


Building on Success

An Action Plan for Modern Water Stewardship in the Sacramento River Watershed for the Next Decade

Water resources managers and fish and wildlife agencies continue to partner in the Sacramento River watershed to creatively manage and operate the water supply and flood protection system to serve [multiple beneficial purposes](#) along the river that include cities and rural communities, farms, functional ecology for fish and birds, hydropower, and recreation.



Managing available water supplies in all year types to ensure an appropriate balance of water in the reservoirs, rivers and creeks, across the landscape, and for communities.



Vitalize Rivers, Landscapes and Safe Drinking Water.



To adapt to an ever-changing climate, the Sacramento River and the surrounding landscape will be re-imagined over the next decade with significant investment and accelerated partnerships to advance watershed stewardship. We will expand a framework of collaboration to vitalize our rivers, landscapes, and communities in the Sacramento River watershed through functional ecology, working agricultural landscapes, and safe drinking water for our communities—with surface and groundwater management all working together to bring our region to life!

The leaders in the region have learned from the recent dry years about the need to be proactive, with a renewed focus to avoid the devastating effects (most vividly in 2022) we saw to every use of water on the west-side of the Sacramento Valley and the various communities dependent upon reliable water supplies. See details [here](#). The objective is to work within the various regulatory processes and thoughtfully manage the available water supplies in all year types to provide certainty and ensure an appropriate balance of water in the reservoirs, rivers and creeks, across the landscape and aquifers, and for communities (many of which are [disadvantaged](#)) in the Sacramento Valley.

Action Plan Summary

- **Improving the functional ecology** of the rivers and landscape in all years, including a holistic approach to salmon recovery and water supplies for fish and wildlife along the Pacific Flyway—with an emphasis on [floodplain reactivation](#).
- **Implementing a significant drought protection program** (up to 500,000 acre-feet (af) over 10 years) in specified critically dry years, as part of the Biological Opinions and Long-Term Operations (LTO) for the Central Valley Project (CVP), to help improve conditions for Chinook salmon.
- **Dedicating water** (100,000 af) during the middle hydrologic years (dry, below normal, above normal) to implement the Bay-Delta Plan as part of the Agreements to Support **Healthy Rivers and Landscapes**.
- **Replenishing groundwater** in times when surplus surface water is available to support **aquifer health** and ensure high quality groundwater is available when needed in the region, particularly during future drier years.
- **Coordination among the water suppliers** along the Sacramento River and the Bureau of Reclamation in all years to **efficiently use water**, including [coordination of diversions](#) and local water transfers for farms and refuges to maximize water use and ensure the beneficial application of water resources in the river and on the landscape.
- **Serving water** when available for **areas of the state** that need additional water supplies through creative water management and water transfers.
- **Advancing Sites Reservoir** as an integral part of the long-term operations for the Sacramento River to store water during high flow periods to ensure water is available in drier times when needed for multiple benefits throughout the state.

Importantly, these actions will all be advanced in tandem and pursued within the current regulatory framework for endangered species, water quality, water rights and groundwater management—with new approaches that call upon new and expanded partnerships for cooperation, coordination, major investments, and implementation—using the strengths of the respective local, federal, and state agencies working with conservation partners.

This coordination will benefit from improved regulatory alignment and new and modern approaches to these regulations. California’s water challenges remind us that we need to accelerate these actions and how much we can get done with collaboration and a commitment to additional flows, accelerated habitat restoration, landscape reactivation and mutual accountability.

