

Amid Dire Colorado River Outlook, States Plan to Tap Their Lake Mead Savings Accounts

This year and next, Arizona and California intend to draw on water they banked in the big reservoir, even as water levels drop.



Lake Mead, the largest reservoir on the Colorado River, is a centerpiece for water supplies in Arizona, California, and Nevada. Mead's declining water levels, projected to reach record lows in the next two years, will challenge water managers in the basin. Photo © J. Carl Ganter/Circle of Blue

Key Takeaways:

- Shared by seven states and Mexico, the Colorado Basin provides about 40 million Americans with a portion of their drinking water and irrigates up to 5.5 million acres.
- It is home to endangered species and supports about \$1.4 trillion in economic activity.
- Because of record-high temperatures and a drying climate, the basin is also dangerously close to being parched: Lake Mead, which is just 36 percent full, is in poor health. So is Lake Powell, located upstream and only 34 percent full.

By Brett Walton, Circle of Blue

A complex and arcane water banking program in the lower Colorado River basin, adopted in 2007 and later amended, was designed to incentivize water conservation, prevent waste, and boost storage in a waning Lake Mead.

The program has already proved its worth, lifting Lake Mead dozens of feet higher than it otherwise would have been and nurturing collaboration among states that will need to work together to surmount daunting challenges of water availability. In the next two years, the program will be tested in another way, becoming a small but important source of water for Arizona and California even as the lake continues to fall to levels that haven't been witnessed in several generations.

Water managers in the basin view the program, called intentionally created surplus or ICS, as a flexible tool for adapting to a drying climate. It is a tool that they will soon call upon. Bill Hasencamp from the Metropolitan Water District of Southern California, a large regional wholesaler, told Circle of Blue that the district intends to draw between 100,000 and 150,000 acre-feet from its savings this year.

Arizona officials, meanwhile, plan to use 69,100 acre-feet of ICS credits to reduce mandatory cutbacks that will be required in 2022 if Mead declines as projected. The state already used this maneuver to deal with a cutback last year, albeit in a smaller amount. Instead of taking a big cut in one year, ICS allows Arizona to "smooth the reduction," as Chuck Cullom of the Central Arizona Project put it. CAP delivers the bulk of Arizona's Colorado River allocation and is first in line in the state when cutbacks are required.

These amounts are small but significant, especially in these times. An acre-foot is 325,851 gallons, or the amount of water that will flood an acre of land to a depth of one foot. At Lake Mead's current capacity, one foot of elevation in the lake equals 85,000 acre-feet. These ICS uses, at the high end, amount to two and a half feet of elevation in Lake Mead.

At the same time that water users plan to tap their savings, scholars in the basin are calling for more analysis of the ICS program, especially as Lake Mead's decline accelerates. They

would like to check how the system responds to ICS use under a range of water supply scenarios.

Ever since the late-2000s, the last time that water supplies in Colorado River reservoirs reached critically low levels, the biggest water users in Arizona, California, and Nevada have been stashing water in Lake Mead, in preparation for another emergency to come — and in an attempt to avoid a catastrophic collapse of the region's water storage system.

With the federal government now projecting that Lake Mead will drop precipitously in the next two years — perhaps to levels not seen since the Great Depression, when the country's largest reservoir was first filled — that emergency has arrived.

"While Colorado River water users have invested billions of dollars to reduce consumption and increase resiliency, the situation we face today is real and urgent," John Entsminger, the general manager of the Southern Nevada Water Authority, said at a House Natural Resources subcommittee [hearing](#) on May 25.

Shared by seven states and Mexico, the iconic river basin provides about 40 million Americans with a portion of their drinking water and irrigates up to 5.5 million acres. It is home to endangered species and supports about \$1.4 trillion in economic activity, according to one 2014 [study](#). Because of

record-high temperatures and a drying climate, the basin is also dangerously parched. Thirsty soils gulp melting snow before it reaches streams. Lake Mead, which is just 36 percent full, is in poor health. So is Lake Powell, located upstream and only 34 percent full.

Lake Mead water levels since 2000. Graphic © Katie Riles/Circle of Blue

Arizona, California, and Nevada, which together form the

lower basin, rely on water from Lake Mead, whose fluctuations have become a barometer for water stress in the American Southwest. As stress increased in the last two decades, water managers have responded. They have been willing to process new information about the changing hydrology and rewrite the rules by which they operate, constraining themselves so as to dodge the worst outcomes. ICS, to this date, has functioned the same way. But difficult situations are likely to soon arise.

"[ICS] has enabled more opportunity to be a part of this puzzle of how to make things work so that we avoid deep shortages that have harsher implications to water users," Sharon Megdal, director of the University of Arizona Water Resources Research Center, told Circle of Blue. "I think it's been a very good tool. But like anything else it's with uncertainty."

