

# New Bay Area dam project reaches major milestone

*By Paul Rogers*

4/19/16

In a significant step for the largest reservoir project in the Bay Area in 20 years, workers have finished building the spillway -- a massive concrete channel as wide as eight lanes of freeway and a quarter mile long -- at Calaveras Dam near the Alameda-Santa Clara county line.

The \$810 million project to replace the old dam with a new, more earthquake-proof version has been beset by delays and cost overruns, due to the discovery of ancient landslides and other difficulties in the years since work began in 2011 that have made the project more complicated.

Tucked away in the remote hillsides east of Interstate 680, Calaveras Reservoir is the largest reservoir for the Hetch Hetchy system in the Bay Area, a key part of providing water to 2.6 million customers in Alameda, Santa Clara, San Mateo and San Francisco counties.

Completing the spillway, which is essentially an overflow channel so that when the reservoir fills, the water doesn't flow uncontrolled over the top of the dam, means work can begin now on the final part of the project, the construction of the 220-foot-high earth-and rockfill dam itself.

"It's a major milestone," said Dan Wade, director of the San Francisco Public Utility Commission's Water System Improvement Program.

When it was built in 1925, Calaveras was the tallest earth-fill dam in the world, an engineering marvel that created a lake three miles long. But in 2001, the state Division of Safety of Dams declared it unsafe for a major earthquake.

"They knew the fault was there" in 1925, Wade said, "but they knew less about it than we know now."

If the dam collapsed during a big quake on the Calaveras Fault, it would send a 30-foot-high wall of water rushing into Fremont and toward Interstate 880, studies showed, potentially killing thousands of people.

Because of the threat, the state ordered the reservoir drained to no more than 40 percent of capacity, losing enough water storage for 300,000 people a year.

The original Calaveras Dam was built by crews with horses and wagons, under the direction of California's most famous water engineer, William Mulholland. In 1913, Mulholland supervised construction of the Los Angeles Aqueduct, which brought water from Owens Valley that enabled Los Angeles to grow into the nation's second-largest metropolis, a story on which the movie "Chinatown" is loosely based.

The new dam will be the same size as the old one, built 400 yards downstream on Calaveras Creek. It is the largest such construction project in the Bay Area since Los Vaqueros Reservoir was built in Contra Costa County in 1998.

When finished, the base of the dam will be a quarter-mile thick, compacted with modern equipment much tighter than was possible for the old dam. It will contain enough dirt and rock to fill 330,000 dump trucks, and be built to withstand a 7.25 magnitude quake. The dam's clay core will allow it to be built higher one day so that the current reservoir, at 96,000 acre feet, could hold four times as much water.

The current dam is considered safe now with its lower level of water.

The project's finish line has moved several times. In 2009, the project was expected to cost \$409 million and be completed in 2015. Now the cost is \$810 million, with a completion date of 2019.

The reason? Once they started digging, the 150 workers found two ancient landslides in the 20 million-year-old geologic layer cake nearby, forcing them to carve away millions of tons of rock and sediment to better anchor the new dam on more solid footing. Recently, they learned of the need to shore up hillsides more than had been expected.

"We did extensive investigations with a world-class team that has built dams around the world," said Wade. "But this is an extremely complex site geologically. So there have been some challenges."

The people whose rate increases are paying for the project say they understand.

"We do not believe it could have been avoided," said Nicole Sandkulla, a civil engineer and CEO of the Bay Area Water Supply and Conservation Agency, an organization of 26 cities and water districts from Daly City to Hayward that purchase Hetch Hetchy Water from San Francisco.

"They are moving essentially an entire mountain that is in a fault zone, and they have found things that they just couldn't see on top of the earth," she said.

The work also has so far revealed 844 fossils, including 12 whale skulls and the tooth of a 50-foot long megalodon shark.

The project is the last big part of a 15-year, \$4.8 billion effort to bring the Hetch Hetchy System in the Bay Area up to modern seismic standards. The work included building a massive water tunnel under the bay and upgrading water treatment plants and pipes.

Environmentalists hated the old Calaveras Dam because it released no water for rainbow trout, occasional steelhead and other fish in Calaveras Creek and Alameda Creek downstream. The new reservoir will regularly release water, and the project also will build a fish ladder on a smaller diversion dam nearby, opening up about 8 miles of creek.

"As you go upstream, it gets pretty remote. It looks like a stream in the foothills of the Sierras," said Jeff Miller, executive director of the Alameda Creek Alliance, a non-profit group. "It's pretty unique. It's the last chance we've got to get these fish back in the East Bay."