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Salt Lake City Confronts a Future Without a Lake.

Utah's Great Salt Lake is disappearing as a "megadrought" persists across the Southwest, forcing the fast-growing city nearby to curb its water use.

From the southern rim of the Great Salt Lake, the largest saltwater lake in the Western Hemisphere, barely any of the pinkish, saline waters that used to engulf the million-acre basin are visible.

"For years the lake lapped right here," says Ella Sorensen, motioning at the gritty dried lake bed underfoot. "But I have watched it disappear over time."

Sorensen is the manager of Audubon's Gillmor Sanctuary, a 3,597-acre wetland preserve along the lake's southern border, about 10 miles from downtown Salt Lake City. Utah's iconic body of water has been beating a retreat from the state's capital: In July 2021, the Great Salt Lake reached its lowest level since measurements began in 1875. The lake's surface area has shrunk to about 950 square miles, according to the US Geological Survey, less than a third of the 3,300 recorded in 1987. This week, the record was broken again.

As the lake has dried, the complex web of life that these brackish waters support has been imperiled, including hundreds of bird species that rely on the insects and shrimp that breed here. "This is a key stop on the migration route," Sorenson says. "But it's mind-bogglingly dry these days."

Blame has fallen on the unprecedented "megadrought" gripping the US Southwest — the region's driest 22-year period in at least 12 centuries, a slow-motion environmental disaster exacerbated by human-caused climate change. According to the US Drought Monitor, 99.9% of Utah is currently in either "severe" or "extreme" drought levels. But the crisis also reflects the growing water demands of an increasingly developed region.

A vanishing lake could spell big trouble for Salt Lake City. The Great Salt Lake is the largest water body in the US after the Great Lakes, and a crucial cog in a fragile regional ecosystem linked to drinking water (not directly, but via evaporation), air quality, biodiversity, and tourism in the city and across the Wasatch Front, a chain of towns and cities containing more than 2.5 million people along the Wasatch Mountain Range.

The lake's value is hard to overstate, says Laura Vernon, the Great Salt Lake coordinator with the Utah Department of Natural Resources (a role created in 2020). Beyond the critical role it plays for millions of migratory birds, brine shrimp farming and mineral extraction bring in hundreds of millions of dollars. And the region's ski industry relies on "lake-effect snow" fed by the lake's moisture. "For too long the lake's value has been overlooked and underappreciated," says Vernon.

The changes are impossible to miss. Antelope Island hasn't been surrounded by water since 2001; "Spiral Jetty," a coil of rocks arranged along the shoreline by sculptor Robert Smithson in 1970, is now a mile from the lake's edge.

"The lake is in big trouble," says Jeremy Shaw, manager of the Antelope Island State Park since

2011. “It’s drying up more and faster every year.”

Vernon says that equilibrium is being “knocked out of balance.” Declining water levels mean salinity is increasing, threatening the brine shrimp. The snowpack that recharges the lake is reducing: Research shows that snow cover in the mountains around the lake melts at least a week earlier than it did 20 years ago. As the bottom of the lake is exposed, winds carry clouds of toxic dust — laced with arsenic and other heavy metals that accumulated both naturally and through man-made pollution — over populated areas nearby.

“Once or twice a month the sky is filled,” says Hugh Ferguson, a Salt Lake City resident and keen birder who has been seeing more frequent dust storms recently. “You can see it coming from a long way off across the valley. The snow turns brown and it melts quicker because of it.”

This confluence of ill effects stands to take a toll on the local economy: A 2019 report commissioned by the Great Salt Lake Advisory Council found low lake levels could result in losses of up to \$2.17 billion per year, through lost mineral extraction, the decline in the shrimp and tourism industries, and health costs to area residents, among other reasons.

Perhaps most alarmingly, Salt Lake City will soon not have enough water to support its population: Demand is set to exceed supply in 2040. Utah is the fastest-growing state in the US, and the capital region’s population is projected to increase almost 50% by 2060, adding another 2.2 million people. The contraction of the Great Salt Lake, which provides up to 8% of the precipitation on the surrounding mountain ranges that feed into the area’s rivers, will cut water supply further.

