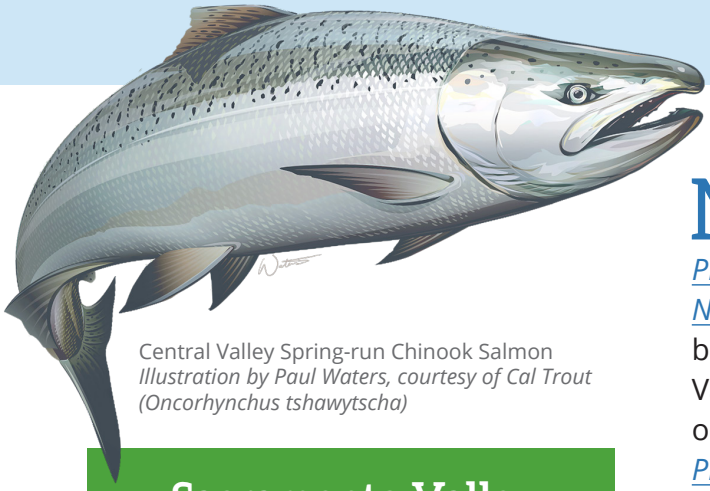
# Sacramento Valley Salmon Recovery Program

**Local water management entities, conservation organizations and state and federal fisheries and water management agencies in 2014 joined together to form the Sacramento Valley Salmon Recovery Program, a collaborative partnership to complete projects and improve science to promote recovery of salmon and other species of fish in the region. These actions are implementing both the National Marine Fisheries Service's Recovery Plan for the Sacramento River and the California Natural Resources Agency's Sacramento Valley Salmon Resiliency Strategy.**



Central Valley Spring-run Chinook Salmon
*Illustration by Paul Waters, courtesy of Cal Trout*
*(Oncorhynchus tshawytscha)*

## Sacramento Valley Chinook Salmon

The Sacramento Valley is home for four runs of Chinook salmon: spring-run, fall-run, late-fall run and winter-run. The spring-run and winter-run Chinook salmon as well as steelhead and green sturgeon are listed as either threatened or endangered by state or federal agencies. All of these fish are anadromous, which means that they move from salt water to fresh water to spawn.

Many of these activities were initially presented by Dave Vogel in his 2011 report, *Insights in to the Problems, Progress and Potential Solutions for Sacramento River Basin Native Anadromous Fish Restoration*, which outlined the biological priorities for salmon recovery in the Sacramento Valley. Further science from UC Davis and conservation organizations also guide the priorities (see e.g., *Floodplains: Processes and Management for Ecosystem Services*).

Building on these reports, the Sacramento Valley Salmon Recovery Program partners have identified almost 50 priority projects to promote salmon recovery in the region. The partners meet regularly to evaluate the priorities and progress towards their completion.

The Sacramento Valley Salmon Recovery Program is a comprehensive effort, addressing all salmon life-cycle stages that occur in fresh water by implementing projects and flows that serve multiple benefits. This program is designed as a proactive and extensive effort, in line with Section 4 of the Endangered Species Act (ESA), to promote recovery of Chinook salmon through the completion of projects to address stressors they are exposed to during the freshwater stages of their life cycle.

# Sacramento River Basin

More than 140 projects have been completed in the Sacramento Valley to benefit salmon since 2000. The Recovery Program is building on these efforts by targeting specific river reaches in the Sacramento River Basin to ensure that projects provide maximum benefit to the life-cycle stage intended.

## Upper River

In the upper reaches of the Sacramento River and its tributaries, returning adult salmon "hold" while they wait to spawn. Once spawning occurs, egg incubation begins followed by fry and juvenile fish rearing. Projects implemented to benefit fish in the upper river include adding spawning gravel, beds and riffles, developing side channels, refugia projects and other safe habitat for fry and juvenile fish. Water resource managers carefully manage the associated flows and cold water to maximize the habitat value of the projects.

## Middle River

This portion of the river serves as a migratory corridor for Chinook salmon to and from the spawning grounds in the upper river. In the middle river, projects are implemented to promote survivability of out-migrating juveniles by preventing entrainment in water diversions by installing fish screens and decreasing the impact of predation through the identification and removal of predator "hot spots." For returning adult Chinook salmon, projects and pulse flows are targeted to reduce straying from the main channel and to remove barriers that block or delay upstream migration to the spawning grounds.

### Butte Creek

Work in the 1990s to improve habitat for spring-run Chinook salmon on Butte Creek provides a good model for salmon recovery in the Sacramento Valley. The comprehensive effort on Butte Creek joined upstream functional flows for spawning and holding habitat with barrier removal in the middle river that improved connectivity with the Sutter Bypass floodplain in the lower river, which provided food and ideal rearing habitat for out-migrating juvenile fish.

