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California's water crisis is beyond a reasonable drought

Sacramento's uncharted water shortage isn't just a blip. This is the new reality.

By [Alastair Bland](#)

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The dusty brown shoreline surrounding Folsom Lake descends steeply into the greenish water. Overhead, the sky is an unseasonal blue, and the exposed lake bed is parched and cracked. Boat ramps, which have delivered countless water skiers and fishermen to the reservoir's edge, no longer reach the shore. The lake's tributaries have turned to trickles, and the towering concrete wall of Folsom Dam has been rising out of the lake, which has been shrinking for months. Just as steadily, another structure also seems to be rising: a submerged, 7-foot-wide tube that hasn't broken the surface for decades. It is Folsom Lake's municipal-water intake, and should this pipe begin gulping air instead of lake water, hundreds of thousands of people will be shifted onto an emergency life-support pumping system—a setup that federal lake managers have never had to use before.

Indeed, all of California is more than a year into the worst drought in state history—and with little chance left of relief this winter.

"This situation is entirely unprecedented," said Robert Roscoe, the general manager of district operations at the Sacramento Suburban Water District. "The American River is a trickle. Folsom Lake is drying up. We have never seen anything like this. This is a dry year unlike any dry year we've ever seen before. On top of that, this extra-dry year comes on the heels of two drier-than-normal years."

On January 17, Gov. Jerry Brown declared a drought emergency, asking state residents to reduce their water use by 20 percent. About the same time, the city of Sacramento likewise initiated emergency actions by mandating a 20 percent water-use cutback by all residents, and none too soon.

The state's reservoirs have been dropping for months and are now dreadfully low. Folsom Lake is at less than 17 percent of its capacity. Shasta Lake is just 36 percent full and San Luis Reservoir—a major agricultural supplier—just 30 percent. Streams and rivers that usually become wintertime torrents of mud-brown water have dwindled into quietly trickling brooks. Sierra Nevada snowpack—relied upon for late-summer irrigation water—is almost absent.

California is a drought-prone land. Yet history has nothing on 2014.

The previous worst drought in California came in the late 1970s—but only 22 million people lived in the state at the time. Today, dry times have struck a very different, and perhaps especially vulnerable, landscape. Almost 40 million people now populate California, and more farmland than ever before is under intensive cultivation. Salmon and steelhead numbers are dropping as their spawning streams are increasingly diverted for human use. The governor even wants to build a pair of giant tunnels that could divert most of the already overused Sacramento River to the San Joaquin Valley—a project that critics argue will not solve the state's water deficit.

This spring, lawns will certainly turn brown throughout the capital and its suburbs. Gardens may not produce fruit this summer. Anyone seen washing their cars will be scorned—if not fined a thousand dollars. Indoors, water consumption will be curtailed by almost-inevitable increases in rates as the region's 21 water districts scramble in disarray to coordinate their cutback advisories. Just how draconian enforcement becomes will depend on what rain falls in the weeks left of winter. But already, city inspectors are slowly driving the streets, patrolling for illegal outdoor use of water.

Forecasters expect a dry winter, and with no historical precedent to the current drought, no one knows how California will cope should a second year pass with almost no rain.

"We've never been here before," said Shauna Lorange, the general manager of the San Juan Water District. "This is uncharted territory. It's exceedingly nerve-racking."

Puddles, pipes and conservation plans

Lorange is hoping for a "miracle March."

Her district supplies water to 265,000 people in Citrus Heights, Orangevale, Fair Oaks, Folsom, Roseville and Granite Bay. Most of its customers rely entirely on the vanishing reserves of Folsom Lake, and she says mandatory 40-percent restrictions may soon need to be initiated.

"We're not there yet, and we still have a chance for some real rain," Lorange said.

But after a year with virtually none, Lorange and other water-agency heads are growing nervous. In late December 2013, the San Juan district made a firm request of its customers:

Stop all outdoor watering.

The encouragement seemed to work. The Folsom Lake water intake, which was reading 89 cubic feet per second in early January had dipped by January 16, to 64 (though later it climbed back above 70).

"People could see Folsom Lake drying up," said Lorange—a realization, she explains, that spurred a voluntary sense of responsibility and action.

On January 14, the city announced a stage 2 drought emergency, mandating 20 percent water reduction and strictly limiting outdoor water use to just one day per week, and only on the weekend. Anyone caught illegally watering their lawns faces a warning for the first violation and a \$50 fine for the next. The fifth and subsequent violations could produce \$1,000 penalties. Other districts were making similar requests to their customers to cut back on their water use.

