THE 2019 REPORT

CALIFORNIA TROUT

FISH · WATER · PEOPLE

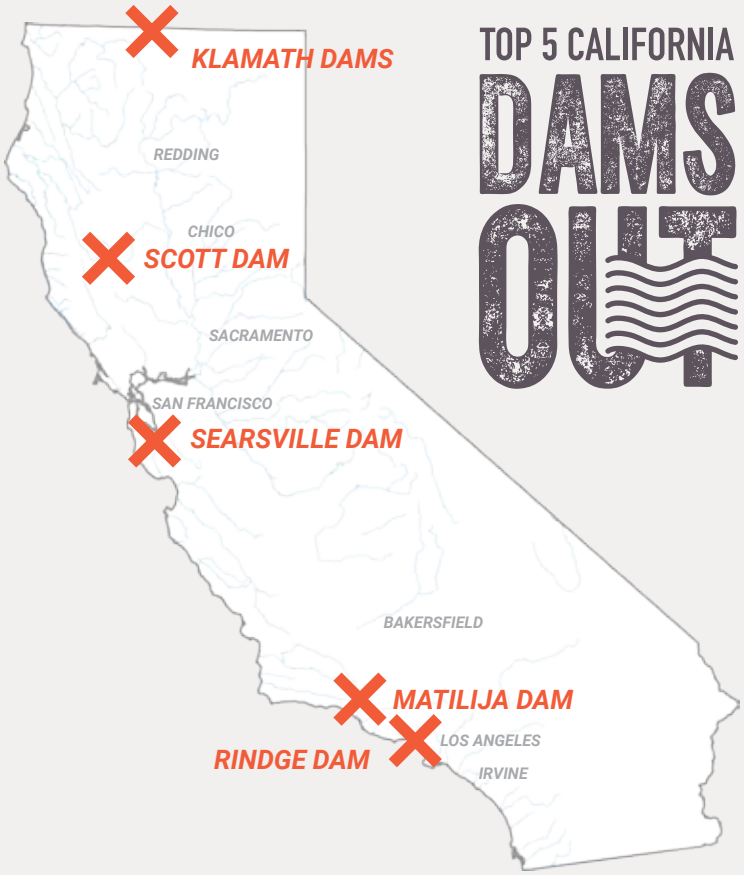
TOP 5 CALIFORNIA DAMS OUT

All photos by Mike Wier except Searsville by Matt Stoecker

TOP 5 CALIFORNIA DAMS OUT

"Dams are not America's answer to the pyramids of Egypt. We did not build them for religious purposes and they do not consecrate our values... Dams do, in fact, outlive their function. When they do, some should go."

- Former Interior Secretary Bruce Babbitt



California has thousands of dams, from small earthen barriers to large dams hundreds of feet tall. More than 1,400 of those dams are large enough to fall under state safety regulations. A great number of them provide critical water supply, flood control, and hydroelectric power. But many have outlived their functional lifespan and the ecosystem and economic benefits of removal far outweigh the cost of leaving them in place.

California Trout's **Top 5 California DAMS OUT Report** highlights five dams that are ripe for removal and that must, for the health of the ecosystem and communities around them, come out. The five dams were selected by analyzing information found in several studies to assess the overall benefits that removing the dam would present to native fish, water, and people. Dams were selected based on the following criteria:

- The dam blocks access to habitat for salmon and steelhead species listed as critical or high concern in the **State of Salmonids II Report** (written by UC Davis and California Trout scientists).
- The dam no longer serves its original purpose, whether generating hydroelectric power, increasing water supply, or managing flood control, and may now pose a public safety threat.
- A dam removal opportunity is present.
- The primary purpose of the dam is not flood control or water supply for people.*

*As listed in the United States Army Corps of Engineers National Inventory of Dams

Dams that are part of the State Water Project or federal Central Valley Project were not considered for inclusion in this report due to their vital role in California's water supply system. Similarly, dams designed to protect people and property from catastrophic floods also were not considered.

The report highlights removal opportunities, such as dam license renewal or new funding opportunities to support the removal process, and status of work being conducted to that end. It also identifies partners involved in removal efforts and provides opportunities for the public to take action to advocate for removal of each dam listed.