Functional Ecology: A Holistic Approach for Fish and Wildlife in the Sacramento River Watershed

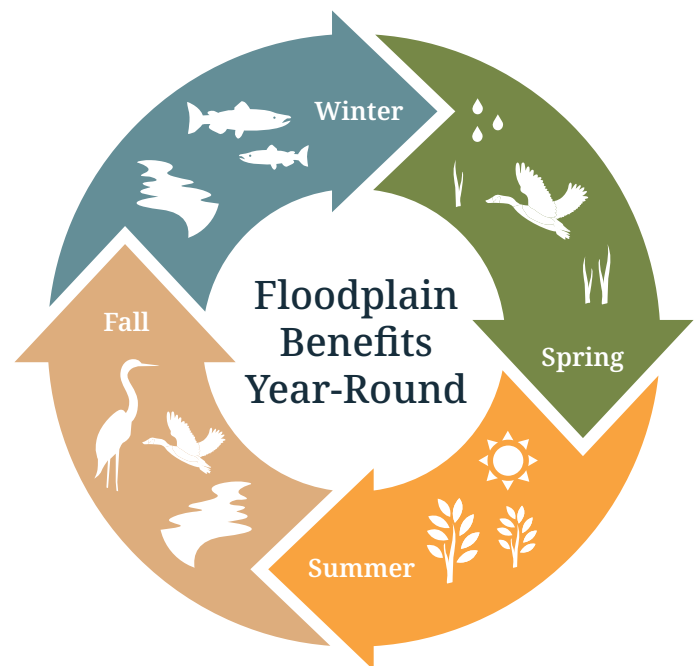
There is an ongoing and concerted effort in the Sacramento River watershed to improve functional ecology, with healthy rivers and creeks depending upon many factors for functional ecology, including a sufficient volume of water interacting with a healthy landscape at the right time and place to deliver the right quantity and quality of water for multiple benefits and approximate the habitat patterns to which the native flora and fauna are adapted. The holistic approach, as shown below, includes a portfolio of collaborative actions in river reaches and historic floodplains designed to provide flows with function—the sufficient water necessary to reactivate the landscape-scale patterns of biophysical habitat conditions that robust, resilient populations of salmon and other native fish, bird, and wildlife populations depend upon.

The holistic approach focuses on salmon (both winter-run and fall-run Chinook salmon) and the fish and wildlife along the Pacific Flyway, with a major emphasis on floodplain reactivation. Our goal is to provide salmon with both a riverscape and landscape they recognize and a better chance for survival. A collaboration of fisheries and water management agencies and conservation partners are working together from ridgetop to river mouth in every part of the Sacramento River Watershed to advance [A Holistic Approach for Healthy Rivers and Landscapes in the Sacramento River Basin](#) to ensure freshwater conditions are improved for each life-stage of all four runs of Chinook salmon.

Floodplains Reimagined

The [Floodplains Reimagined Program](#) is working in concert with a constellation of efforts underway in the Colusa, Butte, and Sutter basins to improve the floodplain functional connectivity to support salmon, birds, and agriculture. The objective is to improve floodplain function in every year type for multiple purposes through voluntary collaborative partnerships with private landowners, sovereign tribal entities, government, and non-government representatives. These efforts show great promise for functional ecology and improving fish and wildlife in the region, while working in harmony with cities, rural communities, and farms.

Supporting this effort is the [Floodplain Forward Coalition](#), a unique partnership of 27 organizations in farming, wildlife conservation, water management and local government all focused on enhancing floodplain reactivation for multiple benefits. The federal and state agencies in October 2024 signed an MOU to advance these efforts.



Sacramento River Winter-Run Chinook Salmon Action Plan (WRAP)

