U.S.

California's Dams Set to Face New Stress Tests

More expected rain will tax a reservoir system that already is worrying officials

By Jim Carlton and Cameron McWhirter

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MORGAN HILL, Calif.—Two years ago, Uvas Reservoir here stood at just 2% of capacity—much of its lake bed baking in a merciless drought.

But now the half-square-mile reservoir is spilling over, sending so much water downstream that a recreational-vehicle park a few miles away in the brush-covered hills has closed because of the threat of its lone bridge being flooded out.

"It's hard to complain about getting the water we need so desperately, but I wish we could just get it spread out more," said Matt Gifford, a 30-year-old manager at a retail store, who was fishing at the lake on Wednesday. His nearby home is threatened by flooding from another reservoir.

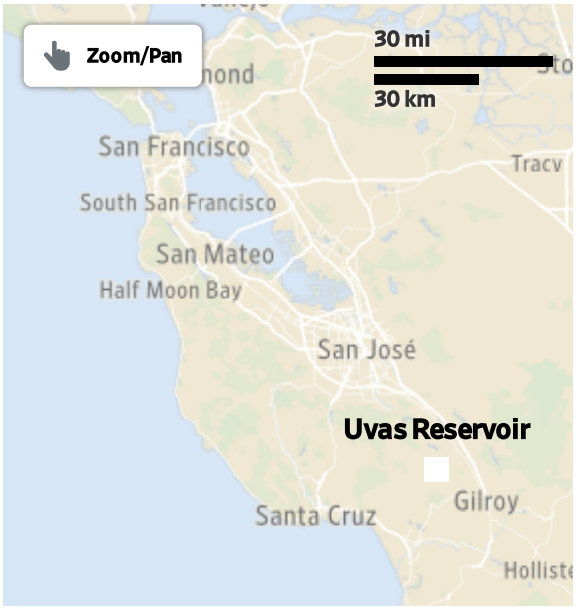
With more rains having drenched the state over the past several days, California's overburdened dam system faced a new stress test after a near disaster at Lake Oroville earlier this month raised questions about the health of the state's extensive network of reservoirs.

State officials on Feb. 12 warned of an impending collapse of an emergency spillway at Oroville as they attempted to lower the lake's level following weeks of rain and snow.

The situation has since stabilized as nearly 200,000 evacuated residents were allowed to return to their homes and crews helped fortify an eroded area of the spillway.

But new flooding concerns surfaced, including at California's largest reservoir, Lake Shasta, which on Feb. 12 began releasing water from its spillway for the first time since 2011.

With water shooting out of the release valve, the swollen Sacramento River downstream experienced flooding, including of a golf driving range, a sheriff's office parking lot and some riverfront homes.



Officials of the U.S. Bureau of Reclamation, which operates the 47-square-mile lake, said they have to make room for more rain and snow this winter to avoid wider flooding.

"The flooding would be so much worse if our facility wasn't there," said Sheri Harral, a bureau spokeswoman at the lake, in the foothills of the Cascade Mountains.

Further south along the Sierra Nevada, dam releases from Don Pedro Reservoir prompted the Turlock Irrigation District on Thursday to warn farmers and ranchers to move property and livestock to higher ground as the Tuolumne River threatened to surge out of its banks with the approaching storms.

Widespread flooding unrelated to dams has been reported in the state from the fresh round of storms. In Southern California, at least two people died in floodwaters and dozens of others were temporarily trapped in their vehicles, while in Northern California, residents of the small farming town of Maxwell were evacuated because of high waters.

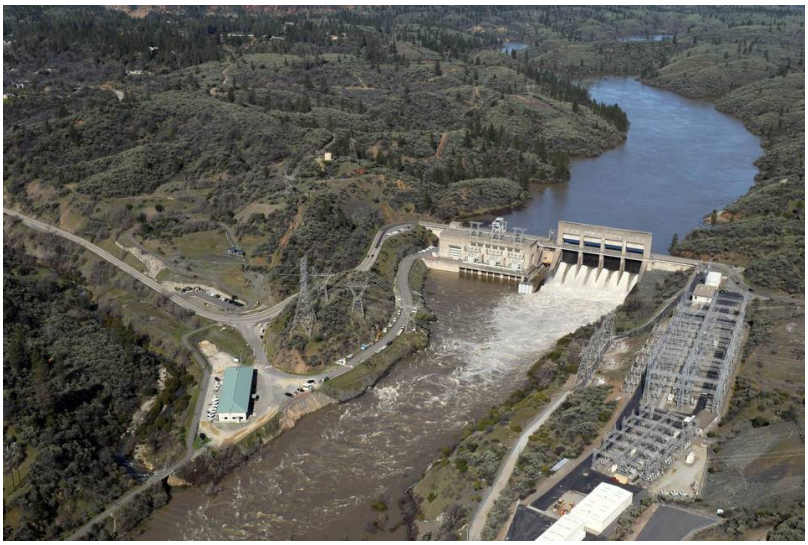
The flooding is happening as a devastating, nearly six-year drought has finally ended in much of California. However, the semiarid state is never far from drought, and because of limited storage facilities is unable to recover much of the water being spilled when reservoirs like Uvas reach 100% capacity.

