

Bypasses and Fish Habitat

Boosting imperiled salmon populations by reimagining how we manage our bypasses year-round

Collaborative efforts among farmers, conservationists, universities, and state and federal agencies are proving that by reactivating our historic floodplains and using our bypasses during key times of the year, we can create high-quality habitat **that produces up to 149 times more food for salmon than the river.** This leads to salmon growing five to twelve times faster, thus increasing their chance of survival on their journey to the Pacific Ocean. This ultimately has the potential to **dramatically boost salmon populations in California.**



The Challenge

Today, 95 percent of the Central Valley's historical floodplains are cut off from the river by levees. Built in the early 1900s to combat devastating floods; levees and bypasses were constructed to corral mighty rivers and push water quickly through the system. Even before invasive species, large rim dams, and Delta water export facilities were introduced into the system, salmon and waterfowl populations started to dramatically decline with the draining of floodplain wetlands and the construction of the levees. Simply put, primary food resources and key rearing habitats are no longer accessible to native species.



*View of the Yolo Bypass,
Fremont Weir and Sacramento River*

Reimagining the Bypasses

Our bypasses are engineered to push water out of the system as quickly as possible when the Sacramento Valley floods. This primary function reduces the threat of flooding to our cities, communities and farms. We are now uncovering ways to re-imagine and better use our bypasses to also benefit fish and wildlife without impacting the primary function: flood protection.

By reactivating our floodplains and allowing bypasses to connect to the river more frequently and for longer durations we can mimic historical flood patterns and restore the natural wetland productivity needed to recover imperiled fish and wildlife populations.

The Weirs

Enhancing Flood Protection, Aiding Wildlife

The Sutter and Yolo Bypasses sit at the lowest points in the valley. Carefully designed weirs at the top of the bypasses redirect water away from the rivers into the bypasses when flooding will occur, thus the primary function for weirs is to act as a pressure valve during flood stages in the river. Built as part of the levee system, the weirs ensure water spills over their tops into the bypasses thus keeping water away from the rivers and the nearby cities, rural communities, and farmland.



Tisdale Weir



Fremont Weir

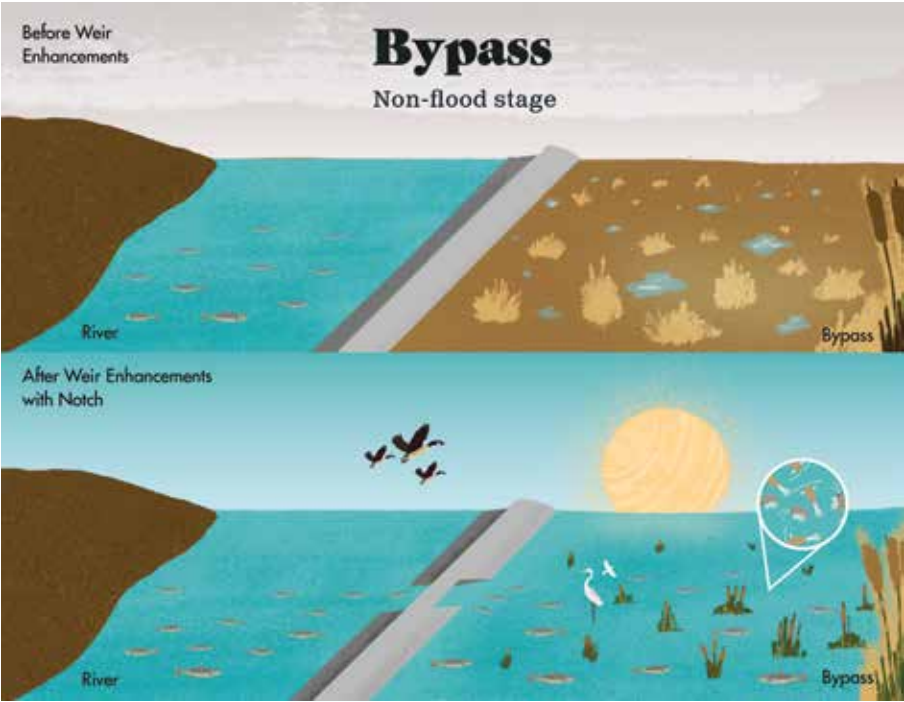
We are now finding additional opportunities with these weirs to aid wildlife by reconnecting the rivers to the bypasses when the rivers are not flooding. Efforts are underway to rehabilitate Tisdale and Fremont Weirs to strengthen flood protection, while also allowing water to flow into the Tisdale, Sutter and Yolo Bypasses during non-flooding periods. The introduction of notches in the weirs will allow water to be directed into the bypasses when we aren't experiencing flooding. There are management plans underway for the bypasses below the weirs to improve flood protection, sustain farming and private wetlands (i.e., duck clubs) and enhance habitat for fish and wildlife. This is a boon for various wildlife, especially endangered salmon.



