

Fish, Floods, and Forests - an ecosystem approach at restoring the lower Tuolumne River

The sound of spawning salmon is back! Near the town of LaGrange, in Stanislaus County, CA, native fall-run Chinook salmon are returning to their natal stream to spawn and continue the cyclical renewal process that has occurred for millennia. Tens or hundreds of thousands of salmon historically returned to the Tuolumne River prior to dams, levees, and other disturbances, yet salmon returns in the late 1980's and early 1990's were in the hundreds. The boom/bust population trends shown in Figure 1 are a cumulative impact of dams, changes to the flow and sediment regime, severe damage to the floodway, delta impacts, and other changes. The vision of the restoration effort on the lower Tuolumne River is to:

"re-establish critical ecological functions, processes, and characteristics, under regulated flow and sediment conditions, that best promotes recovery and maintenance of a resilient, naturally producing salmon population and the river's natural animal and plant communities.

In other words, rehabilitate the underpinnings of a healthy river ecosystem (flow, sediment, and floodway) as the foundation of maintaining the peak salmon returns shown in Figure 1 while preventing the crashes in salmon returns. Floods still occur on the lower Tuolumne River, and more frequently than on most regulated Central Valley rivers (Figure 2). However, changes to the high flow regime have been severe, as have cumulative impacts to the floodway since the mid-1800's, so there is much work to do!

What was done and why?

The cumulative impacts of dams and downstream floodway development include: reduction in flow regime and volume, elimination of fine and coarse sediment sources from the upper watershed, drastic narrowing of the floodway, gravel mining within the floodway (Figure 3), agricultural reclamation of the floodway, and gold dredging of the floodway. These impacts are slowly being reversed, beginning with the 1995 FERC Settlement Agreement, which greatly improves flows within the lower Tuolumne River. The Settlement Agreement also initiated a restoration plan for the lower Tuolumne River that identifies and prioritizes restoration actions. The restoration activities include adding and maintaining gravel downstream of the dams; increasing floodway capacity to address flood control problems rather than new dams; increasing floodplain area to increase riparian habitat, provide functional floodplains, and increase riparian habitat; rebuilding portions of channels impacted by instream gravel mining to improve salmon habitat and reduce predator habitat; and purchasing land and conservation easements to re-establish a contiguous riparian-floodway corridor from LaGrange Dam to the confluence with the Tuolumne River. This approach attempts to address salmon restoration, riparian habitat restoration, river restoration, and flood control improvements in a comprehensive, coordinated way.

Who was involved?

The FERC Settlement Agreement and Lower Tuolumne River Corridor Restoration Plan was a combined effort of two irrigation districts, state and federal agencies, and environmental groups. Implementation of the Settlement Agreement and Restoration Plan has continued this tradition, with all participants contributing to the restoration effort. The Turlock and Modesto Irrigation Districts have taken the lead on large scale floodway restoration projects, California Department of Fish and Game has added spawning gravels and conducted biological monitoring on the river, the Friends of the Tuolumne has purchased land from willing sellers and is conducting floodplain restoration and spawning gravel augmentation, the National Resource Conservation District has purchased floodway easements on the lower Tuolumne River, the Tuolumne River Preservation Trust has coordinated land and conservation easement purchases on the lower river, and US Fish & Wildlife and CALFED have provided funding to most of the restoration actions.

Where can I see the restoration projects?

The gravel augmentation project conducted by the California Department of Fish and Game can be best observed from the Old LaGrange Bridge on the north side of LaGrange (River Mile 50.5). The gravel augmentation has been done on both the downstream side of the bridge (Figure 4), and the upstream side of the bridge. The 7/11 floodway restoration project can be observed from the Roberts Ferry Bridge (River Mile 39.4) looking downstream, and the SRP 9 project can be observed by walking downstream from the Fox Grove County Park under the Geer Road bridge on the south bank of the river at River Mile 25.7 (Figures 5 and 6). The Bobcat Flat gravel augmentation and floodplain reconstruction project (River Mile 43), as well as the Grayson River Ranch floodplain restoration project (River Mile 5.7), are on private property, and visitors should contact the Friends of the Tuolumne for access. The Todd/Venn floodway restoration project (River Mile 7) is also on private property, and visitors should contact the Tuolumne River Preservation Trust for access.

Why is this a model project?

This project is unique in three ways. First, many groups worked together to develop the Restoration Plan, and many groups are taking an active role in implementing restoration projects, including non-government organizations. Second, the restoration approach attempts to take a broader ecosystem approach by addressing the physical underpinnings of the river in the restoration effort (e.g., increasing floodway width, gravel augmentation, floodplain reconstruction, natural riparian regeneration). Third, there is a very strong commitment to monitoring and adaptive management to improve effectiveness of future restoration actions.

For more information on this project, please contact:

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Fig 1. Estimated escapement of adult fall-run Chinook Salmon on the Tuolumne River, 1952 through 1997

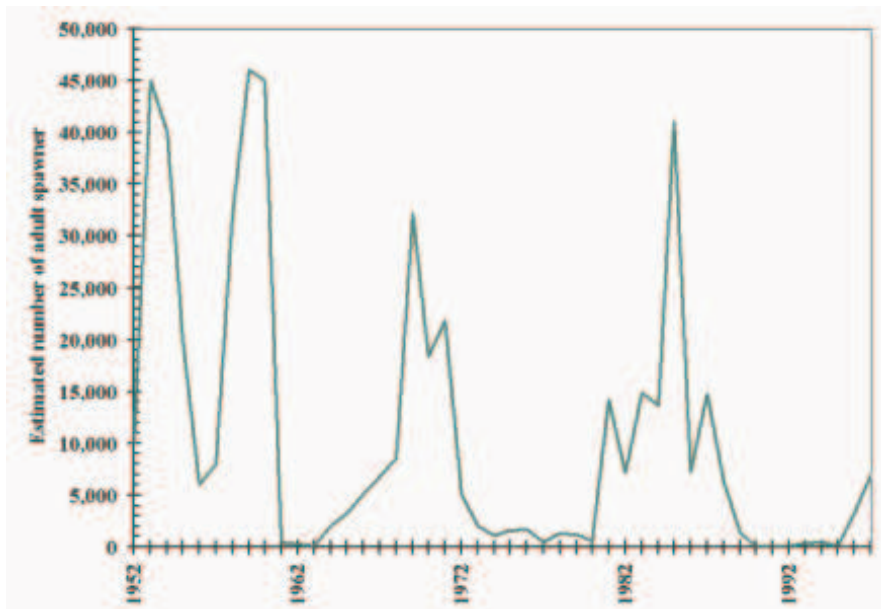


Fig 2. 1997 flood picture



Figure 3. comparison of SRP 9 and 10 air photos in the brochure





Figure 4. gravel augmentation picture with front end loader



Figure 5. comparison of SRP 9 pre and post construction

