



Northern
California
Water
Association

Recovering Chinook Salmon in the Sacramento River Basin

Supporting our native fish through science-based, holistic actions

Recovering Chinook Salmon in the Sacramento Valley means aligning science, working landscapes, and water management to restore resilient ecosystems while supporting a vibrant economy and achieving the long-term recovery and delisting of threatened and endangered species. Rather than relying on isolated actions, a holistic approach to recovery planning means uniting farmers, water managers, conservationists, fishermen, researchers, and agencies to develop practical, locally driven solutions where farms, fish, wildlife, and communities thrive together. To achieve stabilization of fish populations, we must integrate working agricultural lands with restoration, improve river and floodplain function, and coordinate water operations to support communities, farms, and ecological needs. By doing so, we can create a path toward species recovery while strengthening the long-term economic and ecological health of the region.

Collaborative Approach

The Sacramento Valley recognizes that lasting, basin-wide solutions are only possible through strong partnerships. That is why collaborative coalitions such as The Bridge Group, Floodplains Forward, and Healthy Rivers and Landscapes are implementing science-based strategies that improve habitat, enhance water management, and advance our shared goal of restoring robust Chinook salmon populations.



Fish in Focus

Chinook Salmon

California's Chinook salmon are iconic migratory fish that connect mountain streams, rivers, the Sacramento–San Joaquin Delta, and the Pacific Ocean. Born in freshwater, juvenile salmon migrate downstream to the ocean, where they spend one to three years feeding and growing before returning to their natal rivers to spawn. The Sacramento River supports four distinct Chinook runs—winter, spring, fall, and late fall—each adapted to migrate and spawn at different times of the year. Healthy rivers, cold-water habitat, and connected floodplains are essential to sustaining these populations and the communities, wildlife, and fisheries that depend on them.



Steelhead Trout

Steelhead are an ocean-migrating form of rainbow trout and have one of the most diverse life cycles of any salmonid. Unlike Chinook salmon, many steelhead survive spawning and can return to reproduce multiple times. Juveniles spend one to three years rearing in Sacramento River tributaries before migrating to the Pacific Ocean, then return to their natal streams to spawn. Tributaries of the Sacramento River support some of the last remaining populations of naturally produced Central Valley steelhead, making healthy river habitats and reliable cold-water flows essential to their long-term health and sustainability.

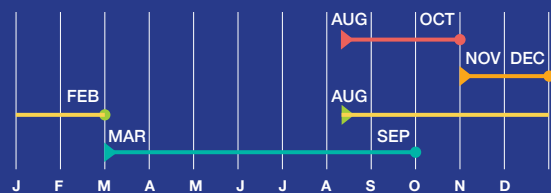


Courtesy of NOAA Fisheries

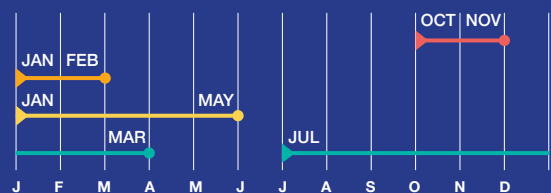
Salmon & Steelhead Migration Schedules

Chinook salmon and steelhead trout are anadromous fish, which means they can live in both fresh and salt-water. In the Sacramento Valley, there are four runs of Chinook salmon, and a run of steelhead. The “runs” of salmon are named for the time of year that they return from the ocean to fresh water to spawn. Sacramento Valley salmon runs include winter-run, spring-run, fall-run, and late fall-run.

