

Should California build dams, reservoirs to help with future droughts?

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By Matt Weiser and Jeremy B. White

SACRAMENTO — As California struggles through a third year of drought, elected officials from both parties are proposing to spend billions of dollars in public money on new dams and reservoirs.

Seven different bills are pending in the Legislature that would use varying amounts of state bond funding to launch a new era of dam construction with the aim of increasing the state's capacity to store precious mountain snowmelt.

The surge of proposals has stoked familiar arguments in California's historic battles over limited water supplies:

Water users in many cities and throughout the state's arid central farm belt say new reservoirs are vital to capture snowmelt that would otherwise flow "wasted" to the sea.

Environmental groups counter that habitat and wildlife need that water, and call for more sweeping conservation measures and water recycling instead.

But this year, as California faces long-term supply shortages, some water policy experts are raising deeper questions: Is there enough water left in California to justify the cost of dams? If taxpayers do front some money, what are they really buying? Are they propping up a project with shaky economics, or buying something with real public value?

The bills before the Legislature aim to place a bond measure on the November ballot.

All propose significant taxpayer subsidies for new reservoirs, ranging from \$1 billion to \$6 billion. The money would be paid back over decades by taxpayers at large via the state general fund. Additional money for each project is expected to come from the water users who benefit.

The bills differ as to which projects they would support. Some would share funding with groundwater storage development projects. Others specify only certain reservoirs would be eligible for money. Consistent across them is an emphasis on dams.

"There is no realistic solution to California's diverse and ever-increasing water needs that does not rely heavily on additional storage," state Sen. Cathleen Galgiani, D-Stockton, said in introducing her bill. It is the most ambitious, offering \$6.2 billion to four new reservoir projects. "Although our population has nearly doubled over the past few decades, we have not significantly increased our water storage capacity."

Despite this enthusiasm, some experts now question the notion that more reservoirs are the answer to water scarcity.

One reason is that most of the good dam sites in California are already occupied by thousands of existing reservoirs. The remaining sites would require much larger dams. This drives up construction costs — as well as the cost of the water ultimately delivered.

More importantly, most of the available natural runoff in California already has been claimed. The State

Water Resources Control Board estimated in 2008 that it already has allocated eight times more water rights in the Sacramento-San Joaquin Delta watershed, the state's largest, than the watershed produces in natural runoff in an average year.

"I think we're seeing definite diminishing returns on investments in storage," said Jay Lund, director of the Center for Watershed Sciences at UC Davis and a professor of civil and environmental engineering.

State and federal water officials currently are studying five major reservoir projects in California, none of which promises a lot of "new" water supply for cities and farms. These include:

-- Sites Reservoir in Colusa County, which would be filled by water pumped from the Sacramento River. Cost: \$3.8 billion.

-- Temperance Flat Reservoir on the San Joaquin River. Cost: \$2.5 billion.

-- Raising Shasta Dam to increase capacity. Cost: \$1.2 billion.

-- Raising the dam at Los Vaqueros Reservoir in Contra Costa County. Cost: \$1 billion.

-- Raising the dam at San Luis Reservoir in Merced County. Cost: \$360 million.

A separate bill pending in Congress targets the Sites project alone. Authored by Reps. John Garamendi, D-Walnut Grove, and Doug LaMalfa, R-Richvale, it would authorize construction of Sites Reservoir, but not provide any money for it.

The five reservoirs would have a combined capacity of about 4 million acre-feet of water, which sounds like a lot. But, together, the five projects would yield "new" water supply of about 400,000 acre-feet in an average water year for farms and cities, or just 10% of their total capacity, according to a Bee analysis of project data. That's less than half the total storage of Folsom Reservoir alone.

In a dry year, the combined yield would increase slightly, to about 520,000 acre-feet. One acre-foot is enough to meet the needs of two average California households for a year.

By comparison, existing reservoirs in the federal government's Central Valley Project — including Shasta, Trinity and Folsom — are able to deliver about half of their total capacity to farms and cities.

The projected water yield from the new reservoirs is relatively low because most of the water they are capable of storing already belongs to someone else, or is obligated to fishery protection. The reservoirs would be required to pass this water through at the appointed time rather than selling it as a "new" supply.

Lester Snow has spent nearly three decades trying to solve California's water problems, most recently as former Gov. Arnold Schwarzenegger's appointee as secretary of the state Natural Resources Agency and, before that, director of the state Department of Water Resources.

He is among the policymakers asking whether the slim water yield from these new reservoirs justifies the taxpayer expense. New reservoirs, he said, only make sense as a tool to help recharge groundwater basins.

"There's nothing magical in and of themselves to build a (reservoir) facility," said Snow, now executive director of the California Water Foundation. "If we had two more surface storage facilities that we built 10 years ago — pick any of the two that people are talking about — they would both be very low right now. There's a tendency to pull down our surface storage when we get mildly short of water."

Developing groundwater storage is preferable, he said, because it is a cheaper way to store drought

reserves close to where people need the water, with less environmental impact.

Managed groundwater banks, under the right conditions, can be slowly recharged in wet years, then tapped in dry years without damaging the subsurface aquifer.

Others assert that new dams still are worth the investment if they are part of a strategy to revise how other aspects of the state's water delivery system are managed.

It makes sense for taxpayers to cover some of the cost if there are public benefits that result from that process, said Tim Quinn, executive director of the Association of California Water Agencies.

The proposed Sites Reservoir, for example, would store water pumped from the Sacramento River. It is the largest of the five proposed reservoir projects, capable of storing 1.8 million acre-feet of water. It would yield only about 9% of that, or 164,000 acre-feet in an average year, in new water supply that could be used by cities and farms.

But supporters point to other benefits: One of its stated purposes is to relieve some of the water delivery burden from Shasta Reservoir so the latter can retain its deep pool of cold water to help salmon runs. Much of the economic justification in draft studies for the project's nearly \$4 billion cost comes from this salmon benefit, not from water supply.

"We've got to get the public out of this mindset that if I spend the money I get lots more water," Quinn said. "We want this bond money to pay for the stuff that benefits the environment, and other public benefits, because we're talking about building a different kind of storage that will need a different kind of financing strategy."

Supporters of the Temperance Flat reservoir on the San Joaquin River make similar arguments. Among the five dam proposals, Temperance Flat would be the worst performer in terms of water supply, promising less than 6% of its capacity in water deliveries in an average year, and even less in dry years — about 2.3%, according to initial studies.

But this is partly because much of its capacity would be reserved to provide water to restore salmon runs on the troubled San Joaquin River.

It also is intended to capture flood pulses to protect downstream communities in the wettest years. And it would hold 195,000 acre-feet of so-called "emergency" water, to be delivered only if water exports from the Sacramento-San Joaquin Delta became unavailable due to a flood or earthquake. In an economic analysis for the project, this emergency water is rated more valuable than the routine supply the reservoir would be capable of delivering.

Ajay Goyal, chief of statewide infrastructure investigations at the California Department of Water Resources, has led the planning for a number of the reservoir proposals along with the U.S. Bureau of Reclamation. He argues the new reservoir projects are about much more than everyday water supply.

"We're requiring people to think about reservoirs in a whole new way," he said. "These projects are providing other ecosystem benefits or other public benefits that are not included in the calculation of (water) yield. We should immediately invest in these projects."

Historically, dams were built in California for just two reasons: water storage and flood control. Fish got little consideration until long after a dam blocked their habitat and people slowly noticed fish populations crashing.

Now, turning the equation around and building a dam to help salmon may be a difficult concept to sell, said

Steve Evans, conservation director at Friends of the River in Sacramento. Especially, he said, when the public is being asked to pay for benefits to salmon that were harmed in the first place by existing dams.

"It almost feels like a fraud is being perpetrated on the public," said Evans, whose group opposes new reservoirs. "Most legislators, bless their souls, don't really understand that dams themselves don't really create water. There's a real serious question whether these are viable projects at all."

Instead of spending money on new dams, Evans favors treatment systems to transform polluted groundwater and urban storm runoff into drinking water.

"We could create a whole new water supply," he said. "Investing relatively modest amounts of money could produce real dividends."

The Nature Conservancy, generally considered a moderate environmental group, takes a different view. It is not yet supporting any reservoir projects, but it does support two of the water bonds now up for consideration, those offered by Assemblyman Anthony Rendon, D-Lakewood, and Sen. Lois Wolk, D-Davis.

The Rendon bill offers \$2.5 billion for storage projects, while Wolk's offers \$1 billion. In both cases, the money could be shared with groundwater projects.

Wolk's bill specifically forbids spending bond money to raise Shasta Dam, which would flood a portion of the McCloud River protected under the California Wild and Scenic Rivers Act.

Jay Ziegler, director of external affairs and policy at The Nature Conservancy, said his group looks at the bond measures through the lens of state water laws passed in 2009.

Those reforms created "coequal goals" to guide state water policy, mandating for the first time that new water projects must both improve water supply reliability and restore ecosystems.

"If you protect greater cold water flow for salmon from reservoirs that are not operated today to really deliver on that, then you get actual greater system reliability," Ziegler said. "We have an opportunity in getting a bond this year that provides important flexibility to think about storage differently and to address the drought."

Jeffrey Michael, an economist at University of the Pacific in Stockton, has analyzed studies produced on the Temperance Flat reservoir proposal.

