

PROPOSAL FORM

Lewis River Aquatic Fund

1. Project Title

Eagle Island Habitat Enhancement: Sites B and C

2. Project manager

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3. Identification of problem or opportunity to be addressed

Problem:

In the watershed of the North Fork and lower mainstem of the Lewis River, there is scarce high-quality riparian zone and in-stream spawning/rearing habitat. This habitat is essential for species listed under the Endangered Species Act (ESA) that use the Lewis River basin, including:

1. Lower Columbia River Chinook salmon, listed as a threatened species,
 - Lewis River is designated critical habitat
2. Columbia River Chum salmon, listed as a threatened species,
 - Lewis River is designated critical habitat
3. Lower Columbia River Steelhead, listed as a threatened species,
 - Lewis River is designated critical habitat
4. Lower Columbia River Coho salmon, listed as a threatened species,
 - Lewis River is proposed as critical habitat
5. Bull Trout, listed as a threatened species,
 - Lewis River is designated critical habitat
6. Eulachon, listed as a threatened species,
 - Lewis River is proposed as critical habitat

These species have endured many impacts that threaten their persistence in the watershed. The impacts arise from various sources and include: alteration of natural flow regimes, degradation of riparian habitat function, loss of floodplain and off-channel habitat areas, inputs of point source and non-point source pollution and impacts of urbanization.

Opportunity:

This project proposal develops the opportunity to benefit fish recovery throughout the North Fork Lewis River, with priority for federal ESA-listed species, by restoring critical riparian zone and in-stream habitat at Eagle Island Sites B and C (Fig. 1). Enhancement of existing riparian forest and in-stream habitat will support larger populations of anadromous fish. This project will also increase the overall abundance of functional habitat, which is in short supply throughout the lower Lewis River.

Our proposal to the ACC is an opportunity to leverage PacifiCorp mitigation funding in the Lewis River watershed at a better-than 6:1 ratio. We will use this ACC award as an anchoring match to leverage additional funding from the Salmon Recovery Fund Board. We estimate the entire project cost for Eagle Island Sites B and C as \$535,000, but request only \$85,000 from the ACC. If for any reason the balance of necessary funding for this whole project is not secured, our ACC award will be returned in full to PacifiCorp.

The Cowlitz Tribe successfully used this leveraging approach in the ACC 2010 round to leverage an additional \$355,000. We anticipate continuing to use this paired funding mechanism to finance restoration projects in the Eagle Island reach of the Lewis River for many years.

The Tribe has integrated Sites B and C into one proposal in order to reduce the significant amount of staging necessary to access the sites. Combining these projects and implementing them simultaneously reduces costs that would be incurred if they were funded separately and implemented sequentially.

Finally, sites B and C are the second and third projects in a large suite of salmonid habitat restoration opportunities developed within Eagle Island reaches for the Eagle Island Technical Oversight Group (TOG). The Cowlitz Tribe successfully obtained funding for Site A and will begin implementing that project in 2011. Other subsequent projects are in scoping and development.

4. Background, Combined Sites B and C

Geomorphic Setting

The project sites are located in the broad alluvial lower Lewis River valley. The river channel is unconfined at this location. Channel type is pool-riffle dominated by gravel and cobble substrate. Gradient is very flat at approximately 0.1%. Summer low-flow wetted-width of the Lewis River south channel at this location is approximately 180 feet. There are few well-defined pools; past habitat surveys indicated most of the habitat in this reach is composed of glide habitat (PacifiCorp 2004).

The historical record (aerial photos dating back to 1938 and survey maps dating back to 1854) indicates a history of active channel dynamics in the project area. Changes in channel shape and structure are due to natural flood processes, as well as human activities including gravel mining. Aerial photos since 1938 show flow in both the north and south Eagle Island channels, with summer flow slowly shifting to the south channel over time.