## Lower River

At one time, the lower reaches of the river would spread out during the winter and early spring on a vast floodplain, providing food and ideal shallow water habitat at just the right time for out-migrating juvenile salmon. The construction of flood control infrastructure in the last century disconnected the rivers from the floodplain, restricting fish in a leveed river channel devoid of adequate food and refuge from predators. Today, projects implemented on this portion of the river encourage fish to migrate on the remaining floodplain (i.e., the bypasses), use the historic floodplain (now rice fields and managed wetlands) to feed fish, and manage flows to promote food production and out-migration survival. The value of these floodplains to salmon is described in great detail in the University of California's *Floodplains: Processes and Management for Ecosystem Services*.

For more information on the Sacramento Valley Salmon Recovery Program, Chinook salmon and other recovery efforts, visit: **www.norcalwater.org/salmon**.

# Sacramento Valley Salmon Recovery Program
# Recently Completed 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. Below are a list of the priority projects that have been completed in the last four years.

## Painter's Riffle Anadromous Fish Habitat Enhancement Project

Reopened Painter's Riffle, a historic Sacramento River salmonid spawning side channel in Redding by moving more than 8,000 cubic yards of gravel. **Glenn-Colusa Irrigation District** (Project completed in 2014)

## Knights Landing Outfall Gates (KLOG)

Installed a positive fish barrier on the downstream side of the existing Knights Landing Outfall Gates to eliminate adult salmon straying off of the Sacramento River. **Reclamation District 108** (Project Completed in 2015)

## Market Street Bridge Spawning Riffle

Placed approximately 9,400 cubic yards of salmon spawning gravel in the Sacramento River immediately below the Market Street Bridge in Redding. **Glenn-Colusa Irrigation District** (Project completed in 2015)

## North Bank Fish Ladder Salmon Brood Stock Fish Trap

Constructed a new fish trapping facility in the north fish ladder of the Anderson-Cottonwood Irrigation District's Diversion Dam to collect broodstock for the winter-run Chinook Conservation Hatchery at the Livingston Stone National Fish Hatchery. **Anderson-Cottonwood Irrigation District** (Project completed in 2015)

## Lateral 21 Outfall Fish Barrier

Installed a fish barrier structure at the outfall to Anderson Creek to address fish entrainment in Anderson-Cottonwood Irrigation District's Lateral 21. **Anderson-Cottonwood Irrigation District** (Project completed in 2015)

## Pritchard Lake Pumping Plant Fish Screen Project

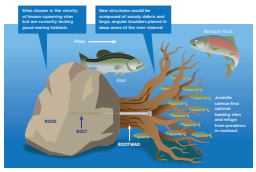
Replaced a Sacramento River diversion upstream from Sacramento with a new pumping plant and fish screen to protect juvenile salmon from entrainment. **Natomas Mutual Water Company** (Project completed in 2015)

## Reclamation District 2035/ Woodland-Davis Clean Water Agency Fish Screen Project

A combined diversion and fish screen project on the Sacramento River upstream from Sacramento to protect juvenile salmon from entrainment. **Reclamation District 2035/Woodland-Davis Clean Water Agency** (Project completed in 2016)

## Cypress Avenue Bridge North

Side Channel Habitat Restoration and Enhancement Project – Restored a side-channel to create salmon rearing habitat along 1/3 mile stretch of the Sacramento River upstream of the east end of the Cypress Avenue Bridge in Redding. **Glenn-Colusa Irrigation District/ Sacramento River Forum** (Project completed in 2016)



## Upper Sacramento River Salmon Rearing Habitat Project

Installed 25 juvenile salmon shelter structures, consisting of tree trunks and root wads bolted to limestone boulders installed in the Sacramento River near Redding. **River Garden Farms** (Completed in 2017)

## COMPLETED PRIORITY PROJECTS (continued)

### Lake California Side Channel Reconnection Project

Removed accumulated gravel at the inlet and reconnect and existing side channel to the Sacramento River during the low flows of late fall and early winter between river mile 269 and 270 to create rearing habitat for juvenile salmon. **Reclamation District 108/Sacramento River Forum** (Project completed in 2017)

### Wallace Weir Fish Rescue Facility Project

Constructed a permanent weir with a positive fish barrier and fish collection facility in the Yolo Bypass to prevent adult salmon from straying into the Colusa Basin Drain and to facilitate relocation of adult salmon that have strayed into the Yolo Bypass. **Reclamation District 108** (Project completed in 2018)