Reconnecting Fish to Food and Safe Habitat:

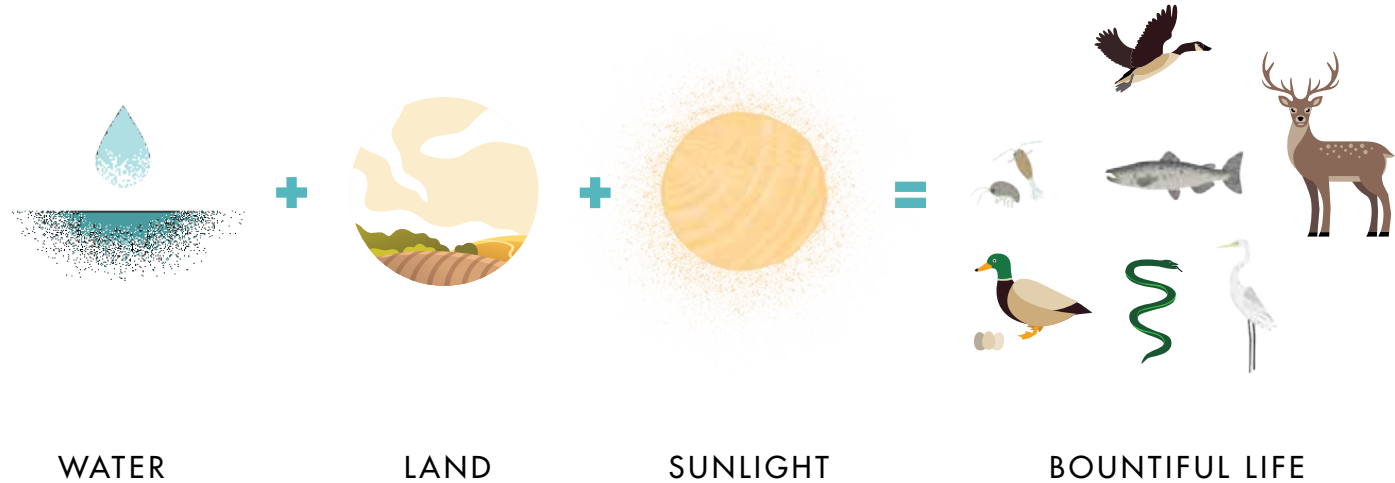
With the ability to move water during non-flood times to farmlands and other managed wetlands along the bypasses, we can create large shallow sections of water on dormant fields. The water, only a few inches deep, spreads out and slows down and acts as a giant solar panel producing billions of zooplankton.

This primary food source for endangered salmon is lacking in the rivers alone, but on the traditional floodplains, the food is bountiful. For the first time in decades young salmon have access to large swaths of food and a safe haven from predator fish.

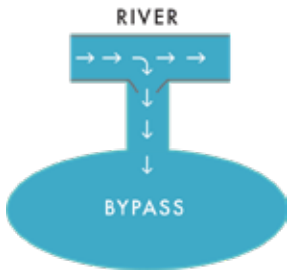


Marrying Water, Land and Sunlight for Bountiful Life

The combination of water, land and sunlight has proven throughout time to be the equation for proper life support and healthy population numbers for all species. California’s Valley floor is a perfect testament to what is possible when all three work in harmony.



How We Are Creating Food for Fish



Water is routed into the bypasses during non-flood times.

Water flows through the bypass and side channels (toe drains).



Water is shallowly spread out over bypass farms fields and managed wetlands.



Water sits, decomposing the remaining rice straw and other vegetation.



The vegetation and rice straw turns to carbon.



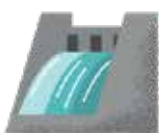
Sunlight warms the water, producing algae.



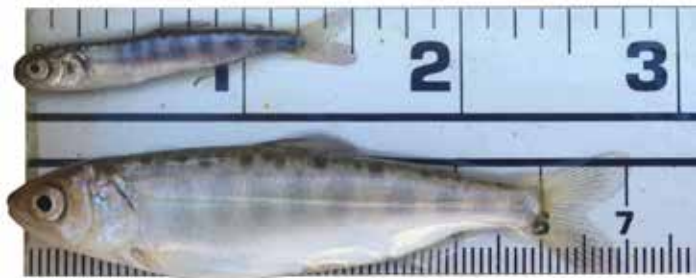
Algae helps spur bug growth.



