Lower Mattole River Fish Habitat Improvement Project
Final Report
USFWS Cooperative Agreement with Mattole Salmon Group

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Cover Page

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Final Report
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Project Start and end dates: 6/30/10 to 2/28/11

Final Report

This project was funded by grants from both the EPA and USFWS.

Complete As Built Project Description

Project Justification and background

Prior to major land disturbances, the Mattole estuary/lagoon was notable for its deep, thermally-stratified pools and numerous functioning north and south bank slough channels that flushed sediments from the river and received marine water. These areas nourished and provided a stable habitat for a variety of avian, terrestrial, and aquatic species, including salmon and steelhead, which used it during summer rearing. However, land-use impacts from logging and road construction, followed by the 1964 flood, dramatically altered the estuary. The estuary was filled in with large volumes of sediment from up-slope and upstream sources, burying the once productive slough channels and estuarine habitats. Today the estuary is poor habitat for all salmon and steelhead species: the water is too warm, habitat cover is poor, and the channel lacks riparian vegetation, and therefore should be a focal point in reducing limiting factors for salmonids in the entire watershed (Downie et al. 2002).

Many studies have been conducted on the Mattole River Estuary documenting these adverse conditions (Barnhart and Young 1985: Young 1987, Busby et al., 1988). In addition, many reports have now been published that identify specific programs and projects that should be implemented to help restore the estuary, and therefore the watershed as a whole. Specifically, dynamics of recovery (MRC 1995), outlines projects relating to installing instream structures in the estuary. The Mattole River Watershed Assessment Report (Downie et. Al., 2002) recommends increasing pool depth, increasing cold water available to juvenile salmon, increasing cover, and increasing habitat complexity for restoration of the estuary/lagoon. The Mattole Watershed Plan (MRC 2005) created even further specific projects related to the findings reports previously mentioned, and specifically outlines mainstem LWD Habitat and scour structures.

Project Description

In March of 2010 MSG hosted a field tour of the estuary to discuss with our technical advisory committee the location and benefits of structure placement. The Committee was in agreement that placement of the LWD structures should happen in areas where possible slough water overflows occur into the mainstem of the Mattole River.

Discussion of the placement of the Apex jams was not conclusive due to high flows during the time of the field tour. A second and smaller field tour took place in June with USFWS engineer Connor Shea. During this second tour exact locations of the four apex jams were decided and marked.

Pre-site pool configuration was completed July 1st by Americorps volunteers Matt Hanington and Sara Burstein (see attachment A). High flows kept construction of project from starting until July 9th.

Wood Acquisition

The first phase of construction was wood acquisition. A local land-owner offered a small area (less than 1 acre) for harvest of wood. A road was constructed to the site using an excavator. The road was constructed to allow low-bed trailer access for hauling of wood to project site (approx. 4 miles from acquisition area to project deck A).

The excavator dug around each tree for harvest and pushed them over. Root-wads and 50 foot lengths of logs were decked at the acquisition site and then loaded and hauled to the project deck A. At the project deck a loader was on standby to unload logs.

Figure 1, Low-bed ready for haul to Project Deck A

LWD Structures

Once the wood acquisition phase was complete and all logs were at the project deck A, the loader hauled in the pieces across variable terrain approx ½ mile. The path for the loader was chosen in consultation with BLM to minimize impact to the landscape and existing vegetation. Loader delivered logs to project deck B. An area immediately outside the riparian forest approximately 30 yards from the location of the LWD structure sites. 12 large pieces were left at the project deck A. to be delivered across the river for the construction of the apex jams.

During the wood acquisition phase, 200 Tons of 2-5 ton boulders were delivered to project deck A. and also transported in to the project sites, with 100 ton of boulders intended for each structure.

The excavator opened up machine access to each of the specific sites. A siltation baffle was installed and the excavator began placement of the boulders. Wood was placed on top of the boulder foundation (see Figure 2.). Once the downstream structure was constructed (approx. 2 days of excavator work) the excavator moved to the up-stream site. Our ground crew moved the siltation baffle and construction began in the same manner.

Once construction of both structures was complete, the excavator assisted with the planting of large willow stakes along the disturbed bank area.

Hand crews then began the process of anchoring all the wood using 1" construction grade re-bar and ¾ galvanized cable (all anchoring techniques in accordance with the CADFG stream restoration manual).

The excavator removed the road-bed, native straw was used to mulch the site and the excavator moved to construction of the Apex Jams (see Figure 4).

Figure 2 LWD structure #5 under construction

Apex Jams

The sites for the four apex jams was on the north bank of the river (see map **Error! Reference source not found.**Figure 8). The loader transported the logs across the river, and the excavator began constructing the jams. The jams were constructed by using a minimum of four large pieces of wood each (40+ foot long pieces with root-wads). The root-wads were placed up-stream and the body of the log was buried downstream (see Figure 3).

Design and placement of the Apex jams was performed in cooperation with USFWS engineer Connor Shea.

Figure 3 Apex jam under construction

Tree planting and project wrap up

All in-stream work, including hand work of anchoring the structures was complete by August 17, 2010. Crews then hauled native grass straw to the site and mulched all areas disturbed by equipment. Note: willow and cottonwood were planted during construction with the assistance of the excavator. Planting of rooted alder trees took place in January 2011. Volunteers from the local high school in under the leadership of the Mattole Restoration Council planted the alder trees in the areas above the water line in disturbed areas.

Figure 4 Mulching disturbed sites after construction

Project Surveys, monuments and follow-up observation

Once all construction phases were complete, MSG ground crews completed two surveys. One elevational survey (see figure 5) which initiated from a monument at Collins gulch (see map **Error! Reference source not found.**Figure 8 **Error! Reference source not found.**) . The Collins Gulch monument was also used in cross-sectional surveys since the mid '90s. The intention of this survey was to link elevations of several key pieces of wood in all LWD and apex structures with the monument to determine elevational changes of the structures over time. Repeat surveys will take place by-annually.