Part of the problem, critics say, is the city’s profligate thirst, and the policies behind it. A state audit in 2015 found that Utah has the highest water use in the US, at 248 gallons per capita, and Salt Lake City charges less for water than all but one of the 30 major US cities surveyed, including desert cities such as Phoenix (which charges 30% more), Las Vegas (36% more), and Santa Fe (82% more). Some local regulations encouraged heavy water consumption, like the city ordinance that required 50% of yards to be covered with “turf, perennial or low growing shrub vegetation” — a figure that has since been reduced to 33%.

On top of that, often the level of residential water consumption simply isn’t known: As Salt Lake City has developed, older agricultural systems in households have been updated to urban, pressurized systems without water meters. The audit found that data submitted to the Division of Water Rights contains “significant inaccuracies.”

“These policies have been flawed, to say the least,” says Newsha Ajami, a hydrologist and chief development officer for research at Berkeley Lab’s Earth and Environmental Sciences Area. “There has to be a complete and total mindset shift. Otherwise one day we’ll turn on the faucet and nothing will come out.”

More broadly, the approach to water rights across Utah, where agriculture makes up to 80% of water use, has also come under question. Until this year, under Utah water law, those who own a right or a share had to use their entire annual allocation or it could go to someone else. Such “use it or lose it” clauses in local regulations were once common in the Southwest. A new state regulation, H.B. 33, means farmers can leave some water in streams without losing their allotted amount. But critics say much policy remains outdated. “These past water rights were established in the 1800s in a pre-climate-changed environment,” says Joanna Endter-Wada, a professor of natural resource policy and social science at Utah State University. “They should be modernized.”

Reducing water use would allow more snowmelt reach the parched lake. And the city is belatedly

responding with a more conservation-oriented set of policies and practices, according to Laura Briefer, director of Salt Lake City's public utilities department. Municipal water prices will rise by 10 to 15% per year until 2028. A project with the company Proseeds is providing at-cost drought resistant grass seed to residents, which requires 30% less water than the popular Kentucky bluegrass. "Water maps" are being developed to identify locations with the greatest capacity to conserve water. Greater emphasis, too, will go into reusing wastewater across homes and businesses, and the city has introduced a moratorium on permits for businesses that use significant water, such as data centers. "We are making sure water is an important part of policy," says Briefer. "In the past that has been very disconnected."

At the state level, Utah legislators passed a bill in February that will create a \$40 million water trust to increase or maintain the water flowing into the Great Salt Lake and sustain its wetlands. In an effort to boost residential water conservation, during this year's session, Utah also became the first in the US to implement a statewide turf buyback program, setting aside \$5 million for cities to compensate residents for removing water-hungry lawns and pay for conservation classes. Another bill, meanwhile, requires water suppliers to meter new and existing pressurized secondary water connections.

But Ajami says that further regulations are needed to prevent the region's galloping development from draining the lake. "We are building future cities today; we can't use the model from 100 years ago," she says.

She points to San Francisco, which has an ordinance requiring buildings over 100,000 square feet to have onsite reuse systems to treat some graywater and reuse it to flush toilets and irrigate plants. "It's clear that 20th-century infrastructure is not suitable for the 21st-century challenges we are facing," says Ajami. "And with climate change, there's less water and less certain supply sources. We need to pay close attention to water governance."

The confluence of the region's booming growth trajectory and its deepening water crisis has brought some pleas from residents and lawmakers to limit or halt development. But Utah's Republican governor, Spencer J. Cox, has resisted calls for measures such as a construction moratorium. "We've always been in a dry state, and we've had very positive economic development," Cox said at a press conference in May. "We are in a drought cycle right now. I don't anticipate that the drought cycle will last forever. I don't know if it will last one more year or five more years or 10 more years."

The issue goes beyond Utah: The Colorado River, a water source for 40 million people across the US Southwest, is also facing record lows and shortages, even as the population of Sun Belt metro areas continues to grow. And globally, climate change is increasing the frequency, severity and duration of droughts, a United Nations report in 2021 concluded, bringing new water crises to growing cities around the world.

"There's a collision between climate change, fast growth and a shrinking Great Salt Lake," says Briefer. "It's a very visual indicator of the risk we face."

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