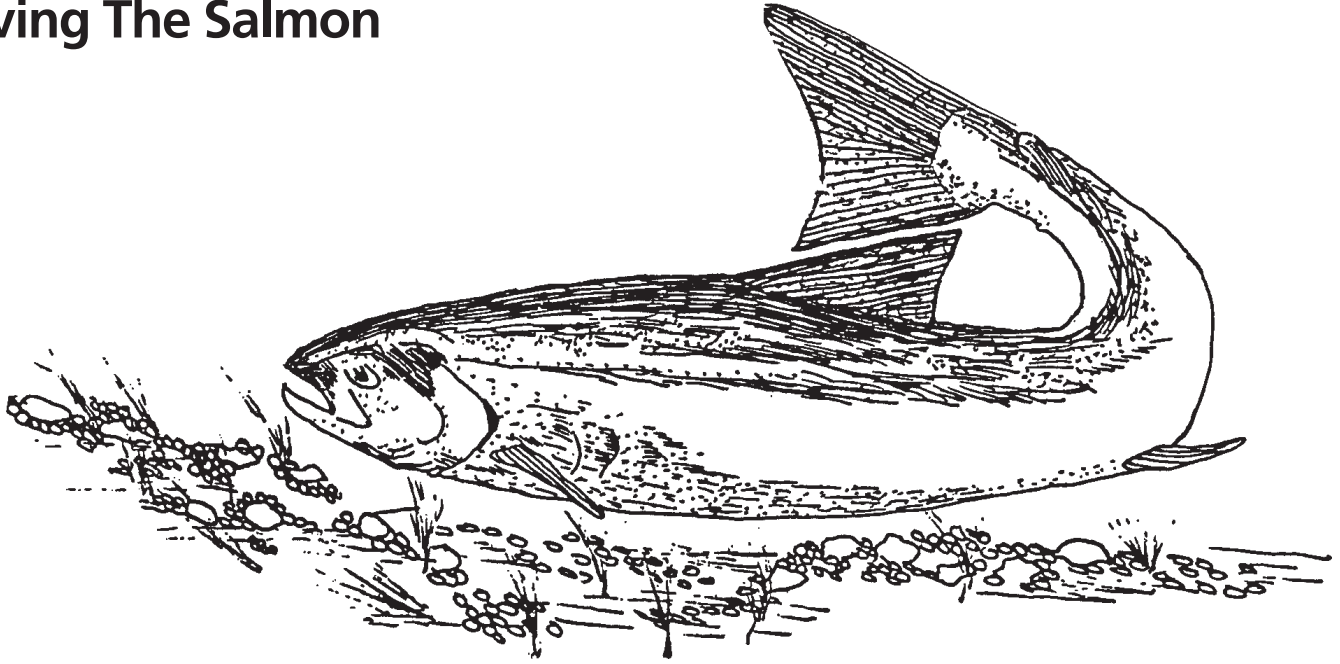




## Saving The Salmon



*“Many of the Pioneers of California, if they are not already aware of the fact, will be sorry to learn that the Salmon fish are fast disappearing from our waters—that is, upon all the streams upon which mining is carried on to any extent...In the year 1849, we had no trouble whatever in procuring all the salmon we wished...In 1851, we could observe a great decrease...”* *Salmon Fishery on the Sacramento River* A.C. Kirkpatrick HUTCHIN'S CALIFORNIA MAGAZINE 1860

### Decline of a Species

California Native Americans harvested large numbers of salmon for food and trade. However, miners, in their quest for gold during the mid -1800's, first contributed to the decline of salmon populations in the Sacramento River. Even though miners were required to contain their debris, attempts to do so were largely ineffective.

Subsequently, silt deposited in rivers and streams quickly deprived the salmon of the clean gravel critical for reproduction. Many of the mines have since been abandoned, but other human activities over the last century, such as logging and the construction of dams, continue to adversely affect the recovery of salmon populations.

