

RESTORATION

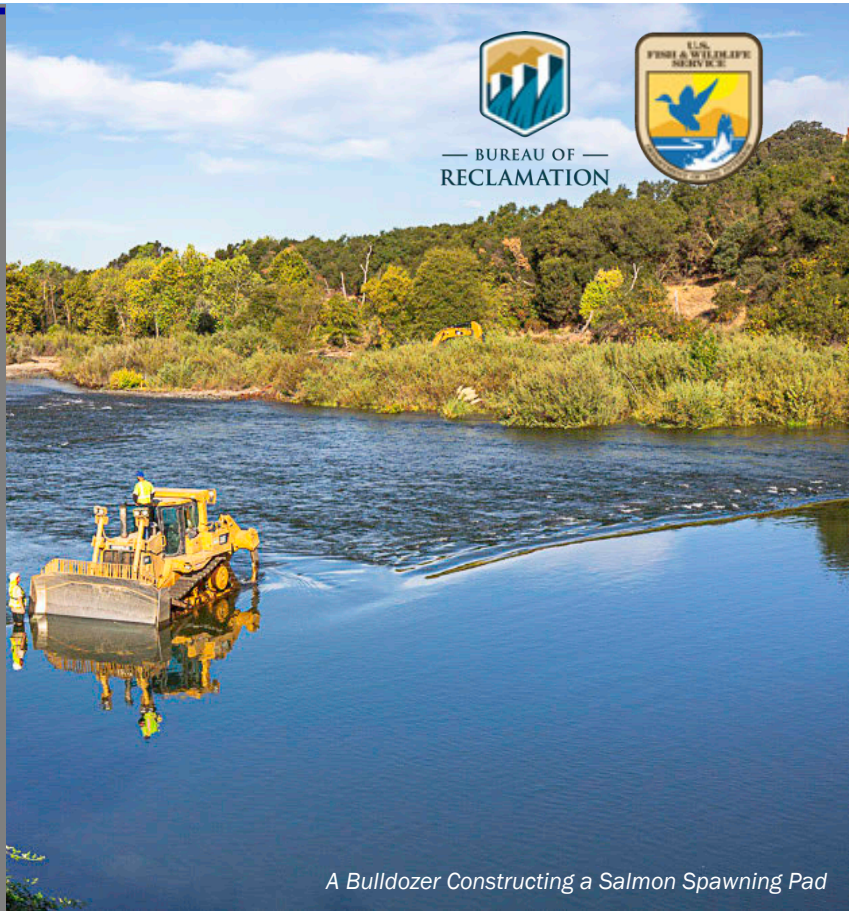
Habitat Restoration for Native Salmonid Conservation in the Lower American River of California



— BUREAU OF —
RECLAMATION



Chinook salmon (*Oncorhynchus tshawytscha*) and Steelhead trout (*Oncorhynchus mykiss*) migrate between marine and freshwater environments in their complex life cycles. Both species are native to the north Pacific Ocean, ranging historically from northern Alaska and Russia to southern California. A combination of overfishing, construction of hydroelectric dams, and habitat loss from agriculture, logging, and mining have reduced populations, especially within their current southernmost range in the central valley of California. To mitigate these disturbances, the U.S. Bureau of Reclamation, Sacramento Water Forum, and the U.S. Fish and Wildlife Service have partnered to restore juvenile rearing and spawning habitat in the Lower American River in California.



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KEY ISSUES ADDRESSED

The Lower American River contains threatened stocks of Chinook salmon and Steelhead. Historical dredging from mining and gravel tailings have caused river channelization, reducing the amount of suitable habitat for rearing juveniles and spawning salmonids. Folsom Dam stabilizes year-round downstream temperature and flow. The dam also lacks a fish passage structure so salmonid populations cannot return further upstream to spawn. Restoration projects in the area therefore focus on enhancing suitable gravel habitat for both spawning and rearing Chinook salmon and Steelhead in several stretches of the Lower American River downstream of the Folsom and Nimbus Dams.

PROJECT GOALS

- Achieve salmonid management goals through collaboration
- Restore several river reaches for spawning and rearing in the Lower American River
- Better understand the life histories of Chinook salmon and Steelhead in this system
- Maintain suitable habitat conditions for long-term salmonid conservation

RECYCLED ROCK

Rock waste along riverbanks from historic gold mining are repurposed as gravel substrate for restoration of salmonid spawning beds in the Lower American River.



Spawning Chinook Salmon (Lighter Areas) at Sailor Bar in Fall 2019

PROJECT HIGHLIGHTS

Creative Collaboration: Federal and state agencies are collaborating with local municipalities to implement on-the-ground restoration measures and policies for conserving salmonid populations.

Long-Term Partnership for Successful Conservation: Since 2008, the partnership has invested over \$7 million into habitat restoration in the Lower American River on Sacramento County Parks land (another valuable partner). This has created over 30 acres of suitable habitat for spawning adults and 1.7 miles of side channels for rearing juveniles.

Ongoing Habitat Expansion: In September 2019, this project expanded to the Upper Sailor Bar location, excavating a new side channel, strategically placing approximately 14,000 cubic yards of washed and sorted gravel into the main channel, and carving a 1,500 ft side channel.

Positive Public Reception and News Coverage: Partnership and collaboration among diverse stakeholders has been met with positive feedback among local residents and news media.

Collaborators

- Numerous federal and state agencies
- The city and county of Sacramento

Funding Partners

- Central Valley Project Improvement Act
- Sacramento Water Forum
- Sacramento Area Flood Control Agency

Lead Author: Alex Koeberle, University of Arizona, February 2020.
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Photos courtesy of BOR and Water Forum



LESSONS LEARNED

Habitat improvement projects increase habitat for adult fish as well as larval and juvenile fish. For example, gravel placement increases habitat availability for adult fish to build nests to lay eggs, while also producing nursery backwaters for salmon fry that emerge from these gravel nests. Salmon biologists have documented increased spawning activity in Sailor Bar with zero redds counted in 2018 and between 700 and 1,400 redds after gravel augmentation in 2019.

Gravel augmentation has broader ecosystem impacts that include increasing populations of macro-invertebrates, which quickly colonize fresh gravel, and increasing the presence of wildlife such as beavers. Additional woody debris input creates more nursery environments for young salmonids.

NEXT STEPS

- Create more juvenile rearing habitat in the Lower American River
- Replace habitat and replenish gravel at previous and new restoration locations
- Improve habitat utility for a range of flow conditions to match river channel characteristics and substrate with flow regime
- Apply lessons learned from Lower American River restoration projects to salmonid spawning grounds with similar restoration opportunities elsewhere in the Upper Sacramento River Basin

PROJECT RESOURCES

For more information on this project, contact John Hannon: jhannon@usbr.gov or Lilly Allen: lallen@waterforum.org

For additional project resources and case studies, photograph the QR code below or visit the CCAST website: WWW.DESERTLCC.ORG/RESOURCE/CCAST



Restored Side Channel in the Lower American River