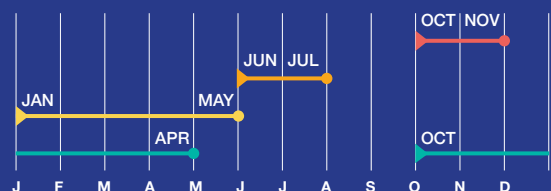
Spring-run Chinook



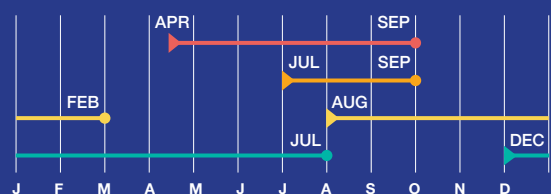
Fall-run Chinook



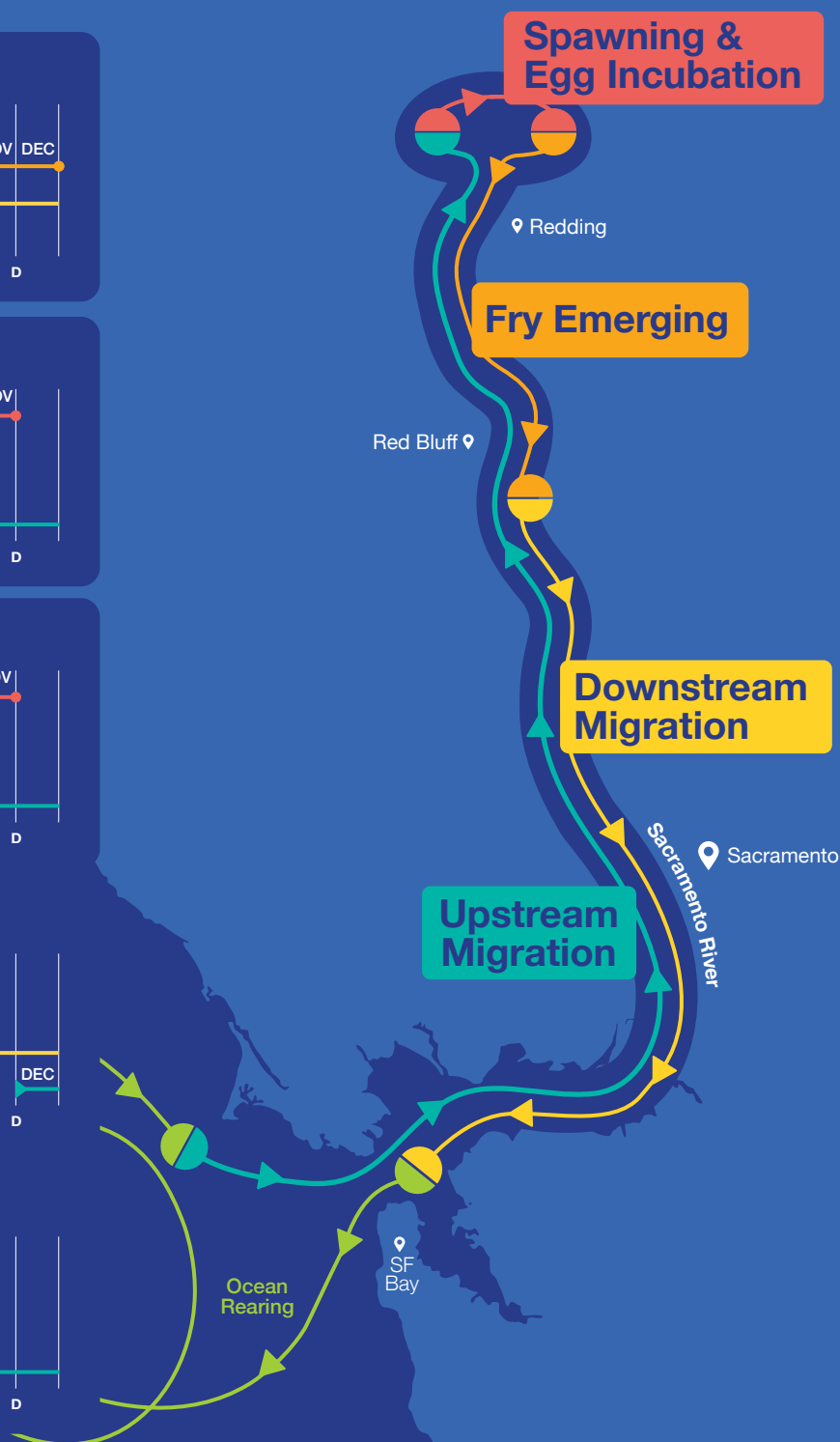
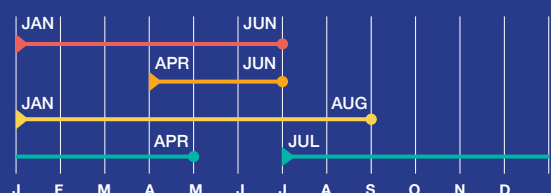
Late Fall-run Chinook



Winter-run Chinook



Steelhead Trout



Chinook Salmon Pacific Ocean Migration

After leaving the Sacramento River, Chinook salmon disperse throughout the Pacific Ocean, where they spend one to four years feeding and growing before returning to their natal rivers to spawn. Ocean conditions and water temperatures influence the timing, routes, and duration of each run's migration. Winter-run Chinook typically migrate south to waters off Morro Bay before returning to the San Francisco Bay. Spring-run, Fall-run, and Late Fall-run travel as far north as Central Oregon, though Fall-run and Late Fall-run commonly move south into Monterey Bay before turning north.