Still, Lorange said many residents in her district have continued running their yard sprinklers at night. Indeed, the only sure means of curbing water use may be to raise rates—and if February remains dry, that's what the San Juan district plans to do. However, state law prevents water suppliers from increasing prices without 45-day advance notice, and Lorange said drought rates won't take effect before April.

Numerous agencies and cities in the area are trying to coordinate their rationing advisories. Still, local water-conservation efforts are as confusing as the Sacramento region is big.

The population is served by 21 water suppliers. These districts rely on a number of different water sources. Some have healthy underground reserves—like the Sacramento Suburban Water District, which serves more than 170,000 connections in the eastern edge of Sacramento and the region between the American River and the Placer County line. Most use at least some surface water, including the Cosumnes, American and Sacramento rivers. A half-million people or so receive water from the almost-empty Folsom Lake. Thus, the level of concern varies from place to place, and each district implements water-conservation guidelines independently.

For instance, even two weeks after Gov. Brown declared a drought emergency, several districts had not issued requests at all for their customers to reduce consumption, while most had asked for 20 percent cutbacks and one—the Placer County Water Agency—a 25 percent reduction.

Sacramentans use lots of water—about 380 gallons per day per household, according to the Regional Water Authority. This amount is higher than the state average, and about two thirds of it can be attributed to outdoor water use, especially lawns and gardens.



Folsom Lake—shown here on February 4, at less than 17 percent of its capacity—has become a popular destination for sightseers. Experts say its low level could be a new reality that will change how we live in the Sacramento region.

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While enforcing outdoor water use is relatively easy, indoor use by Sacramento-area residents is less easily monitored. Moreover, there may be little room to improve. Lorraine said many customers in the San Juan Water District have already installed low-volume toilets and low-flow showerheads.

Amy Talbot, the water-efficiency manager with the Regional Water Authority, said that taking a five-minute shower rather than 10 can save roughly 12 gallons of water. Turning off the water while shaving and brushing teeth can also produce significant savings, and she said reducing per-person consumption by 20 percent "is pretty easy." Cutting back by 50 percent, though, may not be.

But there may truly be no choice, as the winter proceeds under summer-blue skies. The main fear in eastern Sacramento and the suburbs is that Folsom Lake's water-intake pipe will begin drawing in air.

The pipe's opening lies at 317 feet of elevation—150 feet under the surface when the reservoir is full. On the day that the governor declared a drought emergency, the lake's surface was at 359 feet. It is now at 357 feet. Lorraine says that once the lake's surface reaches about 20 feet above the intake, the downward draw of water will create a whirlpool effect. Such a vortex would draw air into the pumps, stalling the system. At this point, emergency pumps would be deployed via a barge in the lake—a measure never taken before.

Even 37 years ago, when Folsom Lake fell to 15 percent of capacity by October, the municipal intake was still functioning.

But at this time in 1977, the lake was fuller than it is today. With many more people now using the lake's water, and the reservoir dropping by a foot per week, it is easy to foresee—at the current rate—that one of Northern California's most important drinking-water sources is likely to be a puddle by late summer, with a giant gurgling whirlpool spinning at its western edge.

Farm razed

Farmer Joe Del Bosque grows mostly almonds and melons on 2,000 acres in the Westlands Water District, an arid region in the western San Joaquin Valley. He has no groundwater reserves, and—like other growers in the region—relies almost entirely on Sacramento River water, delivered by a federal canal from the Delta. Much of this water is stored in San Luis Reservoir, several hundred feet above the Valley in the mountains east of San Jose.

"I've got enough water there to get me through the summer with my almonds," Del Bosque said. "But other people have no water. Lots of row crops will be fallowed this year, and there will be some people cutting down their trees."

Westlands Water District covers 600,000 acres—about 940 square miles—of land and produces several million pounds of almonds every year, among many other crops. But the region also receives just 6 or 7 inches of rain per year, and, as Del Bosque and others know, farming can be a gambling endeavor in such a dry-climate zone.

This year, the water many growers need is simply unavailable, and farmers here are expecting a severe shortage.

"We're bracing our farmers for possibly no allocation this year," said Jason Peltier, Westlands' chief deputy general manager. "If that happens, farmers will let their fields go dry and use what water they get to keep their orchards alive."

