

A collaborative effort underway in the Sacramento Valley engaging a diverse group of entities to promote salmon recovery in an innovative and comprehensive manner.

About

Over the past two years, fourteen Sacramento Valley Salmon Recovery Program (SVSRP) projects have been completed to promote fish passage and increase habitat for Chinook salmon and other fish species. The SVSRP is a collaborative effort of water management entities, conservation organizations and state and federal fishery and water management agencies to promote salmonid recovery in the Sacramento Valley through the identification, prioritization and completion of habitat improvement projects. These projects will help implement the National Marine Fisheries Service's Recovery Plan for the Sacramento Valley and Governor Brown's California Water Action Plan, and thus provide a comprehensive framework to advance the next generation of salmon projects.

Addressing All Stages of the Salmon Lifecycle

Importantly, the SVSRP includes projects that provide benefits to Chinook salmon during all stages of their life cycle occurring in the Sacramento Valley, including upstream and downstream migration, spawning and rearing.

Unique Approach and Partnerships

Another unique aspect of the SVSRP is the role that the various partners in the program play in "adopting" projects, becoming the champion for the project, and leading efforts to get the project implemented. Many of the project champions are adopting projects that are not located within their service area, with some projects sited many miles outside of the water management entity's boundaries.

Flow Agreements

The major rivers and streams of the Sacramento Valley provide essential pathways for spawning salmon and steelhead. Flow agreements to benefit these fish are on every major watercourse in the Sacramento Valley. For more information, visit <http://www.norcalwater.org/efficient-water-management/instream-flows/>

Food for Fish

Also as part of the Sacramento Valley Salmon Recovery Program various partners are exploring creative ways to spread water across the bypasses and other agricultural lands for both 1) fish propagation (i.e., Nigiri project) and 2) fish food production in the traditional floodplain.

Sacramento Valley Salmon Recovery Program

1 3 Flow Management

In addition to fish passage improvements, fish screens, and habitat improvements, improving flow timing is another priority that has been identified to improve salmon recovery in the region. Ongoing flow management efforts implemented over the last two years include:

- Reduce redd stranding through water project reoperations (Settlement Contractors)
- Time spring diversion on the Sacramento River to match releases from Shasta to help manage cold water pool (Settlement Contractors)
- Short-duration pulse flows for wild fish (timed with and without accretion events) (Settlement Contractors)
- Short-duration pulse flows, linked with release of hatchery fish

2 Salmon Rearing Habitat Project (2017)

Project Champion: River Garden Farms

River Garden Farms of Knights Landing created a first-of-its-kind restoration project when it installed 25 salmon shelter structures in the river near Redding – new habitats for salmon that are made of large tree trunks and root wads bolted to 12,000-pound limestone boulders. The structures are intended to help baby salmon hide out and give them refuge against large predators, while enticing them to stay in colder waters longer, increasing their odds of healthy maturation for their journey to the Pacific Ocean.

River Garden Farms was the champion of the project, which cost more than \$600,000, with funding also coming from the U.S. Bureau of Reclamation. Additional partners vital to the shelters project include Northern California Water Association, National Marine Fisheries Service, and the Western Shasta Resource Conservation District.



5 Knights Landing Outfall Gates (KLOG) (2015)

Project Champion: Reclamation District 108

The purpose of the Knights Landing Outfall Gates (KLOG) project was to eliminate adult salmon passage using a physical barrier. Prior to the project, adult salmon were able to enter the Colusa Basin Drain (CBD) through the KLOG when certain flow velocities were met that attract migrating salmon. Once salmon entered the CBD, there was no upstream route for salmon to return to the Sacramento River and, absent fish rescue operations, the fish perished and were lost from production.

The KLOG project constructed a positive fish barrier (with new concrete wing walls and installation of a metal picket weir) on the downstream side of the existing KLOG in the CBD, as well as place a small amount of riprap on the right bank of the CBD immediately downstream of the KLOG. The project served primarily as a fish passage improvement action to prevent salmon entry into the CBD while also maintaining outflows and appropriate water surface elevations. A secondary purpose of the project addressed an existing erosion site on the right bank of the CBD channel immediately downstream of the KLOG structure to enhance stability.



5 Wallace Weir Fish Rescue Facility Project (2017)

Project Champion: Reclamation District 108



Reclamation District No. 108 began construction on the Wallace Weir Fish Rescue Facility Project in August 2016. The \$13.3M project involves constructing a permanent weir with a positive fish barrier and fish collection facility. The fish collection facility would be adjacent to the fish barrier and work in tandem with the barrier.

The proposed project will also involve removal of the existing Wallace Weir, which is a seasonally constructed, earthen berm that crosses the Knight Landing Ridge Cut.