Source Water Protection

Spawning Gravels and Refugia

Modernizing Hatcheries

Temperature Management

Pulse Flows

Fish Passage

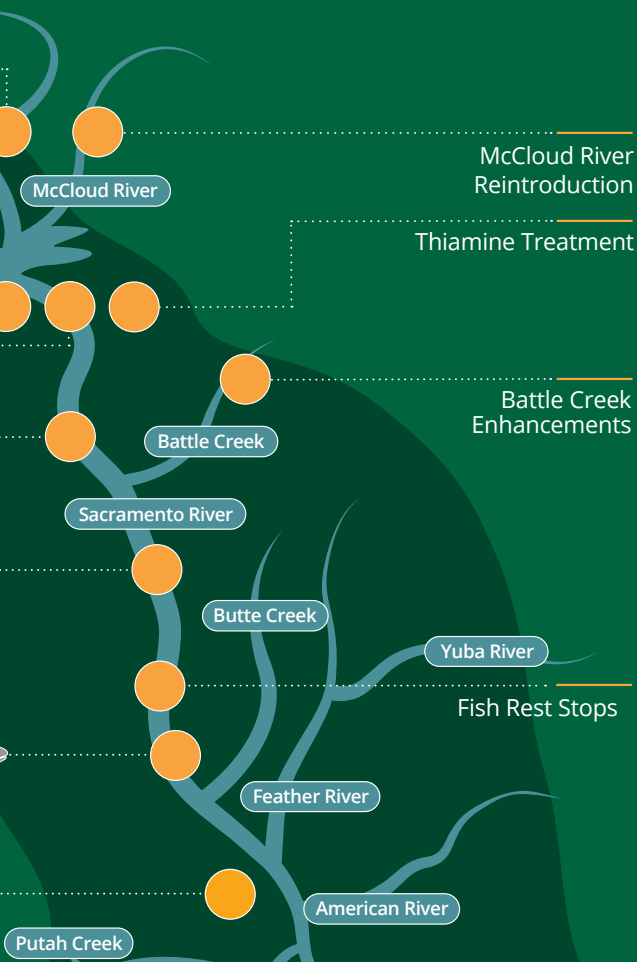
Floodplain Reactivation

McCloud River Reintroduction

Thiamine Treatment

Battle Creek Enhancements

Fish Rest Stops



Winter-Run Action Plan

Federal and state agencies (NMFS, USFWS, Reclamation, CDFW, and DWR) will join the Sacramento River water suppliers in a Memorandum of Agreement to advance the roles and responsibilities of these agencies for actions to improve the survival and viability of winter-run Chinook salmon (winter-run) under the Winter-run Action Plan (WRAP), including the operation of Shasta and Keswick dams and associated diversion of water for beneficial purposes in the Sacramento River watershed as part of the long-term operations of the CVP and State Water Project (SWP). The WRAP will improve every freshwater life-stage of winter-run and the agencies intend to coordinate efforts to improve conditions for winter-run viability through the implementation of the WRAP by executing a range of priority science, habitat/fishery, and infrastructure activities (e.g., Shasta Dam Temperature Control Device, floodplain management, hatcheries) that are expected to yield the most significant survival benefits for the species. For a summary of the WRAP, see [here](#).

Under the WRAP, the agencies will take actions to:

- improve the status and trend monitoring of winter-run and to conduct special studies to address areas of scientific uncertainty that impact recovery actions, water supply, flood control and power generation. (See Sections 3.16.1 of Reclamation’s November 2023 Biological Assessment for ROC-LTO.)
- comprehensively reduce stressors on the viability of winter-run Chinook salmon that may contribute to recovery and reduce impacts to other species, water supply, flood control and power generation. (Sections 3.16.1 of Reclamation’s November 2023 Biological Assessment for ROC-LTO.)



Understanding the WRAP

- Aims to improve every freshwater life-stage of winter-run Chinook salmon
- Agencies will coordinate efforts to execute science, habitat, and infrastructure activities that will yield the most significant survival benefits for salmon

Fall-Run Action Plan

Sacramento River water suppliers are working with commercial and sport fishermen and fisherwomen to advance an action plan to assist the fall-run of Chinook Salmon in the Sacramento River watershed.

Fish and Wildlife and the Pacific Flyway

There has been a concerted effort over the past several decades to improve the Pacific Flyway and the numerous birds and other fish and wildlife that depend on water on the landscape in the Sacramento Valley. Sacramento River water suppliers serve water for four National Wildlife Refuges, 250,000 acres of ricelands, and other managed wetlands. More than [225 species](#) depend upon this water on the landscape, including numerous migratory and shore-birds on the world-renowned Pacific Flyway, many of the state and federally listed species including the giant garter snake (GGS) and western pond turtle, and habitat such as oak woodlands. Landowners and conservationists in the Sacramento Valley, with the support of water suppliers, are continuing to work together to manage farms, ranches, refuges, and wetlands to promote healthy soils that benefit both regional agronomics and efforts for fish and wildlife.

