

## W A T E R S H E D

# Dam Tweaks Yield Results

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For the first time ever, cold water is flowing steadily through Calaveras Dam in southern Alameda County, and into the creek canyon below. It's been just 15 months, but already, fish are responding.

"After one year of flows, we're seeing lots of rainbow trout," says Brian Sak, the supervising biologist with the San Francisco Public Utilities Commission (SFPUC), owner and operator of the dam.

Sak says he and other biologists who routinely survey the creek using snorkeling gear never saw this freshwater native fish — the same species as ocean-going steelhead — occupying Calaveras Creek before.

The return of rainbow trout to Calaveras Creek marks a milestone in an ongoing, multi-agency restoration of Alameda Creek, which drains more than 600 square miles of the East Bay. Much of the watershed is heavily developed and modified, especially the northern reaches in and around Pleasanton and Livermore.

Other parts remain relatively wild, but the area gets scorching hot in the summer, and flows diminished by dams and diversions have made Alameda Creek and its tributaries like Calaveras Creek an even less hospitable environment for trout, steelhead, and salmon, which evolved in a watershed with seasonally intermittent flows in many reaches.

But starting in the 1990s, state and federal agencies, as well as environmental groups, pressured the SFPUC to comply with environmental laws and restore flows in Calaveras Creek, which for decades was noth-

ing more than as a series of warm, stagnant pools. The idea was to revive native fish populations in the Alameda Creek watershed.



The SFPUC owns Calaveras Dam, which impounds the water that it sends to its 2.7 million customers. Since the dam's construction in 1925 by the Spring Valley Water Company, no measurable flows have been allowed through the barrier. The fact that there was water in the creek channel at all was incidental: the result of planned drainage from a leaking dam. But facing legal action, the SFPUC agreed to overhaul its operations in the interests of steelhead recovery as part of its dam rebuild, which wrapped up in 2018.

Finally, in January of 2019, water began to stream out of Calaveras Dam. The flow since then has ranged between 7 and 12 cubic feet per second. Though not much more than a lively trickle, this water has had significant effects on the watershed.

"Calaveras Creek has become a cold-water refugia," says Tim Ramirez, the SFPUC's natural resources and lands management division manager.

As trout have moved into the newly revived creek, nonnative species — primarily largemouth bass and bluegill, which prefer warm water (and prey on baby salmonids) — have evacuated the system, presumably moving into the lower reaches of Alameda Creek.

"What's happened to the stream is exactly what everyone expected to happen," Ramirez says.

Prior to the release of cold reservoir water, Calaveras Creek's water tended to range in temperature from 70 to 75 degrees Fahrenheit: a very inhospitable range for any type of trout or salmon. But after the releases began, temperatures plunged. Now, summertime flows run a cool 52 to 57 degrees. While this has been good for trout, it may be less so for other native species. California roach, Sacramento sucker, Sacramento pikeminnow, and prickly sculpin, among a few other species, all inhabit the watershed and prefer relatively warm water. "We anticipate these species will also move downstream where water temperatures are suitable," Ramirez says.

But the restored cold flows are mandated by the National Marine Fisheries Service, which tends to keep out of inland water issues unless anadromous salmonids are involved. The agency has a recovery plan for endangered Central California Coast steelhead, and this plan is guiding the Alameda Creek restoration efforts. The agency has set an optimistic target of 2,000 spawning adult steelhead for the entire watershed.

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Rotary screw trap in Alameda Creek for trapping fish. Photo: SFPUC



Fish water releases from new Calaveras Dam. Photo: SFPUC

Jeff Miller, director of the Alameda Creek Alliance, one of the groups that challenged the SFPUC's past abuse of Calaveras Creek, says he's happy with the progress being made as different public entities collaborate on reviving the watershed. "The cold water is pushing the invasive predators out and overall we're looking at potentially having 20 miles of spawning and rearing habitat restored," he says.

Miller is optimistic and says even Chinook salmon are liable to return to the system if cold flows are maintained and migration obstacles removed. Like other waterway advocates watching the restoration, he anticipates the installation of fish ladders by county agencies at a few key pinch points that currently block the upstream migration of adult spawning fish.

Already, juvenile steelhead — the offspring of resident rainbow trout — can and do make the exit migration to saltwater, something SFPUC biologists have been tracking since 2015. Using traps designed to catch small fish swimming downstream, the researchers have caught as few as just a handful of outmigrating smolts in a year to as many as several dozen.

Sak says there isn't enough data to explain this variation and says it could be the result of "highly variable" monitoring efforts.



Newborn rainbow trout in Alameda Creek. Photo: SFPUC

"It will take a number of years for creek conditions, as well as the creek's geomorphology and biology, to stabilize to some new post-water-release norm," he says. "Likewise, it will likely take many years for us to even begin to decipher what is going on under the new flow regime."

Farther into the watershed, officials are expecting the eventual arrival of steelhead. Carol Mahoney, a water resources manager with the

Zone 7 Water Agency, which oversees the northern and eastern reaches of the Alameda Creek watershed, says the local tributaries are not a particularly steelhead-friendly place. The waters are heavily impaired by urban pollution, invasive predators like bass, diminished flows and high temperatures, and concrete-lined banks that offer little in the way of shelter for juvenile steelhead.

Nonetheless, Zone 7 is operating some of its facilities as though the federally endangered species will return. She says her district "undertook a project that removed fish passage barriers and impediments on a reach of Arroyo Mocho, and we have attempted to establish a riparian canopy in this area to see if shading is sufficient to reduce temperature enough to support healthy salmonids."

There are clear limits to how completely the Alameda Creek system can be restored. Research from the San Francisco Estuary Institute has shown that the health of the steelhead runs in the system depended heavily on a healthy estuary, where wetland habitat historically provided shelter and abundant food for young fish.

That component of the watershed that has been totally eliminated by urban lowland development.

"In the lower basin, Alameda Creek is now just an armored flood control channel that dumps into the Bay," Sak says. Without this critical piece, the ecosystem is unlikely to rebound to historic abundance no matter how much water flows through the watershed.

But Miller is as optimistic as ocean-going salmonids are resilient. "We stand a good chance of seeing recovery of steelhead and even the chance of Chinook salmon reestablishing themselves," he says.

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### Calveras Creek Snorkel Survey, Fish/100ft