Construction of the permanent barrier will provide a near-term, permanent fix to block federally and state-listed anadromous fish entry into the Colusa Basin Drain through the Knights Landing Ridge Cut. The project will also facilitate fish relocation while maintaining outflows and improve the efficiency and safety of fish rescue operations under broader flow conditions.

1 Painter's Riffle Anadromous Fish Habitat Enhancement Project (2014)

Project Champion: Glenn-Colusa Irrigation District

As part of ongoing efforts to protect fisheries, a unique partnership developed and designed the Painter's Riffle Anadromous Fish Habitat Enhancement Project to enhance salmon habitat that was obstructed by a major storm. The restoration project was designed to reopen Painter's Riffle, a historic salmonid spawning side channel on the Upper Sacramento River, downstream of the Highway 44/299 Bridge.



Agencies involved in the project included Glenn-Colusa Irrigation District (GCID), Bureau of Reclamation, U.S. Fish and Wildlife Service, Golden Gate Salmon Association, Northern California Water Association, and the California Department of Fish and Wildlife (CDFW), who worked together to develop and design the Painter's Riffle restoration project. With Reclamation staff's technical assistance and support from the Central Valley Project Improvement Act (CVPIA), GCID used its own staff and assets to obtain final permits and construct the proposed project.

GCID staff spent over 500 hours preparing and moving approximately 8,000 cubic yards of gravel to reestablish the spawning habitat in the side channel. The fishery biologists involved with the project were very pleased with the results, and with the extremely dry conditions in 2015, the habitat was heavily utilized by the fishery for spawning.

1 Creation of a Spawning Riffle near Market Street Bridge (2015)

Project Champion: Glenn-Colusa Irrigation District



In partnership with local, state and federal agencies, Glenn-Colusa Irrigation District (GCID) constructed the Market Street Bridge gravel project in Redding to restore salmon spawning habitat.

The project, carried out over several weeks, placed salmonid spawning gravel in the Sacramento River, immediately below the Anderson Cottonwood Irrigation District Diversion Dam and Market Street Bridge in Redding. Approximately 9,400 cubic yards of gravel were placed into the river to help improve spawning habitat for Chinook salmon and steelhead trout.

The project was a partnership of the Bureau of Reclamation, Western Shasta Resource Conservation District, California Department of Water Resources, California Department of Fish and Wildlife, Glenn-Colusa Irrigation District and Anderson Cottonwood Irrigation District. GCID contributed the equipment operators and some of the equipment for the project.

1 Cypress Avenue Bridge North - Side Channel Habitat Restoration & Enhancement Project (2016)

Project Champion: Glenn-Colusa Irrigation District



The Cypress Avenue Bridge North - Side Channel Habitat Restoration and Enhancement Project created salmonid rearing habitat by opening side channels on the Sacramento River that were closed off and had no water flowing through, which made the area uninhabitable for young salmon. The project excavated material from an existing side channel complex to provide juvenile rearing habitat for Chinook salmon and Steelhead trout at all flow levels. Before the project, the area was disconnected from the river at lower flows and stranded juvenile fish when river flows dropped. The side channels run along a 1/3 mile stretch of the river upstream of the east end of the Cypress Avenue Bridge.

Glenn-Colusa Irrigation District worked in partnership with The Bureau of Reclamation, Western Shasta Resource Conservation District, California Department of Water Resources, and California Department of Fish and Wildlife.

5 North Bank Fish Ladder Salmon Brood Stock Fish Trap (2015)

Project Champion: Anderson-Cottonwood Irrigation District

In cooperation with the U.S. Fish and Wildlife Service and the California Department of Fish and Wildlife, the Anderson-Cottonwood Irrigation District (ACID) supported the development of a new fish trapping facility in the north fish ladder of the ACID Diversion Dam. The fish trapping facility offers unique capabilities that substantially benefit the management of endangered winter Chinook salmon in the upper Sacramento River. Notably, the facility serves as one of only two established trapping locations that is used to collect broodstock for the winter Chinook Conservation Hatchery at the Livingston Stone National Fish Hatchery.

5 Fish Barrier at Lateral 21 Outfall (2015)

Project Champion: Anderson-Cottonwood Irrigation District

Anderson-Cottonwood Irrigation District (ACID) coordinated with California Department of Fish and Wildlife to address fish entrapment in ACID's Lateral 21, which was resolved by installation of a fish barrier structure at the outfall to Anderson Creek.

3 Pritchard Lake Pumping Plant Fish Screen Project (2015)

Project Champion: Natomas Mutual Water Company

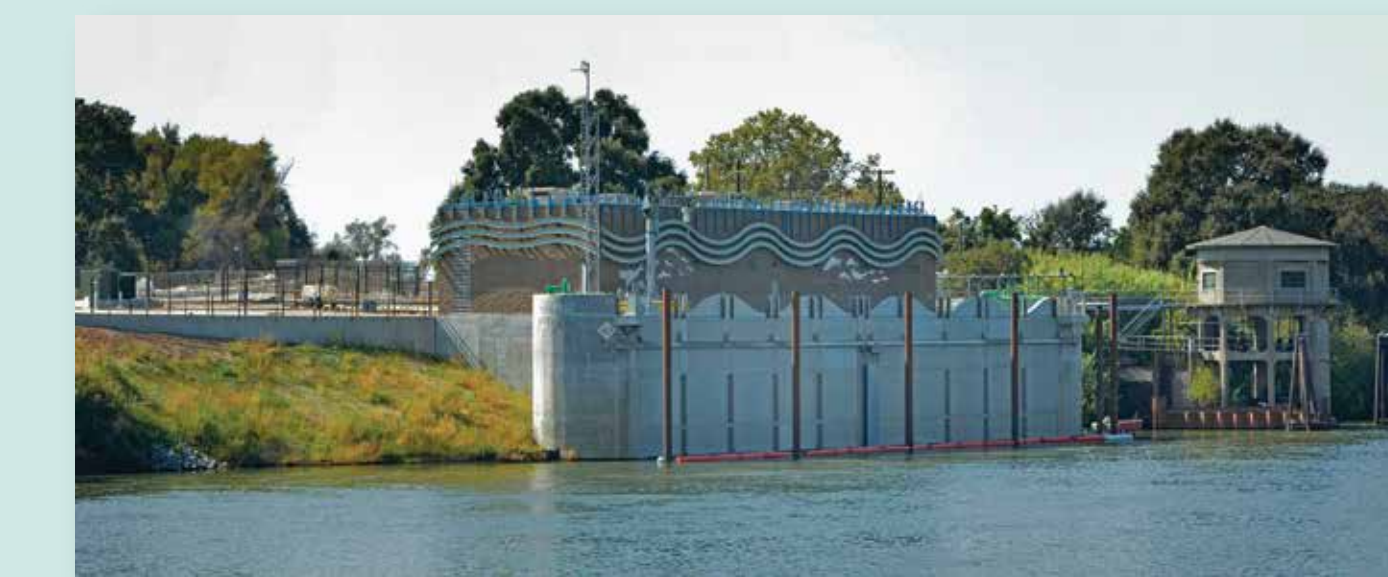
The Natomas Mutual Water Company (Natomas) completed the Pritchard Lake Pumping Plant Replacement as part of the company's American Basin Fish Screen and Habitat Improvement Project. A fish screen is designed to allow the diversion of water while protecting salmon and other fish as they migrate in the river. Water diverted by Natomas serves the farmland north of Sacramento, as well as the Natomas Basin Conservancy, which provides important wetlands habitat for birds, giant garter snakes and other animals.

This was the second of four diversions that Natomas plans to screen as part of the American Basin Fish Screen and Habitat Improvement Project on the Sacramento River. The Pritchard Lake Pumping Plant Replacement project installed two new pumps with a combined capacity of 150 cubic-feet per second (cfs) and 620 square feet of operable stainless steel screens. This project joined the Sankey Fish Screen Project, a 434 cfs diversion located at the northern end of the district, which was completed in 2013.

The efforts to screen high priority diversions is a foundational element of the Sacramento River Salmon Recovery Program.

3 Fish Screen Project (2016)

Project Champion: Reclamation District 2035 / Woodland-Davis Clean Water Agency



Reclamation District 2035 (RD 2035) and Woodland-Davis Clean Water Agency (WDCWA) partnered to complete a combined diversion and fish screen facility. This project screened the largest remaining unscreened diversion on the Sacramento River. With its completion, over 90 percent of the water diverted off of the Sacramento River travels through state-of-the-art fish screens.

The RD 2035/WDCWA Joint Fish Screen/Intake Project is a combined 400 cubic-feet per-second diversion on the Sacramento River, replacing a pumping facility that is nearly 90 years old. This new facility allows RD 2035 to continue diverting

water while allocating a portion of their historic diversion to the cities of Davis and Woodland, augmenting their current groundwater supplies and improving water quality for the communities. The new facility will allow for year-round diversions for the communities as well as water supplies that provide habitat benefits to species of birds using the Pacific Flyway, all while ensuring that salmon are able to migrate up and down the Sacramento River safely past this diversion.

To learn more visit: <http://www.norcalwater.org>

Salmon Life Cycle

1 Spawning & Egg Incubation
Upper Rivers

2 Fry & Juvenile Rearing
Upper Rivers

3 Fry & Juvenile Rearing/Outmigration
Lower Rivers & Bay/Delta

4 Ocean Rearing

5 Adult Upstream Migration

6 Adult Holding

Stressors

