

Running Dry

The arid West searches for ways to save the Colorado River, an over-tapped endangered national treasure that helps feed the entire country.

BY SCOTT HENDRICK AND
LARRY MORANDI

The mighty Colorado River, named for the red rocks of the spectacular canyon walls it so famously carved during the past few million years, is in peril. An increasing population and persistent droughts, combined with a faulty formula for allocating its water, are decreasing flows on this magnificent American river, jeopardizing not only the river itself, but one of the country's fastest growing regions.

As the river meanders its way from the Colorado Rockies to the Gulf of California, it supplies water to more than 30 mil-

lion people in Colorado, Wyoming, Utah, New Mexico, Arizona, Nevada and California, 15 Native American tribes, seven national wildlife refuges, five national parks and four national recreation areas.

The more than 240,000 square miles of the river's basin are a mecca for tourists and naturalists from around the world. Its colorful canyons and dramatic landscapes offer unparalleled rafting, fishing, hunting, hiking and wildlife viewing that generate an estimated \$26 billion each year for the recreation industries.

Tumbling along its 1,450-mile trek, it generates enough electricity to power more than 4 million homes and irrigates 15 percent of the nation's crops on 4 million acres of farmland, helping feed the entire nation. Southern California's Imperial Valley, irrigated mostly from the Colorado, grows an estimated 80 percent of the nation's winter vegetables. In fact, more water is exported from the Colorado River basin than any other river in the world.

But can the Colorado continue to meet the growing demand? A recent study by the Department of the Interior's Bureau of Recla-

Scott Hendrick covers water policy issues for NCSL. Larry Morandi is NCSL's director of state policy research.



Lake Mead

mation looked at several factors that could affect river levels and water use over the next 50 years and concluded there will be a significant gap between water supply and demand. The bureau predicted that if the climate continues to warm in the region—leading to more droughts, increased evaporation and decreased snowpack—river flows could plunge by 9 percent or more. Add to that approximately 49 million to 76 million more people, and the demand on the river by 2060 could outstrip supply by 3.2 million acre-feet (MAF). (One acre-foot is the amount of water needed to cover one acre of land to a depth of one foot. One acre-foot is roughly the amount consumed by two households a year.)

Who Runs the River?

With this much at stake, who's in charge of the river? Before the Colorado River compact was signed in 1922, it was unclear if the same set of rules states used to regulate the water within their borders applied to interstate waters that flowed among states.

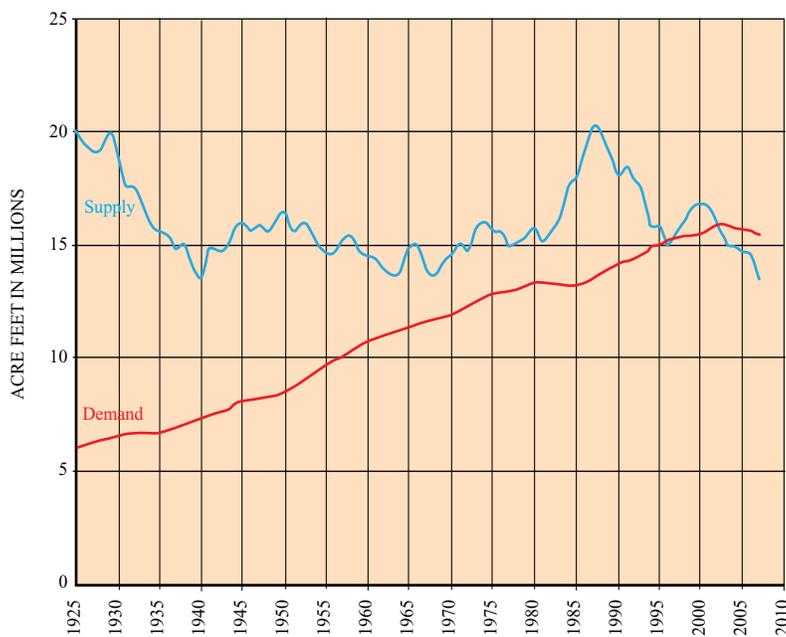
Since the 1800s, Western states have allocated the scarce

Colorado River Basin





Colorado River Long-Term Supply and Demand



Source: U.S. Department of the Interior, Bureau of Reclamation

water within their borders through the “prior appropriation” doctrine that awards the first person to put water to beneficial use a more senior right than subsequent users, as long as the beneficial use continues. Under this system, in times of drought, the most junior users may be left dry.

As the West and Southwest developed in the early 1900s, California’s increasing use of the Colorado River raised concerns among upstream states that if California established senior rights, they might have to temper their use when things got dry. So officials in the seven states negotiated the Colorado River Compact, and Congress signed it in 1922. It:

- ◆ Split the river in half, with Colorado, New Mexico, Utah and Wyoming comprising the upper basin and Arizona, California and Nevada the lower.
- ◆ Allocated rights to 15 MAF of water equally between each basin annually. The total allocated reached 16.5 MAF after a 1944 treaty granted Mexico 1.5 MAF a year.
- ◆ Allowed for variability in the river’s flow by spreading the required annual allotments over a 10-year period.

Flawed Formula at Fault

The formula worked well in the beginning, but there was one significant problem the negotiators didn’t know. Their original



Law of the River

The Colorado River Compact was the first in a series of agreements collectively referred to as the “Law of the River” that governs water use still today. It is the foundation of current water policies, but the original compact did not assign specific amounts of water to each state. Those came later through the Boulder Canyon Project Act of 1928—which assigned 2.8 MAF to Arizona, 4.4 MAF to California, and 0.3 MAF to Nevada—and the Upper Colorado River Basin Compact of 1948—which assigned 51.75 percent of upper basin water to Colorado, 11.25 percent to New Mexico, 23 percent to Utah, and 14 percent to Wyoming. The percentages were applied to the actual water available in the upper basin in any given year. With the lower basin states guaranteed specific amounts, where does that put the upper basin states during dry times?

Rather than go to court over who would shoulder any shortfalls—as Western states so often have done—the seven states and the Department of the Interior reached an agreement in 2007 on interim guidelines to operate the river. The agreement:

- ◆ Sets a minimum water level in Lake Mead that, if breached, would reduce water to Arizona and Nevada (which has not yet occurred).
- ◆ Coordinates the operations of Lake Powell and Lake Mead to move water between the two basins more efficiently.
- ◆ Allows states to store conserved water in Lake Mead for future use instead of the previous requirement to “use it or lose it.”

calculation of the average annual flow of the river—16.4 MAF—was based on a particularly wet 20-year period. In recent years, the flow has averaged only 14.7 MAF, far short of the total 16.5 MAF required in the compact to divide among each basin and Mexico. This outdated water allocation system is inadequate to respond to current pressures.

Put simply, “the Colorado River is oversubscribed,” says Nevada Senator Tick Segerblom (D) from Las Vegas, chair of the Senate Judiciary Committee. “The compact is based on a false understanding of how much water there is.”

Fast-growing cities and droughts have taxed the once-reliable river. In 1922, when the Colorado River Compact was signed, Los Angeles had 1.2 million people. Today, it has more than 9.9 million. In 1990, 23.5 million people relied on the Colorado for some or all of their water. Twenty-three years later, that number is up to more than 30 million. In addition, the area has been hit with a 13-year drought that persists today.

The Hoover (1935) and Glen Canyon (1966) dams were built along the river to ensure sufficient supply for the two basins. They have the capacity to store four times the average annual flow of the river. Without them, the states would



Senator
Tick Segerblom
Nevada

have experienced shortages by now.

Currently, however, the dams’ reservoirs—Lake Mead between Arizona and Nevada and Lake Powell on the Utah-Arizona border—are projected to dip to 45 percent of their combined capacity this month, according to the Bureau of Reclamation. Even so, they provide a defense against overuse of the river’s water. “Bathtub rings in Lake Powell and Lake Mead testify that half-empty glasses are at least half full,” says Colorado Supreme Court Justice Gregory Hobbs, an expert on the complex tangle of water policy and laws in the West.

The Bureau of Reclamation studied a variety of solutions to this scarcity of water in the river and its reservoirs, from increasing supplies to reducing consumption to modifying current practices. Remedies being discussed range from feasible, to creative, to seemingly far-fetched. Some examples, along with their estimated costs per acre-feet a year (AFY) and potential water savings or production by 2060, include:

- ◆ Municipal conservation, at a cost of \$500 to \$900 could reduce water use by about 1 MAF a year.
- ◆ Agricultural conservation efforts, estimated to cost between \$150 and \$750, could conserve 1 MAF a year.
- ◆ Banking water for later use saves an estimated 800,000 AFY.
- ◆ Reuse of municipal wastewater, at a cost of \$1,500 to \$1,800

could yield over 900,000 AFY.

- ◆ Desalination of ocean water off the California coast would cost about \$3,950 to \$4,200 and could produce 1.8 MAF a year.
- ◆ Weather modification such as cloud seeding would cost \$30 to \$40 and could produce 1.7 MAF a year.
- ◆ Importing arctic icebergs to Southern California could cost between \$2,700 and \$3,400 to increase supplies by 600,000 AFY.
- ◆ Piping water to Colorado from the Missouri or Mississippi rivers could cost \$1,700 to \$2,300 and yield 600,000 AFY.

The Bureau of Reclamation cautioned that some of the suggested remedies, such as modifying the weather, importing icebergs or transporting water from as far away as the Missouri and Mississippi watersheds, might not be reliable or technically feasible enough to be put into action.

What Can State Legislatures Do?

Sarah Bates, of the University of Montana's Center of Natural Resources and Environmental Studies, reminds states that even though there is an interstate compact, they maintain the right to manage water within their boundaries. "Think like a region, but act at whatever level of decision making is appropriate," she says.

As water supplies in Arizona evaporate, Arizona Senator Steve Pierce (R), a rancher and chair of the Senate Natural Resources and Rural Affairs Committee, sees a strong role for states to take in managing the river. "Increased competition from both within and outside Arizona has the potential for significantly higher costs for our citizens and possible negative economic, social and ecological impacts," he says. He notes that the Legislature and the Arizona Department of Water Resources "are participating in a process to identify multiple solutions, including demand management, reuse of reclaimed water, water banking, watershed management and augmentation from supplies outside the basin."

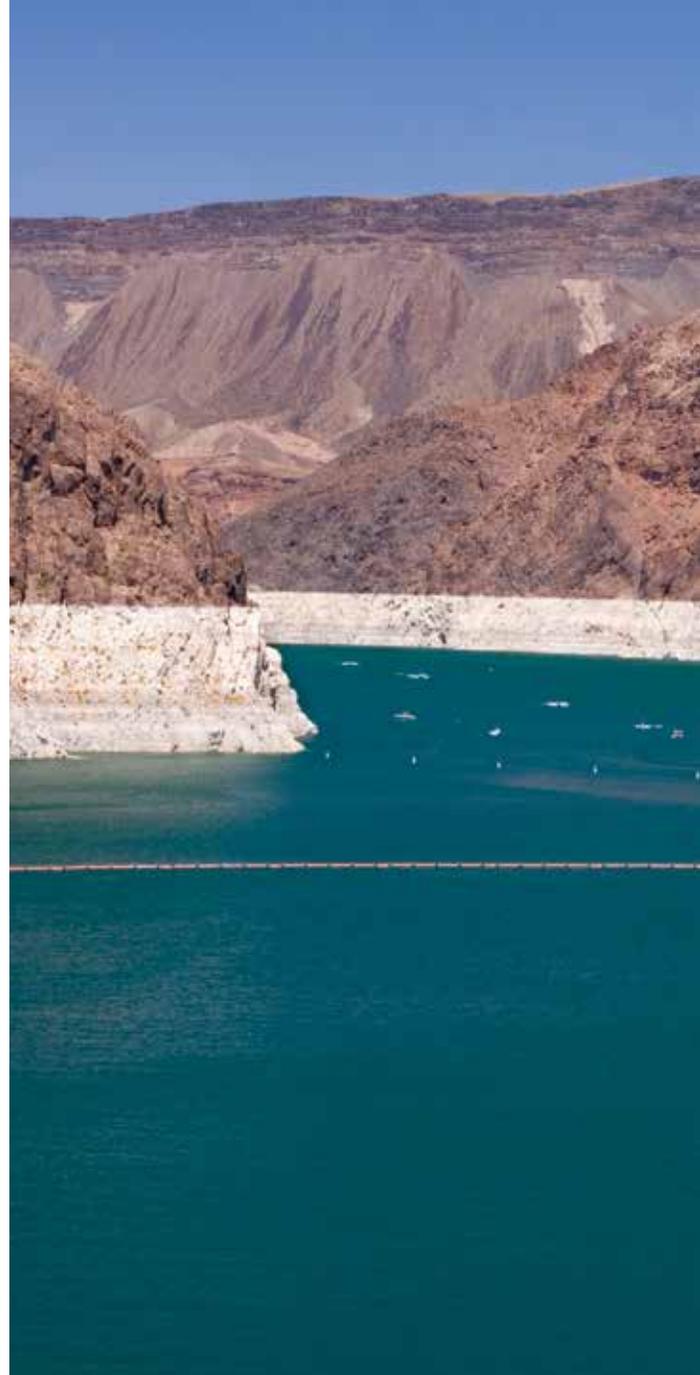
Water banking is one way states can manage their water supply. In Arizona, lawmakers established an underground water bank in 1996 to store the state's unused entitlement of Colorado River water for future use. The law also allows interstate banking and, in 2004, the Las Vegas water authority began paying Arizona to store its unused allotment in its water "bank." When it needs more water, the city cashes in the storage credits it receives from Arizona for an equivalent amount of water directly from Lake Mead.

The Colorado General Assembly passed two bills this year that promote water conservation. They both are designed to counteract the disincentive to conserve inherent in the long-standing "use it or lose it" assumption in the prior appropriation doctrine, which says if you reduce your consumption and don't use your allotted amount of water, your future allotments may be reduced as well.

