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COLORADO RIVER:

Water users scramble as drought foretells scary future

Annie Snider, E&E reporter

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LAS VEGAS -- After 15 straight years of drought, this desert city is rolling the dice on a major engineering project that it hopes will keep some 25 million households from going dry.

Water levels at Lake Mead have hit historic lows -- uncomfortably close to the city's last-gasp intake pipe -- so the Southern Nevada Water Authority is drilling a little deeper.

Two weeks ago, the authority's new 3-mile-long, 20-foot-wide tunnel under Lake Mead reached the massive new concrete water intake.

"Spot on!" Mary Beth Scow, chairwoman of the authority's board of directors, declared with relief at the Colorado River Water Users' annual conference here later that day.

Such an engineering feat does not come cheaply. Boring the tunnel and constructing water intake cost $817 million. And water authority board members just signed off on plans for a $650 million pumping station for the intake, which will require yet another painful rate hike.

All that money is being spent simply to ensure that the authority can sip from Lake Mead as levels drop. It does nothing to guarantee there'll be water in the big bathtub.

The Colorado River and its tributaries provide drinking water to nearly 40 million people across the West, irrigate 5.5 million acres of farmland, sustain a multibillion-dollar recreation industry and pulse through nine national parks.

But there's a fundamental problem: States -- and their farmers, cities and industries -- have long counted on more water than the basin can offer.

Under a 1922 compact, negotiators parceled out 16.4 million acre-feet between the Upper Basin states, Colorado, Wyoming, Utah and New Mexico; the Lower Basin's Arizona, California and Nevada; and Mexico.

But scientists now say that these calculations were based on an unusually soggy period, and that normal flows are decidedly lower.

The system has been kept afloat by collecting extra runoff from wet years in Lake Mead and Lake Powell, the system's two main reservoirs, and drawing them down until the next big water year came along.

But the current prolonged drought is pushing this approach to its limits, as reservoirs continue to be tapped without replenishment. Today, Lake Powell stands at 48 percent capacity and Mead at 40 percent.

Meanwhile, demand is projected to grow. The Lower Basin states are consuming their full 7.5-million-acre-foot allocation under the compact, but the Upper Basin states are using only about 60 percent of their share. All four Upper Basin states have plans underway to tap more in the future.

A major study by the federal Bureau of Reclamation in 2012 projected the annual gap between supply and demand to grow to 3.2 million acre-feet by 2060 -- enough water to supply roughly the same number of homes (***E&ENews PM***, Dec. 12, 2012).

And climate change stands to challenge the system even further. The latest research suggests flows could decline by as much as 35 percent by midcentury.

"The really scary scenarios are 30 or more percent reduction by midcentury," said Doug Kenney, director of the Western Water

Policy Program at the University of Colorado Law School. "In a basin that's really tight as it is, that's really catastrophic."

Numbers game

A handful of numbers haunt water managers in this region.

In the Lower Basin, the first number is 1,075. That's the elevation above sea level at Lake Mead when the first round of rationing -- hitting Arizona and Las Vegas -- begins. That's just 12 feet below where the lake **stands** today.

At 1,050 feet, stricter rationing kicks in and water dips below the level at which the Hoover Dam can continue to produce hydropower. Even harsher restrictions come at 1,025 feet. At 1,000 feet above sea level, Las Vegas' current intakes don't work.

The picture is different in the Upper Basin, where nearly all water users sit upstream of Lake Powell. But that reservoir's water levels still matter.

Falling water levels at Lake Mead have left a bathtub ring of minerals showing where water once stood. Photo by John Locher, courtesy of AP Images.

One reason is hydropower. Glen Canyon Dam produces enough electricity to power 350,000 homes at a far cheaper price than other fuels.

Reclamation estimates there is now a 4 percent chance Lake Powell's water will dip below the level at which the dam can operate by 2018, a scenario that could bring a cascade of effects ranging from reduced Treasury revenue to air quality concerns to problems with Endangered Species Act compliance.

There are also serious legal obligations at play.

Under the 1922 compact, the Upper Basin has to release 75 million acre-feet over 10 years out of Lake Powell to the Lower Basin states and Mexico.

Under this regime, the Upper Basin can afford a dry year or two when it makes lower-than-average deliveries if they are balanced out by wet years when larger deliveries are made.

But multiple years in which less than 7.5 million acre-feet is sent downstream could spell trouble. There are also questions about whether there would be physical limits to the amount of water that could be let out of the dam if water levels dip below the hydropower turbines.