- **Spring-run Chinook**
- **Fall-run Chinook**
- **Late Fall-run Chinook**
- **Winter-run Chinook**

Pacific Ocean

Washington

Oregon

California

Salmon Recovery Efforts

Implementing Healthy Rivers & Landscapes

Based on modern science, Healthy Rivers and Landscapes (HRL) is a collaborative, statewide approach to restore river health, floodplains, and natural landscapes in the Bay-Delta, while supporting our fish, farms, wildlife, communities, and recreation sites. Through scientific monitoring and collaborative decision making, HRL will allow water managers to adapt statewide operations based on real-time conditions and enable broad coordination across watersheds to contribute up to 825,000-acre feet for maximal benefits, while also restoring aquatic habitat for fish and wildlife.

**Collaborative Efforts
have Resulted in 58 Early
Implementation Projects.**

[Learn more about](#)

HEALTHY RIVERS & LANDSCAPES



Fish populations have adapted to the environmental benefits created by land and water interaction that was experienced under historic conditions. When flows and habitat are paired together, we are able to provide better access to habitat, reduce predation, and increase food supply—all critical factors in the long-term health of our fish and wildlife.

The Bay-Delta Watershed has seen significant progress through the early implementation of the Healthy Rivers and Landscapes program. Since December 2018, collaborative efforts have resulted in 58 Early Implementation projects designed to restore and enhance the region's vital ecosystems.



A Holistic Approach to Create Robust Salmon Populations

Projects and strategies noted below focus on supporting native fish during freshwater lifecycle stages including spawning, egg incubation, outward migration and rearing opportunities.

Source Water Protection

Spawning Gravels & Refugia

Modernizing Hatcheries

Temperature Management

Pulse Flows

Fish Rest Stops

Fish Passage

Floodplain Reactivation

Putah Creek Enhancements

McCloud River Reintroduction

Thiamine Treatment

Battle Creek Enhancements

Butte Creek Enhancements

Yuba River Enhancements

Feather River Enhancements

American River Enhancements

Mokelumne River Enhancements

Sacramento River

Redding

Sacramento



Rockwads Project Supports Juvenile Migration



Gravel Augmentation Creates Spawning Habitat

Chinook Salmon Sacramento Valley Recovery Program Projects

Participants in the Sacramento Valley Salmon Recovery Program are continuing to make progress in implementing the program's priorities. Since 2000, more than 140 projects have been completed to promote salmon recovery in the region. They include...

Riparian Zones

Creation of notches to promote access and provide food sources for migrating juveniles

Spawning Gravel Enhancement

Place various sized rock and gravel to supplement needed habitat for adult spawning and egg incubation.

Salmon Ladders

Creation of passage ways on diversion dams to allow access to upper river sites for spawning.

Fish Screens

Preventing straying of fish into canals and low flow areas.

Floodplain Enhancement & Access Improvements

Creation of notches to promote access and provide food sources for migrating juveniles

Juvenile Rearing Habitat

Side channels and placement of rockwads (wooded and stone debris placed down river).

HEALTHY RIVERS & LANDSCAPES

A diverse coalition of water agencies representing 32 million people supports a transformational, watershed-wide approach that benefits fish, birds and wildlife across California.



FLOODPLAIN FORWARD

A 35-member organization representing landowners, irrigation districts, higher education, and conservation groups. The coalition, and the collaborative model of dynamic conservation, has resulted in farms, refuges, and managed wetlands providing essential habitat for waterfowl and shorebirds as well as potential food production and safe havens for endangered fish species.



A coalition of farmers, fishermen, water suppliers, researchers, and conservationists—in coordination with the U.S. Fish and Wildlife Service and the Center for Watershed Sciences at the University of California, Davis.

