

State Coastal Conservancy

Final Report

Project Title: Mattole Estuary off-channel and Slough Restoration

Agreement Number: 13-125

Award Period: June 1st, 2015 to June 1st, 2018

Grantee Organization: Mattole Salmon Group

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Reporting period: June 16th, 2014 to December 31st, 2017

Authors: Sungnome Madrone

Abstract

The BLM with the Mattole Salmon Group, and partnership organizations, developed a 5-year plan for enhancing the Mattole Estuary. The State Coastal Conservancy, the Department of Fish and Wildlife (DFW), and the Department of Water Resources funded major components of the 5-year plan implementation, which included helicopter wood-placement of over 150 trees and planting of willow cuttings in 2013, and another 250 whole trees in 2016. This current phase of plan implementation included 1. The completion of the Mattole Estuary Slough Restoration Plan and Designs; 2. Installation and construction of Fish Habitat improvement and streambank stabilization structures in the estuary; and 3. Native Riparian Vegetation Planting in the lower river/estuary area.

This report will focus on #2 above and #1 and #3 are presented in separate reports with great detail and are attached.

The 2016 helicopter wood placement component for this 2016 work included the following numbers:

L-1: 12 pcs

L-2: 9 pcs

R-1: 9 pcs

R-2 and R-3: 31 pcs

R-4: 22 pcs

R-5: 11 pcs

Woodzilla 2: 9 pcs

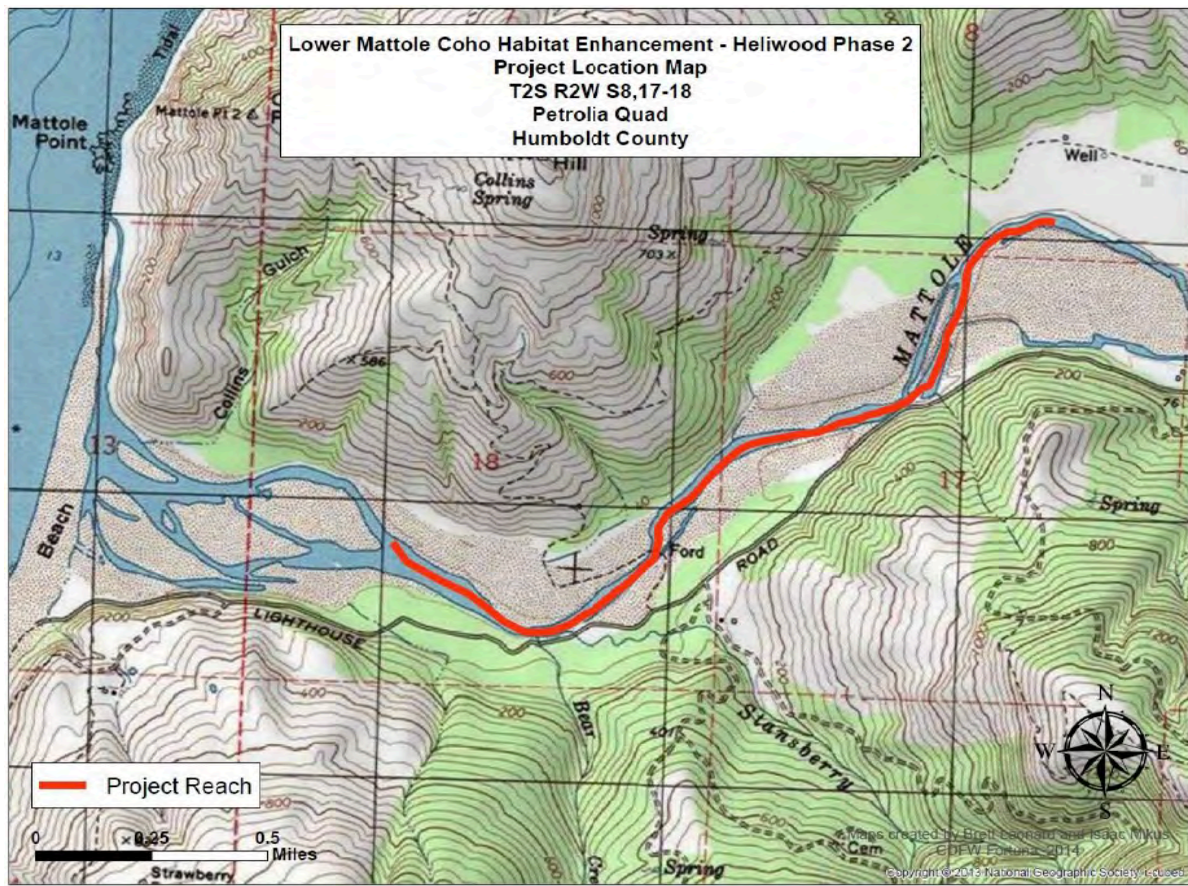
Total = 103 pieces placed instream, at terrace margins, or on the right bank (nearly all were whole trees, with boles and integral root wads). Please note that this is a minimum figure, as during post-placement field surveys of an unknown number of unanchored whole trees were swept downstream into areas of the estuary where accurate enumeration, geo-referencing, and PIT-tagging of individual trees became impossible.

