



California Department of Fish and Wildlife
Fisheries Restoration Grant Program
Restoration Project Case Study



**P1510529 Redwood Creek Instream Habitat Improvement Project -
 Schroeder**

Project Objective(s) – The purpose of this project was to improve spawning habitat, sort spawning gravels, enhance pools, and increase habitat complexity in Redwood Creek. Six large wood (LW) and boulder features were constructed along a 1,142-foot reach. Additionally, restoration and enhancement of the riparian in this reach was done by planting trees.

Project Location(s) – Redwood Creek; tributary to the South Fork Eel River; near the town of Briceland; in Humboldt County.

Project Description – From September 5th through October 14th of 2016, six instream LW structures were built along 0.22 miles of Redwood Creek consisting of 40 pieces of LW, 5 yards of small wood, and 60 tons of boulders. The LW pieces consisted of 20 logs, 9 rootwads, and 11 logs with attached rootwads. Access routes and riparian buffers were mulched and planted with redwood trees (*Sequoia sempervirens*) and Douglas fir (*Pseudotsuga menziesii*) totaling a half an acre treated.

Photo Credit: Eel River Watershed Improvement Group



Figure 1. Shallow, lateral scour pool lacking large wood prior to feature placement (Pre-treatment conditions, 9/1/2016)

Photo Credit: K. Boozel, Pacific States Marine Fisheries Commission



Figure 2. Large wood added by wedging in existing riparian. Resulting in increased shelter, pool depth, and habitat complexity (Post-treatment conditions, 10/01/2019)

Project Monitoring

Pre-Treatment

Date(s): 8/25/2016

Implementation

Date(s): 11/29/2016

Post-Treatment

Date(s): 10/01/2019

Post-Treatment Project Monitoring Summary

All six instream structures were assessed for effectiveness in 2019. Several of the features design plans and locations were modified from what was proposed, with grant manager approval. Design changes were mostly in the form of adding additional wood or boulders. Two features received additional boulder weirs and five out of the six features received additional logs and rootwads.



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Additionally, two of the features were relocated further downstream, from where original monitoring was conducted. This caused a decrease in the stream length treated and pre-treatment monitoring metrics for two pool units to be irrelevant when comparing pre and post habitat conditions.

Photo Credit: Eel River Watershed Improvement Group

Photo Credit: K. Boozel, Pacific States Marine Fisheries Commission



Figure 3. Two large wood features shortly after installation in lateral scour pool in lower end of treatment reach (Post-treatment conditions, 11/2/2016)



Figure 4. A significant amount of additional large wood and small woody debris was intercepted and accumulated, increasing fish cover and habitat complexity (Post-treatment conditions, 10/1/2019)

This project received pre- and post-treatment snorkel validation monitoring. Six pools were snorkeled during pre-treatment monitoring where features were proposed to be, and eight pools were snorkeled post treatment (Table 1). Four of the pools ended up being evaluated both pre-treatment and post-treatment; therefore, were comparable units for habitat characteristics. Average maximum residual depth for the four pool units was 2.0 ft. at pre-treatment and 2.6 ft. post-treatment. Salmonid density decreased from pre to post monitoring. Several factors could have been the cause for this decrease including, interannual variation in weather events, variability in size and spawner distribution, oceanic conditions, survey timing, or displacement due to invasive Sacramento Pikeminnow. This project met its' objective and purpose of providing increased availability of cover and habitat in Redwood Creek.

Table 1. Snorkel survey results for pre and post-implementation validation monitoring.

| Date | Avg. Area of Pools (ft ²) | Avg. Residual Depth (ft) | Coho Salmon | | | Trout | | | Pikeminnow | | |
|---------|---------------------------------------|--------------------------|-------------|----|---------------------------------|-------|----|----|---------------------------------|-------|---------------------------------|
| | | | YOY | 1+ | Density (fish/ft ²) | YOY | 1+ | 2+ | Density (fish/ft ²) | Count | Density (fish/ft ²) |
| 8/25/16 | 732.17 | 2.1 | 261 | 13 | 0.06 | 79 | 11 | 0 | 0.02 | 0 | 0.00 |
| 10/1/19 | 1223.29 | 2.2 | 41 | 0 | 0.00 | 34 | 9 | 2 | 0.005 | 10 | 0.001 |

Project Funding & Cost

- Department of Fish and Wildlife Fisheries Restoration Grant Program.....\$74,441
- California Conservation Corps.....\$15,176
- **Total Project Cost.....\$89,617**