

# FACING AN UNCERTAIN COLORADO RIVER BASIN FUTURE

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## SUMMARY

The Colorado River Basin is just one example, albeit an extremely important one in the West, of a stressed river system. The Colorado River Basin Water Supply and Demand Study, released by the U.S. Bureau of Reclamation in late 2012, documents how growth, climate, economic development, and other factors point to an uncertain picture for communities, rural and urban alike. This policy brief highlights key questions communities should consider as they plan for their water futures. Communities large and small must prepare themselves for the economic and hydrologic implications of greater conservation in the municipal and industrial sectors, increased agricultural efficiencies, water transfers that may involve land fallowing, increased consideration of water for natural resources, and investments in more advanced treatment technologies. They will be positioned to make better decisions if their residents – who ultimately are the farmers and ranchers, the business operators, the environmentalists, and the recreationists – are informed and excited about water.

## THE CONTEXT

Study teams always hope their efforts will not just become another study to be shelved, in these days on some disk, rather than on a bookshelf collecting dust. There is no question that the Colorado River Basin Water Supply and Demand Study, released in late 2012 by the U.S. Bureau of Reclamation, is not meeting this fate. The seven U.S. states sharing the Colorado River are Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming. They share water pursuant to the complex body of laws, court decisions, and regulations known as the Law of the River. Wyoming, Utah, Colorado, and New Mexico in the Upper Basin use a different formula for sharing water than Arizona, California, and Nevada in the Lower Basin.

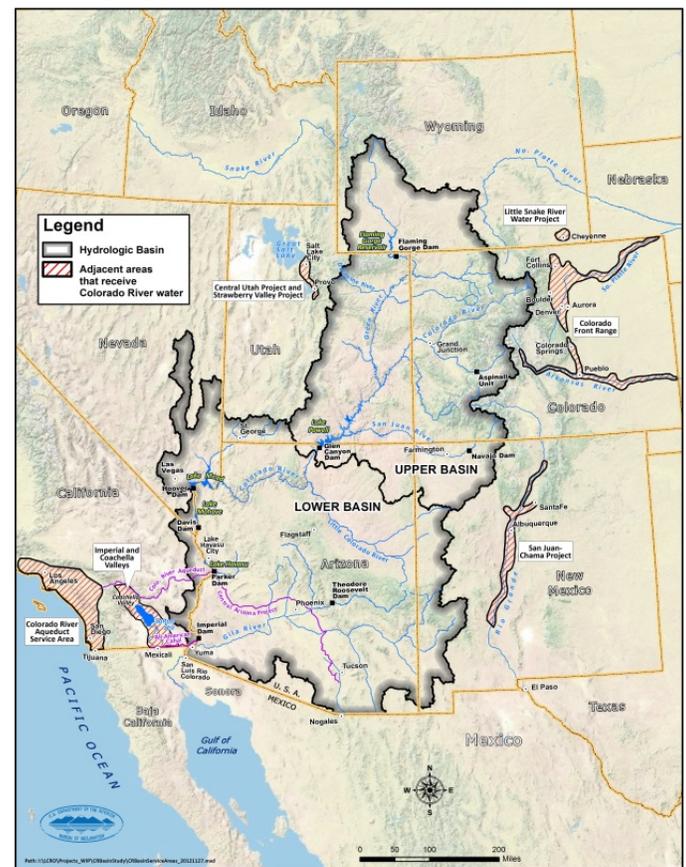


Figure 1. Study Area, *Colorado River Basin Water Supply and Demand Study*, U.S. Bureau of Reclamation, 2012.

Lake Powell is the large storage reservoir for the Upper Basin and Lake Mead provides storage for the Lower Basin. There has been much conflict over the years regarding this River system, along with important instances of collaboration. This study is an example of the latter. Compilation of the information and analysis represented an unprecedented degree of collaboration and buy-in among the seven Colorado River Basin states and Reclamation's internal and consulting teams. Figure 1 shows the study area. Depicted along with the boundaries of the Colorado River watershed are areas outside the boundaries that receive Colorado River water, such as Denver, Los Angeles and farming areas in southeastern California.