Proposed new reservoirs to capture storm runoff have been blocked by environmental groups and other opponents for decades, in a situation that frustrates water managers.

This year "is a textbook example of why we need more storage in California," said Timothy Quinn, executive director of the Association of California Water Agencies.

Many dams across the country face underfunding and maintenance neglect, some dam experts say, but California's face added threats.

Robert Bea, professor emeritus at the Center for Catastrophic Risk Management at the University of California, Berkeley, helped put together a multiyear study of California's infrastructure, including its water system, after Hurricane Katrina in 2005 devastated New Orleans. The group's conclusion was that California's dam and river system "has risks that were clearly not



An aerial shot of the Keswick Dam, on the Sacramento River, releasing water last Sunday. PHOTO: UNITED STATES BUREAU OF RECLAMATION

acceptable," including defects and damage. The report recommended billions of dollars to revamp the system to avoid disaster, he said.

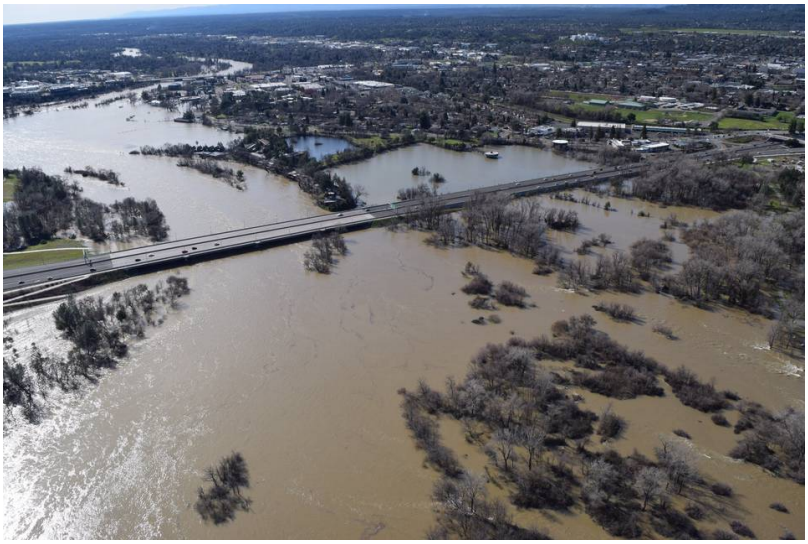
"It's a hell of a lot of money," but the alternative would be much more costly in damage and loss of life, he said.

In 2013, the California Department of Water Resources and the U.S. Army Corps of Engineers estimated needs of more than $50 billion for the state's dam and water infrastructure projects and more than $100 billion for future projects. The report found the state's flood-management responsibilities vexed by a "complex framework of public agencies" and with "inconsistent and insufficient" funding.

While dams undergo rigorous inspection, sometimes failures happen, said Jay Lund, professor of engineering and director of the Center for Watershed Sciences at the University of California, Davis. In 1995, nearly half the water behind a dam in Folsom, northeast of Sacramento, rushed out after a gate broke because of corrosion, he said. "Things do go wrong," Mr. Lund said.

One threat facing a number of dams in California is their risk of collapse in an earthquake. This city of 41,000 south of San Jose, for example, could be partially inundated by failure of the 240-foot Anderson Dam if a major earthquake hit on a local fault when its reservoir was at its full capacity, said a 2007 report by the Santa Clara Valley Water District.

State and federal regulators ordered the district, which also operates Uvas and eight other reservoirs, to keep Anderson to about two thirds its capacity to lessen the hazard, pending a seismic retrofit slated to start in 2020 for $400 million. But with more than double the normal rainfall in the local mountains, Anderson has filled up faster than it can be drained, and over the



An aerial view of the Sacramento River in Redding, Calif., following last week's water release. PHOTO: UNITED STATES BUREAU OF RECLAMATION

weekend it spilled for the first time in 11 years—creating potential flooding downstream.

"We try to do the best we can," said Aaron Baker, a water operations manager at the wholesaler for about two million people.

Corrections & Amplifications

The Santa Clara Valley Water District issued a report in 2007 on the Anderson Dam. An earlier version of this article incorrectly stated the report's issuer as the Santa Clara County Water District. (Feb. 18, 2017)

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