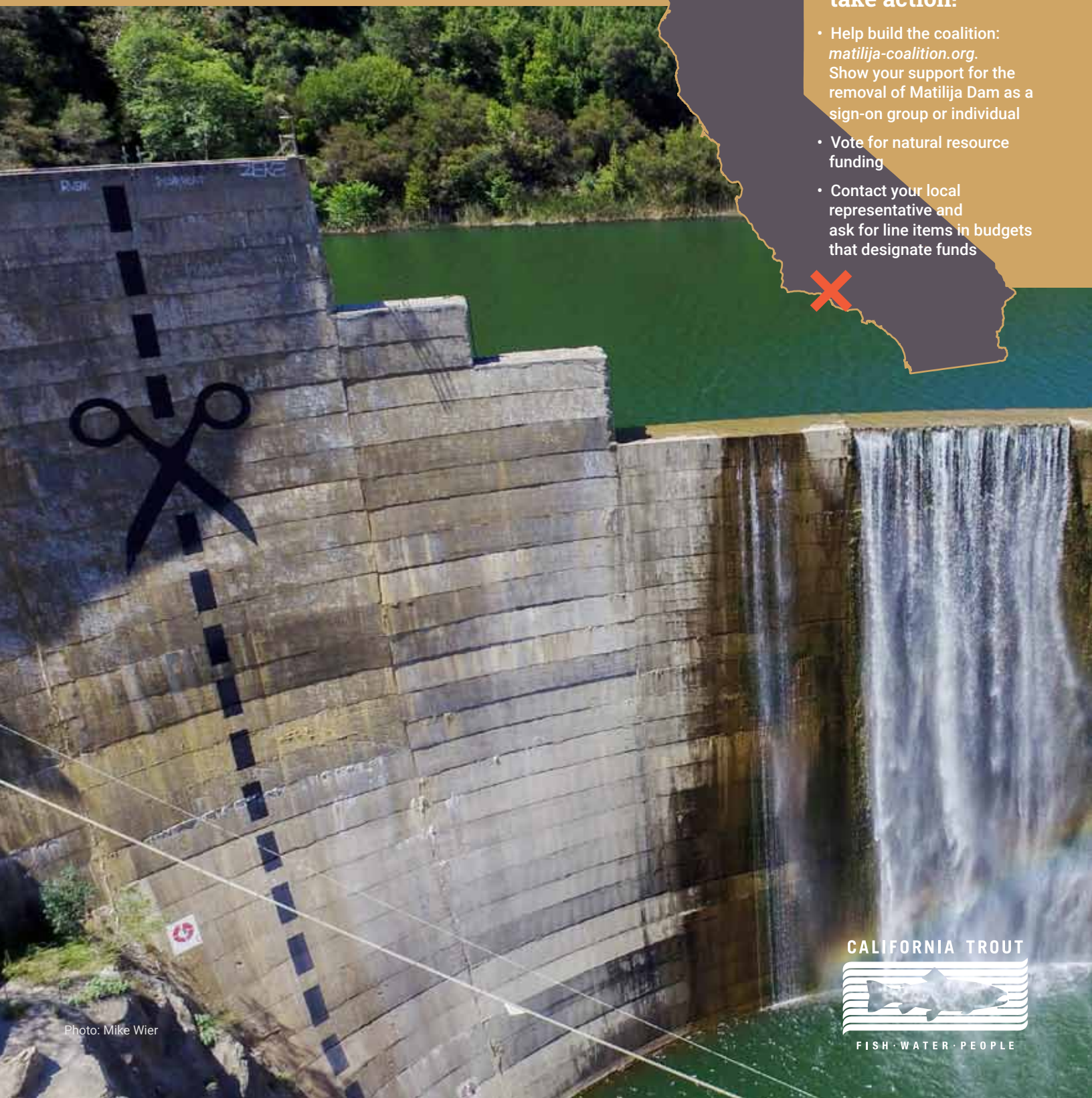
About California Trout

Founded in 1971, California Trout is a non-profit conservation and advocacy organization that is dedicated to solving California's complex resource issues while balancing the needs of wild fish and people. The organization focuses on science-based, scalable solutions to California's most complex water management challenges. CalTrout has six regional offices throughout the state with headquarters in San Francisco. ***Reconnecting Habitat*** is one of the organization's key initiatives in its effort to return native fish to resilience. Removing barriers to fish passage, including obsolete dams, is the initiative's primary objective.

