

A Holistic Approach to Healthy Rivers and Landscapes



- Upper River
- Middle River
- Lower River

Source Water Protection

Spawning Gravels and Refugia

Modernizing Hatcheries

Temperature Management

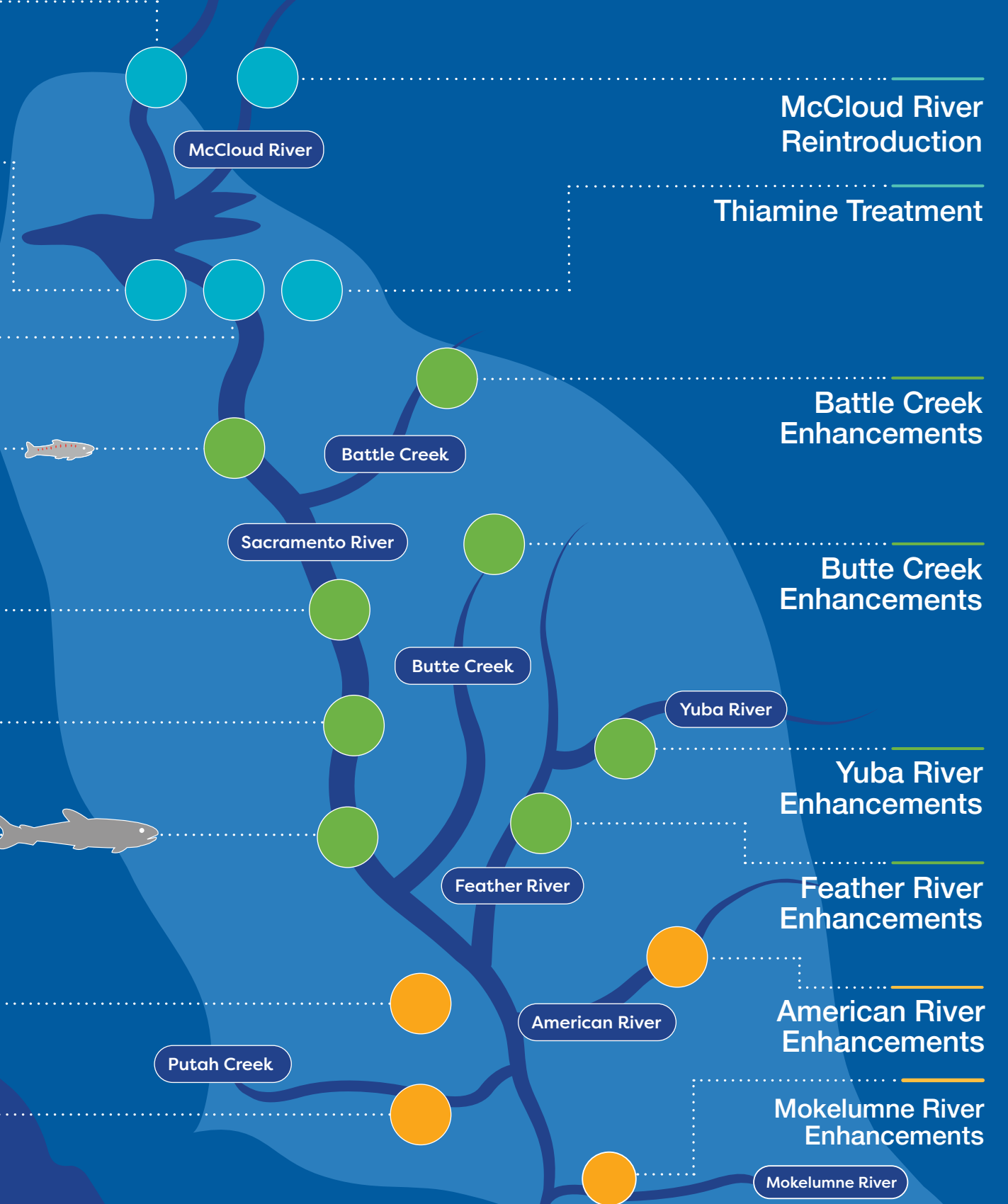
Pulse Flows

Fish Rest Stops

Fish Passage

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Putah Creek Enhancements



A Holistic Approach for Healthy Rivers and Landscapes in the Sacramento River Basin