Creating Surplus

ICS was conceived during negotiations between the seven states that led to a milestone agreement in 2007 that transformed how the basin operates. At the time, Lake Powell had experienced the driest five-year period in the region in a century and there were unresolved questions about delivering water under such conditions. The [2007 Interim Guidelines](#), which expire at the end of 2025, were a landmark document that secured three substantial changes.

First, the guidelines developed a formula for determining how much water is released from Lake Powell into Lake Mead. The releases are designed to keep the reservoirs roughly in balance.

The guidelines also set Lake Mead elevations at which lower basin states would be required to reduce their withdrawals. The first of these shortage tiers — at 1,075 feet above sea level — is expected to be breached next year. (Mead is currently at 1,073 feet, but for shortage determinations, it is the projected level in the following January that matters. Right now that projection is 1,066 feet.)

The third change was establishing intentionally created surplus, or ICS. The program allows big water users in the lower basin to open a savings account in the lake. To bank water in their account, they must take an action that reduces water consumption. That banked water is credited to the user that created it. ICS is not conservation in the household sense of simply using less. It is not taking a shorter shower or only watering the lawn once a week. ICS is instead more comparable to a personal savings account. Water banked now becomes an asset that can be withdrawn later, subject to certain conditions.

The program was championed initially by the Metropolitan Water District of South California. Known as Met, the district is the largest urban water wholesaler in the state, providing

water to 19 million people in six counties including Los Angeles and San Diego. Met wanted a way to take advantage of its right to store “surplus” water in Lake Mead, a right it secured in 1931 when it agreed to be cut off from Colorado River supplies before the state’s irrigation districts were. Met needed the flexibility of extra Lake Mead storage for two reasons: a court decision limited California’s use of Colorado River starting in 2003 and its supply from reservoirs in northern California’s Sierra Nevada mountains is quite variable. In dry years in the Sierra, like this year when deliveries from the State Water Project canals are low, Met draws more water from the Colorado River. It is one of the many ways that human use connects watersheds of the American West that are physically separated by hundreds of miles.

With a bit of linguistic maneuvering, the rules were written so that agencies like Met could create “surplus” by investing in conservation. Say, for example, that Met paid to line a canal with concrete so water would not seep into the soil, or paid farmers to fallow their fields. The Bureau of Reclamation, playing the oversight role in the lower basin, checks that the lining kept water in the canal and the alfalfa fields were not irrigated. That amount of water — the difference between what would have been delivered without the intervention and what was actually delivered — would then be credited to Met in the form of ICS, minus a small percentage that is the lake’s

share.

A few years later these rules were altered to bring Mexico into the program. U.S. entities can pay a counterpart in Mexico for conservation and reap the ICS asset. The rules were changed again in 2019, in an agreement called the Drought Contingency Plan, or DCP, that welcomed certain tribal nations into the fold. Banked water is now subjected to a one-time tax of 10 percent, a cut that is credited to the storage system as a whole.

The Central Arizona Project canal delivers Colorado River water some 336 miles to counties in the middle of the state. Photo © J. Carl Ganter/Circle of Blue

Only six entities have created ICS, according to Jeremy Dodds, who is responsible for ICS accounting and verification at the Bureau of Reclamation. Those six are some of the largest water users in the basin: Met, Gila River Indian Community, Colorado River Indian Tribes, Southern Nevada

Water Authority, Imperial Irrigation District, and the Central Arizona Water Conservation District, which manages CAP. Within the four categories of ICS, there are limits on the ICS each water user can create, the amount they can take out in a year, and the total amount stored.

There have been far more ICS deposits than withdrawals. Dodds said that about 3.7 million acre-feet of ICS have been created since 2007, but water users have withdrawn only about 550,000 acre-feet. Taking into account the system cuts, the Bureau of Reclamation [counts just over 2.8 million acre-feet](#) of ICS in Mead today. About half belongs to Met.

Met has been responsible for nearly all withdrawals, taking out a combined 485,000 acre-feet in 2013, 2014, and 2015 when California was clutched by a severe drought and water deliveries from the State Water Project bottomed out in 2014 at 5 percent of contracted amounts.

When it is withdrawn, ICS is additional to a state's typical allocation of Colorado River water. That means California can exceed its annual 4.4 million acre-feet allocation when Met draws on ICS.

Bill Hasencamp, who is Met's manager of Colorado River resources, said that his district's ICS account is like a yo-yo that goes up and down, depending on water supply conditions elsewhere in California.

“This is a dry year and we have to take water out to offset northern California’s shortfall,” Hasencamp told Circle of Blue about the district’s plan to withdraw between 100,000 and 150,000 acre-feet of ICS in 2021. In total, Met has nearly 1.3 million acre-feet of ICS, more than half of that banked in the last two years. “So we’re going to tap into that. But our hope is as soon as it’s another wet year in California, we’ll put that much back in and more.”