Fish are able to eat bugs on the bypasses and are safe from larger predators that lurk in the river.



The water slowly drains from the bypasses, triggering outward fish migration.



Science Shows Benefits to Fish:

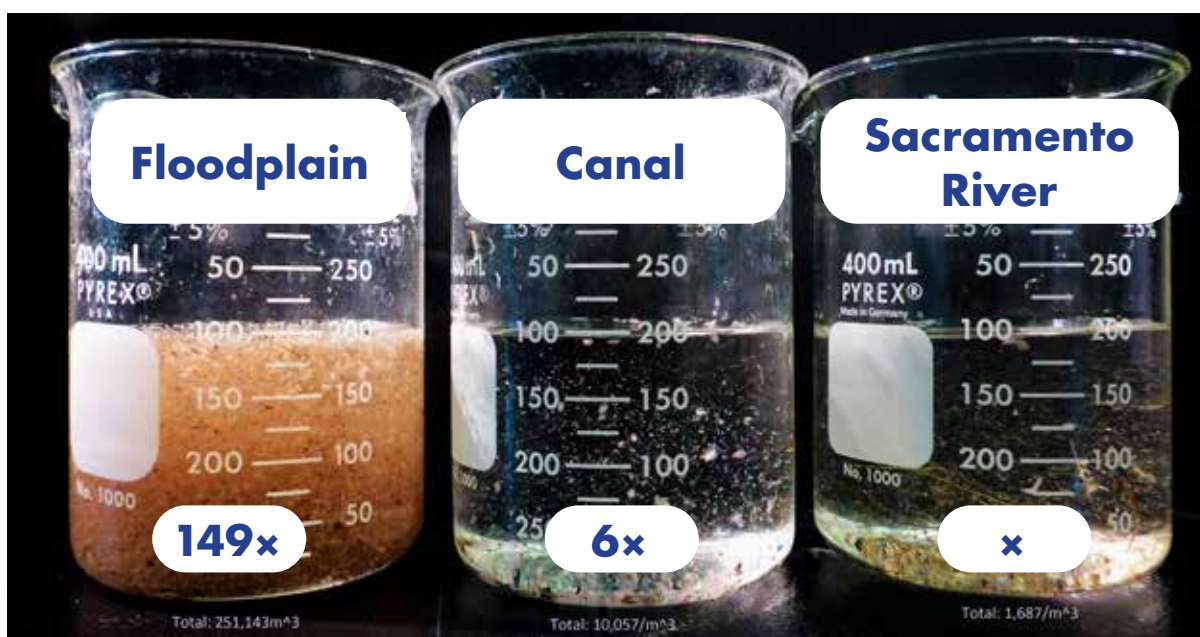
A multi-year study led by UC Davis Center for Watershed Sciences, Department of Water Resources, Department of Fish and Wildlife, Delta Stewardship Council and California Trout reveals astonishing results:

- ▶ Zooplankton (bug) densities were **up to 149 times higher** in the bypasses compared to tested sites in the adjacent Sacramento River.
- ▶ Juvenile salmon feeding on the bypass grew **5 to 12 times faster** compared to fish that only ate in the Sacramento River.

This rapid growth among juvenile salmon is vital for the salmon's overall health, ability to evade predators and the strength required for the species to reach the Pacific Ocean for the next phase of their lifecycle. The bigger and stronger they are as juveniles helps improve the chances the salmon come back to the river to spawn as adults.