For Discussion, July 2023

The leaders living and working in the Sacramento River Basin are embarking on a once-in-a-generation opportunity to advance a holistic and comprehensive approach for fisheries by aligning the current leadership, science, available funding, and a devotion to “give salmon a chance” by improving freshwater conditions for salmon throughout the Sacramento River Basin.

The following offers a macro-view of the Sacramento River Basin, showing the holistic approach that is underway--from ridgetop to river mouth--to improve freshwater conditions for each life-stage of all four-runs of Chinook salmon. This approach and the actions throughout the region are designed to restore ecosystem function of the landscapes and riverscapes, while concurrently helping secure water supplies for communities, farms, other fish and wildlife, recreation, and hydropower. We recognize that a healthy river ecosystem depends upon on a sufficient volume of water interacting with a healthy landscape in a way that approximates the habitat patterns to which the native flora and fauna are adapted. Our approach includes a portfolio of actions in every river reach designed to reactivate the landscape-scale patterns of biophysical habitat conditions that robust, resilient populations of salmon (and other fish, bird, and wildlife populations) depend upon.



Source: Northern California Water Association

July 26, 2023

[Key Action Areas for Fish Management and Recovery](#)

McCloud River Reintroduction. The *Winnemem Wintu Tribe*, *California Department of Fish and Wildlife*, and *NOAA Fisheries* recently signed agreements to restore Chinook salmon to their original spawning areas in cold mountain rivers north of Redding now blocked by Shasta Reservoir. More details [here](#).

Temperature Management at Lake Shasta. The *Bureau of Reclamation* is performing maintenance and repairs, as well as a plan for more significant performance improvements, to the Shasta Temperature Control Device (TCD) that will help cold water management for incubating salmon below Keswick, operating in conjunction with improved spawning habitat, rearing habitat, and thiamine treatment. See [Shasta Dam Temperature Control Device Performance Evaluation Report of Findings](#).

Spawning Gravels and Refugia. The *Sacramento River Settlement Contractors* (SRSCs) and others are working in the upper Sacramento River below Shasta Lake ([See Aiding Salmon](#)) to augment spawning gravels to the river and side channels, and they have placed rockwads and opened side-channels to provide safe-haven for young salmon fry. See more [here](#). The *fishery agencies* will assess the spawning habitat to determine how many salmon can successfully spawn within the existing habitat and to help guide future spawning habitat projects.

Thiamine Treatment. The *SRSCs*, working with the *fishery agencies*, are treating fish with thiamine to address the thiamine deficiency that has significantly impacted salmon over the past several years. To help with this treatment process, work has begun on the design for a fish trap at the Anderson-Cottonwood Irrigation District (ACID) diversion dam, with an investigation underway to determine the feasibility of a permanent facility.

Source Water Protection. *CalTrout* and other conservation organizations are advancing long-term strategies to protect the spring-fed source waters of the Sacramento River system, with their underground network of volcanic aquifers that are a key component of California's clean and cold-water supply. Source waters are the life-blood for the region and support multiple human uses, sustain refuge habitat for cold-water aquatic species, and provide ecological and economic resilience to drought and climate change.

Modernizing Hatcheries. The *U.S. Fish and Wildlife Service (USFWS)* is diversifying, modernizing, and expanding Livingston Stone and Coleman National Fish Hatcheries which serve as vital infrastructure for salmon spawning below the major dams and help produce fish for commercial and recreational fishing in California. This includes expanding hatchery practices to release fry as well as smolts, increase the frequency of releases, begin releasing fish earlier in the year and vary the location of releases with the goal of enhancing survival. To assist with this effort, *CDFW* is conducting an assessment of hatcheries.