Peltier says his region's 600 farmers may need to fallow as much as 200,000 acres. Farmers on the east side of the San Joaquin Valley, though more water secure than Westlands growers, will also face hardships if Delta pumping is severely curtailed.

But many environmentalists and water-policy analysts feel that farmers are partially to blame for the hit they will likely take this year.

Across Westlands, first heavily cultivated in the 1960s after massive pumps were installed in the Delta, growers have been shifting en masse from annual field crops to fruit trees.

Annual crops—like cantaloupes and cotton—can be fallowed for a season and replanted in the next with minimal loss to the farmer. Trees and grapevines, however, need water every year. If that water doesn't come, entire orchards can die, costing growers several additional years without a crop as the new trees mature toward producing age.

"This is creating a constant demand for water in a state without a constant supply of water. It takes away all flexibility in management," said Mike Hudson, a water activist and commercial salmon fisherman in Oakland.

The almond industry, especially, is exploding. The crop is one of the most lucrative in California, and growers are planting so many new trees that nurseries can hardly meet the demand. Bearing acreage has boomed from about 500,000 statewide in 2002 to more than 800,000 today—enough trees to guzzle up almost all of Shasta Lake's capacity. The San Joaquin Valley's pomegranate, peach, pistachio and walnut orchards are also growing.

But Peltier said that planting such tree crops is not so much a risky endeavor in a water-strapped environment as it is a "coping strategy."

"If you plant more almonds, that gives you the cash you need to buy more expensive water the next year," he explained.

Westlands Water District is one of several large buyers in the San Joaquin Valley that receives Delta water. However, an agreement signed years ago between Westlands and the Bureau of Reclamation warns the water district that its water supply can never be guaranteed in a given year due to unforeseeable conditions, including drought. The contract also says that environmental laws that safeguard Delta water conditions must be met before Westlands' full water supply can be delivered.



Click on the image for a larger version.

"Westlands is the last in line to get water, and they should be the first in line to get cut during shortages," said Patricia Schifferle, director of Pacific Advocates, a water-focused environmental consultant.

In fact, Westlands' water supply is cut most years, as the contract requires. Still, what water is delivered to Westlands often comes at great cost to fish species that live in the Delta, according to Bill Jennings, a water-law specialist and director of the California Sportfishing Protection Alliance in Stockton. Jennings said the Bureau of Reclamation manages to deliver at least 300,000 acre-feet of Delta water to Westlands in dry years by frequently violating state and federal environmental laws that protect the Delta ecosystem.

David Zetland, author of the forthcoming book *Living With Water Scarcity*, believes California's crop production has burgeoned far beyond the sustainable level. "Agriculture needs to be using half the water it is now," said Zetland, who calls the San Joaquin Valley "the No. 1 hot spot of unsustainable agriculture." Water use isn't the only issue he has with Westlands. The region's soil has in places become contaminated by toxic deposits of salt, selenium and boron, which are leached from the ground and left there after evaporation—a result of the area's poor drainage. The once-fertile Tigris-Euphrates river valley was ruined by a similar process.

Zetland believes one way to curb farm growth and sustainably manage the industry would be to prohibit agricultural districts from importing water from other drainages, as farms in the San Joaquin and the Imperial valleys do. Zetland says the perception that Northern California has a surplus of freshwater is false.

"The ecosystem evolved with the natural water supply," he said.

Jerry Cadagan, a longtime water activist in Sonoma, feels Westlands Water District has dug itself into a hard, dry spot. In an email he wrote:

"I believe it is the ultimate in hypocrisy to sign a contract that essentially says you are the last in line and the first to be cut off [when water runs out], and then plant permanent crops that need water every year, and then when your allocation is reduced, you blame it on ... everyone but yourself."

Del Bosque, who said his melons are as important to him financially as his almonds, recognizes that he and his neighbors are in dire straits, whoever is to blame.

"We're the last ones to get water, and we understand that," Del Bosque said. "Most of us here on the west side have pretty much resigned ourselves to getting no water this year, no matter how much it rains. If we don't get rain, some of us may be history by next year."

A new, dry normal

The drought has heated up the ongoing debate surrounding the Bay Delta Conservation Plan, the state's proposed water-conveyance project that would divert much of the Sacramento River via two giant tunnels into the San Joaquin Valley.