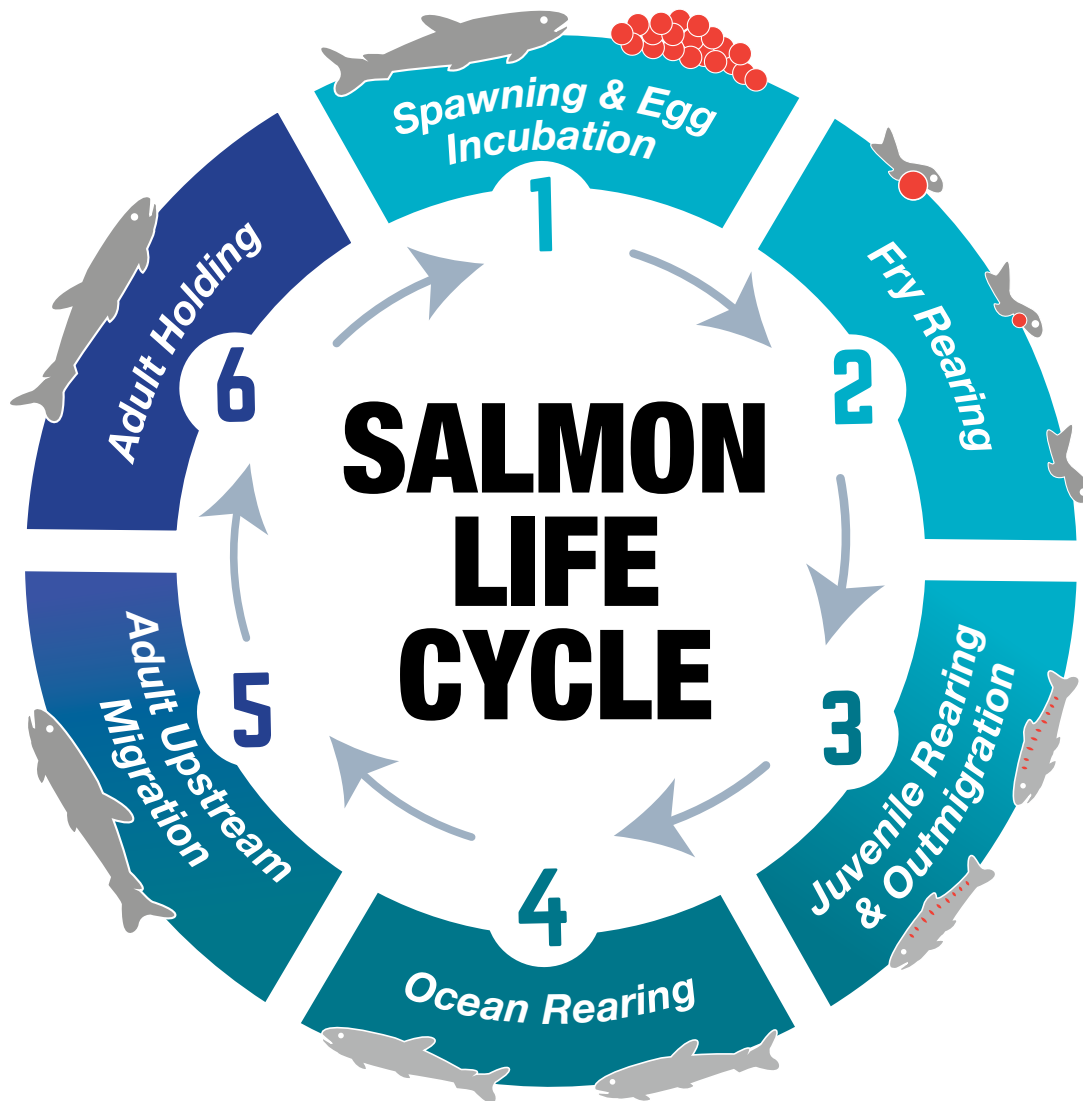


The difference is “cloudy”...
and that is a boon for California's salmon.



The Bigger Picture

The efforts to reconnect and reactivate the historic floodplains in the Yolo and Sutter bypasses are just a few of the projects tied to a greater undertaking that aims to improve survival rates of Chinook salmon. **The Sacramento Valley Salmon Recovery Program** is a collaborative partnership to complete projects and improve science to promote recovery of salmon and other species of fish in Northern California. **The key to the program is the way in which it works to improve habitat for each life stage of the salmon.**



The success of the Sacramento Valley Salmon Recovery Program relies on each organization bringing expertise in specific areas to help increase the chance of success. Over the past 20 years, more than 140 projects have been completed.

What's Next

The coalition continues to grow as more farmers, ranchers, scientists, and public agencies are coming together to be a part of the solution. The “New Way Forward” entails a collaborative approach to water management and habitat creation. The winning formula of “Science + Agricultural Lands + Collaboration” has proven to be the most successful way at achieving results in a complex web of water policy and regulations in California.

The efforts don't stop with waterfowl and endangered fish. If robust population numbers of salmon are realized, we will collectively have the opportunity to use and manage water resources to benefit more fish and wildlife.



Cooperative Partnership:

The Floodplain Forward Coalition has come together to explore and develop opportunities to reactivate the floodplain in the Sacramento Valley. The various efforts in and around the bypasses represent a **private-public partnership with landowners, conservation organizations, water districts, government agencies, and university researchers** all dedicated to finding innovative solutions that serve multiple benefits: flood protection, water supply, farming, and fish and wildlife. By reimagining our bypasses and reactivating our floodplains in this manner, we are able to provide nature-based solutions that mimic the natural functions for fish and wildlife in our historic floodplains. The Floodplain Forward partners include:

