

California drought puzzle: store or conserve more water?

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Raising the height of Shasta Dam 18.5 feet to increase the reservoir's capacity is among the proposals in a draft plan. Photo: Paul Chinn, The Chronicle

There was a time not long ago when much of civilized society considered each drop of river water that reached the ocean a wasted resource.

That was before environmentalists pointed out the benefits of the outflow to fish, wildlife and the ocean ecosystem, setting off an ongoing tug-of-war between fishermen and farmers in California that has reached a critical stage this year as the state struggles through a drought.

One thing that's become clear amid the fallow cropland and rationing is that there is not enough water storage in California to sustain all the competing interests. The dilemma has again put a spotlight on the precious water that gets away.

In an average year, rain and snowmelt in California generate about 71 million acre-feet of water, some of which is captured in reservoirs or groundwater basins. An acre-foot is the amount needed to cover an acre with a foot of water, enough to supply an average household for a year.

About 32 percent of the 71 million acre-feet is used for agriculture and 10 percent for urban areas, according to the state Department of Water Resources' chief hydrologist, [Maury Roos](#).

About 35 percent of the total is reserved by law to help river ecosystems, wetlands and fisheries, and to maintain a healthy flow of water in the Sacramento-San Joaquin River Delta.

That leaves about 21 percent of the total to flow out into the ocean without being used for anything, according to Roos' calculations.

"That is the segment we can capture more of," Roos said. "If we could store more of that, we would have a larger water supply."

Trouble is, nobody in California can agree on how, or even whether, to capture it.

Storage, conservation

Everybody agrees that something must be done to quench California's ever increasing thirst. The question is whether the state should spend billions of dollars capturing the water behind dams and distributing it through new pipelines or spend a little less money by maximizing usage through conservation.

A laundry list of proposals, including water recycling, groundwater storage and even cloud seeding, are listed in a working draft of the California Water Plan, a comprehensive blueprint for future management of the resource.

It is nevertheless Gov. [Jerry Brown](#)'s proposal to build twin water tunnels to bypass the delta and take water south that is getting all the attention. The project, which is part of the Delta Conservation Plan, would include restoration of marsh habitat in the delta.

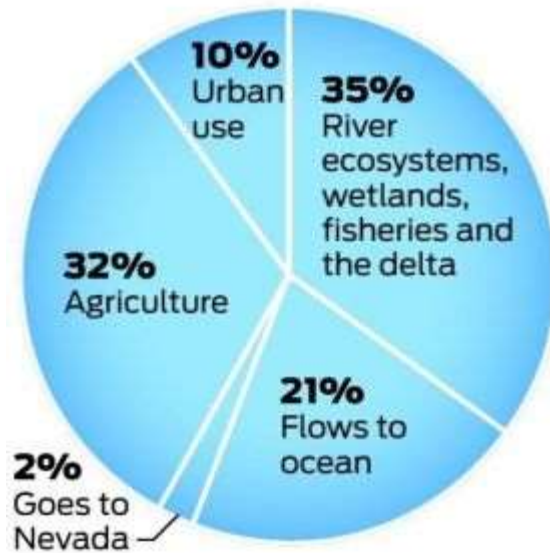
[Jason Peltier](#), the deputy general manager for the Westlands Water District, said farmers generally support the tunnels because the project would free up more water for agriculture.

"Most years there is plenty of water in the system that we can't get to because of operating restrictions," Peltier said. "We've seen over the last 20 years layer upon layer of regulatory restrictions that have taken away water for humans and allocated it for the environment."

Problem is, the tunnels could cost anywhere from \$25 billion to \$67 billion, according to recent estimates.

California's water use

An acre-foot is enough water to supply one household for a year.



10 million acre-feet of water
(typical wet year)

Source: Maury Roos, Chief Hydrologist,
State Department of Water Resources

John Blanchard / The Chronicle

California's reservoirs

In a typical wet year, California captures about 10 million acre-feet of water in its reservoirs, about 80 percent of which is held in the state water department's two biggest reservoirs behind Shasta and Oroville dams.

That's well below the 43 million acre-feet capacity of the 1,200 reservoirs under the jurisdiction of the state water department. The reason, said Roos, is that the department is required to release water for fish and wetlands management and must also leave space during winters to avoid flood-causing overflows.

Yet, agricultural interests support expanding California's reservoir capacity by adding 18.5 feet to Shasta Dam and building Sites Dam, near the town of Maxwell (Colusa County), and Temperance Flat Dam, near Millerton (Madera County) on the San Joaquin River.

These proposals, like the tunnels plan, are expensive. The Shasta dam and Sites proposals together would cost about \$3.5 billion and add about 2.6 million acre-feet of water to the system, just enough to "take you through one dry year," Roos said.

Meanwhile, environmental groups mostly oppose the tunnels and water storage projects. The

existing dams and conveyance system, they say, cut off the historic salmon and steelhead trout runs and have imperiled other fish populations, like the delta smelt. Instead, they are pushing for water conservation, treatment and recycling plants.

Jon Rosenfield, a conservation biologist for the **Bay Institute**, said water bond money would be better spent replacing thousands of old leaking water mains around the state, implementing tiered water rates and building storm-water capture and water recycling systems.

"It simply doesn't make sense for us to be flushing toilets with pristine water transported miles from the **Sierra Nevada**," Rosenfield said. "The notion that it just gets used once and then it is gone is crazy."

Recycling success

Conservationists point to the Metropolitan Water District of Southern California as the model for a successful recycling program. The district has built over the past two decades a wastewater treatment and reclamation system that cleans dirty household water and then filters it into the groundwater for reuse later on.

Tom Stokely, the water policy analyst for the California Water Impact Network, said Los Angeles County now uses less water than it did 30 years ago despite having at least a million more residents.

"It's really up to the Legislature and the individual water districts to take this up, but if they use up all their borrowing on the twin tunnels there won't be money left over for these things," said Stokely, adding that statewide recycling and conservation programs could save 2 million acre-feet of water a year. "We see it as an either-or scenario. Do we have a sustainable water future or do we spend all our resources on costly tunnels and water storage projects?"

None of the various ideas would solve California's water shortage problems, which are more severe than most people realize, according to regulators.

Capturing more water

California would need six times more water storage than it now has to make it through a worst-case-scenario drought, Roos said. That amounts to an additional 18 million acre-feet of storage. Water analysts at UC Davis estimate that all of the dam proposals together would only add 4 million or 5 million acre-feet, at a cost of \$6 billion to \$8 billion.

Meanwhile, demand just keeps growing as more people move into the state. It is a situation that can only get more dire as the world warms up, snow in the mountains decreases and droughts become more common.

Ultimately, Californians will have to come to grips with the fact that, no matter what gets done, the state will never be drought proof, said **Jay Lund**, the director of the Center for Watershed Sciences at UC Davis.

"I think there will be some ability to improve, mostly in terms of giving incentives to store groundwater in wet years and to move water from north to south - efficiencies like that - but you can't make it rain," Lund said. "In the end, we will still be living in a semi-arid climate, and we will still have droughts. Most of what we can do is make it easier to prepare for the next drought."

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