Pulse Flows. The *Bureau of Reclamation*, *NOAA Fisheries*, and *USFWS* have implemented two pulse flow releases from Keswick Dam into the Sacramento River in 2023 to help improve survival rates for out-migrating juvenile spring-run Chinook salmon smolts through the Sacramento River in addition to the planned releases of more than 10 million fall-run and winter-run Chinook salmon from the Coleman National Fish Hatchery. Pulse flows are envisioned at strategic times in certain years to improve survival rates. See [SRSP](#).

Battle Creek. A *Battle Creek Salmon Recovery Working Group* has assembled the various parties working on the creek to prioritize the actions and projects, such as dam and barrier removal and floodplain restoration, needed to restore volitional access to cold, high elevation spawning salmon habitats for winter-run and spring-run Chinook Salmon. The cold abundant spring-fed water of the Battle Creek watershed represent one of the Central Valley's most important opportunities for Chinook salmon recovery See the [Battle Creek Project List](#).

Salmon Rest Stops. *River Partners and UC Davis Center for Watershed Sciences* are developing in-river habitat restoration projects that provide riparian sanctuaries and rest stops for fish. This includes restoring historic side-channels and connecting oxbows and other parts of the floodplain to allow flows to integrate with rearing habitat. See more [here](#).

Fish Passage. The *Bureau of Reclamation and USFWS* are supporting several *SRSCs* to complete the last major fish screens on the middle Sacramento River to ensure fish passage and to allow more flexible management of the Sacramento River during dry years, including facilities at [Meridian](#) and [Natomas](#). There is also a similar effort by *DWR* to work with *Sutter Extension Water District* to modify the Sunset Pumps and Diversion Dam on the Feather River to ensure fish passage.

Butte Creek. The *Butte-Sutter Bypass Coordinated Operations Group* is building upon the most successful suite of spring-run restoration actions in the Sacramento River Basin by advancing a series of projects to improve water quality, enhance spring-run habitat and reduce fish kills, including passage improvement projects at Weir 1, Giusti Weir, the Lahar Formation, a long-term program to address invasive aquatic weeds in the Sutter Bypass, and a program to voluntarily coordinate diversions to enhance fish passage. See [Butte Creek Program](#).

Feather River. *DWR* is working with the *Feather River water agencies* and the *State Water Contractors* to improve salmon below Oroville Dam, including efforts to advance the [FERC settlement](#) in an expedited manner.

Yuba River. *Yuba Water Agency* is working with state and federal agencies to advance an ambitious [restoration effort](#) that includes the following major actions:

- Construction of a new fishway resembling a natural river that salmon, steelhead, sturgeon, and lamprey can follow to get around the U.S. Army Corps of Engineers' Daguerre Point Dam to reach more than 10 miles of healthy spawning habitat in the lower Yuba River.
- Construction of a modernized water diversion at Daguerre Point Dam to supply irrigation water south of the lower Yuba River that will protect fish passing the intake.
- Initiation of a comprehensive reintroduction program to support recovery efforts of spring-run Chinook salmon with a goal of returning them to their original habitat in the North Yuba River above New Bullards Bar Reservoir as soon as 2025.

The restoration agreement builds on the success of past partnerships, including the Lower Yuba River Accord and the North Yuba Forest Partnership. In addition, Yuba Water Agency is partnering in several other collaborative aquatic restoration projects, including the multi-phase [Hallwood Side Channel and Floodplain Restoration Project](#).