### New Juvenile Salmon Conservation Project

Constructed piles of woody debris, anchored via sandbags filled with river rock and natural materials to provide habitat to help sustain the dwindling populations of endangered Winter Run Chinook Salmon. **Trout Unlimited Shasta Trinity Cascades Chapter** (Project completed in 2018)

### Kapusta 1a Side Channel Project

Opened up a side channel at river mile 288 just upstream from the City of Anderson to provide rearing habitat for juvenile salmon. **Western Shasta Resource Conservation District/Sacramento River Forum** (Project completed in 2018)

### Fremont Weir Adult Fish Passage Modification Project

The existing fish ladder at Fremont Weir was widened and deepened and upstream and downstream adjoining channels were reconfigured to enhance flow through the structure and migratory fish passage. In addition, one agricultural road crossings along the Tule Canal that delayed migration was replaced, and another removed. **California Department of Water Resources** (Project completed in 2018)

### Market Street Bridge Spawning Gravel

An additional 9,400 cubic yards of salmon spawning gravel was placed into the Sacramento River under Market Street Bridge in Redding. **Reclamation District 108, Glenn-Colusa Irrigation District, Sutter Mutual Water Company, River Garden Farms, Provident Irrigation District, Princeton-Cordora-Glenn Irrigation District, Anderson-Cottonwood Irrigation District, Sacramento River Forum, CSU Chico Foundation** (Project completed in 2019)

## Flow Management

Reduce the potential for Chinook salmon redd dewatering in the Sacramento River below Keswick Dam by modifying the demand patterns of fall diversions within participating Sacramento River Settlement Contractor service areas without increasing the total volume of water diverted or affecting downstream conditions. **Settlement Contractors** (Ongoing)

Time spring diversions on the Sacramento River to match releases from Shasta based upon real-time data on hydrology and timing of fish movements to help manage cold water pool. **Settlement Contractors** (Ongoing)

Managing releases and diversions for pulse flows from Keswick Dam in the spring to enhance the outmigration success of juvenile Chinook salmon from the upper Sacramento to the Delta, while avoiding impacts to other beneficial purposes. **Settlement Contractors** (Ongoing)

Managing for short-duration pulse flows, linked with the release of fall-run Chinook salmon from Coleman National Fish Hatchery to ensure maximum benefit in stimulating the outmigration of both naturally-produced and hatchery fish. **Settlement Contractors** (Ongoing)

A spring pulse flow coordinated with fisheries agencies on the Feather River through releases from the Oroville Complex to assist in the outmigration of hatchery spring-run Chinook salmon. **California Department of Water Resources** (Performed in 2018)

# Stories You Haven't Seen

## Sacramento Valley Salmon Recovery Program

The Sacramento Valley Salmon Recovery Program (Recovery Program) is a comprehensive effort to address all salmon life-cycle stages that occur in fresh water by implementing projects and flows that serve multiple benefits throughout the region. The links to videos below help visualize the various projects that have been completed in the Sacramento Valley to advance salmon recovery in the region.

More than 140 projects have been completed in the Sacramento Valley to benefit salmon since 2000. The Recovery Program continues to build on these efforts by targeting specific river reaches in the Sacramento River Basin to ensure that projects provide maximum benefit to the different life-cycle stages.

## Butte Creek

Work in the 1990s to improve habitat for spring-run Chinook salmon on Butte Creek provides a good model for salmon recovery in the Sacramento Valley. The comprehensive effort on Butte Creek joined upstream functional flows for spawning and holding habitat with barrier removal in the middle river that improved connectivity with the Sutter Bypass floodplain in the lower river, which provided food and ideal rearing habitat for out-migrating juvenile fish.

## Upper River

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- Salmon Spawning Gravel Project
- Saving the Salmon: Shelter Project
- Salmon Shelters: Root Wads
- Market Street Side Channel Project Overview
- Market Street Side Channel Partnerships
- Market Street Side Channel Construction
- American River Salmonid Habitat Restoration Project Construction
- American River Salmonid Habitat Restoration at Sacramento Bar

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- Bullock Bend Oxbow Reconnection
- RD 2035/WDCWA Fish Screen Construction

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- The New Way Forward: Wetlands
- Saving the Salmon: Growing Fish Food on Farm Fields
- Salmon Raised in Rice Fields
- Fremont Weir Fish Passage Project Groundbreaking Ceremony
- Wallace Weir Project Will Save Salmon
- Wallace Weir Construction Event
- Knights Landing Outfall Gates (KLOG) Salmon Protection Project
- Nigiri Project: Salmon in Rice Fields

For more information on the Sacramento Valley Salmon Recovery Program, Chinook salmon and other recovery efforts, visit:

**www.norcalwater.org/salmon**

To easily access these videos, this document is available at:

**www.norcalwater.org/svsrp-storiesyouhaventseen/**