1. Project Title

Muddy River Tributary near Hoo Hoo Bridge

2. Project Manager

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3. Identification of problem or opportunity to be addressed

Problem:
The Muddy River and some tributaries were highly impacted by the volcanic eruption and subsequent lahar events of the 1980 eruption of Mt. St. Helens. Impacts include loss of mature riparian vegetation, high mobile sediment loads, loss of functional large woody material, channel instability, and increased summer water temperatures. Restoring or enhancing side channels and tributaries is critical to ensure success of reintroduced salmon and steelhead in the Muddy River Watershed. This habitat is essential for species listed under the Endangered Species Act (ESA) that use this watershed within the Lewis River Basin, including Lower Columbia River coho and Chinook salmon, steelhead trout, and bull trout. These species have endured many effects that threaten their survival in the watershed. Effects in addition to the Mount St. Helens eruption and associated lahar event include sediment inputs, shade reduction, large wood removal and passage barriers from past land management activities such as logging, roads, and development of hydro-resources, which until recently has blocked all access into the upper watershed for anadromous species since the 1930's. To ensure reintroduction efforts of salmon and steelhead into the upper basin are successful the Forest Service has worked with PacifiCorp on a variety of projects including acclimation ponds for juvenile spring Chinook salmon, road decommissioning, replacement of migration blocking culverts with bridges, and various streambank and instream fish habitat restoration projects.

Opportunity:
This project proposal develops the opportunity to ensure fish reintroduction efforts are successful in the upper North Fork Lewis River system including the Muddy River Watershed. It prioritizes opportunities for ESA listed fish species by restoring instream fish habitat to its full potential in a tributary of the Muddy River. Enhancement and restoration of instream habitat will increase the overall abundance of functional habitat in streams above the dams. This proposal builds on the success of several other projects in this tributary including a PacifiCorp funded project to remove a migration barrier culvert with a bridge, and an Ecotrust funded project to restore fish habitat in the lower portion of this tributary. The upper portion has great potential because the riparian vegetation is more intact than the lower section, and the stream was not as affected by 1980 volcanic events.

The Forest Service proposes to enhance ½ mile of the Muddy River tributary associated with Hoo Hoo Bridge, by creating instream structures composed of large woody material

with rootwads. The tributary has cooler summer water temperatures than many of the streams entering the Muddy River and has a dense riparian canopy of Alder and second growth conifers to keep the groundwater influenced flow well shaded and cool. The tributary currently lacks large woody material, but has the potential to provide excellent rearing and refugia habitats. Enhancing the stream with large woody material should bring it to its full potential and create desirable habitat for fish (Everest et al. 1985; Everest et al. 1986)

A tracked excavator will place 15 structures constructed from approximately 200 pieces of large wood, into the stream. The large wood will come from a timber sale unit currently being developed near Forest Road 8322700. Structures will be keyed into the stream bank by excavating a trench, placing logs with rootwads and backfilling over 2/3 of each log length. A tracked excavator will access the area via a remnant logging road, and will assemble the instream structures.

4. Background

Reconnaissance surveys conducted for this project occurred during August and September 2012. Juvenile coho salmon were first documented in this tributary by fisheries technician Bryce Michaels during the 2008 survey of the migration barrier culvert. They were located in the pool formed by the culvert which has since been replaced with a bridge. Spawning surveys occurred in September 2013 and two small redds by landlocked coho in the lower section that had restoration work were found. The Government shutdown in October 2013 prevented any further surveys from occurring, missing much of the coho spawning season. Restoration projects associated with this tributary include removal of a migration barrier culvert with a bridge in 2009 (Partial ACC Funds), Instream restoration of the lower reach of this tributary in 2012 (Ecotrust Funds), Invasive weed removal projects for Scotch Broom over the last 10 years (ACC, Rocky Mtn. Elk, Skamania County, Title II and USFS funds.)

A stream survey of the tributary was completed September 12-15, 2005. At that time rainbow and cutthroat trout were observed in the stream. The lower portion of the stream below the new bridge is within the Muddy River 100 year floodplain and was affected by the 1980 lahar. The reach upstream of the bridge was not directly affected by the lahar event, however past timber management activities occurred in this watershed and a remnant logging road located about 250-400 feet away parallels the creek for some distance. Large woody material was observed at about eight pieces per mile. Pools deeper than three feet were found to be approximately 2.2 per mile. Spot water temperatures recorded during the survey ranged from 9°-11°C.

The 2009 Lower Columbia Salmon Recovery Plan Six Year Habitat Work Schedule does not specifically identify this tributary, however the project tributary flows into the reach identified as Muddy River 2 which is rated as Tier 3. The Lower Columbia Fish Recovery Boards Salmon Recovery Plan specifically cites side channel habitat and stream channel habitat structure as high priority restoration needs. It is rated in the top five stream reaches for restoration work. The top three critical life stages identified in the plan are egg incubation and 0-age active rearing, and, 0-age inactive rearing (overwintering). The ACC Synthesis Matrix rated this section of the river as having Medium/High restoration potential and as a Primary coho population area with a low rating for coho reach potential. Concerns in Muddy River 2 include temperature, high sediment, channel stability, marginal riparian area and low instream large wood.

The Gifford Pinchot National Forest Restoration Plan identifies projects benefiting salmonid re-introduction as priority projects in the Muddy River 2.

5. Project Objective(s)

GOAL:
Enhance the quality of fish habitat in the Lewis River by:

- Improving habitat complexity and diversity in this cool water tributary to the Muddy River using Large Woody Material
- Providing refugia during winter flows for juvenile salmonids.
- Providing increased spawning opportunities for adult salmonids.

This project addresses the following Aquatic Fund priorities.

Priority 1: *Benefit fish recovery throughout the North Fork Lewis River, with priority to federal ESA-listed species.*
Coho salmon and steelhead trout are listed as a threatened species under the ESA. This project will directly benefit recovery of listed species by providing quality tributary habitat for rearing of juvenile salmonids. Spawning habitat will also be restored in the tributary.

Priority 2: *Support the reintroduction of anadromous fish throughout the basin.*
Creating quality rearing habitat in tributaries will support reintroduction of anadromous fish in the Muddy River Watershed, which flows into the North Fork Lewis River.. The ACC Synthesis Matrix rated this section of the river as having medium/high restoration potential and as a Primary coho population area.

Priority 3*: Enhance fish habitat in the Lewis River Basin-, with priority given to the North Fork Lewis River.*
This project is located in the Muddy River Watershed which flows into the North Fork Lewis River. It is well documented that coho salmon juveniles prefer slow water habitats with large wood components.

6. Tasks:

Task 1: NEPA and required permits.

1) NEPA was completed for this project area in 2010. NEPA for the timber stand was completed July 2013.

2) Instream restoration activities are covered within the WDFW-MOU, and the Regional Permit with the Army Corps of Engineers.

3) The Forest Service is the landowner and project sponsor, and permission has been obtained to do this project.

Task 2: Project Survey and Design.

1) Finalize project design and project preparation details. Preliminary designs completed during reconnaissance visits in 2013 will be refined and finalized. A laser level will be used to obtain a longitudinal profile and collect cross-sectional information as we finalize designs.

2) Secure materials. We have developed a 20 acre timber sale to use for fish habitat restoration activities over the next five years in the vicinity of Forest Road 8322700 road. We will layout an area within this stand to thin and prepare for harvest operations.

Task 3: Project Implementation

1) Develop equipment and logging contract. A standard RFQ contract will be developed specifying the scope of the project and project requirements. We will use an equipment rental contract to perform the actual work, which will allows us the flexibility to make changes to the project as implementation is occurring.
2) Administer contract. A Fish Biologist or Fisheries Technician will administer the contract to ensure contract compliance and project specifications are met.

Task 4: Monitoring

1) Perform baseline monitoring. This monitoring will occur prior to project implementation and include a longitudinal profile, cross-sections, pebble counts, photo-documentation and snorkel surveys. Mount St. Helens Institute (MSHI) will provide two interns and volunteers including urban youth to perform monitoring work, they will perform most aspects of the monitoring with supervision and training from the Forest Service. Snorkel surveys will be conducted by the Forest Service.
2) Perform post project monitoring, which will include the same parameters collected during baseline monitoring. This monitoring will occur following project implementation and will continue on an annual basis for several years following project completion. MSHI will provide two interns and volunteers for this portion of the work supervised by the Forest Service
3) Monitoring Report. A monitoring report will be written each year following project implementation. MSHI will provide raw data in excel format, provide analysis of data and will complete the report with USFS assistance.

7. Methods:

The Mt. St. Helens Fisheries department will oversee all phases of this project including project design, implementation and monitoring.

Approximately 15 structures will be created using 200 pieces of LWM that would be harvested during thinning operations from a nearby timber sale unit which would allow long stems (40+ feet) with attached rootwads to be obtained. Woody material will be trucked via Forest Road 8322700 and 8322, and stockpiled in a grassy area beyond the north side of Hoo Hoo Bridge. From there, the wood will be transported to each structure site using a logging skidder. Once at the site the logs will be moved and placed by an excavator. Wood for this project will come from a timber sale unit adjacent to Forest Road 8322700 road.

Approximately 10 to 15 pieces of LWM will be used at each structure location to form complex habitat. Structures will protrude 1/2 to 1/3 of the way into the channel to minimize water shear stress and create a meandering thalweg. Key pieces of wood at each location will be anchored into the streambanks using an excavator to dig trenches up to 30 feet long, and to bury the wood. Other pieces of LWM will be interwoven into these key pieces and riparian vegetation.

8. Specific Work Products

Deliverable 1: Completed project. Fifteen structures will be created using 200 pieces of LWD.

Deliverable 2: Construction Completion Report describing the project. Report to include project narrative, lessons learned and photographs of completed projects.

Deliverable 3: Monitoring Report.

Deliverable 4: Final Report describing the entire process and the status of the project two years after implementation.

9. Project Duration

Monitoring for this project would begin during the summer of 2014. Project implementation would occur July 15th 2015 and is expected to take two weeks to complete. 'As built' documents will be completed by December 31st, 2015. An initial report documenting fish response to the structures will be completed by December 31st, 2016. The first monitoring report with pre and post project data will be available December 31, 2015. If funding or LWM supply becomes an issue, project dates would be delayed by one year from above.

A project closeout meeting would occur at an ACC meeting following project completion.

10. Permits

The Gifford Pinchot National Forest has a Memorandum of Agreement with the Washington State Department of Ecology (DOE). The agreement recognizes the Forest Service will ensure that 1) all waters on National Forest lands meet or exceed water quality laws and regulations (Sections 301, 302, 303, 306 and 307) of the Clean Water Act and 2) activities on those lands are consistent with the level of protection of the Washington Administrative Code relevant to state and federal water quality requirements. This agreement is neither a fiscal nor a funds obligation document.

The Gifford Pinchot National Forest has a Memorandum of Understanding (MOU) with the Washington State Department of Fish and Wildlife Regarding Hydraulic Projects conducted by USDA Forest Service Northwest Region (2005). Compliance with the instream restoration provisions within this MOU replaces the need for an individual hydraulic project approval (HPA). This fish habitat enhancement project will be conducted within the project design criteria provisions set forth in this MOU.

The Clean Water Act (as amended by the Water Quality Act of 1987, Public Law 100-4) authorizes the states to regulate the "fill and removal" activities of Federal agencies. In Washington, the Forest Service has authorization for its fill and removal projects through the MOU with WDFW when the projects comply with the provisions of the MOU.

The US Forest Service has a state wide Regional General Permit (RGP) with the Army Corps of Engineers to perform aquatic restoration activities in waterways. Permit CENWS-OD-RG-RGP-8 authorizes the USFS to perform 13 restoration activities including Large Wood, Boulder and Gravel Placement on National Forest Lands.

Land ownership in this section of the Lewis River is comprised of public lands. The project is wholly on public lands administered by the USDA Forest Service.

11. Matching Funds and In-kind Contributions

Partner	**Contribution**	**Funds**
Forest Service	Project development, Contracting, Permitting, Monitoring	$14,000 In-kind
Materials from USFS	Trees with rootwads	$30,000 In-kind
Mt. St. Helens Institute	Monitoring	$2,000 In-kind

12. Professional Review of Proposed Project

This project proposal was reviewed by Gifford Pinchot National Forest (GPNF) Soil and Water program manager, Ruth Tracy, Mt St. Helens Institute Science and Education Programs Manager, Abi Groskopf, and acting Forest Fisheries program manager Ken Wieman.

13. Budget

		NEPA	Final designs	Project Mgmt	Construction	Monitoring/Labor /Reporting/Coord.
Personnel Costs						
FS - Zone Team or Contract						
FS –Fish Bio and Hydrologist			$4,000 (IK) $1,000 (ACC)			
FS - Fish Bio and Bio Technician				$5,000 (IK) $4,000 (ACC)		$1,000 (ACC)
FS - Contract administrator -					$3,000 (IK) $4,000 (ACC)	
FS - Contract Specialist					$2,000 (IK)	
Mt St. Helens Institute						$3,000 (IK)
Mt. St. Helens Institute Community Education						$3,000 (ACC)
Materials						
Forest Service 200 Pieces of LWM with rootwads					$30,000 (IK)	
Contract Payables						
Excavator Contract					$12,000 (ACC)	
Logging and hauling of trees					$15, 000 (ACC)	
Materials and Supplies				$1,000 (ACC)		
Total ACC Funds	**$41,000**		**$1,000**	**$5,000**	**$31,000**	**$4,000**
Total FS Funds	*$44,000*		*$4,000*	*$5,000*	*$35,000*	
Total Partner Funds	*$2,000*					*$2,000*
Project Total	***$87,000***					

FS personnel estimated at $400/day.

Muddy River Hoo Hoo Tributary expanded budget 2014

Item	**Personnel**	**Estimated Days/units***	**Cost Per Unit**	**Total***
Final Designs	Fish Biologist Hydrologist Fish Technician	5 2 5.5	$400 per day per person	$4,000 (IK) $1,000 (ACC)
Project Management	Fish Biologist Fish Technician Mileage	10 10 2000 miles	$400 per day per person $0.50	$4,000 (IK) $4,000 (ACC) $1,000 (IK)
Construction	Contract Administration/Prep Transportation Logging contract Equipment contract	21 **1**,000 miles	$400 per day per person $0.50	$4,500 (IK) $4,000 (ACC) $500 (IK) $15,000(ACC) $12,000 (ACC)
Materials & Supplies	Field Equipment, Notebooks, Misc Supplies			$1,000 (ACC)
Trees with rootwads		200		$30,000 (IK)
Monitoring *MSHI* *USFS*	 Supervisor Assistant Fish Biologist Volunteers Transportation	 10 2.5 25 1,000	$300 per day per person $400/per day $20 $0.50	 $1,500 (IK) $3,500 (ACC) $500 (IK) $500 (ACC)
Total				**$87,000**

*Values are rounded up or down as need to display whole number and days

Muddy River Hoo Hoo Tributary Equipment Budget 2014

Item	Cost per unit	Number of units	ACC cost	Total Cost
Excavator Operator/Fuel/ Supplies, misc	$125 hour	84	$10,500	$10,500
Excavator Move in/out	$1,500	1	$1,500	$1,500
Logging and Hauling cost: Based on Previous Contract	$15,000	1	$15,000	$15,000
Total			**$27,000**	**$27,000**

14. Photo Documentation (Per National Marine Fisheries Service's Biological Opinion for Relicensing of the Lewis River Hydroelectric Projects):

    Identify process or methodology project will include to provide photo documentation of habitat conditions at the project site before, during, and after project completion.

    a. Include general views and close-ups showing details of the project and project area, including pre- and post-construction.
    b. Label each photo with date, time, project name, photographer's name, and documentation of the subject activity.

15. Insurance. All qualifying applicants shall comply with PacifiCorp's insurance requirements set forth in Appendix E. The policy limits are deemed sufficient by PacifiCorp for project activities involving significant risk, including placement of large woody debris in navigable waterways, and are presumed to be sufficient for all activities likely to be funded under this RFP.

Should applicant's insurance program not meet these requirements, bid pricing should include any additional costs applicant would incur to comply with these requirements.

Questions from ACC members

All projects: Proposals should demonstrate that the project is scientifically supported, has a clear nexus to the Lewis River hydroelectric projects, and clearly supports the Aquatic Fund objectives. Please prepare the document with the assumption that the reader is not familiar with the Lewis River basin, its issues, or its resources.

Muddy River Tributary near Hoo Hoo Bridge

LCFRB: Project occurs in an unrated reach, which indicates a low priority for habitat improvement. Biggest question for this proposal: is it benefiting habitat that is limiting production? Proposal says it will improve rearing habitat but should be expanded to demonstrate how much rearing habitat will be provided as a result of this project. Also need to document that rearing habitat is a limiting factor. Proposal would benefit from providing additional usage data, especially since this is and unrated tier that currently has a low restoration value. Current usage data is anecdotal in nature and a more systematic survey that would document both adult and juvenile usage would provide data to better assess value of this project. It appears that a similar project was recently completed downstream in the same location. Is there any data regarding usage or habitat benefits observed from that project? If this project is building on previous projects funded by the Aquatic Fund this proposal should include that information, especially any usage data collected since that project was completed. Also, should identify that habitat being improved is upstream of a location where a passage barrier was recently addressed (Culvert Replacement). Project as described is a good project at a very good cost, but is it in the best location? This may be a timing issue where some usage data is collected and provided to support this project next year. Why are we doing the work here?

Habitat in the Muddy River was severely impacted during the 1980 lahar event, therefore tributaries in the Muddy River such as this one that were not impacted by the lahar are crucial refugia areas. We believe this project will improve habitat that is limiting production both in this tributary and the Muddy River watershed. Usage data for juveniles is not available, however no juvenile coho were observed during several site visits in 2013, and only limited spawning data information was collected. Information on the restored section of stream is also limited in nature; however the two redds observed in 2013 were associated with the restoration activities. Other restoration work associated with this project includes removal of a migration barrier culvert with a bridge in 2009, invasive weed removal in the riparian area of this stream and the Muddy River floodplain, decommissioning of 1 mile of the 8322700 road, and decommissioning of 3 miles of road since 2008 in the watershed. One of the other key issues is this tributary was documented in 2005 as having summer water temperatures several degrees cooler than other nearby tributaries, thus making this an ideal summer rearing tributary for salmonids.

Utilities: It appears that improvements may provide additional habitat for coho since there is already some existing use albeit those were landlocked. Currently, this tributary is not part of the coho sample framework for upper river surveys. Is not clear why, but at some point it was decided that this is not a spawning stream (for transported adult anadromous species). Therefore, the benefits need to be evaluated further despite the two landlocked coho that were observed in the tributary.

The stream reach appears to have potential for transported adult spawning. Progeny from both residualized or transported coho have important value in meeting the reintroduction's goals.

This stream is similar in nature to other nearby tributaries where transported coho were observed. To date, only landlocked salmon were observed spawning in this tributary; however juveniles documented below the culvert were progeny from transported fish.

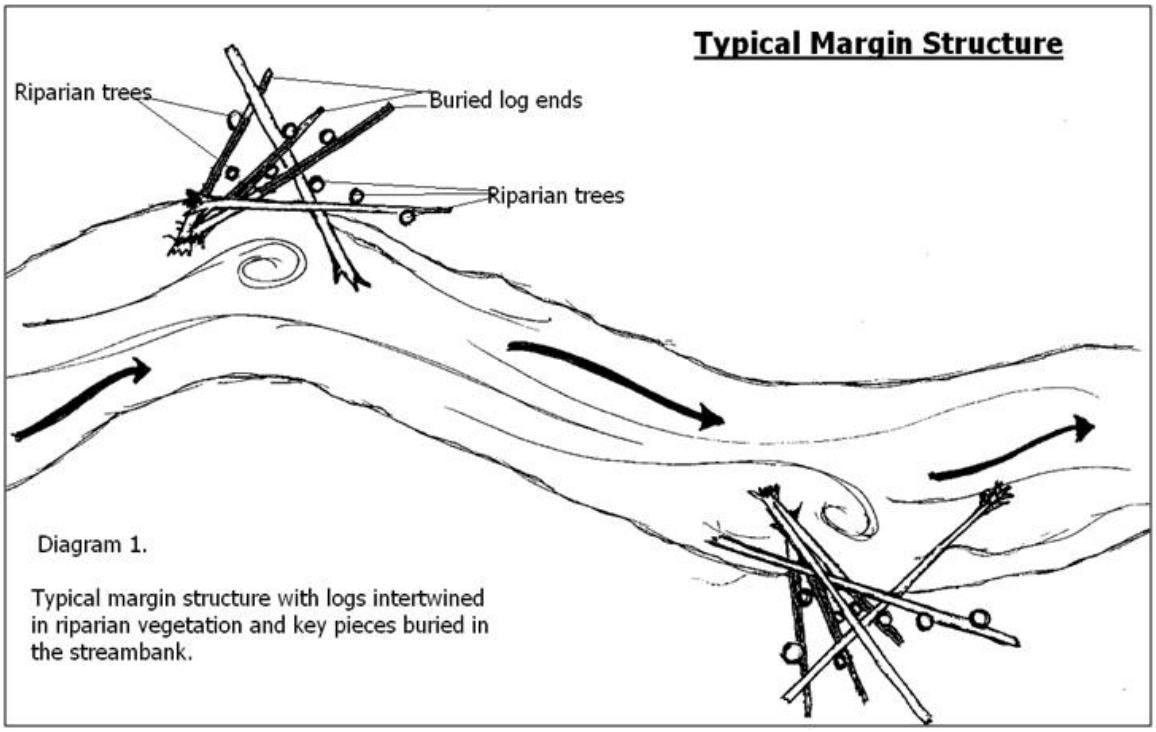
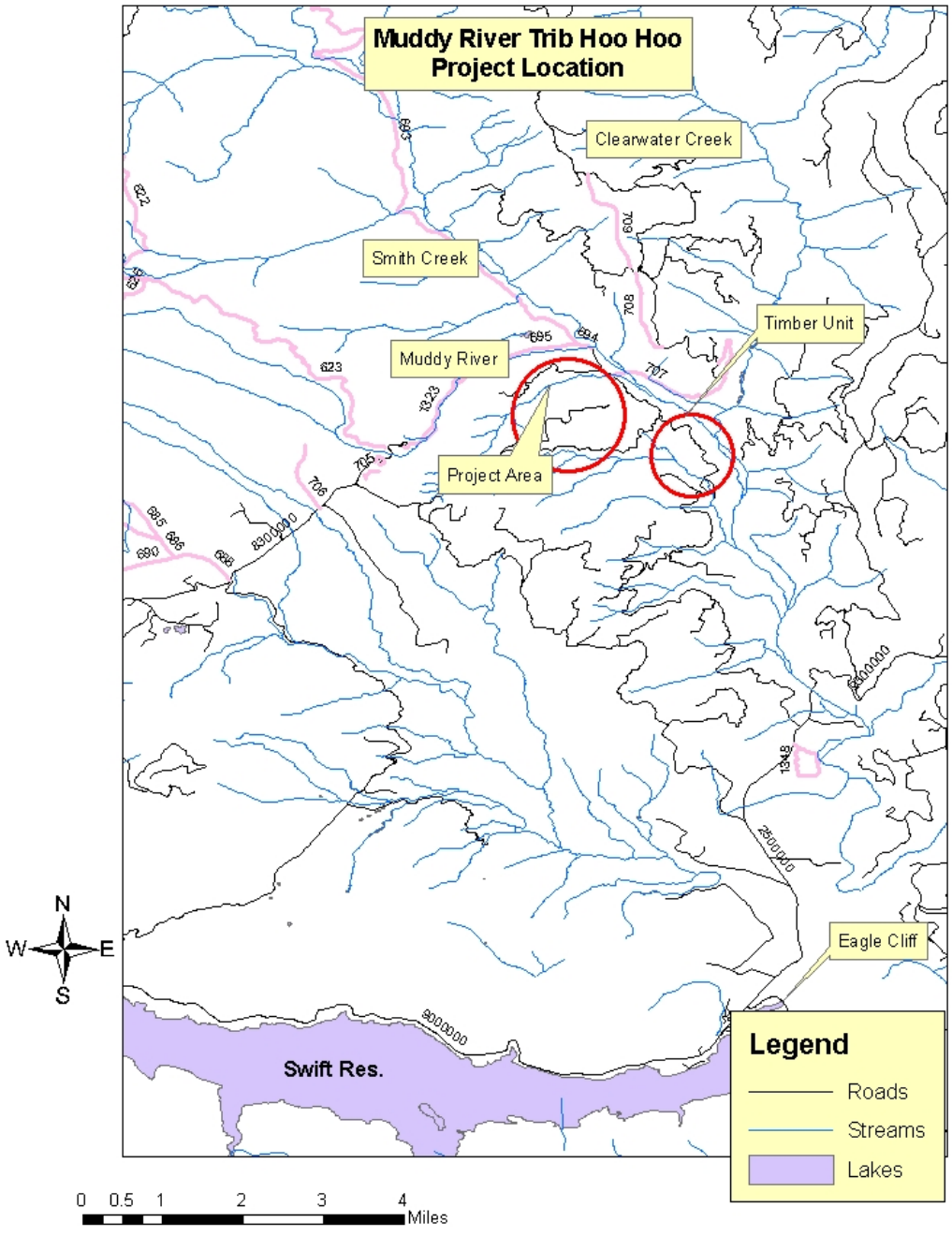
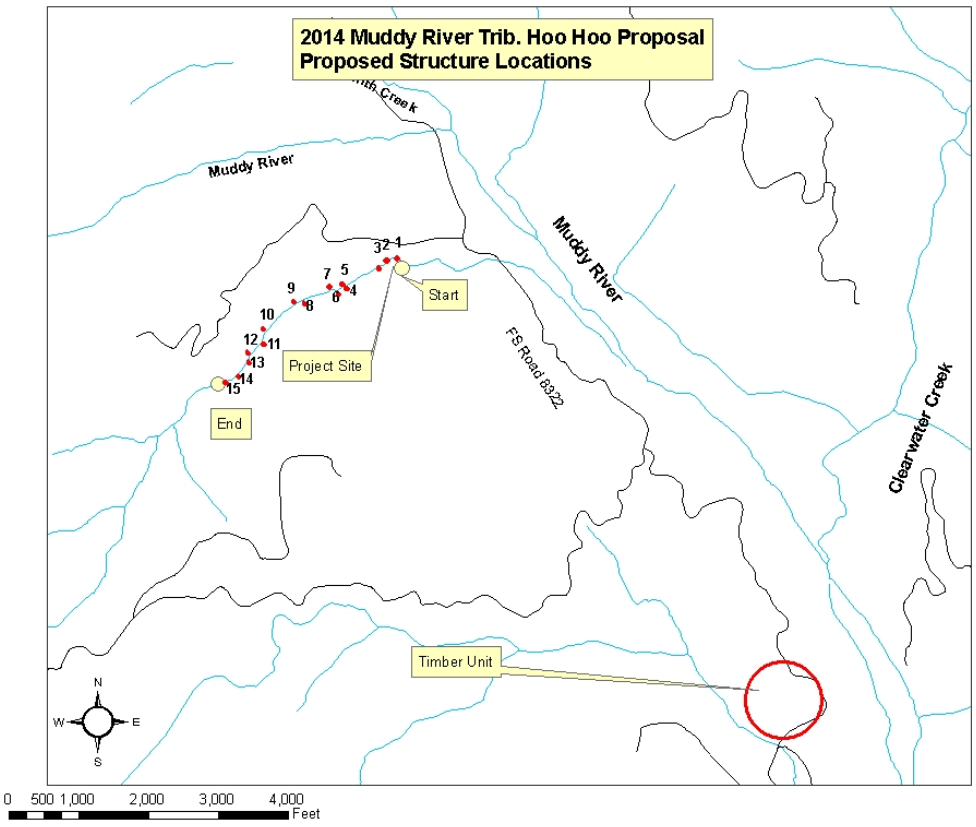