If the Upper Basin's deliveries fall below what's required under the compact, the Interior Department would step in to require states to begin curtailing water use. But what that would look like -- how much from which states, implemented under what rules -- is simply uncharted territory.

"That's the worst-case scenario because we're not ready for it," said Chris Treese with the Colorado River District, Colorado's main water planning agency for the Colorado River Basin. "We're not ready for it to the point that we don't know what would happen."

To be sure, the disaster scenarios are not imminent, and if they do come, water managers will have time to prepare. But right now, they offer a major incentive for officials to act while there is still time to stave them off.

Contingency plans

The path forward will be neither simple nor painless.

"We have to come out of our own particular comfortable positions, we have to work together, we have to listen to each other's concerns in order to reach an agreement that will sustain this river, sustain our communities and environment for generations

to come," David Modeer, general manager of Arizona's major pipeline system, preached to leaders at the water users' conference.

"Failure is not an option," he said.

In the near term, both basins are working on contingency plans.

In the Upper Basin, managers are thinking through whether water could be released from a series of smaller upstream reservoirs in a time of emergency when water levels at Powell are falling near the level that hydropower would cut out.

They are also considering increasing cloud seeding programs in a bid to boost snowpack and spring runoff into the river. A 10-year study recently released by Wyoming suggested seeding the right storms could increase precipitation by as much as 15 percent (***Greenwire***, Dec. 23).

And managers are looking at how they would go about managing demand in the Upper Basin, where users access water before it reaches the main reservoir rather than receiving deliveries from it.

Plans are further along in the Lower Basin, where Arizona, California and Nevada recently agreed on a plan to voluntarily cut usage by between 1.5 million and 3 million acre-feet over the next five years.

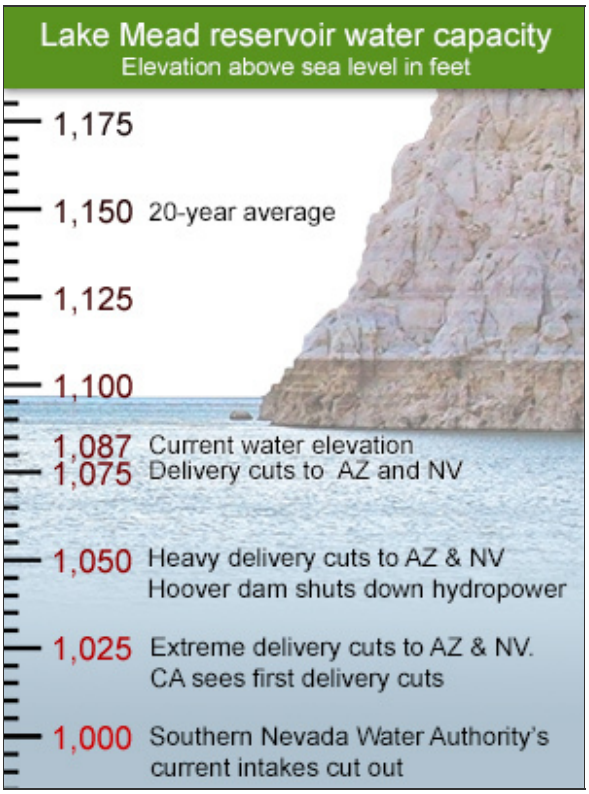
All sides agree that the deal, signed during the users' conference here, won't begin to solve the basin's overarching problems. For one thing, users have only mapped out the path to 750,000 acre-feet of those reductions and are back-weighting the targets.

But it does suggest states are prepared to share the pain rather than battle over the remaining water in court.

It also follows an earlier agreement among water users in the Lower Basin this summer to conduct an $11 million conservation pilot program (***Greenwire***, Aug. 1).

"I think the significance of the system conservation agreement isn't the volume of water; it isn't the amount of money; it's not even the parties who are there," said John Entsminger, general manager of the Southern Nevada Water Authority.

"It's the fact that for the first time on the river, we see major water users acting with the basin as a whole in mind and getting to that equilibrium and treating the system as the beneficiary rather than acting in their own local best interest and trying to put water in their bank accounts."



As Lake Mead's water level drops, painful consequences kick in under the law of the river. Data courtesy of the U.S. Bureau of Reclamation.

Conservation

As hard as meeting the near-term crisis of water levels at Lake Mead and Lake Powell is, the long-term challenge of balancing out supply and demand on the Colorado River promises to be even harder.

Many users feel they have already made major sacrifices. Asking for more, especially when similar action by others isn't guaranteed, is no small request.

Metropolitan areas in the Lower Basin have significantly increased efficiency in recent years. Las Vegas uses about 40 percent less water per person than it did 25 years ago thanks to programs that pay residents to take out grass lawns and treat nearly all the city's effluent so it can be sent back to Lake Mead.

But cities in the region have been growing, a fact that has eaten up any gains.

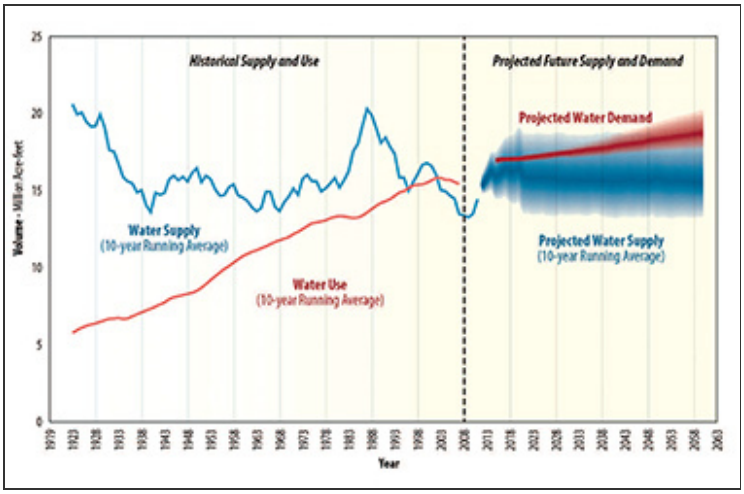
Agriculture, too, has become more productive, but farmers and ranchers still use roughly three-quarters of the water consumed

in the basin.

As the biggest users, often holding senior water rights and receiving subsidized deliveries, farmers and ranchers are often eyed by municipalities and developers with plans for growth. That sets up a potentially explosive political dynamic.

Take, for instance, how Entsminger responded when asked on a conference panel whether demand needs to be reduced in the basin.

"We need to reduce depletions, and I think that's a significant difference," he said -- a comment that provoked a lampooning by the political cartoonist who provided lunchtime entertainment to conferencegoers.



[+] A handful of wet years along the Colorado River have allowed the system to handle heavy demands in the past, but experts say this approach is reaching its breaking point as use continues to grow and drought grips the basin. Graphic courtesy of the Bureau of Reclamation.

Enter the Bureau of Reclamation. The agency, which for much of its history was a phalanx of ambitious engineers, has in recent years set itself up as a convener within stretched river basins to help players face the challenges ahead.

The bureau's 2012 study laying out the projected gap between supply and demand along the Colorado River set the table. Since then, stakeholders have been meeting to begin mapping out a path forward.

The first reporting back on that effort is due out early next month.

Those documents are expected to lay out ideas for water conservation broadly agreed to by both farmers and cities, as well as proposals for keeping water in the river for the benefit of the environment and recreation. Reclamation officials have said they hope to pluck ideas from them to fund as pilot projects.

Meanwhile, hopes persist that more water could be brought into the system.

In addition to plans for increasing precipitation by seeding clouds, ideas have been batted around for years about piping water in from other basins. Desalination of ocean water in California or groundwater in Arizona has also been contemplated.

The basin report estimates that together, desalination and importation could bring another 3.8 million acre-feet into the basin by 2060, albeit at often sky-high prices reaching up to $3,400 per acre-foot for some of the most outlandish ideas, like shipping icebergs to Southern California.

Need for speed

But whether it's conservation or augmentation, one question always surfaces: Who will pick up the tab?

"All of these solutions are meaningless if you can't afford to implement them," said Taylor Hawes, who directs the Nature Conservancy's Colorado River program and is co-chairing Reclamation's work group on environmental and recreational flows.

And as water levels remain precariously low, pressure is mounting to move faster.

Michael Connor, the Interior Department's second in command, who helmed Reclamation for more than four years, had tough words for his former colleagues in the basin.

If conditions worsen without consensus from the states on what to do, the federal government will have to step in, he told them at the conference.

"We need more urgency, more definitive commitments and more collaborative agreements," he said. "Without proactive agreements, I fear the Colorado River Basin will return to its past and replicate what still goes on in many basins, which is

conflict, litigation and gridlock."

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