TOP 5 CALIFORNIA

DAMS OUT

MATILIJA DAM is located in the Ventura River watershed on Matilija Creek, north of Ojai. The concrete arch dam, built in 1947, was originally designed for water storage and flood control. Scissors painted on the dam by graffiti artists in 2011 have become an iconic symbol for dam removal.



Get involved, take action!

- Help build the coalition: *matilija-coalition.org.* Show your support for the removal of Matilija Dam as a sign-on group or individual
- Vote for natural resource funding
- Contact your local representative and ask for line items in budgets that designate funds

Photo: Mike Wier

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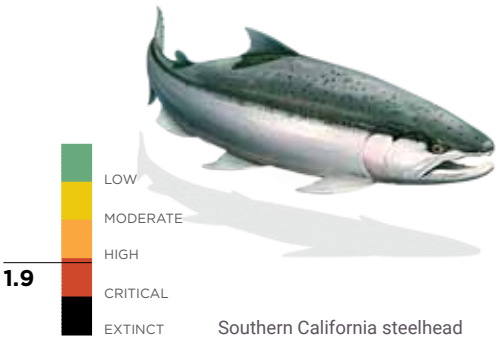
The Problem

The reservoir behind Matilija Dam is almost completely filled in with sediment, significantly reducing storage capacity to the point of rendering the dam non-functional. With no fish ladder or bypass structure present, it is a complete barrier to the migration of endangered Southern California steelhead. The dam also causes increased water temperatures, an altered flow regime, and deprives the lower watershed, estuary and beaches of sediment.

Southern California steelhead are an incredibly important species because they evolved in seasonally disconnected systems and are able to survive in warmer waters than are other steelhead populations. With only an estimated 500 individuals remaining, this life history trait makes this a particularly valuable population to protect in the face of climate change.



Southern California steelhead

Dam removal will reconnect access to critical steelhead habitat and help with the recovery of steelhead in Southern California. The removal of Matilija Dam will restore access to 17 miles of spawning, rearing and foraging habitat above the dam.

Current Situation

For almost 20 years a broad coalition of community groups and resource agencies have been advocating for dam removal and working together to develop a comprehensive strategy to restore the Ventura River. Ventura County officially made the decision in 1998 to remove the dam altogether. Congressional approval for a preferred preliminary design was obtained through the Water Resources Development Act of 2007, but was not funded.

The Matilija Dam Ecosystem Restoration Project will cost millions of dollars and the lack of dedicated funding has been a major impediment to action. Other factors, such as determining the proper sediment release strategy, the need to modify downstream roads, levees and bridges, and the effect of the Thomas Fire on the landscape all add to the challenges of the undertaking. Regardless, all stakeholders agree, Matilija Dam must come down.

Potential for Removal

In March 2016, the group overseeing design alternatives voted in favor of a removal plan. The approved alternative will use two bore holes in the dam itself to erode and transport as much sediment as possible during the first few high flow events once they are opened. This concept represents a "natural transport" alternative that concentrates the bulk of transport of the trapped sediment to the first few storm events. This alternative will minimize ecologic impact downstream and also lower the overall project cost by reducing the need to truck material out of the reservoir. Current projections estimate that once the bore holes are opened, complete dam removal and a free-flowing river will be achieved in two to five years. Releasing sediment through placed bore holes was demonstrated with success in 2011 on the Condit Dam in Washington State. Currently, the technical studies and planning needed to execute this alternative are ongoing.

The Matilija Dam Ecosystem Restoration Project funding committee is actively pursuing all funding strategies to complete the required upgrades to bridges, roads and levees and fully fund dam removal. In May 2017, with resources from a California Department of Fish and Wildlife Proposition 1 grant, the project secured funding for the next step of the dam removal process.

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To learn more visit caltrout.org/DamsOut


Photo: Mike Wier

MATILIJA DAM

Owner
Ventura County Watershed Protection District

Completed 1947

Location Ventura River

Fish species affected
Southern California steelhead, SOS II status: CRITICAL, federally listed endangered species

Size
Height:163 ft., Length: 620 ft.

Capacity
Total designed capacity: 7,018 acre ft., current capacity: less than 500 acre ft., projected capacity by 2020: 0 acre ft.