He estimates that taxpayers will be asked to cover half the project's total cost, or about \$1.25 billion, because that is the claimed benefit to salmon runs. That investment would produce, at best, a 4.9% annual increase in the salmon population, he said.

"We're not talking about tens of thousands of fish," Michael said. "They are trying to justify it as an environmental project, but the size of the subsidy that they say is justified just makes no sense. I haven't heard too many salmon restoration experts say that's the first place they'd spend a billion dollars to help the fish."

Michael believes there is a need for additional water storage projects, but said they are hard to justify economically.

"They're grasping for justification," he said. "You have to ask: Are there less costly ways to achieve similar levels of benefits?"

Legislative support for new reservoirs remains strong, nonetheless, across party lines.

For instance, Assemblyman Dan Logue, R-Marysville, recently dropped his own water bond bill and signed on to another offered by Assemblyman Henry T. Perea, D-Fresno. The Perea bill would provide as much as \$3 billion for new reservoirs.

Perea emphasized that water users would be paying a major share of any new reservoirs, but he said it's important for taxpayers at large to contribute as well.

"The bond was never designed to pay for the entire construction cost of these various storage projects. We're just a portion of it," he said.

"My community is hurting so bad," Perea added, "that we need to show leadership coming out of the Central Valley on what the priorities are."

