Process-based restoration to benefit juvenile salmonids on the Lower Yuba River

The Hallwood Side Channel and Floodplain Restoration Project

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Project Objectives

- Restore and enhance ecosystem processes for productive juvenile salmonid rearing habitat
- Increase natural production of fall-run and spring-run Chinook salmon (Onchorhynchus tshawytscha) and Central Valley steelhead (O. mykiss) in the Lower Yuba River
- Support CVPIA Anadromous Fish Restoration Program (AFRP) “Doubling Goal”
Lower Yuba River

685 million CY hydraulic mining sediment deposited from 1849 to 1909 (Gilbert, 1917)

Photos (cbec 2013)
Dynamic Existing Conditions

2017

Teichert Hallwood Facility
North Training Wall
Middle Training Wall
South Training Wall
Overflow or High Flow Side Channel
Main Channel Lower Yuba River
Goldfields

Legend:
- Powerline
- PG&E and WAPA Transmission Towers
  - Towers
  - Proximate Towers
- EA Boundary

NAIP (2014), cbec aerial (2017)
2017 Floods

(A) January 9, 2017 at ~80,000 cfs

(B) March 3, 2017 at ~4,600 cfs
Topographic Change 2014 - 2017

NAIP (2014), cbec aerial and topographic survey(2017)

Hallwood Project 2018-09-05
Restoration Design Concept

- Habitat enhancement actions:
  - Topographic modification
  - Predominantly rely on natural recruitment, some focused riparian planting
  - Large wood placement

- Full Build-out Result: 165 acres riparian floodplain, 1.7 miles perennial and 6.1 miles seasonal side channels/alcoves
• Phases 1 & 2 funded by USFWS
• 3.1 million cubic yards of material to be removed from the river corridor
• Phased project could take 4 to 6 years depending on facility operations and funding availability
2D Hydraulic Modeling

- Two model domains
  - Ecological flows (531 cfs – 10,000 cfs)
  - Flood flows (up to 180,000 cfs)
Existing Habitat at 5,000 cfs

- Fry-Juv. Chinook Salmon and Steelhead (without and with cover)
- Surface connection above ~3,000 cfs
- Upper main channel split to ~50% flow to each channel down to baseflow
Habitat Enhancements

• Up to 37% increase inundated acres (max at 7,500 cfs)
• Up to 74% increase wetted edge (max at 2,000 cfs)
• Up to 50% increase in Chinook Salmon and Steelhead Fry-Juv. WUA at 2000 cfs (without cover and with cover)
• Up to 38% decrease deep pools (> 6 ft deep)
Habitat Enhancements

- 11% more acres inundated 21 days at 2,000 cfs
- 34% more acres inundated 21 days at 5,000 cfs
- No loss in spawning habitat

New Habitat Created
- 1.7 miles perennial channels
- 2.0 miles alcoves
- 4.1 miles seasonal side channels or swales
Flood WSE Reduction

180,000 cfs

Up to > 3 feet WSE reduction across site

Up to 0.14 ft rise along local ag berm, no increase in flood footprint
Additional Benefits

Economic benefits to local economy, including recreational fishery

Educational benefits, community involvement, scientific research, pre- and post-construction monitoring

(Photo: habitat.fisheries.org)
A Multi-Stakeholder Project

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- Cramer Fish Sciences
- South Yuba River Citizens League (SYRCL)
- Horizon Water and Environment
- Teichert Materials, Teichert Construction
- Western Aggregates
- Yuba County
- CA Representative J. Garamendi
- Three Rivers Levee Improvement Authority
- Western Area Power Administration
- Pacific Gas & Electric
- Yuba County Water Agency & River Management Team

- UC Davis
- National Marine Fisheries Service
- United States Army Corps of Engineers
- Central Valley Flood Protection Board
- CA Department of Fish and Wildlife
- CA State Mining and Geology Board
- CA State Historic Preservation Office
- CA State Lands Commission
- State Water Resources Control Board
- Central Valley Regional Water Quality Board