Plus, approximately another 150 pieces were delivered to the south-side terrace -- to sites L-3 and L-4, located upstream from the 2013 project area -- and subsequently used for stream barbs (small to medium-sized trees, some without root wads).

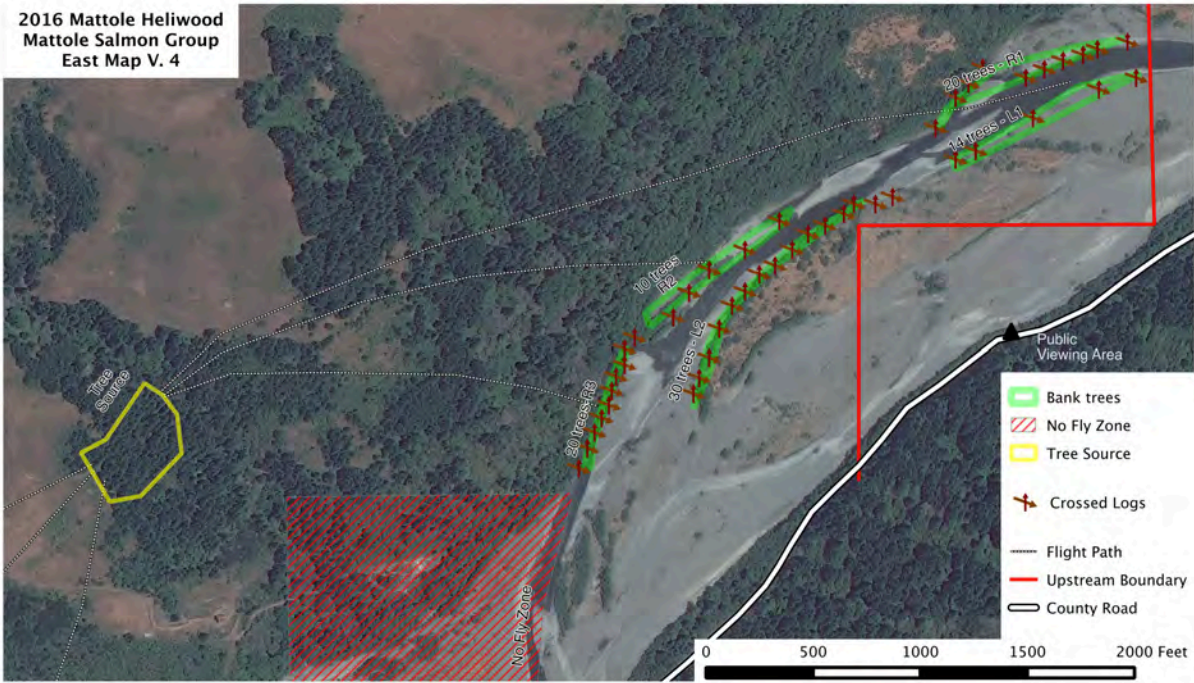
Trees were tipped on-slope with an excavator and placed in the river by helicopter. Monitoring includes PIT tagging each whole tree, GPS mapping, and a 1-foot contour topographical map of the entire riverine work site.

Location

Construction activities took place in the channel bed and along the banks of the Mattole River estuary. These include intermediate-elevation islands, bar apices, and terrace margins. All work sites are in the lower 3 miles of the river. The locations of the project boundaries are approximately 40.2925696degrees north latitude, 124.3447309degrees west longitude at the upstream end; and 40.2992245degrees north latitude, 124.3084057degrees west longitude at the downstream end as depicted on the Project Location Maps below.

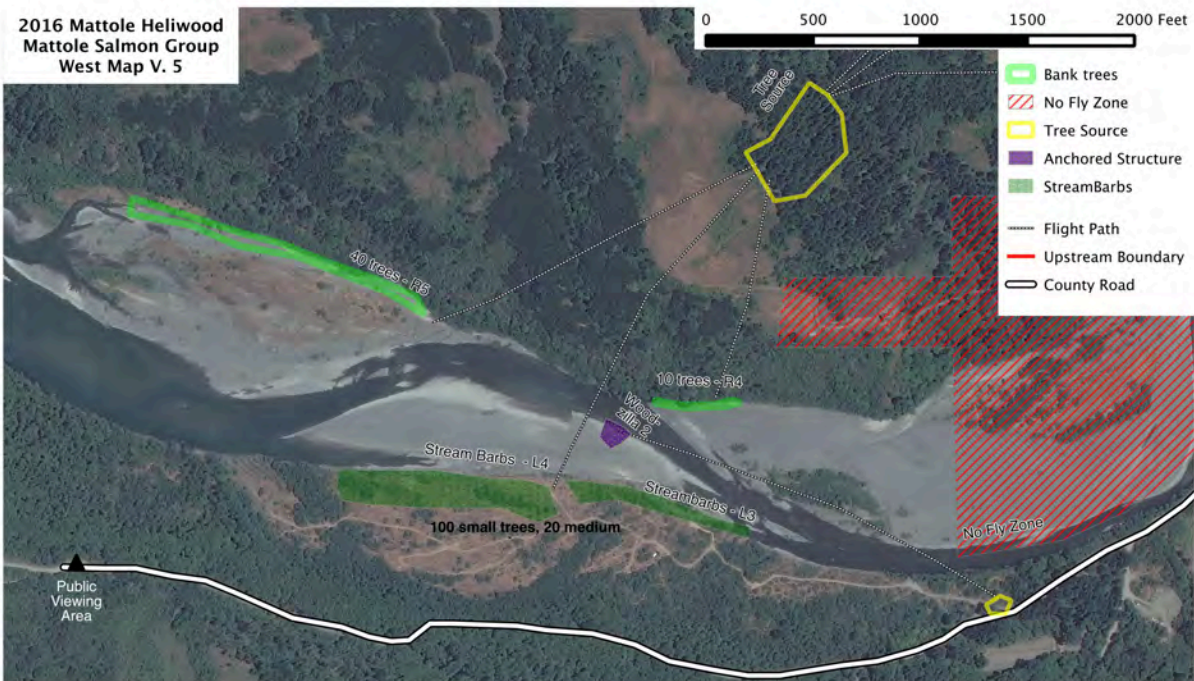


2016 Mattole Heliwood
Mattole Salmon Group
East Map V. 4



Map 1. Areas of Tree tipping and placement (East Side above and West Side below)

2016 Mattole Heliwood
Mattole Salmon Group
West Map V. 5



In early 2012 the Estuary Restoration Plan was completed and BLM began permitting the planned activities. These permits were secured in early summer 2013. MSG and MRC began fund raising in 2012 and were successful.

Heliwood

The placement of 250 whole trees or large pieces of trees, took place between September and October 2016. A helicopter was used to place trees to conserve as much branch and root wad complexity as possible. All areas disturbed in the process of tree removal were planted and mulched before winter rains.

Below are details of the work time line and process.

Landowners donated all of the trees, from nearby encroached grasslands. These encroaching trees were removed and the grassland areas restored. The removed trees are being used for structures within the river environment.

Beginning in July 2016 an excavator with a ground crew providing assistance prepared whole tree materials from Moore Hill (see map 1). Heavy equipment was used to improve the road to access the work sites. An excavator and D4 dozer were used to yard and tip. The crew tipped 250 whole trees. All materials to be placed by helicopter, were placed in areas accessible to helicopter grapple. Several trees were weighed using a crane scale to ensure appropriate weights for the Helicopter. Tipping work on Moore Hill was completed by 9/1/16.



Figure 1. Access Road before improvement.



Figure 2. Excavator working deck.



Figure 3. Tipped tree and pole deck.

From 7/1 to 9/1 an excavator and ground crew were mobilized to the site. Material was then decked into “helibundles” (logs grouped to maximize helicopter efficiency).

On 9/19-9/21 Columbia Helicopters brought in Aircraft and support crew. A Service landing area was established on Chambers flat, near the work site. Of the 250 whole trees tipped with many trees with root wads were transported to the river bar with the helicopter. Seven of the tipped trees were too large and were bucked down into smaller portions light enough to be carried. 253 total pieces of large wood were flown (including 200 root waded trees) in 150 turns in 12.5 helicopter hours.



Figure 5. Helicopter Arrives at Service Landing.



Figure 6. Helicopter delivers trees.



Figure 7. Large Wood in-stream whole trees.



Figure 8. Start of Woodzilla 2 with two 26,000 lb.40 foot long tree boles with root wads

Starting on 9/28/16 the excavator operator completed construction of the Woodzilla 2 apex jam as designed by our technical advisory committee.



Figure 9. Finish grading of tree donor site on Moore Hill



Figure 10. Mulching of tree donor site on Moore Hill



Figure 11. Revegetation of tree donor site on Moore Hill

Monitoring Program

After tree placement was complete, the Mattole Salmon Group implemented a monitoring program to answer the question, "Which trees moved, under what size flows, and where." This monitoring program involved placing a Passive Identification Tag (PIT) into each whole tree. A hole was drilled with a cordless drill at 4' above root wad. The hole was drilled towards the center of the log, and at a depth to put the tag ½ inch under the cambium. The tag was inserted into the tree (see figure 8). Silicone calk was used to seal the hole and secure the tag. Trees with greater than 16" diameter got two tags, on opposite sides of the tree. Additional information was collected about size (total length and diameter at breast height (dbh), species and complexity for each tree and associated with the trees individual number. Using a total station all trees were marked in their orientation on the landscape. The total station work gave us an as built map of the entire project site with one (1) foot contour intervals.

Two re-surveys have taken place since the project began. One in the spring of 2014, and another in Fall of 2014. Re-surveys involve scanning the tree PIT tags and using GPS to locate each tree on the project map. This shows which trees have moved and to where. We used a total station to re-map terrain elevations after many significant high flows (over 25,000 CFS) during 2016-2017.



Figure 12. PIT tag insertion into tree.

Stream Barbs/Deep Trenched Willow baffles

We constructed 30 stream barbs with 160- 60 to 80-foot-long trees that were 16-36” in diameter with root wads and limbs. The total trench length was 2740 feet with 3,340 willow cuttings 15-20 feet long and multi branched. The stream barbs treated 2010 feet of stream bank. This approach uses a bio-technical terrace margin treatment designed to increase bank resistance to erosion.

The trenches were placed at about a 30-degree angle downstream with the flow and about 50-70 feet apart. The trenches were excavated 15-20 feet deep to the summer water table so that the cuttings were placed in water immediately after being cut. After backfilling the trenches the area was regarded and mulched. During the winter the Mattole Restoration Council planted additional container riparian plants within the baffles trench areas. This planting is described in the detailed report by MRC attached.



Figure 13. Trenches with willow & wood



Figure 14. Revegetation at spoils site

Lessons Learned

Identifying the Service landing early in the process is important and the site needs to be accessible to large fuel trucks and service equipment. Larger trees required a larger helicopter to move them, such as a double prop Chinook. Cost effectiveness is tied to location of trees removed and locations placed. One mile flight distance max is suggested for cost effectiveness. Avoiding road crossings that would require road closures is important for quick turns per load. Deep trenched baffles and whole tree stream barbs are effective restoration techniques.

I. Results/Progress to Date

We have completed what will be the second phase of heliwood-loading in the Mattole Estuary. 253 trees were placed. The results from our surveys tell us that several pieces of wood have moved in winter storms. In some cases the wood may have been washed out to sea, however by far the majority the wood pieces have traveled downstream and settled at a new location. The trees seem to move through the river system slowly due to the drag from branches and root wads.

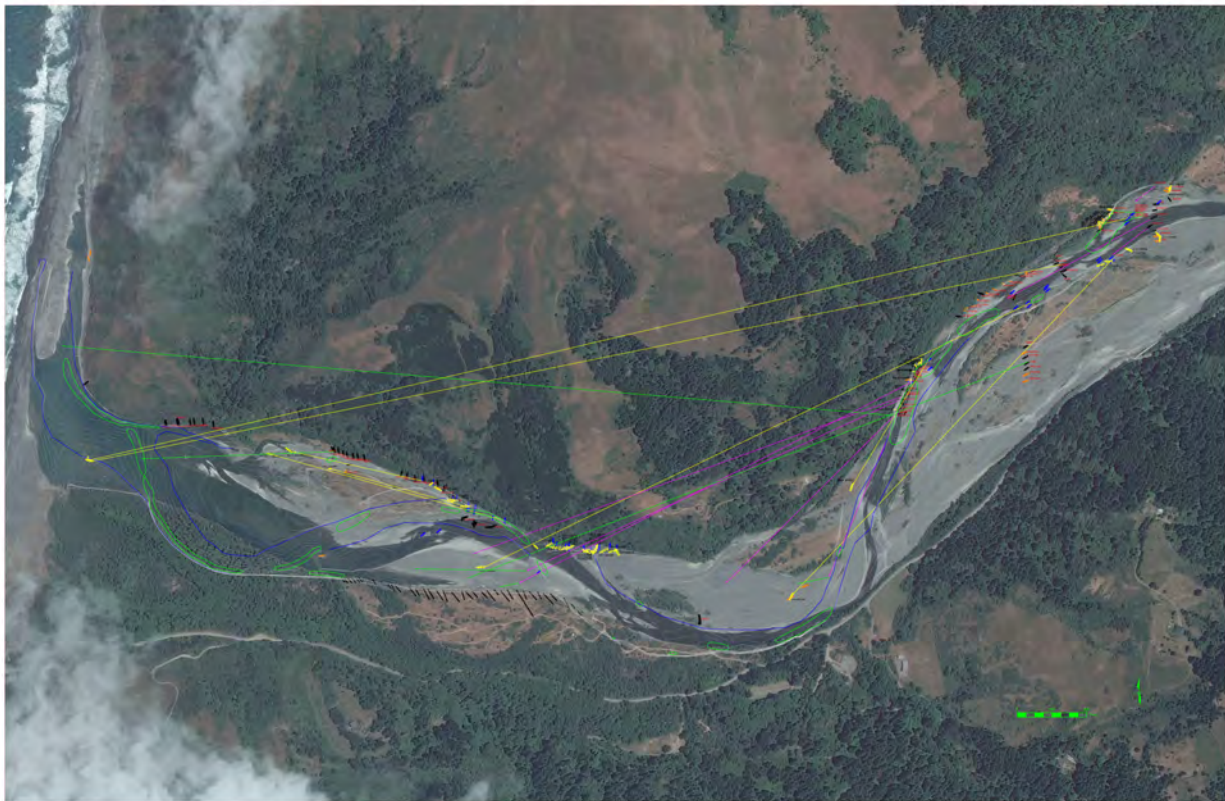


Figure 15. Wood movement after-winter flows of 2016/2017; includes 2013 and 2016 placed trees

The MSG feels that in situations where high volumes of large wood are placed the PIT tag/GPS monitoring method is an inexpensive and effective method to monitor the movement and progress of installed large wood.

Stream barb construction and deep trenched willow baffles were effective at protecting over 2000 feet of stream bank.

All riparian revegetation targets have been attained.

II. Restoration Targets and Progress

Habitat Type:	Acres/miles/metric tons accomplished in this reporting period:	Acres/miles/metric tons accomplished to-date (cumulative):	Acres/miles/metric tons projected to be completed at end of award:
Riverine and estuarine	Repair 15,000 ft of stream	15,000	15,000
Riverine and estuarine	Plant 2000 willows	3400	3400
Riverine	Place 253 trees	250	250

All helicopter wood was placed in an area in the Mattole Estuary covering 3 miles. The 250 pieces of large wood that were placed by the helicopter were spread throughout this area. The wood placed is expected to, over time, promote riverine island/bar creation and scour.

With riverine Island/bar creation – wood will hang up on elevational higher bars and contribute to establishment of willow and deposition of fines downstream. This will over time contribute to island creation and a more stable river channel that is lined with vegetation creating more complex and cool habitat.

Scour – Wood that gets hung up on elevational lower areas of strong current will promote scour under and around the wood.

New proposals have been submitted and funds have starting coming in for Phase 3 to include more whole tree placement and planting. A new TAC meeting is planned for next spring.

Results monitoring is ongoing and includes follow up location mapping of all placed trees, slough fish presence monitoring and water temps. Extensive photo monitoring has also occurred. An article was written for the Mattole Watershed News on the new slough excavation and is included with this report.

III. Permit Status

All permits were acquired and complete.

IV. Species Benefitting

Chinook, Coho, Steelhead

V. Project Partners

The Mattole Salmon Group (MSG), the Mattole Restoration Council (MRC), the Bureau of Land Management (BLM), CA Department of Fish and Wildlife (DFW), Department of Water Resources (DWR), the State Coastal Conservancy, and local landowners.