ICS serves another purpose, too. Lower basin states can use ICS to cover part of their mandatory cutbacks under the Drought Contingency Plan. In effect, states have “pre-paid” some of their shortage obligations. Arizona leaned on that mechanism in 2020, when it contributed 47,434 in ICS credits to a required 192,000 acre-feet reduction.

That doesn’t mean the rights to the water are lost, though. ICS that pays down a shortage obligation, through the basin’s accounting alchemy, becomes DCP ICS. This is a special category can be withdrawn through the year 2057, but only once Lake Mead rises above 1,110 feet.

Quest for Certainty in an Uncertain System

To this point, basin managers and federal officials are extremely satisfied with ICS. It is a “landmark success,” according to Colby Pellegrino, Colorado River program

manager for the Southern Nevada Water Authority. Cullom of the Central Arizona Project said that the program has led to “deeper collaboration among water users interstate and intrastate and even internationally.” Elizabeth Klein, senior counselor to the secretary of the Interior and the department’s drought response coordinator, praised the ICS program during a House Natural Resources subcommittee hearing on May 25. “This demonstrates the extraordinary importance of taking proactive, cooperative measures to protect limited water supplies,” Klein said.

But as Lake Mead declines, there are scenarios that will test the system of checks and balances.

One uncertainty that has been partially resolved is the risk of unintended consequences. The 2007 Interim Guidelines said that ICS was not allowed to be withdrawn during shortage situations, when Mead is below 1,075 feet. There was fear several years ago that there would be a run on the bank as the lake approached that level. Met would draw down its credits, storing the water elsewhere and leading the reservoir to crash.

That scenario did not happen, due in part to the DCP. That agreement allows ICS to be withdrawn until Mead reaches 1,025 feet. California, in exchange for the ability to take water out at lower lake levels, agreed for the first time to cutbacks in its Colorado River allocation, which constrains its ability to withdraw ICS as the lake declines. Below elevation 1,045, for

every five feet that Mead declines, California's cutbacks increase, thus diminishing its capacity to withdraw ICS.

These are some of the checks and balances written into the system, Pellegrino explained. The compromise on when ICS could be withdrawn provided more certainty, she said, but it also delayed a reckoning with the key question: whether there is a point at which ICS becomes stranded, even temporarily. The DCP contains a clause that the states will discuss "additional measures" if Lake Mead is projected to fall below 1,030 feet.

Hasencamp offered another consideration: the size of the ICS accounts relative to the amount of water in Lake Mead. Right now about 30 percent of the water in the reservoir is ICS. What happens if that figure reaches 40 percent or 50 percent? Is there a limit?

"At some point we're going to have to take cuts as a lower basin as opposed to ICS," Hasencamp said. "That's the only drawback: it gives you a false sense of security about how much water you really have in there."

Hasencamp said that Met would be willing to put a large volume of water in Mead and get only a portion of it out again because having a diverse source of supplies during dry years in California is so important for the district.

The false sense of security is what irks Brad Udall about ICS. Udall is a water and climate scientist at Colorado State University who says that ICS has laudable intentions: preventing water waste and increasing water levels in Mead. Higher reservoir levels help lakeside marinas stay in business and maintain the valuable hydropower generated by Hoover Dam. But Udall also believes that discussing Lake Mead water storage without being explicit about how much is set aside as ICS amounts to a “double counting” of supplies, combining the private ICS accounts with the public pool of water.

Udall would prefer a more rigorous examination of the implications of ICS use, especially given that the credits can be used to reduce shortage requirements. But he could not recall any academic study that modeled potential outcomes. One such study, however, is on the horizon.

Sarah Porter, director of the Kyl Center for Water Policy at Arizona State University, said that she plans to start work this year on an assessment of how ICS use would impact water availability in Arizona. A full analysis will take 18 months to two years, she said. But preliminary results could be available in six months or so.

“We have to look at a range of scenarios so we can look at a range of responses,” Porter told Circle of Blue.

The water supply scenarios are indeed daunting. By April

2022, the Bureau of Reclamation projects that Mead will drop to 1,063 feet, or 33 percent of its capacity. A year after that, in April 2023, the forecast is that Mead will sit at 1,047 feet. At that elevation, the reservoir would be just over 28 percent full.

All of these issues should be on the table soon. The basin states are set to begin negotiations over what will replace the 2007 interim guidelines, which expire on December 31, 2025. A big question — maybe the biggest — is how to permanently reduce reliance on the river so that water withdrawals are more in line with the drying hydrology.

“We all recognize ICS as a short-term tool,” Hasencamp said. “We have some tough negotiations about coming up with perhaps a million acre-feet a year shared among three states and the country of Mexico.”