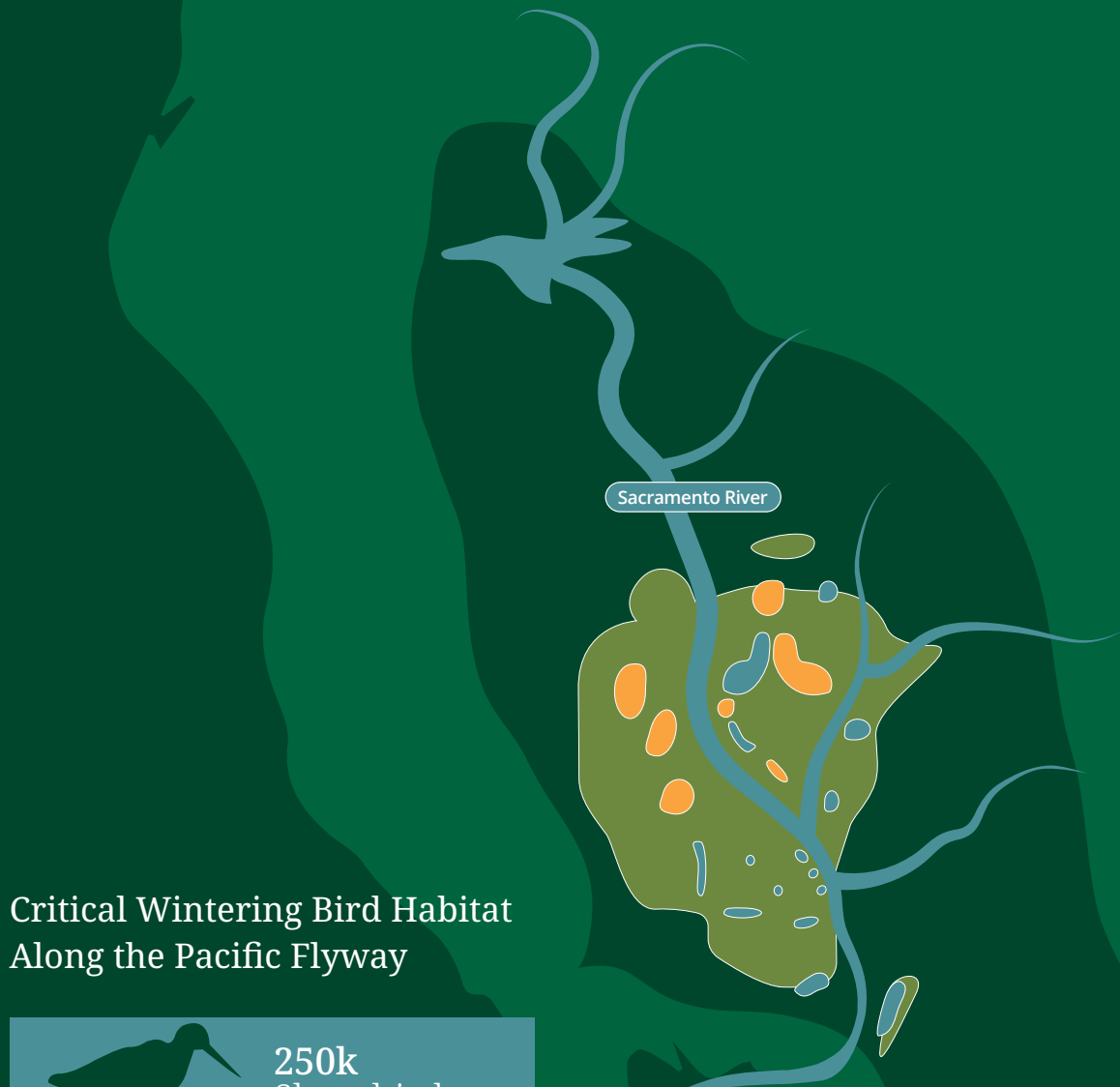


Sacramento River Water Suppliers

- Serve water for four National Wildlife Refuges, 250,000 acres of ricelands, and other managed wetlands.
- Spread water on the landscape to benefit 225 species who depend on wetland habitats.



A Holistic Approach to Healthy Rivers and Landscapes



Critical Wintering Bird Habitat Along the Pacific Flyway

 250k Shorebirds

 4 Million Waterfowl

Approximately one billion birds annually migrate through the Sacramento Valley

-  Ricelands
-  Private Wetland Areas
-  National and State Wildlife Refuges

Drought Protection in Critically Dry Years

In specified critically dry years, the Bureau of Reclamation and the Sacramento River Settlement Contractors (Settlement Contractors) will implement the Drought Protection Program by making water available to facilitate CVP operations on the Sacramento River to improve spawning, rearing, and migratory conditions for endangered winter-run Chinook Salmon, the delivery of water for farms and wildlife refuges in the Sacramento Valley, Delta outflow requirements, and other purposes of the CVP. (Long Term Operations Draft Environmental Impact Statement, Appendix E – Draft Alternatives, page E-80.) The Drought Protect Program is a temporary, 20-year program, where the parties commit to implement these actions while working on the holistic Winter-Run Action Plan (WRAP) to help recover salmon previously described.

Program Water

Program water will be made available to Reclamation by the Settlement Contractors reducing their contract supplies in certain drought years.

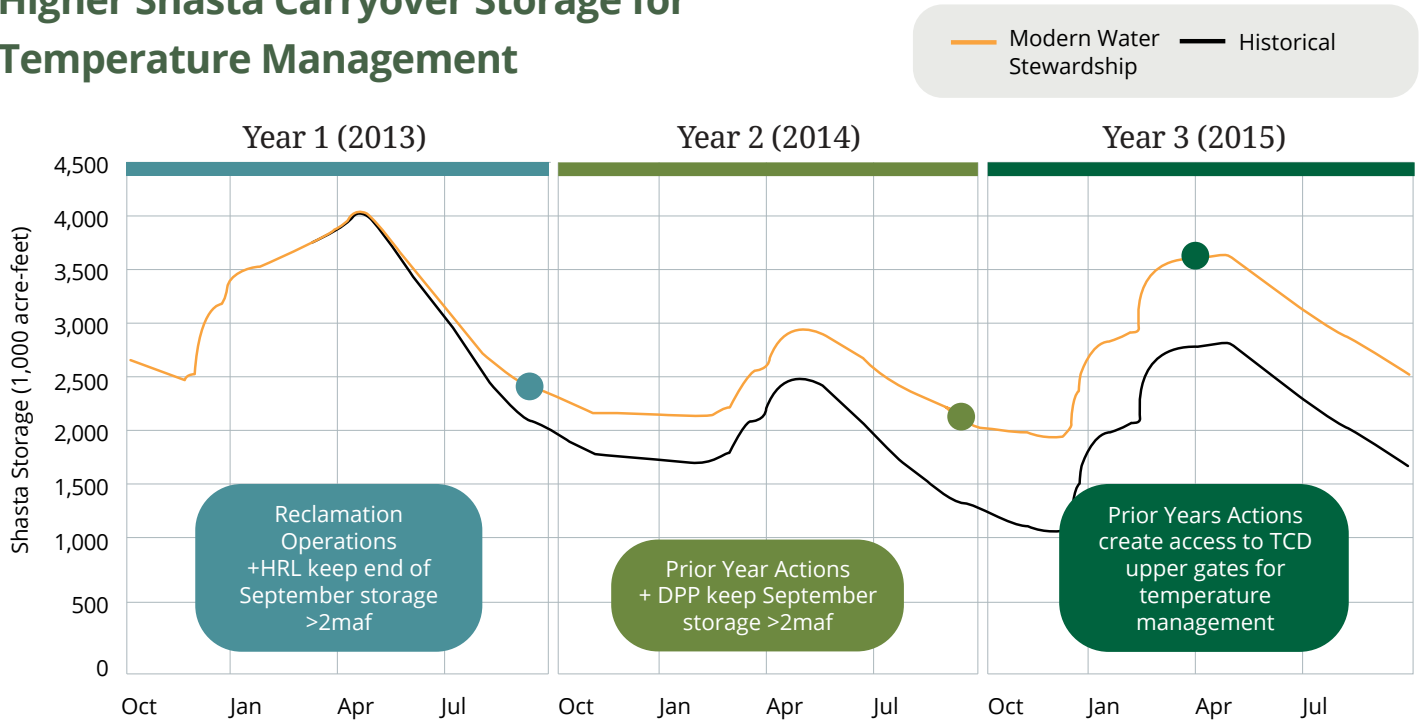
- Up to 500,000 af of water for the first ten years (Phase 1, February 2025 – February 2035) and 100,000 af for the next ten years (Phase 2, February 2035 – February 2045);
- Reclamation will use this water to help manage the Sacramento River under the Long-Term Operations (LTO) for the CVP, including retaining carryover storage in Shasta Lake for future dry years;
- Reclamation will make an initial investment to the Settlement Contractors from drought funding in the federal Inflation Reduction Act at the beginning of the program to mitigate for the undelivered water supply and to ensure that program water will be available during the specified critically dry years.
- The program water is in addition to the existing contract reductions under the Settlement Contracts for the specific year type and is deemed equivalent to a reasonable and beneficial use of water and does not reflect any change to the underlying water rights. As this program is implemented, the Settlement Contractors will receive at least 50% of total contract supply in program years.
- The Settlement Contractors will coordinate their diversions to ensure maximum efficiency during the program year.
- Program water is contingent upon completing the milestones in the WRAP.