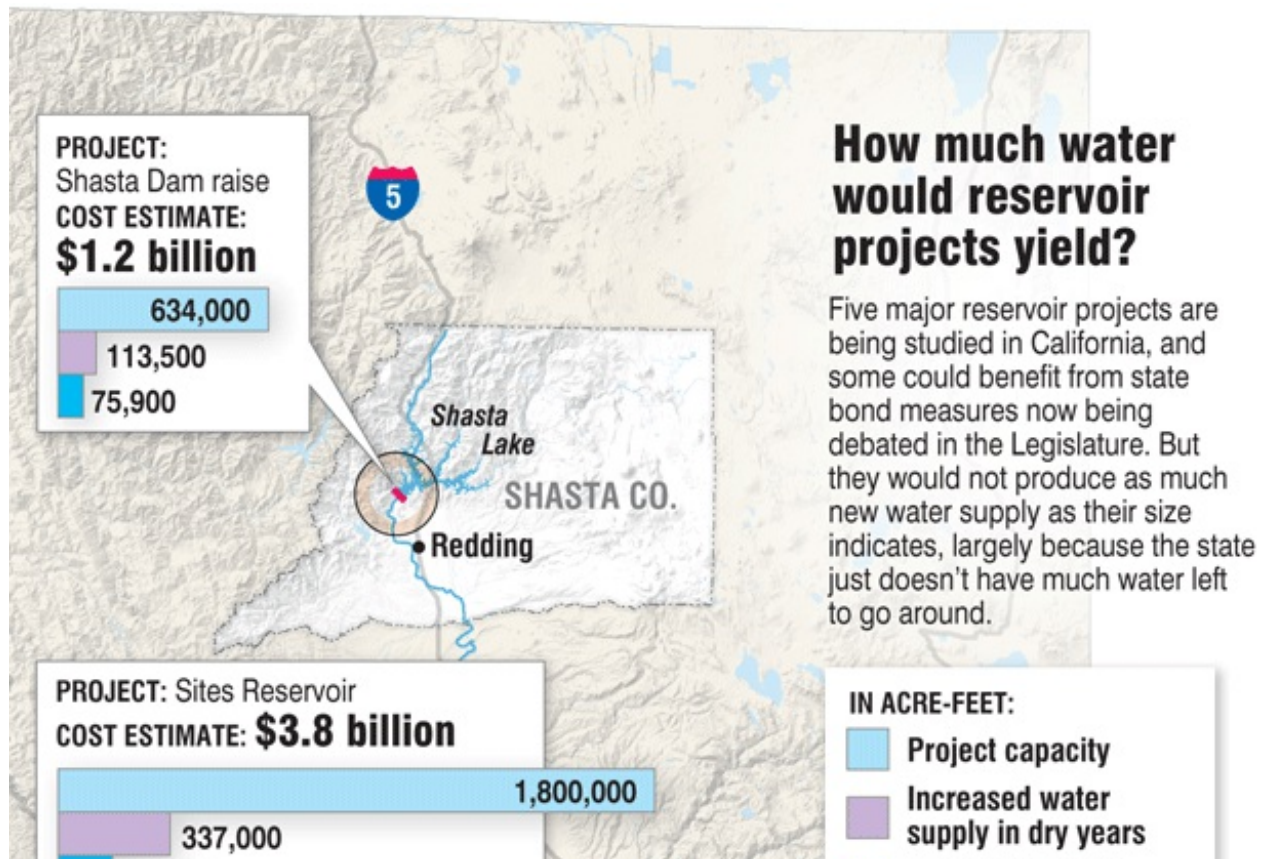
Comparing reservoir projects

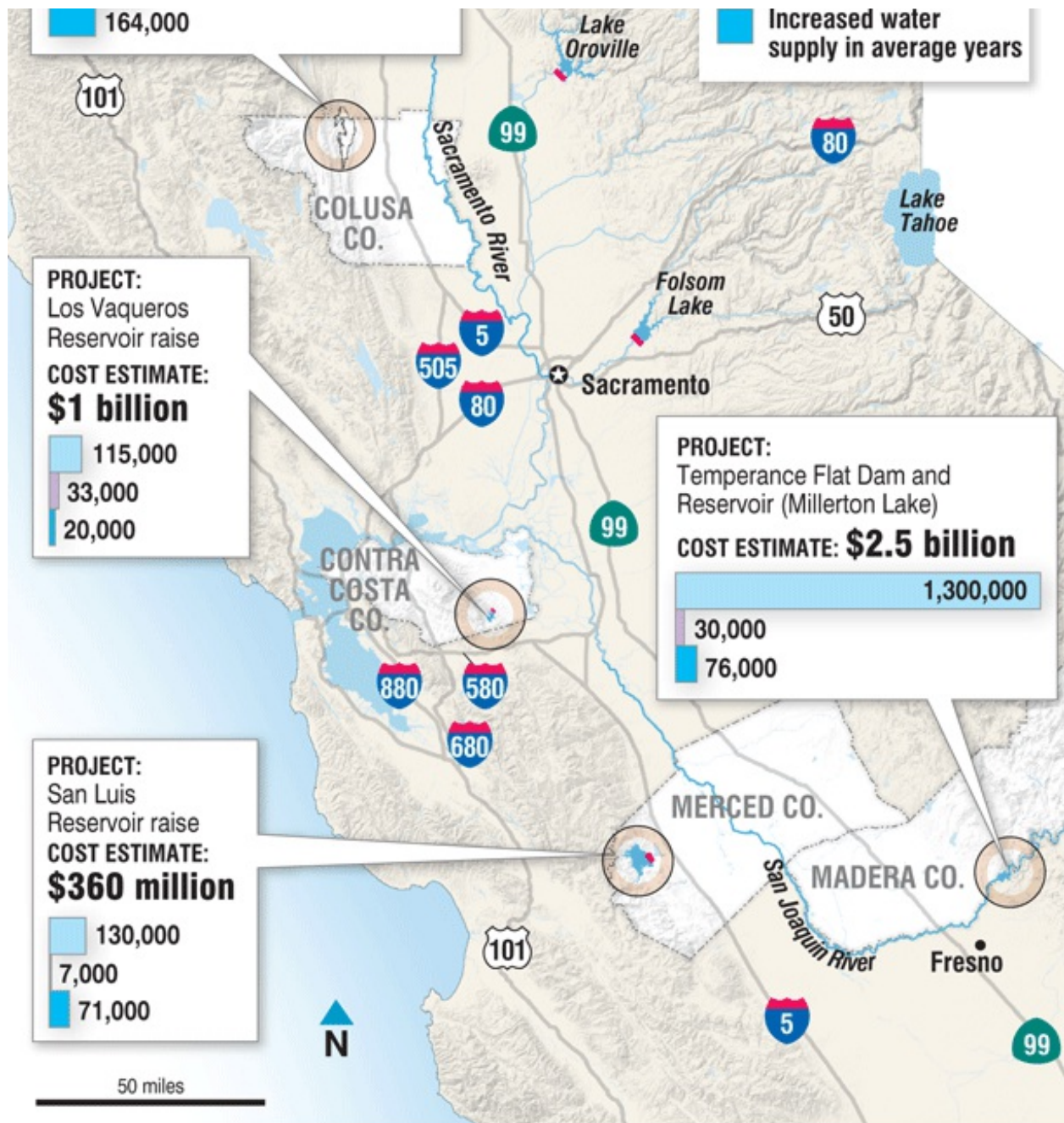
Five major reservoirs now proposed in California would cost nearly \$9 billion combined. Here's the construction cost per acre-foot of "new" water they'll deliver to customers.

Reservoir project	Sites	Temperance Flat	Shasta raise	Los Vaqueros raise	San Luis raise
Cost estimate	\$3.8 billion	\$2.5 billion	\$1.2 billion	\$1 billion	\$360 million
Projected increased water supply in average years (in acre-feet)	164,000	76,000	75,900	20,000	71,000
Project construction cost per acre-foot of increased water supply	\$23,171	\$32,895	\$15,810	\$50,000	\$5,070

Note: Customers will generally pay less than \$1,000 per acre-foot because construction costs are financed over decades.
Source: U.S. Bureau of Reclamation

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