Stakeholders
Ventura County Watershed Protection District, California Department of Fish and Wildlife, Matilija Coalition, Patagonia, CalTrout, State Coastal Conservancy, Surfrider Foundation, National Marine Fisheries Service, Wildlife Conservation Board

TOP 5 CALIFORNIA

DAMS OUT

SCOTT DAM is one of two dams that make up the Potter Valley Hydropower Project. The Project, owned by PG&E, consists of Scott and Cape Horn dams, two reservoirs, and a diversion tunnel that sends water south to the Russian River watershed. The dams are up for Federal Energy Regulatory Commission (FERC) relicensing in 2022.

Get involved, take action!

- Visit *pottervalleyproject.org* for more information
- Subscribe to CalTrout's newsletter to receive updates on the project

Photo: Mike Wier

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The Problem

Fish populations in the Eel River are severely depressed. Although the Eel River once boasted some of the best salmon runs in California, the river's salmon and steelhead populations are all listed as threatened under the Federal Endangered Species Act. Water throughout the Eel River is listed as impaired under the Clean Water Act for excessive sedimentation and high temperatures. The river's delta and estuary are also negatively affected by agricultural practices, sediment issues, and water quality.

While the lower Cape Horn Dam has a fish ladder, the taller Scott Dam, which creates Lake Pillsbury, blocks 150 miles of potential salmon and steelhead rearing habitat. It is the largest barrier to native salmonid habitat in the Eel watershed and likely the entire north coast.

Current Situation

The Eel represents perhaps the greatest opportunity in California to restore a watershed to its former abundance of wild salmonids.

Chinook salmon. Photo by Mike Wier

With the dams facing the FERC relicensing process and PG&E's recent decision to withdraw from that process as well as from their plans to auction of the Project, a unique opportunity presents itself for conservation organizations, including CalTrout, to steer the future of the Eel River toward robust fisheries and a healthy watershed.

While the recent PG&E bankruptcy proceedings have complicated the situation, conservation organizations, water users including the Potter Valley Irrigation District and Sonoma Water, tribes and other stakeholders have been working together to find a two-basin solution and take a proactive, science-driven approach to the relicensing process. This two-basin approach would provide a solution that increases the flow of water in the Eel River, opens habitat above Scott Dam, and protects the interests of farmers, ranchers, wine growers and residents who rely on Russian River water.

Potential for Removal

Much research has been done to determine the best path forward for the Potter Valley Project that meets the needs of water users, landowners, and the ecosystem. From analyzing the water supply needs to evaluating fish passage technologies to working hard to put all of the necessary pieces together for a productive settlement with all the participating parties, stakeholders are exploring all options.

While the potential to remove Scott Dam is a distinct possibility given that FERC will likely require improvements in fish passage to bring it up to 21st century standards, all of the participating parties will have to work together to find a solution that will meet the diverse interests at the table. That being said, there are a number of emerging scenarios that could provide for the removal of Scott Dam while maintaining or increasing water security for Russian River water interests.

Southern Oregon/Northern California Coast coho salmon

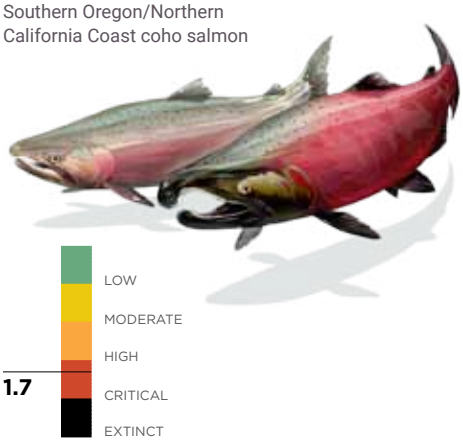

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Photo: Mike Wier

SCOTT DAM

Owner
Pacific Gas & Electric (put up for auction in September 2018 then withdrawn in January 2019)

Completed 1921

Location Eel River

Fish species affected
California Coast Chinook salmon, SOS II status: HIGH; Southern Oregon/Northern California Coast coho salmon, SOS II status: CRITICAL; Northern California summer steelhead, SOS II status: CRITICAL; Northern California winter steelhead, SOS II status: MODERATE

Size
Height:138 ft., Length: 850 ft.

