



**Hollow Tree Complex Habitat
Enhancement Project – Phase II
Mendocino County, California**

Final Report

FRGP Grant Number: P1510524

December 2018



Prepared by:

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For:

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PROJECT TITLE: Hollow Tree Complex Habitat Enhancement Project – Phase II

FRGP GRANT #: P1510524

GRANTEE NAME AND CONTACT INFORMATION:

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Overview of Project:

Description: Twenty-four large woody debris (LWD) structures were constructed along two stream reaches in the Hollow Tree Creek watershed. A total of 96 pieces of LWD were added to stream channels during the course of this project. The LWD in the structures was configured to improve the quality and quantity of spawning and rearing habitat for salmonids by increasing habitat diversity and availability, improving pool depth and frequency, and by sorting spawning gravels.

Logs used in the project were both purchased and sourced from the forest where removal wouldn't significantly impact the riparian forest function. Most structures were built using heavy equipment. Some structures were built without heavy equipment by using griphoists and California Conservation Corps (CCC) labor. LWD structures were anchored by CCC crews using techniques approved by the CDFW Grant Manager, Beatrijs deWaard, and described in the *CDFW Salmonid Stream Habitat Restoration Manual* (CDFW, 2010). Anchoring techniques included: soft anchoring (e.g. wedging logs that were at least 1.5 times bankfull width between mature riparian trees and leaving them unanchored), and traditional anchoring wherein logs were wedged between mature riparian trees and secured with a minimum of two anchor points using 1-inch threaded rebar, nuts, and washers.

All LWD features were documented with upstream and/or downstream photo points. All disturbed surfaces on the streambanks were mulched using rice straw and local vegetation. In addition to mulching the disturbed areas, the CCC also planted a total of 1200 redwood (*Sequoia sempervirens*) seedlings.

Location: Tributaries: Bear Wallow Creek, a tributary to Huckleberry Creek, and Huckleberry Creek, a tributary to Hollow Tree Creek, tributary to the South Fork Eel River, tributary to the Eel River, tributary to the Pacific Ocean.

- Huckleberry Creek; Upstream: 39.73011900, -123.72486100, Downstream: 39.73332500, -123.72366400.
- Bear Wallow Creek; Upstream: 39.72839200, -123.71463300, Downstream: 39.73146100, -123.72415300.

Grant Term: June 1, 2016 – January 31, 2019

Implementation start and end dates: The work window for this project started on July 1st, 2017. Heavy Equipment operation began on July 5th, 2017 and ended August 1st, 2017. Anchoring occurred from August 30th, 2017 to September 29th, 2017. Tree planting was completed on December 12, 2017.

Assessment Plans Identifying Project:

- California Department of Fish and Game. 2002. *Bear Wallow Creek Stream Habitat Inventory Report*. California Department of Fish and Game.
- California Department of Fish and Game. 2004. *Recovery Strategy for California Coho Salmon*. California Department of Fish and Game.
- California Department of Fish and Wildlife. 2010. *California Salmonid Stream Habitat Restoration Manual, Fourth Edition*. California Department of Fish and Wildlife.
- California Department of Fish and Wildlife. 2014. *South Fork Eel River Basin Assessment Report*. California Department of Fish and Wildlife.

Listed Species Surveys and Relocation: Northern spotted owl surveys were conducted by Mendocino Redwood Company prior to this project. No fish relocation or de-watering occurred.

Project Budget

In support of the *Hollow Tree Complex Habitat Enhancement Project – Phase II* an amount of \$148,158 was funded by CDFW through FRGP with an additional \$58,928 of funds arranged by the California Conservation Corps (CCC) and Mendocino Redwood Company (MRC) through in-kind cost share contributions.

During the course of the project the CCC contributed \$25,467.75 in cost share as the portion of crew time that was not charged to the project. The MRC contributed \$35,000 in cost share as logs donated to the project. During the life of the project, \$144,002.46 of FRGP funds were spent, and \$60,467.75 of cost share was used, for a total project cost of \$204,470.21.

Cost Share Breakout

SOURCE OF FUNDS	CASH	IN-KIND	TOTAL	PERCENT
Fisheries Restoration Grant Program	\$144,002.46	\$0.00	\$144,002.46	70.4%
Other State Agencies: CCC	\$0.00	\$25,467.75*	\$25,467.75	12.5%
Other: Mendocino Redwood Company	\$0.00	\$35,000**	\$35,000	17.1%
Total Project Cost	\$144,002.46	\$60,467.75	\$204,470.21	100%

Budget Notes:

* Cost share in “California Conservation Corps Subcontractor Costs” line item, it is contributed by the California Conservation Corps as the portion of work crew cost that the CCC did not charge the project for.

** Cost share from the “Logs/Rootwads” line item, it is the dollar value of logs contributed by Mendocino Redwood Company for the project.

Final Budget

Description	FRGP Funds	Approved Adjustments	Cost Share	FRGP Funds Expended	Total Project Cost
Personnel Services					
<i>Project Manager</i>	\$7,200	\$7,200	\$0.00	\$7,200.00	\$7,200.00
<i>Staff Benefits @ 30%</i>	\$2,160	\$2,160	\$0.00	\$2,160.00	\$2,160.00
Total Personnel Services	\$9,360	\$9,360	\$0.00	\$9,360.00	\$9,360.00
Operating Expenses					
<i>Subcontractor Costs (CCC)</i>	\$63,329	\$63,329	\$25,467.75	\$62,441.27	\$87,909.02
<i>Subcontractor Costs (Heavy Equipment)</i>	\$37,240	\$37,240	\$0.00	\$37,240.00	\$37,240.00
Grantee Sub Costs Total	\$100,569	\$100,569	\$25,467.75	\$99,681.27	\$125,149.02
Threadbar	\$3,500	\$3,500	\$0.00	\$3,500.00	\$3,500.00
Washers	\$1,600	\$1,600	\$0.00	\$1,600.00	\$1,600.00
Nuts	\$2,800	\$2,800	\$0.00	\$2,800.00	\$2,800.00
Logs/Rootwads	\$15,000	\$14,839.75	\$35,000.00	\$13,000.00	\$48,000.00
Drill Bits and Extensions	\$960	\$960	\$0.00	\$960.00	\$960.00
Tools and Materials	\$1,500	\$1,500	\$0.00	\$1,017.29	\$1,017.29
Power Tool Equipment and Repair	\$2,800	\$2,800	\$0.00	\$2,651.45	\$2,651.45
Transportation	\$570	\$570	\$0.00	\$570.00	\$570.00
1600 Permit	\$1,673	\$1,833.25	\$0.00	\$1,833.25	\$1,833.25
Conifer Seedlings	\$3,500	\$3,500	\$0.00	\$3,000.00	\$3,000.00
Grantee Other Costs Total	\$33,903	\$33,903	\$35,000.00	\$30,931.99	\$65,931.99
Total Operating Expenses	\$134,472	\$134,472	\$60,467.75	\$130,613.26	\$191,081.01
Subtotals and Indirect Charges					
Subtotal Contractors	\$100,569	\$100,569	\$25,467.75	\$99,681.27	\$125,149.02
<i>Subtotal A + B (Personnel + Operating)</i>	\$43,263	\$43,263	\$35,000.00	\$40,291.99	\$75,291.99
<i>Administrative Overhead @10%</i>	\$4,326	\$4,326	\$0.00	\$4,029.20	\$4,029.20
Grand Total	\$148,158	\$148,158	\$60,467.75	\$144,002.46	\$204,470.21

Reporting Metrics

Hollow Tree Complex – Phase II Performance Measures - Entire Project

Measure Category	Measure
Overall stream length treated (miles, count one side of stream only)	0.96
Area (footprint) of in-stream features installed within bankfull channel (square feet)	2920
Length of aquatic habitat disturbed (sum of individual feature lengths - feet)	372
Instream features installed/modified (number)	24
Gravel Volume added to stream (cubic yards)	N/A
Amount of wetland area treated (acres)	N/A
Amount of artificial wetland created (acres)	N/A
Amount of wetland area treated for invasive species (acres)	N/A
Amount of estuarine area treated (acres)	N/A
Amount of estuarine area created (acres)	N/A
Amount of estuarine area treated for invasive species (acres)	N/A
Length of stream treated for channel reconfiguration/connectivity (miles)	N/A
Length of off-channel stream created (acres)	N/A
In-stream pools created/added (number)	N/A
Length of stream treated for channel structure placement (miles)	N/A
Pools created through channel structure placement (number)	N/A
Length of stream treated with spawning gravel placement (miles)	N/A
Species of aquatic plants removed/controlled (text-write out species of plants)	N/A
Length of stream treated for plant removal/control (miles)	N/A
Total length of in-stream habitat treated (sum of individual feature lengths – miles)	0.13
Total pieces of LWD	96

Number of plants planted	1200
Species of plants planted	<i>Sequoia sempervirens</i>
Area planted in riparian	2.01 acres
Length of riparian stream bank treated overall	0.96 miles
Length of riparian stream bank treated on both sides	1.1 miles
Amount of riparian area treated	N/A
Amount of riparian area treated for invasive species	N/A

Hollow Tree Complex – Phase II Site Specific Metrics – Bear Wallow Creek Site

Measure Category	Measure
Overall stream length treated (miles, count one side of stream only)	0.71
Area (footprint) of in-stream features installed within bankfull channel (square feet)	1,639
Length of aquatic habitat disturbed (sum of individual feature lengths - feet)	210
Instream features installed/modified (number)	16
Gravel Volume added to stream (cubic yards)	N/A
Amount of wetland area treated (acres)	N/A
Amount of artificial wetland created (acres)	N/A
Amount of wetland area treated for invasive species (acres)	N/A
Amount of estuarine area treated (acres)	N/A
Amount of estuarine area created (acres)	N/A
Amount of estuarine area treated for invasive species (acres)	N/A
Length of stream treated for channel reconfiguration/connectivity (miles)	N/A
Length of off-channel stream created (acres)	N/A
In-stream pools created/added (number)	N/A
Length of stream treated for channel structure placement (miles)	N/A
Pools created through channel structure placement (number)	N/A
Length of stream treated with spawning gravel placement (miles)	N/A
Species of aquatic plants removed/controlled (text-write out species of plants)	N/A
Length of stream treated for plant removal/control (miles)	N/A
Total length of in-stream habitat treated (sum of individual feature lengths – miles)	0.07
Total pieces of LWD	59

Bear Wallow Creek Site Performance Measure Summary	
Type of Materials Used	Anchored Logs, Logs Anchored Together, Logs Anchored to Boulders and Rootwads
Miles of Stream Treated with Structure Placement	0.71 miles
Number of Structures Placed	16 structures
Number of Instream Pools Created	N/A - Not a deliverable of this project
Miles of Stream Treated with Riparian Planting	0.71 miles
Miles of Stream Bank Treated with Riparian Planting (both sides)	0.85 miles
Acres Treated with Riparian Planting	1.72 acres
Number of Plants Planted	1100 trees
Provisions for Survival Monitoring	Randomized assessment of survivability after 1 year, replant if less than 80%
Provisions for Watering	None
Scientific Name of plants planted	<i>Sequoia sempervirens</i>

Hollow Tree Complex – Phase II Feature Specific Metrics – Bear Wallow Creek Site

Site # (footage from point of survey origin)	# LWD	Log	Root-wad	Log w/ Rootwad	Log Weir	Fish Passage	Length (ft.)	Feet ²
50	5	4	1	0	0	0	20	100
175	3	2	1	0	0	0	37	148
360	3	2	1	0	0	0	22	132
394	4	3	0	1	0	0	29	145
763	4	3	0	1	0	0	31	155
1010	3	3	0	0	0	0	19	76
1110	4	3	1	0	0	0	7	105
1226	2	2	0	0	0	0	12	120
1387	2	1	0	1	0	0	11	55
1600	2	2	0	0	0	0	20	80
2077	5	5	0	0	0	0	37	126
2534	5	4	1	0	0	0	30	54
3081	4	4	0	0	0	0	35	136
3390	5	5	0	0	0	0	33	64
3544	1	1	0	0	0	0	17	37
3732	7	7	0	0	0	0	31	106

Hollow Tree Complex – Phase II Site Specific Metrics – Huckleberry Creek Site

Measure Category	Measure
Overall stream length treated (miles, count one side of stream only)	0.25
Area (footprint) of in-stream features installed within bankfull channel (square feet)	1281
Length of aquatic habitat disturbed (sum of individual feature lengths - feet)	162
Instream features installed/modified (number)	8
Gravel Volume added to stream (cubic yards)	N/A
Amount of wetland area treated (acres)	N/A
Amount of artificial wetland created (acres)	N/A
Amount of wetland area treated for invasive species (acres)	N/A
Amount of estuarine area treated (acres)	N/A
Amount of estuarine area created (acres)	N/A
Amount of estuarine area treated for invasive species (acres)	N/A
Length of stream treated for channel reconfiguration/connectivity (miles)	N/A
Length of off-channel stream created (acres)	N/A
In-stream pools created/added (number)	N/A
Length of stream treated for channel structure placement (miles)	N/A
Pools created through channel structure placement (number)	N/A
Length of stream treated with spawning gravel placement (miles)	N/A
Species of aquatic plants removed/controlled (text-write out species of plants)	N/A

Length of stream treated for plant removal/control (miles)	N/A
Total length of in-stream habitat treated (sum of individual feature lengths – miles)	0.06
Total pieces of LWD	37

Huckleberry Creek Site Performance Measure Summary	
Type of Materials Used	Anchored Logs, Logs Anchored Together, and Rootwads
Miles of Stream Treated with Structure Placement	0.25 miles
Number of Structures Placed	8 structures
Number of Instream Pools Created	N/A - Not a deliverable of this project
Miles of Stream Treated with Riparian Planting	0.25 miles
Miles of Stream Bank Treated with Riparian Planting (both sides)	0.25 miles
Acres Treated with Riparian Planting	0.3 acres
Number of Plants Planted	100 trees
Provisions for Survival Monitoring	Randomized assessment of survivability after 1 year, replant if less than 80%
Provisions for Watering	None
Scientific Name of plants planted	<i>Sequoia sempervirens</i>

Hollow Tree Complex – Phase II Feature Specific Metrics – Huckleberry Creek Site

Site # (footage from point of survey origin)	# LWD	Log	Root-wad	Log w/ Rootwad	Log Weir	Fish Passage	Length (ft.)	Feet ²
338	2	2	0	0	0	0	23	115
589	9	7	0	2	0	0	48	252
849	6	5	0	1	0	0	40	168
895	6	5	0	1	0	0	80	160
995	2	2	0	0	0	0	12	120
1088	5	5	0	0	0	0	55	220
1175	4	4	0	0	0	0	24	96
1306	3	2	1	0	0	0	25	150

Pre-Project and Post-Project Photos

Bear Wallow (BW) Photos:

Site BW, Feature 50 – Pre-project



Downstream View from LB

Site BW, Feature 50 – Post-project



Downstream View from RB

Site BW, Feature 175 – Pre-project



Upstream View from MC

Site BW, Feature 175 – Post-project



Upstream View from RB

Site BW, Feature 360 – Pre-project



Downstream View from MC

Site BW, Feature 360 – Post-project



Downstream View from RB

Site BW, Feature 394 – Pre-project



Downstream View from MC

Site BW, Feature 394 – Post-project



Downstream View from RB

Site BW, Feature 763 – Pre-project



Upstream View from MC – Lower Structure

Site BW, Feature 763 – Post-project



View from RB – Lower Structure

Site BW, Feature 763 – Pre-project



Downstream View from MC – Upper Structure

Site BW, Feature 763 – Post-project



View from RB – Upper Structure

Site BW, Feature 1010 – Pre-project



Upstream View from MC

Site BW, Feature 1010 – Post-project



Downstream View from RB

BW Site, Feature 1110 – Pre-project



Upstream View from MC

BW Site, Feature 1110 – Post-project



View from RB

BW Site, Feature 1226 – Pre-project



Downstream View from MC

BW Site, Feature 1226 – Post-project



Downstream View from RB

BW Site, Feature 1387 – Pre-project



Downstream View from MC

BW Site, Feature 1387 – Post-project



Upstream View from RB

BW Site, Feature 1600 – Pre-project



View from RB

BW Site, Feature 1600 – Post-project



View from RB

BW Site, Feature 2077 – Pre-project



Upstream View from MC

BW Site, Feature 2077 – Post-project



Upstream View from RB

BW Site, Feature 2534 – Pre-project



Downstream View from RB – Lower Structure

BW Site, Feature 2534 – Post-project



Downstream View from RB – Lower Structure

BW Site, Feature 2534 – Pre-project



Upstream View from MC – Upper Structure

BW Site, Feature 2534 – Post-project



View from RB – Upper Structure

BW Site, Feature 3081 – Pre-project



Downstream View from LB

BW Site, Feature 3081 – Post-project



Downstream View from LB

BW Site, Feature 3390 – Pre-project



Upstream View from MC

BW Site, Feature 3390 – Post-project



Upstream View from MC

BW Site, Feature 3544 - Pre-project



Downstream View from LB

BW Site, Feature 3544 – Post-project



Upstream View from LB

BW Site, Feature 3772 – Pre-project

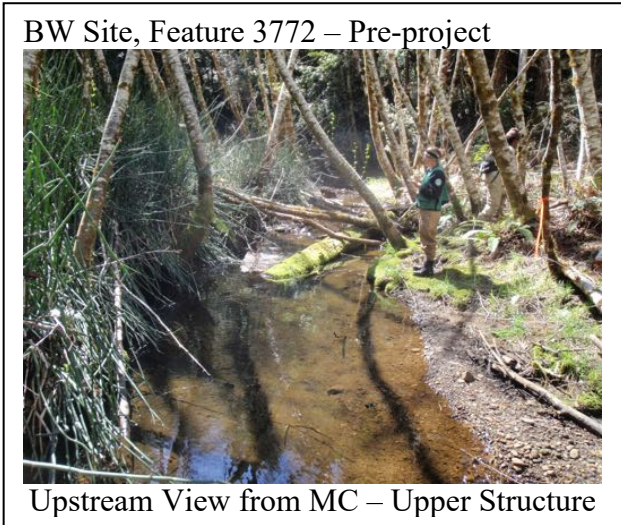


Downstream View from MC – Lower

BW Site, Feature 3772 – Post-project



Upstream View from LB – Lower Structure



Huckleberry Photos:

Site HB, Feature 338 – Pre-project



Downstream View from MC

Site HB, Feature 338 – Post-project



View from LB

Site HB, Feature 589 – Pre-project



Upstream View from MC

Site HB, Feature 589 – Post-project



Upstream View from LB

Site HB, Feature 849 – Pre-project



Upstream View from MC

Site HB, Feature 849 – Post-project



Upstream View from LB

Site HB, Feature 895 – Pre-project



Downstream View from LB – Lower Structure

Site HB, Feature 895 – Post-project



Upstream View from MC – Lower Structure

Site HB, Feature 895 – Pre-project



Upstream View from MC – Upper Structure

Site HB, Feature 895 – Post-project



Upstream View from LB – Upper Structure

Site HB, Feature 995 – Pre-project



Downstream View from MC

Site HB, Feature 995 – Post-project



Downstream View from MC

Site HB, Feature 1088 – Pre-project



Upstream View from MC

Site HB, Feature 1088 – Post-project



Downstream View from LB

Site HB, Feature 1175 – Pre-project



Downstream View from MC

Site HB, Feature 1175 – Post-project



Downstream View from LB

Site HB, Feature 1306 – Pre-project



Upstream View from MC

Site HB, Feature 1306 – Post-project



Downstream View from RB