American River. The *Water Forum* is undertaking a comprehensive effort to improve conditions in the headwaters with forest management, and below Folsom Lake for fall-run Chinook salmon and steelhead trout, including implementation of the [Water Forum Agreement](#), the [Modified Flow Management Standard](#), and [habitat management](#) along the lower river. Since 2008, Water Forum has leveraged funding from regional water suppliers and state and federal grants to [construct](#), maintain, and [monitor](#) effectiveness for over 35 acres of spawning habitat and miles of side channels to benefit the fishery. This work continues in 2023 with the [Upper River Bend - Phase 1 project](#) which will increase available habitat by an additional 11 acres. The Water Forum also focuses on multibenefit enhancements on [tributary creeks](#) and [educational](#) activities through partnerships along the lower river.

Putah Creek. The *Lower Putah Creek Coordinating Council* has been proactively coordinating the efforts on the creek for the restoration of native fishes, including fall-run Chinook salmon, since the ratification of the [Putah Creek Accord](#) in 2000, where there is an agreement and program where pulse flows are supplied to the lower creek during fall and spring to mimic a natural flow regime. See [here](#).

Floodplain Reactivation. The *Floodplains Forward Coalition* is advancing a comprehensive effort to reactivate the floodplain in a way that ensures public safety and mimics the historic floodplain in the Sacramento River Basin by spreading water out and slowing it down to provide food and safe-haven for fish and wildlife in the fall and winter. This includes:

- River Connections – Projects that reconnect rivers to their historical floodplains;
- In-River Function – Projects that enhance, restore, and create in-river function & habitat;
- Floodplain Flow Corridors – Projects that improve/ create flow conveyance infrastructure needed to reactivate floodplains and improve fish passage;
- Floodplain Reactivation & Fish Food – Projects that reactivate floodplains, provide fish rearing habitat, and/ or generate fish food;

These various projects are described in more detail in [Floodplain Forward, A Portfolio for Fish and Wildlife](#) and [Floodplains Reimagined](#).

A Framework for Harmony and Collaboration

Restoring ecosystem function and recovering the natural communities in the Sacramento River Basin will depend upon a continuation and expansion of broad partnerships among the region's human communities. To implement these actions, local, state, and federal agencies working with farmers, tribes, conservation partners and fishermen will all need to join together to collaboratively create new forms of governance that will call on their respective talents and abilities. All partners will need to cooperate to build synergy between the multitude of programs involved including the Long-Term Operations for the Central Valley Project (CVP) and State Water Project (SWP), Biological Opinions, Recovery Plans, Resilience Strategies, FERC licenses, and Agreements to Support Healthy Rivers and Landscapes. Together these partners will seek unprecedented state, federal, and philanthropic funding to support this ambitious landscape-scale approach to restoring a major ecosystem capable of recovering the abundance of its keystone species like Chinook salmon.

NOAA Fisheries has named the Sacramento River winter-run Chinook salmon as part of its 2021-2025 Species in the Spotlight initiative to provide immediate, targeted efforts to halt declines and stabilize populations, focus resources within and outside of NOAA, guide agency actions and investments, expand partnerships and increase public awareness and support for these species. The California Natural Resources Agency has its Sacramento Valley Salmon Resiliency Strategy identifying specific habitat restoration actions to improve the viability and resiliency of Chinook salmon and steelhead. These programs will serve as the catalyst for these actions and will build upon the efforts and experiences learned from more than [200 projects](#) that have been completed for the benefit of salmon in the Sacramento River Basin. The goal is to “give salmon a chance” by focusing on efforts to make sure that salmon can survive and ultimately thrive in every part of the freshwater ecosystem.

The leaders in the Sacramento River Basin are committed to support ecosystem function and provide riverscape and landscape-scale habitat benefits for fish, bird, and wildlife populations, while preserving, sustaining, and promoting working agricultural landscapes across the Sacramento River Basin with a collective goal to promote harmony and bring our natural and working landscapes in this region to life through the careful interaction of water, sun, and land.

We would welcome input and ideas to improve freshwater conditions for each life-stage of all four-runs of Chinook salmon at info@norcalwater.org.

