and above the aggregate of the quantities specified in paragraphs (a) and (b); and if such surplus shall prove insufficient for this purpose, then, the burden of such deficiency shall be equally borne by the Upper Basin and the Lower Basin, and whenever necessary the States of the Upper Division shall deliver at Lee Ferry water to supply one-half of the deficiency so recognized in addition to that provided in paragraph (d)."

Mexico obligation at Lee Ferry, releasing this 750,000 acre-foot amount from Lake Powell annually. The Upper Basin has objected to this interpretation of the Compact, arguing water for Mexico should come first from the consumption in the Lower Basin exceeding its 8.5 million acre-foot apportionment.[12]

In addition, the Upper Basin may argue the consumption occurring in the Lower Basin in excess of 8.5 million acre-feet comes from surplus water that was supposed to be used to meet the Mexican Treaty obligation. Before uses in the Upper Basin are limited to provide half of the Mexico water, uses above 8.5 million acre-feet should be restricted.

Finally, the Upper Basin has consistently objected to bearing any responsibility for transit losses between Lee Ferry and the Mexican border. In its view, its obligation to provide half of the water if surplus is not available is satisfied at Lee Ferry.

3. Must the Upper Basin ensure flows of 75 million acre-feet at Lee Ferry every consecutive 10-year period if it means being unable to consumptively use 7.5 million acre-feet allocated under the 1922 Compact?

Since more than 80% of the basin's water originates in the upper region, Lower Basin commissioners insisted on insurance that sufficient water would pass the dividing point at Lee Ferry so that Lower Basin uses would be protected. Agreement on 75 million acre-feet over consecutive 10-year periods was a compromise, splitting the difference between the positions of the two sub-basins.[13] Information available to the commissioners in 1922 indicated annual average flows at Lee Ferry during the previous 20 years of 16.4 million acre-feet, suggesting there would be enough water to support annual consumption of 7.5 million acre-feet in the Upper Basin with plenty of water left over for the Lower Basin and Mexico.[14] Now it is apparent that, even with Lake Powell, the Upper Basin will never be able to consume 7.5 million acre-feet of system water and still meet the Lee Ferry flow obligation.[15] A recent study for the State of Colorado, incorporating hydrological assumptions of lower runoff indicated using tree-ring analysis and potential further reductions associated with anthropogenic climate change, concluded the State likely has little, if any, reliably developable apportionment.[16]

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[12] As storage in Lake Powell dropped sharply between 2000 and 2004, Upper Basin representatives once again raised their objection to the "deficiency" release from Lake Powell. Letter from Scott Balcomb et al., Governors' Representatives on Colorado River Operations of the States of Colorado, Wyoming, New Mexico & Utah to Herb Guenther et al., Governors' Representatives of the States of Arizona, California, and Nevada (October 7, 2004). The Lower Basin, led by Arizona, responded that the existence of a surplus or deficiency must be determined annually, based on the volume of water available in the Colorado River. If that volume exceeds 16 million acre-feet, there is surplus. W. Patrick Schiffer , et al., " From a Colorado River Compact Challenge to the Next Era of Cooperation Among the Seven Basin States," 49 ARIZ. L. REV. 217, 222 (2007).

[13] The 10-year period reflected the fears of Upper Basin commissioners that prolonged periods of drought could otherwise prevent achievement of this commitment.

[14] Norris Hundley, Jr., WATER AND THE WEST: THE COLORADO RIVER COMPACT AND THE POLITICS OF WATER IN THE WEST, 2d ed. (1975, 2009) at 192.

[15] Estimates of just how much consumptive use the Upper Basin may be able to make have gradually decreased over the years. Reclamation's most recent "hydrologic determination," published in 2007, concluded the Upper Basin can expect to consumptively use 5.76 million acre-feet, not including the evaporation losses associated with the large federal reservoirs in the Upper Basin. Bureau of Reclamation, Hydrologic Determination 2007, Water Availability from Navajo Reservoir and the Upper Colorado River Basin for Use in New Mexico (April 2007). Present consumptive uses are estimated to be about 4.0 million acre-feet.

[16] AECOM, Colorado River Water Availability Study, Phase I Report, Draft, Colorado Water Conservation Board, March 22, 2010.