Capacity
Total designed capacity: 80,600 acre ft. Forms Lake Pillsbury

Stakeholders
PG&E, Sonoma Water, Round Valley Tribe, Potter Valley Irrigation District, CalTrout, Friends of the Eel, Trout Unlimited, California Hydropower Reform Coalition

TOP 5 CALIFORNIA

DAMS OUT

SEARSVILLE DAM was built in 1892 and is located on San Francisquito Creek, which historically supported a run of steelhead in several upstream tributaries. The dam does not provide potable water or hydropower. Its primary use is providing irrigation water to the Stanford University campus and some flood control benefits to the downstream cities of Palo Alto, Menlo Park, and East Palo Alto.

Get involved, take action!

Keep up to date on developments by signing up for CalTrout's newsletter at *caltrout.org*

Photo: Matt Stoecker

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The Problem

Searsville Dam has lost over 90% of its original water storage capacity as roughly 1.5 million cubic yards of sediment have filled in the reservoir. It poses an impassable barrier to steelhead attempting to migrate to historical spawning grounds mostly upstream of the current dam site in the San Francisquito Creek watershed. While a few steelhead have been seen spawning below the dam in past years, they can no longer access the high quality habitat above the dam, and resident fish upstream cannot emigrate to San Francisco Bay and the Pacific Ocean.

The sediment trapped behind the dam and what to do with it presents the biggest obstacle to dam removal. Simply removing the dam and letting all the sediment move downstream would compromise existing flood control features in a heavily urbanized and modified watershed. This could increase the risk of catastrophic flooding for dense, high-value real estate downstream of Stanford's campus.

Current Situation

Removing Searsville Dam represents an important opportunity to significantly increase spawning and rearing habitat for federally threatened Central California Coast steelhead in an anchor watershed that is necessary for recovery of the species.

Stakeholders have been working to identify feasible opportunities to allow fish passage at Searsville Dam for over a decade, with several independent consultant reports but no clear path forward to show for it. Complicating the situation is the significantly altered watershed downstream of Searsville, where the existing channel of San Francisquito Creek can no longer safely pass flows downstream without flooding neighboring cities. Significant investments in replacing undersized culverts and other barriers at road crossings have been made already, but more infrastructure improvements would be required for miles downstream to allow sediment and streamflows to move out to San Francisco Bay without backing up floodwaters onto densely populated urban areas.

Potential for Removal

Searsville has been a contentious subject for Stanford University and those paying attention to steelhead and salmon issues in the Bay Area for decades. The challenge of balancing flood risk and fish passage, the very low abundance of steelhead on the Peninsula, and the extremely high cost of any potential solution makes finding a path forward difficult. Stanford has committed to presenting their internal fact-finding on the fish passage possibilities at Searsville Dam to external stakeholders and the National Marine Fisheries Service once they have selected a preferred alternative. However, this has not happened despite several years of waiting.

A possible option is to punch a hole in the bottom of the dam to slowly meter out the reservoir's sediment from the reservoir over a period of years, gradually moving it downstream to San Francisco Bay. Sediment is badly needed in the bay to reinforce marshlands impacted by sea level rise. After a period of time, a second project phase of stream restoration and eventual removal of the dam itself would begin to allow steelhead unimpeded access to historical habitat upstream in the watershed.

Whether it's that option or another, a solution is needed. The high cost of dam removal, insurance liability coverage, and the hesitancy of Stanford University and the surrounding communities to enter into serious dam removal conversations has created difficult challenges and has slowed the progress.

Central California Coast steelhead

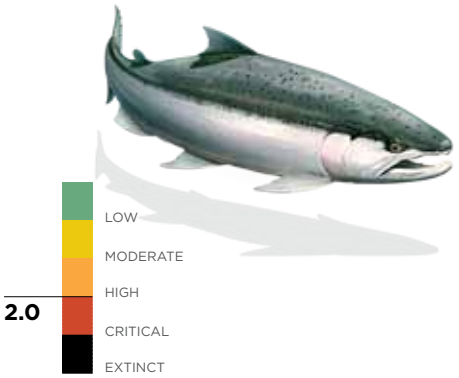


Photo: CC Gazebo

SEARSVILLE DAM

Owner
Stanford University

Completed 1892

Location Corte Madera Creek, San Francisquito Creek watershed

Fish species affected
Central California Coast steelhead, SOS II status: HIGH

Size
Height: 65 ft., Length: 275 ft.

Capacity
Total designed capacity: 1,840 acre ft., forming Searsville Lake, 90% filled with sediment

Stakeholders
Beyond Searsville Dam Coalition, American Rivers, California Department of Fish & Wildlife, CalTrout, National Marine Fisheries Service, Stanford University, San Francisquito Joint Powers Authority, Grassroots Ecology, among others

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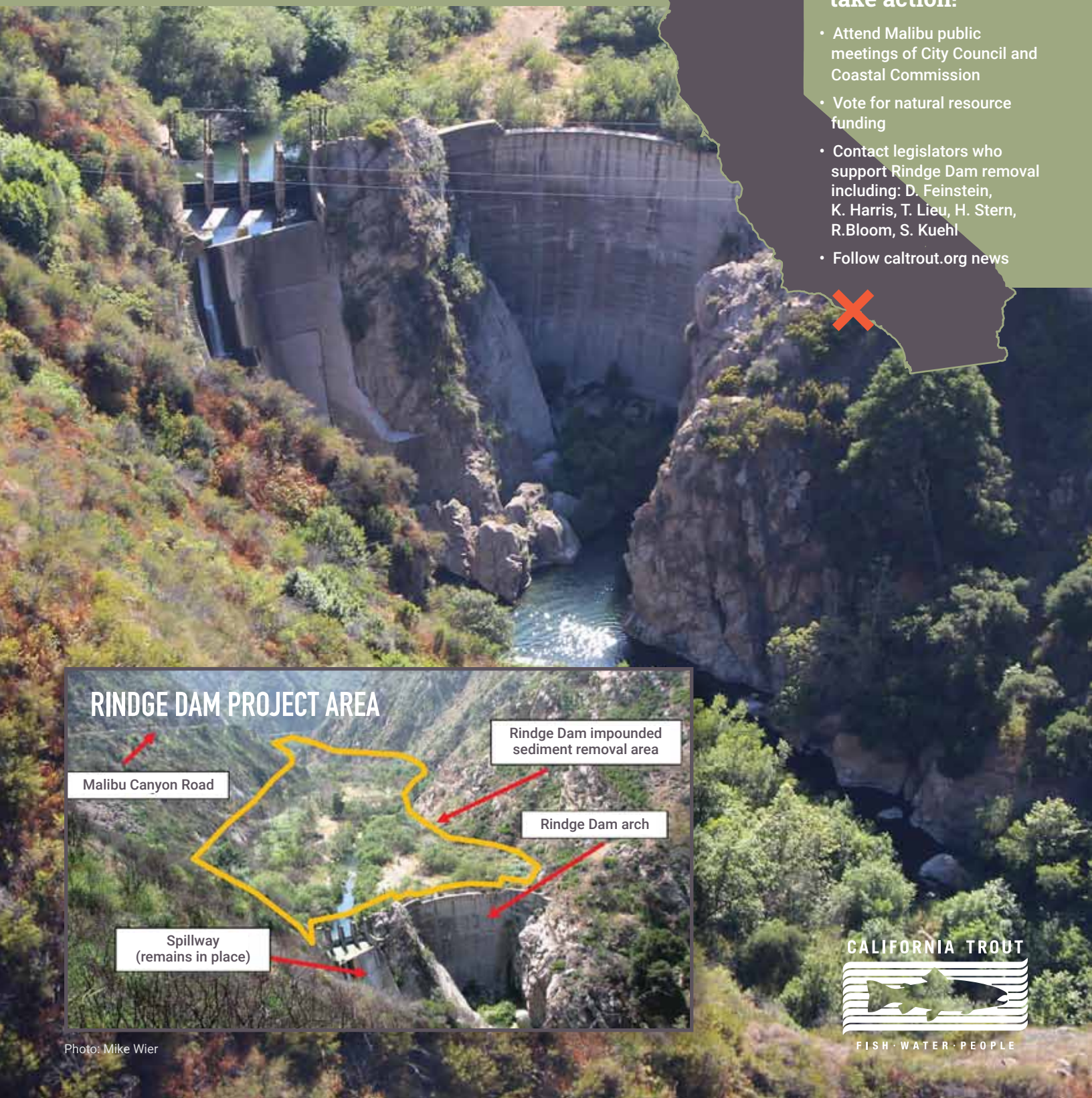
DAMS OUT

RINDGE DAM is located about three miles upstream from the Malibu coastline. The structure was completed in 1926 on the Rindge family property and provided water for irrigation and household use in Malibu. By the 1940s the reservoir had completely filled with sediment and the dam was decommissioned in 1967. It was purchased shortly thereafter to become part of Malibu Creek State Park.



Get involved, take action!

- Attend Malibu public meetings of City Council and Coastal Commission
- Vote for natural resource funding
- Contact legislators who support Rindge Dam removal including: D. Feinstein, K. Harris, T. Lieu, H. Stern, R.Bloom, S. Kuehl
- Follow caltrout.org news

Photo: Mike Wier

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The Problem

Rindge Dam altered the natural geomorphic, riparian and aesthetic character of Malibu Creek. The dam has trapped over 780,000 cubic yards of sediment that was naturally destined for the coastline, where it would support beach nourishment and prevent coastal erosion. Having completely filled with sediment less than 30 years after being built, the dam was rendered defunct over 64 years ago.

Since the dam's construction, federally endangered Southern California steelhead have been blocked from reaching high-quality spawning grounds in upper Malibu Creek, which is designated critical habitat for this steelhead species. The dam prevents steelhead from accessing more than 18 miles of historical spawning and rearing habitat in Malibu Creek and tributaries.

Adult and juvenile steelhead. Photo courtesy of NOAA

Current Situation

The watershed represents a unique opportunity for systemic and sustainable ecosystem restoration in highly urbanized southern California. Rindge Dam was deemed obsolete due its lack of function as a water storage facility and has been the subject of removal planning for decades.

While there is very little disagreement about the need for removal, progress has been slow given the multiple agencies and organizations involved in the planning. The dam removal process was formalized when the U.S. House of Representatives commissioned the "Malibu Creek Ecosystem Restoration Feasibility Study" in 1992, requesting a solution that improved the Malibu Creek watershed and the Malibu shoreline. The Army Corps of Engineers led this study to investigate ecosystem restoration opportunities within the Malibu Creek watershed, to improve aquatic and riparian ecosystem habitat connectivity and restore more natural sediment transport to the coast.

Working with the Army Corps, the Locally Preferred Plan (LPP) promoted by California Department of Parks and Recreation is the preferred alternative for dam removal. That alternative, described in the Feasibility Study completed in January 2017, calls for removal of the concrete arch dam and spillway, removal of upstream smaller fish passage barriers, and removal of the impounded sediment using traditional mining methods and various deposit locations for that sediment. The impounded sediment, an estimated 276,000 cubic yards, would be placed along the Malibu shoreline or nearby areas.

Potential for Removal

The removal plan for Rindge Dam was approved by the California Coastal Commission and California Department of Parks and Recreation. The project is nearing completion of the environmental review phase initiated in 2000 pending release of the final Feasibility Report by Army Corps of Engineers and review by National Marine Fisheries Service.

Trucking the impounded sediment to its end destination is the time-consuming and tricky piece of this dam removal project. Some would be trucked up Highway 101 to Ventura Harbor about 41 miles away from the dam and placed on barges for transport to the Malibu shoreline. Nearly two-thirds of the impounded sediment would be trucked from the impounded sediment site to a local landfill. The timeframe to transport all the sediment is estimated at 8 years due to seasonal construction and daily trucking restrictions. Total cost estimate is $187 million, with significant cost savings if sediment transport costs can be economized.

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Photo: Mike Wier

RINDGE DAM

Owner
California Department of Parks and Recreation

Completed 1924

Location Malibu Creek

Fish species affected
Southern California steelhead, SOS II status: CRITICAL, federally listed endangered species

Size Height: 100 ft.

Capacity
Total designed capacity: 600 acre ft.
Current capacity: zero acre ft., completely filled with sediment

Stakeholders
California Dept of Parks and Rec, Santa Monica Mountains National Recreation Area, Santa Monica Mountains RCD, City of Malibu, Mountains Restoration Trust, CalTrout, Surfrider, Army Corps of Engineers, National Marine Fisheries Service, California Department of Fish and Wildlife, Las Virgenes Municipal Water District

TOP 5 CALIFORNIA

DAMS OUT

KLAMATH DAMS Copco #1, Copco #2, Iron Gate and J.C. Boyle (in Oregon) are four aging hydroelectric dams on the mainstem Klamath River, which flows through parts of Southern Oregon and Northern California. Removal of the dams has been the subject of national attention for nearly two decades. Over 40 organizations, irrigation districts, and tribes support taking the dams out.

Get involved, take action!

- Subscribe to the Klamath River Renewal Corporation newsletter on their website *klamathrenewal.org*
- Follow KRRC on Facebook for the latest updates *facebook.com/klamathrenewal*

Iron Gate Dam. Photo: Mike Wier

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The Problem

The Klamath dams block salmon and steelhead from reaching more than 300 miles of spawning and rearing habitat in the upper basin. Historically, the Upper Klamath-Trinity Rivers spring-run Chinook salmon was the most abundant run on the river. Today less than 3% remain, in large part because they cannot access historical habitat in the Upper Klamath Basin.

The four dams have been in a perpetual Federal Energy Regulatory Commission (FERC) relicensing process since 2000, originally started by then-owner PacificCorp.

Locations of the three dams on the Klamath River

While there is broad support for the removal of these defunct dams, there is some local opposition to the project, including from landowners around the current reservoirs and some local ranchers and farmers.

Current Situation

A non-profit organization, the Klamath River Renewal Corporation (KRRC), was formed in 2016 to take ownership of four PacifiCorp-owned dams (Copco #1, Copco #2, Iron Gate and JC Boyle), for the purpose of overseeing the dam removal process. That work will include restoring formerly inundated lands and implementing required mitigation measures in compliance with all applicable federal, state, and local regulations. PacifiCorp will continue to operate the dams until FERC approves a license transfer to KRRC.

KRRC is currently working to secure permits, develop deconstruction plans, secure bids for the work of removing dams and restoring the lands under the reservoirs, and contract with a design-build firm to run the majority of the deconstruction project.

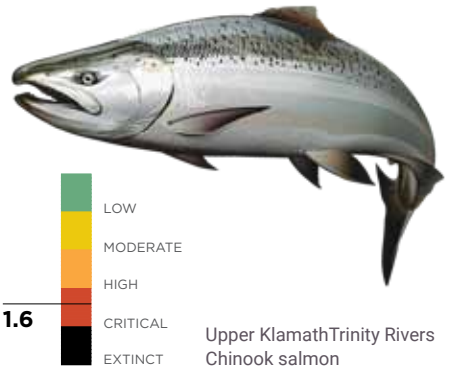
One important remaining step is the transfer of the FERC license from PacifiCorp to KRRC. This is currently pending before FERC and is expected to be completed by summer of 2019.

Potential for Removal

All the pieces are in place for these dams to be removed by 2021 pending the license transfer. Funding for the projects is set, with up to $450 million secured from PacifiCorp ratepayers and the state of California through the 2014 Proposition 1 Water Bond. An independent group of expert consultants have assessed whether existing funding is sufficient for KRRC to complete the dam removal project. The consultants determined that the KRRC's methodology and approach to assessing costs and risk is generally sound and it is likely that there will be sufficient funding within the state cost cap ($450M) to complete the project.

Removing the Klamath dams will be the largest dam removal project in the world, restoring access to native fish species' historical cold-water habitat.

Chinook in bubbles. Photo: USFWS



Upper KlamathTrinity Rivers Chinook salmon

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To learn more visit caltrout.org/DamsOut

Copco #6. Photo: Mike Wier

KLAMATH DAMS

Owner
Klamath River Renewal Corporation upon federal license transfer

Completed 1922 (Copco #1), 1925 (Copco #2), and 1964 (Iron Gate)

Location Klamath River - the 4th dam, JC Boyle, is located in Oregon

Fish species affected
7 species including: Upper Klamath-Trinity Rivers spring-run Chinook salmon, SOS II status: CRITICAL; Southern Oregon/ Northern California Coast coho salmon, SOS II status: CRITICAL; Klamath Mountains Province summer steelhead, SOS II status: CRITICAL

Size
Iron Gate H 189 ft./L 540 ft., Copco #1 H 250 ft./L 415 ft., Copco #2 H 63 ft./L 278 ft.

Capacity
Iron Gate 58,000 acre ft., Copco #1 60,000 acre ft., Copco #2 73 acre ft. (diversion dam)

Stakeholders
See full list of over 40 stakeholders at caltrout.org/DamsOut