Program Water Defined

As listed in this document, “Program Water” represents the total amount of water reduced from Settlement Contract totals when the water supply action is triggered, which is instead held in Shasta Lake.

Higher Shasta Carryover Storage for Temperature Management



Carryover Storage

During the temporary period of the Drought Protection Program, Reclamation intends to operate Shasta with higher carryover storage as a way to conserve water during extended drought years (see graph above). The carryover requirements are important to federal and state agencies and thus will be a temporary part of the overall program while the broader Winter-run Action Plan is advanced and we learn what is working best for salmon. The program will be continually evaluated to determine the best approach to carryover storage for temperature management and water supplies.

Process:

On March 15, Reclamation will provide an initial forecast based on a 90% exceedance to the Settlement Contractors to help define the water year type and whether the conditions support a program year, including the initial quantity of program water. This information will be updated by April 15 with Reclamation identifying the final amount of program water.

By July 15, Reclamation will provide a forecast (based on 90% exceedance) on the end of September Shasta Lake storage. If the forecast is greater than 2.0 million acre-feet, the program water that creates storage above 2.0 maf will be available to the Settlement Contractors for their use. If Shasta Lake forecasted end of September storage is less than 2.0 maf, Reclamation and the Settlement Contractors will meet and confer on operations for the remainder of the water year.