The Upper Basin states might choose to litigate the 10-year, 75 million acre-foot flow obligation. Two arguments have been suggested. One is based on mutual mistake—that this provision resulted from flawed information about basin water supply and should be reformed (as a matter of contract law) to reflect more accurate information.[17] Another argument is this provision must be read in combination with the provision apportioning beneficial consumptive use of 7.5 million acre-feet to each sub-basin. The argument is the flow obligation cannot override the specific apportionment to the Upper Basin, especially so long as the Lower Basin has sufficient water to consume 7.5 million acre-feet. Another version of this argument would reduce the flow obligation according to the reduction in water availability attributable to climate change.

Experience with state versus state litigation in the U.S. Supreme Court suggests resolution will require many years. For example, Arizona filed suit against California in 1952 to get resolution of its share of the Lower Basin's Compact apportionment; the U.S. Supreme Court issued its decision in 1963 followed by its decree in 1964 and now supplemented by four additional opinions.[18] Moreover, it is difficult to assess how the Court might rule. The issues are complex, and there are good arguments on both sides. Still, the states might choose litigation as the only possible way to achieve resolution. Alternatively, the states could choose to focus on searching for negotiated solutions that might provide the basis for legal accommodation. That is the subject of the following section.

The Search for Solutions

Human-caused depletions to the water of the basin now exceed the recorded average supply of water. Yet there are legally-based expectations in most basin states to further increase consumptive uses of basin water. Negotiations need to focus on ways to reduce depletions while meeting essential basin water needs. Outlined here are possible elements of a basin negotiation.

First, there should be no new net depletions of water in the Colorado River basin.

The basin states should not approve any new water uses or allow the exercise of any already-established water rights that would increase the depletion of basin water. Additional consumptive uses (or evaporative losses associated with new water storage) should only be allowed if at least the equivalent amount of existing consumptive uses (or evaporative loss) is retired. Thus, for example, water consumptively used for new energy development or urban growth would have to be fully offset by the retirement of an equivalent amount of existing consumptive uses so there would be no net increase in the depletion of basin water. Presumably, such transactions would be managed by the party wanting to make a new consumptive use, although states might instead choose to acquire the water and make it available to new uses.

Such a proposal imposes heavily on continued expectations in the Upper Basin to develop more of the 7.5 million acre-foot consumptive use apportionment under the 1922 Compact. While most water leaders in the Upper Basin accept the fact that the 7.5 million acre-foot allotment will

[17] John U. Carlson & Alan E. Boles, Jr., "Contrary Views of the Law of the Colorado River: An Examination of Rivalries between the Upper and Lower Basins," 32 ROCKY MT. MIN. L. INST. 21-1 (1986).
[18] *Arizona v. California,* 373 U.S. 546 (1963); 376 U.S. 340 (1964); 439 U.S. 419; 460 U.S. 605 (1983); 530 U.S. 392 (2000); 531 U.S. 1 (2000).

never be fully used, they have fiercely guarded their expectations to consumptively use more basin water. They are unlikely to accept such a cap on new depletions without other changes that would justify loss of what Upper Basin water leaders believe was the essential bargain achieved by the 1922 Compact—that the slower growing economy in this region would still have water to develop when eventually needed.

Second, the Lee Ferry flow obligation (including releases for Mexico) should be relaxed so long as there is sufficient water available to supply Lower Basin (including Mexico) consumptive uses.

The purpose of the Lee Ferry flow obligation was to ensure sufficient water reached the Lower Basin to help supply apportioned uses. The 10-year, 75 million acre-foot requirement was a compromise agreement. There should be nothing talismanic about the number so long as its purpose is achieved. Agreement on this principle would likely make the Upper Basin more willing to consider accepting a no-new-net-depletion requirement. When Congress funded construction of Glen Canyon Dam and the other Colorado River Project Storage reservoirs in 1956, it was believed that storage in these reservoirs would enable the Upper Basin to increase its consumptive uses to 7.5 million acre-feet/year while delivering enough water to the Lower Basin to ensure consumptive use of 8.5 million acre-feet of from the main stream and tributaries in the Lower Basin, as well as delivery of another 1.5 million acre-feet to Mexico. It is now clear there is simply not enough water in the system to make this possible.