Pre-project and post project site surveys used monuments located due south of LWD structures #5 and #6 outside of the work area. These monuments are marked with a nail in a tree and a steel tag (see map Figure 8 for location). The intention of these surveys is to understand the structures effects on the bathymetry. Repeat surveys will take place by-annually.

Figure 5 LWD Elevational survey

All project sites were observed and photographed throughout the winter to observe effects of flow and structure integrity. Our observations showed complete structural integrity of LWD structures, and a large accumulation of woody debris (see Figure 6 and **Error! Reference source not found.**Figure 7)

Figure 6 LWD structure #5 after flows

Figure 7 LWD structure #6 after flows

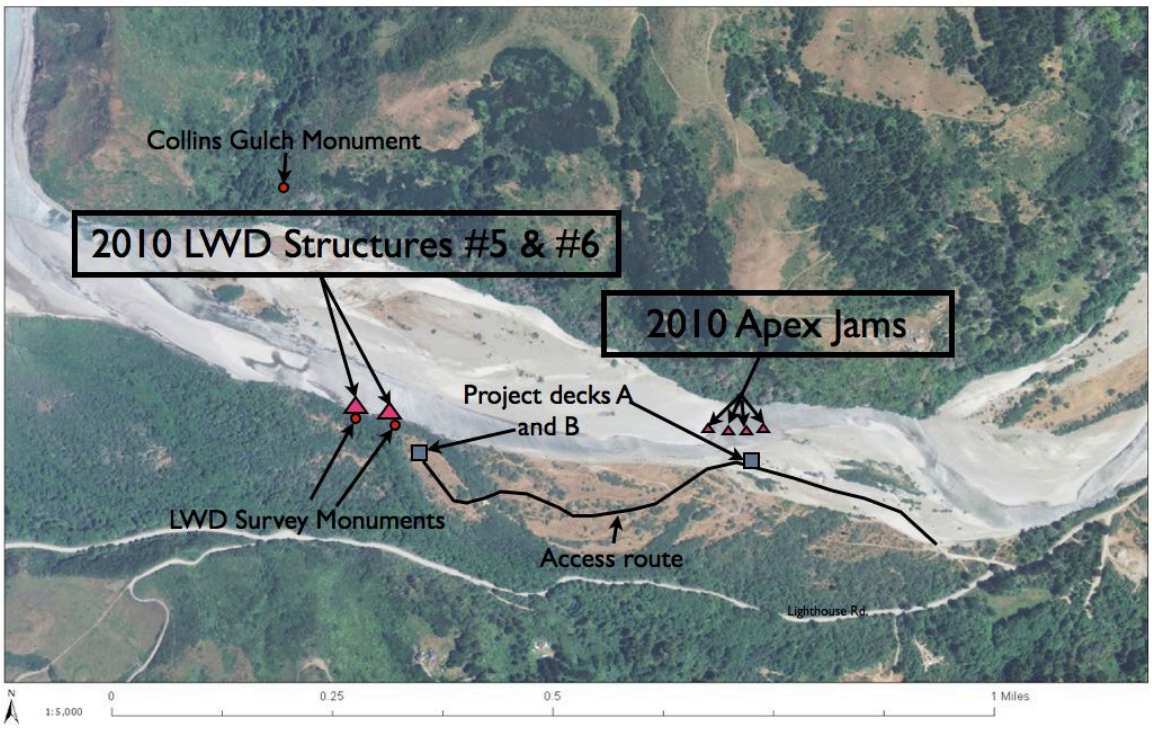

Figure 8 Project Area Map

Attachment A.
In-stream pre-site assessment data for Estuary Structures 2010
July 1, 2010
Matt Hanington, Sarah Burstein

Downstream structure site

Total Length	94 ft			YSI	
Monument Distance	Nail in tree in riparian area width	8.62 ft above water level depth	1.2	Time	15:28
				Temp C	21.5
0	0	0.01		mmHg	764
	10	0.88		DO %	101.9
	20	0.28		Do Mg/L	8.98
	30	0.37		Cond	0.201
10	0	0.1		pH	8.33
	10	1.08			
	20	0.28			
	30	0.4			
20	0	0.06			
	10	1.32			
	20	0.28			
	30	0.32			
30	0	0.18			
	10	2.2			
	20	0.38			
	30	0.26			
40	0	0.08			
	10	2.1			
	20	0.54			
	30	0.36			
50	0	0.16			
	10	2.34			
	20	0.63			
	30	0.42			
60	0	3.16			
	10	2.99			
	20	0.7			
	30	0.51			
70	0	2.56			
	10	3.31			
	20	0.56			
	30	0.52			
80	0	1.63			
	10	3.21			
	20	0.95			
	30	0.57			
94	0	2.18			
	10	2.38			
	20	1.01			
	30	0.74			

Upstream structure site

Total Length: 63 ft

Monument length	nail in tree width	10.8 ft above water level depth
0	0	0.52
	10	1.85
	20	1.39
10	0	0.06
	10	1.42
	20	1.53
20	0	0.12
	10	1.25
	20	1.26
30	0	0.16
	10	1.22
	20	1.11
40	0	0.14
	10	1.02
	20	0.85
50	0	0.1
	10	1.04
	20	0.65
63	0	0.06
	10	1.11
	20	0.64

YSI	
Time	16:00
Temp C	21.7
mmHg	763.9
DO %	102
Do Mg/L	8.96
Cond	0.201
pH	8.32

Attachment B.

Map of estuary area, structures and survey monument locations