The 85-page Study report, which was supported by about 2,000

pages of appendices, was immediately referred to as a Call to Action. Figure 2 has quickly become the iconic symbol of the Study. The left side of Figure 2 shows the historical supply and use of Colorado River for the U.S. and the Republic of Mexico. Only recently has use exceeded the supply, based on 10-year running averages. The right part of the graphic shows projected demand and supply in a fuzzy way because the Study considered several scenarios. It shows the range for the gap between the projected future supplies of water and projected demands for water in the study area. The projected “average gap” is 3.2 million acre-feet, where an acre-foot of water is 325,851 gallons. Though large, the result should not be surprising: the West has been growing rapidly and water supplies are not plentiful. It was not expected that the Colorado River would meet all of the future demands of the study area, where it is estimated that up to 40 million people currently benefit from Colorado River water deliveries.

The allocations to the Upper and Lower Basins were based on historical flows during what is now known to have been an unusually wet period. Tree ring analysis shows that average Colorado River flows are lower than those allocated by the 1922 interstate compact. It has been known for some time that the Colorado River is over-allocated. Although the watershed has experienced drought conditions for what is going on 15 years and population has grown significantly, a shortage has yet to be declared on the Colorado. Less-than-full utilization of existing entitlements, some very wet years, and significant surface storage have forestalled official declaration of a shortage. However, according to reports issued by Reclamation, it may not be too long before the U.S. Secretary of Interior declares a shortage pursuant to the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead (U.S. Bureau of Reclamation, 2007). Such a declaration has great significance for the Central Arizona Project in particular, which would, for the first time, experience cutbacks in its annual Colorado River water diversions. The Central Arizona Project provides agricultural, municipal, and industrial water to the central part of Arizona, with agricultural water absorbing much of the curtailment. A shortage declaration would also impact Las Vegas, which depends on Colorado River water for over 90 percent of municipal water deliveries, to a lesser extent.

As immediate follow-on to the Study’s release, the Department of Interior, through the Bureau of Reclamation, formed working groups to consider options and opportunities for closing the gap. The three working groups are looking at: municipal and industrial water conservation and reuse; issues related to agricultural efficiencies and water transactions; and river flow issues connected to the environment, electricity, and recreation. Closing the gap will require a portfolio of actions that are likely to vary with local conditions. It is anticipated that the efforts of the working groups, slated to be completed in 2014, will lay the foundation for additional dialogue and planning. Much work will remain, including at the individual community level. The first working group is examining the potential ways the municipal sector can contribute to

closing the gap, including more robust conservation measures. The second working group is looking at agricultural conservation potential and water transaction opportunities, and the third working group is considering healthy river flows and energy matters. In addition to these basin-wide working groups, there are dialogues at the state and regional levels.

The Study, and subsequent activities, all assert that communities throughout the Colorado River Basin must consider their water futures, as well as the implications of how other areas look to resolve their water challenges. The scale of necessary investigation ranges from small to large, from individual to regional. For example, recognizing that projections show Arizona faces a large gap between water supply and demand in 2050, the Arizona Department of Water Resources in January 2014 issued its vision statement, “Arizona’s Next Century: A Strategic Vision for Water Supply Sustainability.” This document identifies what it considers to be Arizona’s key areas of focus as it looks to close the State’s projected water gap. The list of options includes more water reuse, brackish water desalination, importation/exchange of water supplies (such as desalinated seawater) developed outside of Arizona, harvested rainwater or storm water. Water conservation, in a state where the culture of water conservation already is strong, will also play an important role.

The Colorado River Basin is just one example, albeit an extremely important one in the West, of a stressed river system. The implications of growth, climate, economic development, and other factors paint an uncertain picture for communities, rural and urban alike, throughout the United States. The following discussion identifies questions communities should probe as they plan for their water futures.

## QUESTIONS TO CONSIDER

### **To what extent are you “in control” of your water future?**

Water management is largely decentralized in the United States. Although the Environmental Protection Agency enforces drinking water quality and discharge regulations and the Department of Interior

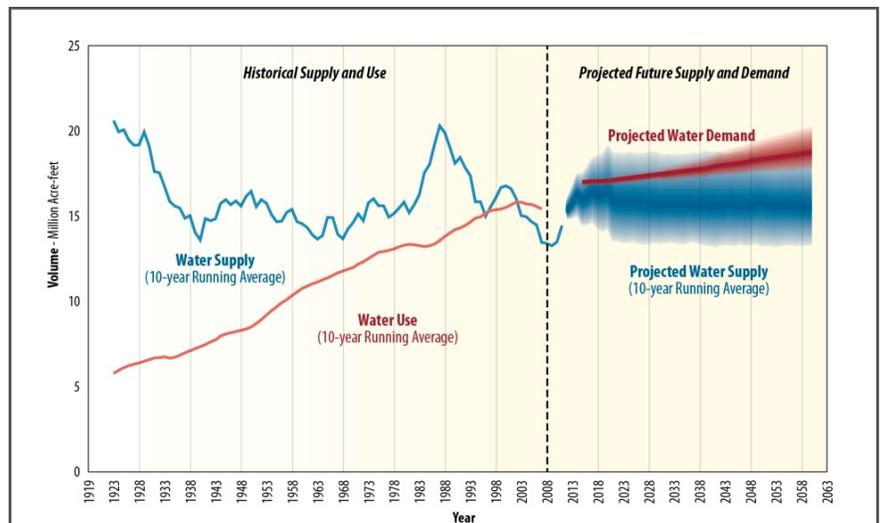


Figure 2. Projected Water Supply-Demand Gap in the Colorado River Basin.

manages the Colorado River, other surface water systems may be under state purview. The regulations governing groundwater use, to the extent they exist, are largely established by states. The extent to which a community is in control of its water future will depend on what type(s) of water rights it holds and, of course, the quantity of those rights over time. The rights may not be quantified and the amount of water available may not be known. Considering groundwater, on the supply side, the reliability of the water depends on many factors, including extractions by other users, groundwater quantity in storage and its replenishment rate, and climate variability, which can affect the surface water flows that recharge groundwater as well as the usage of groundwater by natural systems. Similar factors can be listed for surface water. On the demand side, land use decisions, including those related to zoning and community development, industry and agriculture, are important. What influences the demand or supply side of the equation may be local or distant or may be beyond anyone single community's control, such as is the case with climate. The bottom line is to know where your water comes from and what influences its availability. This knowledge can help a community take action to diversify its water supply portfolio, as has been the case for Payson, a rural community in Arizona that addressed its limited groundwater supplies by acquiring rights to use a surface water source (2013).

***To what extent are financing mechanisms available for infrastructure investments for meeting existing and/or new water demands?***

Funding water infrastructure can be a particular challenge for smaller communities due to fewer customers or residents over which to spread fixed costs. Investment may be needed to replace septic tanks with a centralized sewer and treatment system, treat drinking water for naturally occurring arsenic, replace infrastructure that has outlived its useful life, or install new transmission, treatment and/or distribution infrastructure. Community water systems may be able to take advantage of loans and/or grants made available through a state revolving loan fund, such as Arizona's Water Infrastructure Financing Authority (2014). There may be statutorily authorized mechanisms for joining together to fund infrastructure that serves more than one community. Knowing what options are already in place and the requirements for taking advantage of them, such as prerequisite studies, will assist communities in being ready to finance their water infrastructure.

***To what extent can better interaction among agencies or entities help in preparing for different future water scenarios?***

Effective coordination between the land-use decision-making body and the water and sewer entity (or entities) can assist in development of more cost-effective infrastructure plans. Along with drinking water, sewer system considerations are of high importance. Leaching of septic systems can impact drinking water quality. Treated wastewater can be, and in many locales is, a community water resource to be reused to meet irrigation, industrial, and perhaps drinking water needs. Where they do not already exist, communities should create opportunities for regular interaction between land-use planners and water providers. Communities should talk to each other; small water systems can be

adjacent to growing suburban communities. Interconnections or outright consolidations of water systems can result in more reliable supplies and/or cost efficiencies.

***How can engagement with stakeholders be improved?***

Everyone uses and needs water. So, everyone is a stakeholder – usually a busy stakeholder. Involvement of interested parties, including the general public, is critical to the developing and implementing water plans, whether for the short or long term. However, engagement can be challenging when the public is accustomed to clean and reliable water. Continuing education can prepare the public to assist and support the decision makers in formulating and adopting water strategies. Citizens often talk about how water is relatively inexpensive in the West compared to the eastern communities in which they lived, and yet those contemplating water rate increases frequently encounter vociferous opposition. Roundtables, focused interviews, and focus groups, such as those conducted/facilitated by the Colorado Water Institute, have successfully elicited input and perspective. School district involvement can be encouraged through existing water education programs for K-12 teachers and their students, such as Project WET (Water Education for Teachers).

It is also important that the water using sectors – or those representing them – engage with each other. Understanding each other's perspectives and stories is crucial for resolving disputes, and there are many disputes involving both current and future water utilization practices. During the summer of 2011, agricultural and environmental stakeholders from Arizona and Colorado visited central Oregon to learn about successful collaboration of agricultural and ranching interests with those working on water flows for salmon spawning. Bringing people together in a different – and quite beautiful – setting enabled relationships to be established that led to additional and less contentious interactions.

Translating the technical information of studies is likewise critical. Because comprehensive approaches to engagement and interaction require time and financial resources, it is important that engagement and outreach be carefully incorporated into water initiatives, including pilot or full-sized projects, grant proposals, and other funding partnerships. The City of San Diego's pilot advanced tertiary wastewater treatment facility was constructed with visitors in mind. The continued engagement of the academic community through research, teaching, and outreach, including that of Cooperative Extension, can assist these endeavors. The academic community can also lend its independent expertise through service on expert panels and advisory committees.

***What are the options for balancing water demand and supply in an uncertain future?***

The options for meeting the water demands are many, and each option may have many associated nuances. For the Colorado River Basin Water Supply and Demand Study, a total of 163 options were submitted by the public to Reclamation in response to its call for suggestions

for increasing available supplies and/or decreasing demand. Not all options were evaluated and incorporated into the final Study and not all options are feasible in all locations. For example, rainwater harvesting laws differ across the Colorado River Basin states, as do grey water regulations. Of course, there are many additional options that were not submitted. As rural communities continue to prepare for their water futures, a wide range of options will have to be considered. The relevant options will reflect the local conditions and perspectives. Whether or not there is a desire to change laws to implement such options must be left to the individual states and jurisdictions. Thus, the very short answer to a very deep and complex question is, "It depends." Much work remains to be done.

## CONCLUSION

Communities across the Colorado River Basin are facing complex water management challenges. Growing and competing demand for scarce water resources will require choices on the part of communities across the Colorado River Basin. Water will not come cheaply to those who demand more of it. Communities large and small must prepare

themselves for the economic and hydrologic implications of greater conservation in the municipal and industrial sectors, increased agricultural efficiencies, water transfers that may involve land fallowing, increased consideration of water for nature, and investments in more advanced treatment technologies. Choices will have to be made by individuals and public and private entities. Elected and appointed officials from all jurisdictional levels will be called upon to consider sizable investments. Ongoing consultation with a broad range of individuals, businesses, and other organizations, including the academic community, will be necessary. Communities of all types will be positioned to make better decisions and contribute to more informed deliberations if their residents—the farmers and ranchers, the business operators, the environmentalists, and the recreationists—are informed and excited about water. Water challenges are going to be a mainstay in the Colorado River Basin, so we'd best be prepared for them. 🌱

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