### Cycle of Life

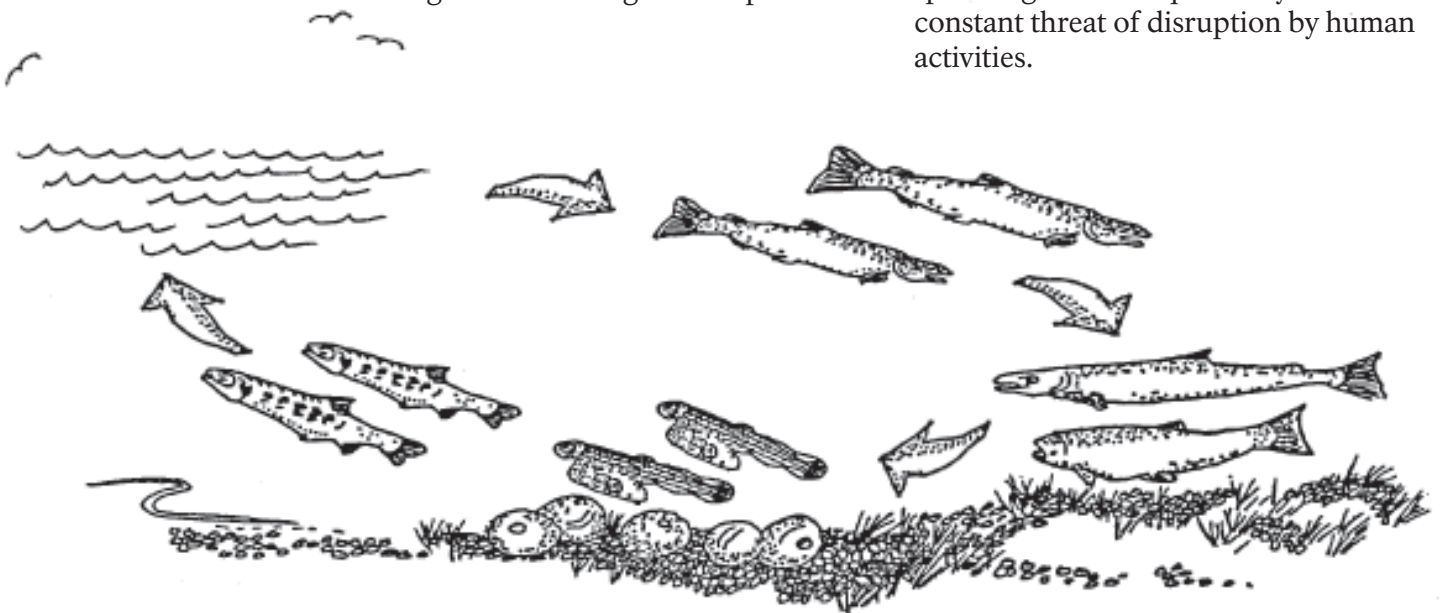
Salmon migrate several hundred miles from the ocean to the Sacramento River in order to lay their eggs in the clear gravel beds of the river and its tributaries.

The eggs and larvae require cold (42° - 56° F) and clean water to survive. If conditions are right, they hatch in about 50 days. The newly hatched salmon or “yolk -sac fry” stay in the clear gravel for two to three weeks until the yolk sack is absorbed.

Once they emerge from the gravel the “fry” feed along the water's edge. The optimum

water temperature for salmon fry ranges from 42° to 65°F. The urge to migrate to the ocean occurs when the fry undergo physiological changes that allow them to adapt to living in salt water.

The fry slowly migrate down the Sacramento River and finally into the Pacific Ocean where they spend most of their adult lives. After several years, the adult salmon then return to native waters to spawn a new generation. Exhausted from their long journey, they die soon after spawning. This unique life cycle is under constant threat of disruption by human activities.



## Watershed Degradation

Historically, salmon were able to freely migrate from the ocean and spawn in the upper reaches of the Sacramento River and its tributaries, including Whiskeytown National Recreation Area's Clear Creek. However, logging, agriculture, and development over the years altered stream channels and contaminated clean gravel beds, thereby reducing suitable habitat and spawning areas.