Diagram 1.

Typical margin structure with logs intertwined in riparian vegetation and key pieces buried in the streambank.


Muddy River Trib Hoo Hoo
Project Location
Clearwater Creek
Smith Creek
Timber Unit
Muddy River
Project Area
Eagle Cliff
Swift Res.
N
W
E
S
0 0.5 1 2 3 4
Miles
Legend
Roads
Streams
Lakes


2014 Muddy River Trib. Hoo Hoo Proposal
Proposed Structure Locations
Muddy River
Muddy River
Clearwater Creek
FS Road 8322
Start
Project Site
End
Timber Unit
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
N
W
E
S
0 500 1,000 2,000 3,000 4,000
Feet

2014 Muddy River Trib. Hoo Hoo Proposal
Proposed Structure Locations

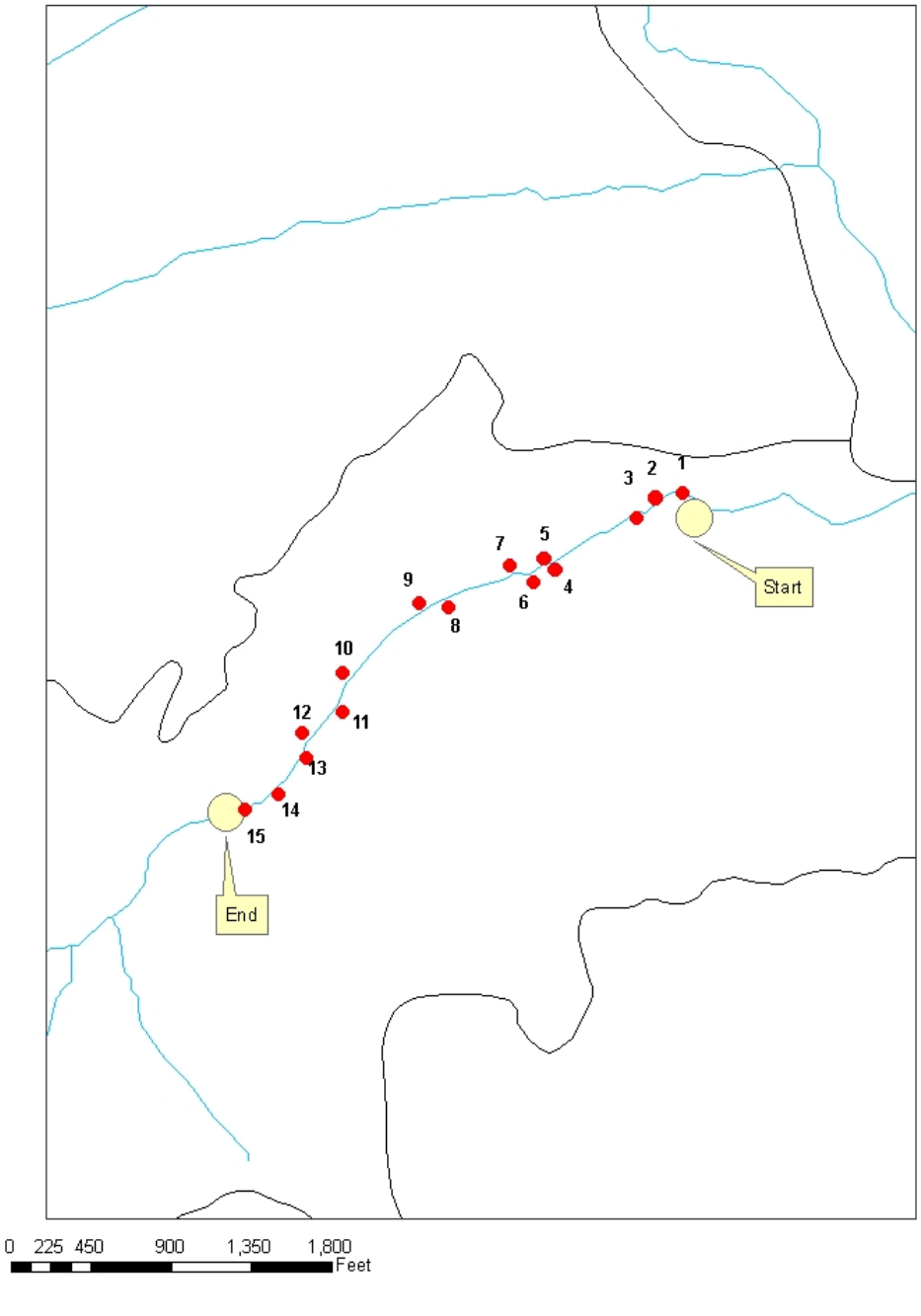


Table of structure design criteria and expected outcomes

Structure Number	Hiding Cover	Overwintering Refugia	Summer Rearing	Pool Formation	Gravel Sorting	Bank Stability
1	x	x	x	x		x
2	x	x	x	x		x
3	x	x	x	x		x
4	x	x	x	x	x	
5	x	x	x	x	x	
6	x	x	x	x	x	
7	x	x	x	x	x	
8	x	x	x	x	x	
9	x	x	x	x	x	
10	x	x	x	x	x	
11	x	x	x	x	x	
12	x	x	x	x	x	
13	x	x	x	x	x	x
14	x	x	x	x		x
15	x	x	x	x		x

1. Photos of past restoration downstream of project proposal

2. Section of stream below project proposal area

References

Everest, Fred, James Sedell, John Wolfe, 1985. “Fisheries Enhancement in the Fish Creek Basin”, Project No. 1984-01100, 234 electronic pages, (BPA report DOE/BP-16726-1)

Everest, Fred H. Gordon H. Reeves, James R. Sedell, Pacific Northwest Forest and Range Experiment Station 1986. Abundance, Behavior, and Habitat Utilization by Coho Salmon and Steelhead in Fish Creek, Oregon as Influenced by Habitat Enhancement 1985 Annual Report.