Westlands' Peltier, like many in the agriculture industry, supports the plan. He feels the proposed 35-mile-long twin tubes would increase reliability for farmers by allowing sufficient transfer of water, even in dry years, without compromising the health of the Delta and its fisheries.

But opponents of the Bay Delta Conservation Plan, including salmon fishermen and environmental groups, say the project would likely destroy struggling fish populations by simply removing too much water from the river too consistently. One of the plan's main drawbacks, they say, is that the twin tunnels would not produce any new water, as desalination and water-recycling systems would do.

In fact, more water—not just ways to handle it—may be direly needed in the coming decades. Some climatologists believe that California could be entering a period of increasingly frequent, increasingly severe droughts.

A paleoclimatologist named Scott Stine has theorized that the past 150 years of recorded history chanced to have been exceptionally wet and that California is likely to cycle back into drier conditions, which Stine believes have been the norm through California's geologic history. He has said that the agricultural and industrial economies of California have been built on expectations of abundant rainfall and that the carrying capacity of the region is actually deceptively lower than what modern Californians have come to believe.

In other words, drought could be the norm for California, and there may be a long dry spell ahead.

The culprit for the ongoing drought is a massive ridge of high pressure that remains anchored over the North Pacific Ocean. It has hardly shifted for 14 months and is creating a

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massive atmospheric rain shadow on the West Coast. Storms that would normally float eastward over California with the jet stream are being deflected northward by the ridge, which is roughly the size of the Andes Mountains. When this devastating barrier will dissipate is unclear.

Randall Osterhuber, the lead researcher at the Central Sierra Snow Laboratory near Donner Pass, said if this ridge breaks down, a large storm or two could still swoop in over California, soaking the valleys and cloaking the mountains.

"But every day that it's clear and dry," he said, "the statistical chances that we'll have an average or almost-average water year decline significantly."

Expensive food and an exodus

On January 29, Northern Californians were reminded what it feels like when water falls from the sky. Umbrellas came out, and clusters of people assembled under awnings and bus shelters. The roads grew slick, and spray erupted from passing cars in the streets. It was pouring.

But it wasn't nearly enough.

"This January will still end up being one of the driest ever," said Roscoe, at the Sacramento Suburban Water District.

Others also felt the relief but knew the rain would only dampen the surface of the earth for a few days, and unprecedented drought-response measures are still likely. The city of Roseville has asked its residents to reduce water use by 20 percent, says its government-relations analyst Sean Bigley.

"But we're looking at mandatory cutbacks by midmonth," he said.

If little rain has fallen by March, restrictions could be ramped up to include no watering of lawns. Trees, shrubs and drought-tolerant plants will be exceptions.

If the Pacific high-pressure ridge has still not broken down by late-February and allowed a rainstorm or two to drench the state, the San Juan District plans to enact a required 40-percent cutback on water use on the 26th day of the month. This action would entirely prohibit lawn irrigation—trees would be allowed some water—and would be accompanied by a mailer notice of a boost in user rates. Never before, Lorange said, have rates been increased as a response to drought.

Other districts are similarly planning usage-rate hikes, and while each city has its own system of staged drought cutbacks, most are cooperating to align their rationing advisories—and increase them to full force if necessary, which could mean mandatory 50 percent reductions. If rain doesn't fall by May, the chances of any precipitation coming before September are virtually zero, and by then, most Sacramento-area residents can expect a full-fledged state of water rationing and heavy-handed fines for washing cars, spraying the sidewalk, feeding dying tomato vines or wasting precious water in any way.

Ed George, a farmer near Winters, believes he may survive the year. He uses water from wells, which he suspects to be part of a subterranean water system fed and recharged by the perennial supply of Lake Berryessa—rather than the drainage of the dwindling Cache Creek—and George believes his water supply will hold out. He hopes so, anyway. Other growers, he is certain, will produce little to nothing in 2014.

"Food is going to be really expensive," he predicted. "If I can get a crop this year going, I'll do really well, with great prices."

George expects that ranchers will have to cull their herds of cattle when the dry spring provides no ample pasture.

"Beef will be really cheap for a while, and then prices will jump way up," he said.

Jerry Cadagan, who has lived through at least two severe droughts in California, said this one takes things to a new level. He is confident the state's residential water supplies will last the rest of 2014.

"But if we don't get rain this winter, and if next fall is dry, too, we're going to see people leaving the state."

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