VI. Project Timeline

Project has been in development since 2012, and is part of an on-going restoration plan for the Mattole Estuary. On the ground-work for this component of the project began in late summer/fall 2016 and completed in fall 2016. Monitoring and additional components of the restoration plan are on-going

VII. Monitoring and Maintenance Activities

Trees placed have been tagged (as described above) and mapped. An as-built topographic map was created using a total station. We re-did the total station mapping after several significant bank full events, and we re-scanned and mapped each piece of wood in the low water season. These re-surveys, every few years will show us which trees move, when and how far. We can then equate tree size, complexity, anchoring, and location with stability/movement.

VIII. Community Involvement

	This reporting period:	To-date (cumulative):	Projected for completed award:
Volunteer Numbers:	15	15	15
Volunteer Hours:	150	150	150

IX. Outreach Activities

During fly days, MSG set up a meet and greet BBQ at the best viewing points. Curious neighbors stopped by the BBQ for a burger and discussion on what we were doing and why. Mattole Salmon Group arranged with the Local school for students to have a field trip to the site to see the work being done and to learn about the project.

AmeriCorps Volunteers and several local citizens provided volunteer services to monitor fish use, and spread seed and straw. Over 200 college students from Humboldt State University were taken on field trips to view restoration activities.



Figure 16. Elementary School at work site.

X. Supporting Materials

We developed maps and handouts to explain the project to the public and the media. We have written an article on the project and partners and are planning several presentations at future workshops and conferences, including the upcoming Salmonid Restoration Federation's annual conference. We led a field trip at the Coho Confab summer, 2017.

Project Budget

State of California
 State Coastal Conservancy
 Rev. SCC:1 (01/2015)

REQUEST FOR DISBURSEMENT FORM

Name of Grantee/Contractor: Mattole Salmon Group	Agreement Number: 13-125	Invoice Number: 13		
Address (include zip code): P.O. Box 188 Petrolia, CA 95558	Project Name: Mattole Estuary off-channel and Slough Restoration Project			
	Billing Period Covered: From: 1/1/17 To: 12/31/17			
Work Plan Task Number and Name <i>(insert rows as needed for work plan)</i>	Task Budget	Costs Incurred this Period	Total Cost to Date	Remaining Balance
Task 1: Project Coordinator	\$ 11,200.00		\$ 11,199.50	\$ 0.50
Task 1: Labor Specialist	\$ 8,000.00	\$ 525.00	\$ 7,991.50	\$ 8.50
Task 2: Project Coordinator	\$ 11,200.00		\$ 11,199.79	\$ 0.21
Task 2: Labor Specialist	\$ 15,000.00	\$ -	\$ 14,999.99	\$ 0.01
Task 3: Project Coordinator	\$ 2,200.00		\$ 2,200.00	\$ -
Task 4: Project Manager	\$ 10,000.00	\$ 89.20	\$ 10,009.22	\$ (9.22)
Task 4: Bookkeeper	\$ 4,000.00	\$ -	\$ 4,000.00	\$ -
Direct Costs: Field Supplies	\$ 823.00		\$ 823.00	\$ -
Direct Cost: 4x4 Truck Use	\$ 1,200.00	\$ -	\$ 1,200.00	\$ -
Direct Cost: Mileage	\$ 1,120.00	\$ -	\$ 1,120.00	\$ -
Subcontractors: MRC	\$ 40,000.00		\$ 40,000.00	\$ -
Subcontractors: MLA, Inc	\$ 8,988.00		\$ 8,988.00	\$ -
Subcontractors: Patrick Queen	\$ 77,029.00		\$ 77,029.00	\$ -
Overhead/Indirect Costs	\$ 9,240.00	\$ 65.12	\$ 9,240.00	\$ -
				\$ -
				\$ -
TOTAL	\$ 200,000.00	\$ 679.32	\$ 200,000.00	\$ -
LESS Ten (10%) Percent Withhold (if applicable)		\$ 67.93	Attach all receipts of expenditures , Progress Report & other supporting documents required.	
TOTAL AMOUNT REQUESTED		\$ 611.39		

Matching Costs

Source	Cash	In-kind	TOTAL
FRGP	\$299,784	0	\$299,784
DWR/IRWMP	\$210,000	0	\$210,000
Private Landowners	\$125,000	0	\$125,000
TOTAL PROJECT COST	\$634,784	0	\$634,784

Grantee Signature: _____

Grantee Name: Sungnome Madrone, ED_____