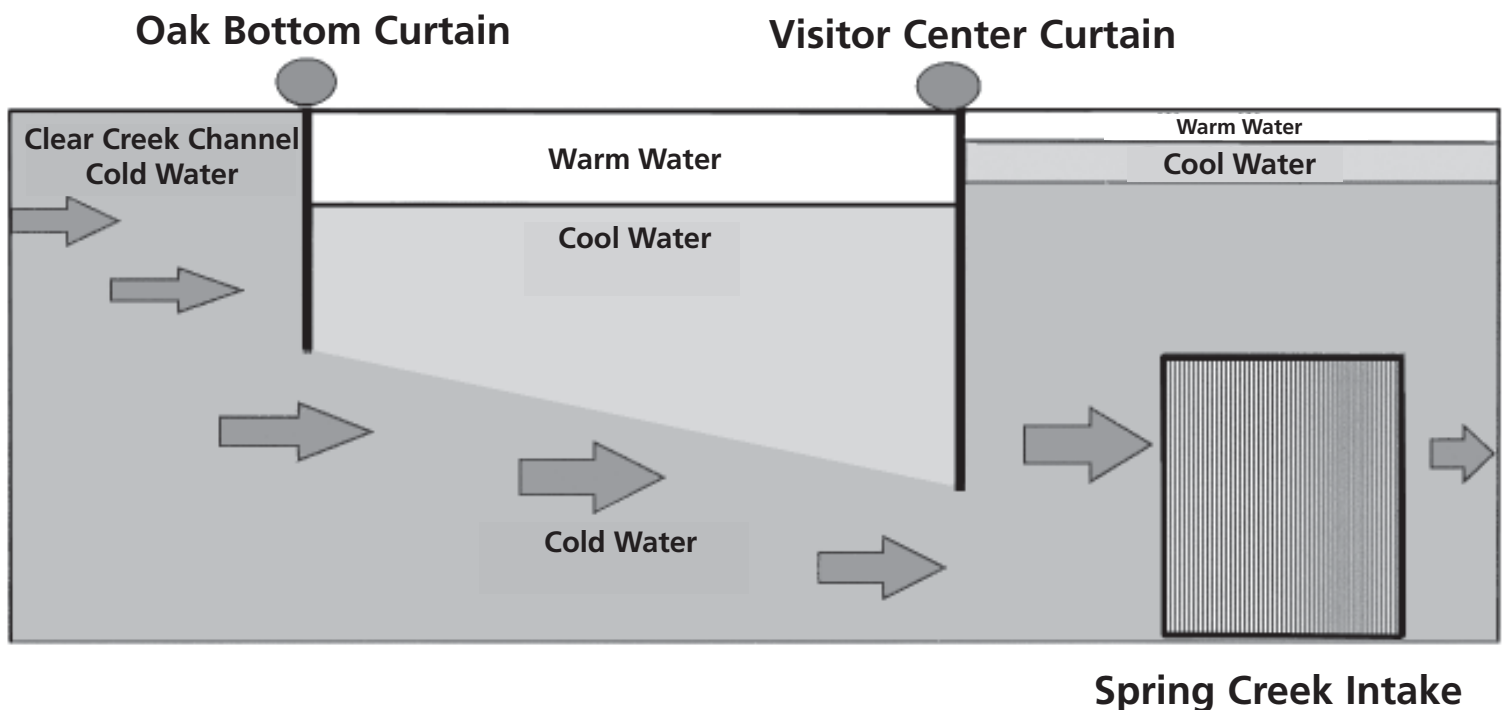
Today, dams and water diversions of the Central Valley Project present insurmountable obstacles to salmon by blocking access to spawning areas and affecting water quality and habitat.

These activities have contributed to changes in water temperature, which plays a critical role in the life cycle of these fish.

## Curtains Cool Chinook

In 1993, water temperature control curtains were installed in Whiskeytown Lake by the Bureau of Reclamation to help regulate the temperature range requirements of salmon eggs and sac-fry. The curtains are made of reinforced rubber sheets that form a continuous barrier under the water. The Oak Bottom water curtain is 600 feet in length and reaches a depth of 40 feet. It serves as a barrier to prevent warm water from mixing with cold water coming from the Carr Powerhouse.

The water curtain below the Visitor Center is 2400 feet in length and reaches a depth of 100 feet. This curtain extends out into the lake in a U-shape to aid cold water movement into the Spring Creek underwater intake and tunnel.



This new technology allows the Bureau of Reclamation to manage the needs of the Central Valley by providing water for farmers and generating electricity. It also provides for the passage of cold water so necessary for the survival of Northern California's Chinook salmon.

*The water curtains are not designed for tying up boats, sunbathing or other recreational activities. Stay safe by staying off!*