Implementing the Healthy Rivers and Landscapes Program

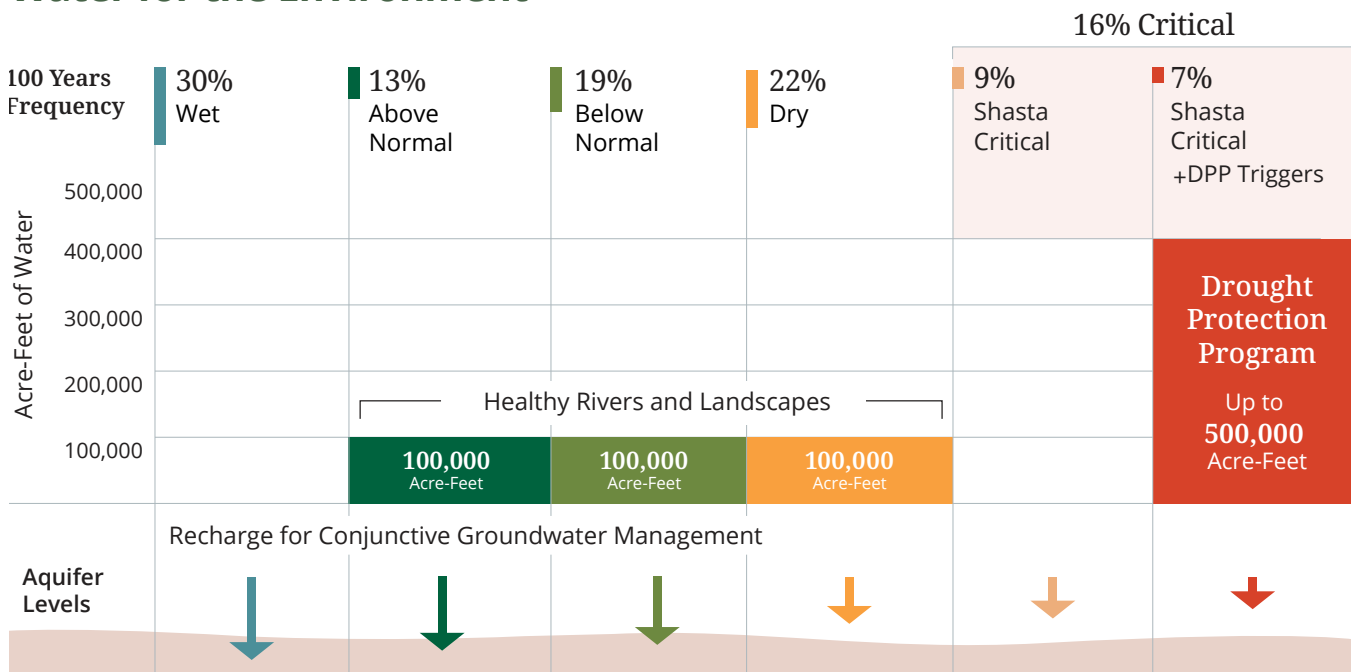
The Settlement Contractors and the water districts along the Tehama-Colusa Canal will contribute to the implementation of the Healthy Rivers and Landscapes Program.

Program Water and Habitat:

The Settlement Contractors, in coordination with Reclamation, will redirect water for instream flows and Delta outflow by making available 100,000 af of surface water during Above Normal, Below Normal, and Dry water year types during the term of the [Agreements to Support Healthy Rivers and Landscapes](#) (HRL). (Appendix 1 to the HRL MOU). The 100,000 af of surface water will be made available from within the service areas of the Settlement Contractors through land idling/shifting, with up to twenty percent made available by groundwater substitution in alignment with local Groundwater Sustainability Plans.

Reclamation and the State Water Board entered a Memorandum of Understanding (MOU) to ensure that Reclamation will operate Shasta Reservoir to facilitate the implementation of the HRL Agreements, including reservoir releases of surface water made available by the Settlement Contractors to meet Sacramento River instream flows and Delta outflow objectives.

Water for the Environment



Note: Existing Shasta Critical Year reductions from 100% to 75% supply are not shown here.



In addition to the instream flow contributions, the Settlement Contractors are committed to functional ecology and will continue to deliver water to four National Wildlife Refuges, ricelands, and other managed wetlands to support the Pacific Flyway and various birds and wildlife. As part of the HRL program, the Settlement Contractors, with assistance from the Tehama-Colusa Canal Authority, have also advanced numerous measures and projects to improve conditions for fish and wildlife, including spawning habitat in the upper river, fish passage improvements in the middle river, and floodplain reactivation in the lower system. A list of these actions is available [here](#). This is part of a holistic approach to salmon recovery to support the NMFS Recovery Plan for Chinook Salmon (see Winter-Run Action Plan above) and the California Salmon Strategy.

Upper River: Spawning Habitat



Middle River: Fish Screen



Lower River: Floodplain Activation



Process

On March 15 (preliminary) and April 15 (final) of each year, the Settlement Contractors will be provided a forecast by Reclamation, in coordination with the Department of Water Resources (“DWR”), based on a 90% (preliminary) and 50% (final) exceedance as to whether the year is forecasted to be an Above Normal, Below Normal, or Dry water year type. The April 15 forecast will constitute the final notice to Settlement Contractors as to whether surface water shall be made available pursuant to the Agreements to Support Healthy Rivers and Landscapes. The Settlement Contractors and the water districts along the Tehama-Colusa Canal will contribute funding to support the Agreements.

Active Aquifer Replenishment

With less surface water available during the dry periods this past decade, groundwater pumping increased on the west-side of the Sacramento Valley, placing new pressures on the aquifer systems. The Settlement Contractors, the water districts along the Tehama-Colusa Canal, and the local Groundwater Sustainability Agencies are working together to better understand and actively manage both surface and groundwater resources for long-term sustainability under the Sustainable Groundwater Management Act (SGMA). The Groundwater Sustainability Plans (GSPs) for this area focus on sustainable yield of the groundwater resources and conjunctively managing the surface and groundwater supplies, with an emphasis on using surface water when available and actively replenishing groundwater when surplus surface supplies are available. This includes using and improving infrastructure to deliver surface water to key areas when available and to provide water for more active recharge, both direct and in-lieu. See [Accelerating Groundwater Recharge](#).

With both the water reduction and HRL programs described above, there will be increased reliance on groundwater resources during certain years to support cities, rural communities, and farms. To support this groundwater use, there will be an increased emphasis on access to groundwater, particularly during critical dry years, which requires active aquifer replenishment, both direct and in-lieu, whenever there are opportunities to access surface water for groundwater replenishment.

To support these important local efforts, successful aquifer replenishment will require assistance from state and federal agencies, including flexible permitting, real time allocations of surplus water, and neighbor-to-neighbor water transfers.



Advancing Sites Reservoir

Sites Reservoir, a 1.5 maf offstream reservoir on the west-side of the Sacramento Valley near Maxwell, has strong momentum and is on track to get built and be put into operation during the next decade. Sites will be an integral part of the long-term operations for the Sacramento River. Sites Reservoir is specifically designed to capture and store surplus surface water generated during wet periods, like the atmospheric rivers that seasonally make landfall in California, to increase water flexibility, reliability, and resiliency in drier years. Estimates show that since January 2024, Sites Reservoir would have diverted and captured about 840,000 acre-feet of water. This would have been in addition to the 700,000 acre-feet Sites would have diverted and captured in 2023, resulting in a full reservoir headed into summer 2024.

Once operational, Sites Reservoir operations will be coordinated with the SWP and CVP, improving management of California's water supply during extremes such as flooding and drought and could assist in helping to implement the programs described above.



Sites Reservoir will have a dedicated allocation of storage space and water for the environment through the Proposition 1, which will help provide needed supplies for a variety of ecosystem purposes. Reclamation is investing in Sites to achieve, among other outcomes, preserving the cold-water pool in Shasta Lake later into the summer months to support temperature control in downstream river reaches to benefit salmon development, spawning and rearing. Sites water for the environment can also be used to improve Pacific Flyway habitat for migratory birds and other native species and improve conditions for Delta smelt. Sites Reservoir, with the implementation of an environmental water manager and strong partnerships, can provide a valuable asset supporting an environmental water budget to optimally serve functional ecology in the region while also supporting other uses of water. This is the kind of forward thinking and innovative actions that are necessary for effective riverscape management into the next century.

To see more about Sites Reservoir, [click here](#).



In closing, we would appreciate any questions or an opportunity to provide a detailed briefing on these important efforts for water stewardship in the Sacramento River watershed. Please contact Thad Bettner with the Sacramento River Settlement Contractors at tbettner@waterecology.net or Bill Vanderwaal with the Tehama Colusa Canal Authority at wvanderwaal@tccanal.org.



Thad Bettner / *Sacramento River Settlement Contractors*

tbettner@waterecology.net

Bill Vanderwaal / *Tehama Colusa Canal Authority*

wvanderwaal@tccanal.org

sacvalleywater.org