We should reconsider the bifurcation of the basin at Lee Ferry and focus instead on stabilizing and securing some sustainable level of consumptive uses and depletions in the basin, considering a basin-wide water budget. With a reduced water supply there may be different and better ways to utilize the basin's extensive system of water storage facilities. The possibilities are enormous, and it is impossible to say which particular approaches would work best and also be acceptable to the complex mix of stakeholders in the basin.

Third, consumptive uses in the Lower Basin states and Mexico of the water of the Colorado River must be managed so they are limited to no more than nine million acre-feet per year in normal years.

Water use practices in the Lower Basin and Mexico developed under conditions of surplus. When water was relatively abundant, careful management was less important. So, for example, between 1996 and 2000, an annual average of 1.1 million acre-feet passed to Mexico beyond the amount required by the Treaty.[19] With the disappearance of these surpluses, water management in the Lower Basin needs to change.

Steps already are being taken to improve the efficiency of Lower Basin water management, but with the intention of enabling increased consumption of basin water in some cases.[20] There are many opportunities for such efficiencies that should be pursued solely for the purpose of reducing the need for releases from Lake Mead. The goal should be to limit such releases to no more than the amount necessary to meet apportioned beneficial consumptive uses.

[19] Bureau of Reclamation, Colorado River System Consumptive Uses and Losses Report, 1996-2000, Summary Table at iv, available online at http://www.usbr.gov/uc/library/envdocs/reports/crs/pdfs/crs962000.pdf.
[20] In return for helping to finance the Drop 2 structure, the Southern Nevada Water Authority is getting rights to increase its consumption of basin water.

Fourth, a federally-funded program to strategically reduce the annual level of consumptive uses in the basin should be established.

More fundamentally, it is time to put the question of the sustainable level of consumptive uses in the Lower Basin on the table. It has long been recognized the basin's water supply is overallocated. The full extent of this overallocation is now painfully evident. If the Upper Basin is to give up its expectations of increasing its consumptive uses of basin water, the Lower Basin must be willing to make some changes in the amount of consumptive uses it now enjoys. That such reductions can be managed is evidenced by California's cutback from 5.2 million acre-feet of consumptive use to 4.4 million acre-feet in 2004. Mexico needs to be part of this discussion as well. A reduced basin water supply means that all beneficiaries must be part of working out ways to live with that reality. It is never easy to reduce uses, but it is time to start doing so.

Fifth, all basin states must facilitate voluntary processes allowing reallocation of basin water to new uses within their states.

Despite the existence of shortages of water in relation to demand, there is in fact sufficient water to meet basin needs. Most of the basin's water is used for irrigation of crops. The allocation of this water occurred in an era in which irrigated agriculture represented an important economic engine for the basin states. Because most of this agriculture could not bear the full costs of developing and delivering this water, governments subsidized much of these costs. Today, however, the economic justification for these decisions no longer exists, yet the subsidized uses continue.[21]

The process of voluntary reallocation of a portion of the basin's water now dedicated to irrigation is well underway. Much, much more is needed, however, if the basin's reliable water supply is to meet emerging essential demands.

Conclusion

Basin leaders face a difficult challenge. Water supply issues now require responses that mean getting along with less water in some cases and paying more for the water that is used. The political culture of western water developed on the basis of governmentally-supported expansion of water supplies to promote economic development. Despite the broad recognition that this era has ended, the culture remains well entrenched. It will take real leadership to move the basin states beyond the still- powerful perception that economic growth requires ever increasing (low cost) supplies of water. Yet the realities in the Colorado River basin are forcing reconsideration of long-held assumptions about water availability and uses of basin water. The basin's water budget is untenable. Supplementation of water supplies from outside the basin remains the hope of many to bring this budget into balance, but options are few and enormously expensive. More feasible (and already underway) are approaches based on improved water management to reduce losses, reduced consumption in lower economically-valued uses, and voluntary reallocation to meet new demands. Real progress depends, however, on shared agreement or acceptance of a sustainable basin water budget, one that realistically balances consumption and unavoidable losses with reliable supplies. Reaching such agreement is the challenge ahead.

[21] As an example, users of water supplied from Reclamation dams such as Lake Mead pay little or nothing for the water.