"We wanted to give people with existing water rights additional flexibility," says Colorado Senator Gail Schwartz



Senator
Steve Pierce
Arizona



(D), chair of the Senate Agriculture, Natural Resources and Energy Committee.

The first bill protects the long-term water rights of owners who temporarily use less water as a result of participating in an approved water conservation program, a water bank, or a land fallowing program that removes a section of farmland from irrigation for a year.

The second bill allows a water rights holder to store water for future beneficial use without losing the entitlement. It recognizes that such storage "is not speculative hoarding but, rather, is part of prudent water management."

Senator Ellen Roberts (R), from the rural southwestern part of the state, sees the bill as a "practical approach" to dealing with shortages that are likely to get worse without incentives to conserve and store water. "We're not trying to overturn the basis of Colorado water law," she says. "We just need the ability to deal



Senator
Ellen Roberts
Colorado



“Bathtub rings in Lake Powell and Lake Mead testify that half-empty glasses are at least half full.”

—COLORADO SUPREME COURT JUSTICE GREGORY HOBBS

with drought and wildfires.” Roberts knows that downstream states might be concerned about the legislation, but offers assurances that “we’re not depriving anyone of water that we don’t have a legitimate need for from year to year.”



Senator
Gail Schwartz
Colorado

A Trickle of Hope

Larry MacDonnell, a former water law professor at the universities of Wyoming and Colorado who has worked with legislators on water policy throughout the West, acknowledges the important role of states in Colorado River decisions. He views conservation, reallocation and water banking as the best options to keep net river use even. He is concerned, however, with state water plans that would increase consumption up to approved compact levels when the amount in the river is clearly declining.

“The challenge is that, with diminishing supplies, junior water

Not Just Out West

Other states also struggle over how to allocate limited water resources.

Apalachicola-Chattahoochee-Flint Water Dispute

Georgia, Alabama and Florida have been in court for more than 20 years fighting over water from the Apalachicola-Chattahoochee-Flint river basin. The three rivers drain nearly 20,000 square miles of land, starting north of Atlanta and emptying into the Gulf of Mexico off the Florida panhandle. Seventy-four percent of the basin is in Georgia, 15 percent in Alabama and 11 percent in Florida. The system provides water for drinking and navigation, generates power, irrigates crops, protects endangered species, provides commercial fishing and offers recreational opportunities.

Litigation began in 1990 when Alabama tried to stop the Army Corps of Engineers from increasing Atlanta’s drinking water supply from Lake Lanier to meet its explosive population growth to the potential detriment of other water uses downstream. Florida joined the two states in negotiations throughout the 1990s and eventually agreed on a compact in 1997 whose primary purpose was to develop a plan to allocate the basin among the states. Negotiations broke down in 2003, however, and the compact dissolved.

A 2009 federal court decision sided with Alabama and Florida in determining that municipal water supply was not part of the original purpose behind Lake Lanier, but a 2011 circuit court of appeals ruling overturned that decision and said the Corps could consider Atlanta’s request for more water. In June 2012, the U.S. Supreme Court turned down a request to get involved.

Red River Water Dispute

The Red River rises on the Texas panhandle and flows 1,300 miles through Texas, Oklahoma, Arkansas and Louisiana before joining the Mississippi River. The four states reached agreement on a compact to allocate the river in 1978, which Congress ratified two years later. It called for an equitable apportionment of the river, with each state getting access to 25 percent.

The Tarrant Regional Water District, which supplies water to 11 counties in north-central Texas, including the rapidly growing cities of Fort Worth and Arlington, sought to divert a portion of its share from a tributary of the Red River in Oklahoma in 2007. Its rationale was easy to understand—water quality in the Oklahoma tributary was better than that in the river on the Texas side of the border, and thus less expensive to treat. The permit was denied and Tarrant sued, arguing that the compact preempted more restrictive state laws, and that the restrictions were a violation of interstate commerce.

Federal district and appellate courts sided with Oklahoma, and Tarrant took the case to the U.S. Supreme Court. In June of this year, the Supreme Court unanimously concurred with Oklahoma, ruling that the compact does not create cross-border rights, and that Oklahoma’s laws do not infringe on interstate commerce.

rights holders may be cut off if the water’s not there,” he says. “Who wants to build a future on an unreliable water supply?”

Even with the daunting supply-and-demand scenarios of the future, MacDonnell sees opportunities for states to bring the Colorado back to health. He points out that the more stakeholders get involved in making decisions about the river’s future, it produces more creative thinking, more creative ideas.

“We’ve changed our thinking dramatically with a shift in the landscape that I’m really pleased to see.”