



# California Fish Tracking Consortium



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## The Project

Little is known about the many different anadromous fish of California due to the difficulty of studying these highly migratory species. Because they rely on many different habitats, such as streams, rivers, estuaries, and the ocean, they are vulnerable to many natural and human-caused impacts. Many questions regarding these species' life histories need to be answered to better understand how to protect their populations and maintain sustainable fisheries.

The Central Valley Fish Tracking Consortium is a collaboration between several academic, government and private organizations working together to answer some of these questions. Recent advances in acoustic tagging technologies make it possible to track the movement patterns and survival of different species of migratory fish all throughout the Sacramento River watershed all the way to the Pacific Ocean. With funding from several sources, including notably the CALFED Bay-Delta Program, National Oceanic and Atmospheric Administration and United States Army Corps of Engineers, we have set up an array of acoustic monitors that "listen" for tagged fish throughout the Sacramento River watershed to the Golden Gate Bridge.

## The People

**NOAA/NMFS Santa Cruz** - Dr. R. Bruce MacFarlane

**U.C. Davis** - Dr. A. Peter Klimley

**U.S. Army Corps of Engineers** - Peter Lacivita

**Bay Planning Coalition** - Ellen Johnck

**U.S. Fish and Wildlife Service, Stockton**-Patricia Brandes

**U.S. Fish and Wildlife Service, Red Bluff** - Robert Null

**East Bay Municipal Utilities District** - James Smith

**ECORP Consulting** - Tom Keegan

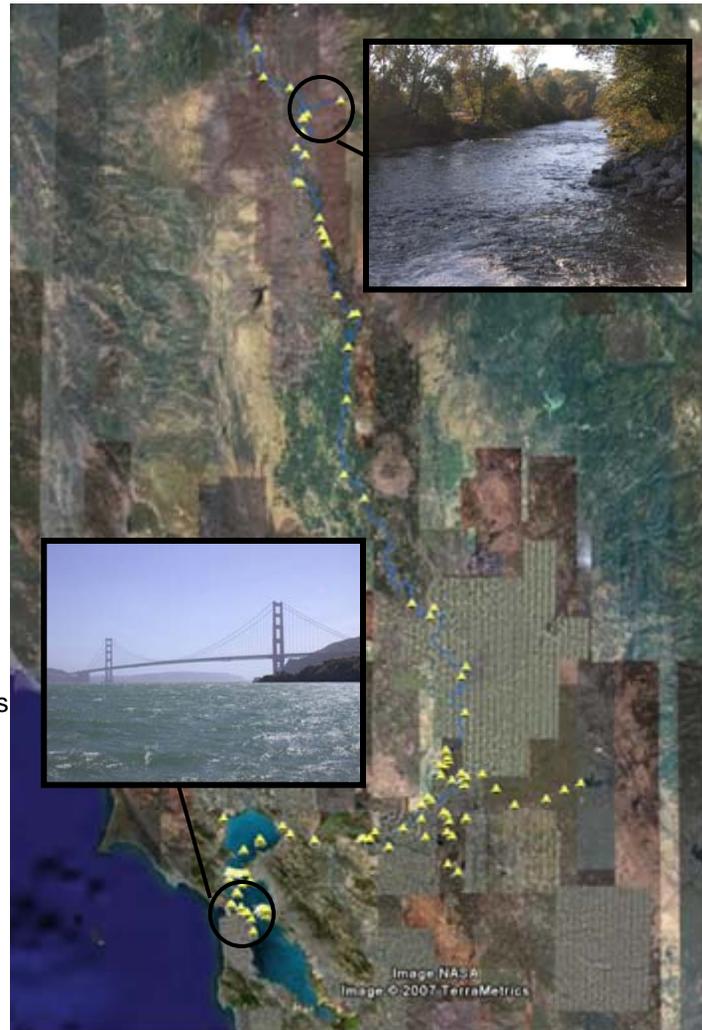
**California Department of Water Resources** - Kevin Clark

**Hanson Environmental** - Dr. Chuck Hanson

**Coleman National Fish Hatchery** – Scott Hamelburg

## The Places

Currently, this project covers the Sacramento River below Lake Shasta (the dam marking the furthest a fish can migrate up the Sacramento) all the way to where the San Francisco Bay meets the Pacific Ocean, at the Golden Gate. We have monitors all throughout this area, with special emphasis in the Delta, the Carquinez Straits and the Golden Gate Bridge. In the future with added funding, we hope to extend our array of monitors outside of the San Francisco Bay and up and down the California coast. The map below shows the general location of all of our monitors.



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**The Fish** - Chinook salmon, steelhead, and green sturgeon are all highly migratory, anadromous fish native to California. Anadromous means they migrate from the ocean to spawn in rivers. In this case, the fish studied make a full cycle, being born in freshwater, going to the ocean and returning years later to spawn in freshwater. These three species are of special concern in California because their populations are all in jeopardy. It is our hope to discover where the problems stem from: whether in the Ocean or the freshwater system; whether due to human or natural effects.



**STEELHEAD** (*Oncorhynchus mykiss*): The Steelhead is actually an anadromous strain of the more commonly known rainbow trout. It can grow to a size of 3 ½ feet and 40 pounds. The Steelhead makes the same upstream migration to spawn as the Chinook salmon, but unlike the Chinook, the Steelhead does not necessarily die afterwards, and can come back to spawn again a following year. For this reason, we will be tagging both juveniles and post-spawn adults to track their travels downstream. The Central Valley Steelhead is considered a threatened strain of the species according to the Endangered Species Act (ESA).

**CHINOOK SALMON** (*Oncorhynchus tshawytscha*): The Chinook salmon is the biggest of the North American salmon, getting as big as 5 feet and 130 pounds. The Sacramento river watershed is unique in the sense that watershed is home to 3 runs of Chinook salmon. The “winter” strain is considered to be endangered, the “spring” strain is considered to be threatened, and finally the “fall/late fall” strain is considered as a species of concern under the ESA. We will be tagging juvenile fall/late fall Chinook salmon for this project.



**GREEN STURGEON** (*Acipenser medirostris*): The green sturgeon belongs to the *Acipenser* family, these ‘living fossils’ are one of the oldest fish families still in existence. The Central Valley is home to two species of sturgeon, the white and the green. The “smaller” of the two, the green sturgeon, gets to a size of 8 feet and 350 pounds. The green sturgeon is considered a threatened species by ESA.



**The Technology** - Vemco manufactures acoustic “pinger” tags that send a signal (at 69kHz) to underwater monitors. Each fish has a tag inserted into the fish’s abdomen before release. The signal emitted by the tag is a coded transmission that is unique for every tag, and therefore every fish. Thus, the nearby underwater monitor will register the code and exact time. This will allow us to know exactly which fish was where and when.

**Learn More** - Visit our website at:

<http://californiafishtracking.ucdavis.edu> or contact Dr. R. Bruce MacFarlane, National Marine Fisheries Service SWFSC, 110 Shaffer Road, Santa Cruz, California 95060. Phone: (831) 420-3939