At the reach scale, channel complexity, available habitat cover, and the health of native riparian forest communities have been reduced since historical conditions. Reach-scale fluvial evolution is progressing toward a simplified channel planform as former multithread channels are abandoned. Past gravel mining, and possibly the effects of the hydropower system on sediment transport, have contributed to incision that has resulted in abandonment of off-channel habitat and has appeared to reduce the frequency of channel adjustment.

Large Woody Debris Conditions

LWD in the mainstem Lewis River has been quantified as part of a number of studies, including the Stream Channel Morphology and Aquatic Habitat Study (BioAnalysts, et al. 2003, WTS-3 Report) and a habitat assessment conducted by the Lower Columbia Fish Recovery Board (LCFRB 2004a). The WTS-3 Study counted 72+ pieces (>15 cm diameter and >7.6 meters long) in the Eagle Island channels in 2000 and the LCFRB study (2004a) counted approximately 113 pieces (>10 cm diameter and >7.6 meters long).

Large woody debris (LWD) conditions in the lower river below Merwin Dam were evaluated as part of the Lewis River LWD Study (Interfluve et al. 2008). The study estimated the historical abundance of LWD pieces by reach using a regression model developed from old-growth streams throughout Washington State (Fox and Bolton 2007). These data suggest an historical LWD frequency of approximately 70 pieces per 100 meters, for a total of 2,709 pieces (>10 cm diameter and > 2 meters long) within the Eagle Island reaches. Thus, historical LWD numbers may have been on the order of 20 times larger than current numbers in the Eagle Island reaches.

As part of the LWD Study, a survey was conducted on August 10, 2007 to identify the quantity of “key pieces” of LWD in the mainstem. A key piece was defined as a piece that was judged to be self-stabilized within the bankfull channel. In the Eagle Island reaches (Lewis 4A and 4B) a total of 5 key pieces were identified; 4 were cottonwoods and one was of unknown species. One piece in reach 4B was serving as a key piece of a large jam that extended up onto the river right flood terrace (South channel, river mile 11.3). The presence of large key pieces is critical in a system the size of the Lewis, where most wood will only be retained in the channel as part of large jams that are initiated by very large (i.e. old-growth) key pieces.

In general, the LWD study concluded that LWD dynamics have been severely altered in the mainstem. The ability of the Lewis River to support significant quantities of LWD is impacted by: 1) the series of hydroelectric dams that interrupt wood transport, 2) past harvest of large trees that could provide a source for key pieces, 3) alteration of the natural flood regime that could serve to recruit wood from the stream corridor, and 4) channel alterations that reduce channel migration processes that could recruit LWD.

Fish Species and Use

The lower North Fork Lewis Basin is used by 6 populations of salmon and steelhead, including fall and spring Chinook, winter and summer steelhead, coho, and chum. The fall Chinook run consists of an early-spawning “tule” run as well as a late-spawning “bright” run. Fall Chinook make extensive use of the lower mainstem for spawning. The highest concentrations of Chinook spawning occur within the 5 mile reach downstream of Merwin Dam; however, Chinook spawning also occurs within the Eagle Island reaches.

Since the early 1980s, WDFW has conducted juvenile seining targeting fall Chinook in the spring and early summer (typically late May to early July). The seining effort is conducted in order to capture juvenile fall Chinook for tagging and is not specifically designed to map spatial distribution or habitat preferences for juvenile rearing. Nevertheless, the data does provide some indication of occurrence of juvenile rearing in the project area. Data from 2004 to 2008 indicate 700 to 3,600 have been captured near Site B; and 0 to over 10,000 have been captured near Site C. Based on species composition for the entire lower river, the vast majority of these juvenile fish are Chinook, with smaller amounts of coho, trout, and chum (very few chum would be expected in these catches).

In addition, unpublished 2008 and 2009 WDFW survey data for winter steelhead show multiple redds in close proximity to the entrance of the Site C side channel (Fig. 2).

Although eulachon are known to ascend as high in the Lewis River as the base of Merwin Dam, it is not expected that these enhancements to alcove and side-channel structure and habitat will benefit the species, either returning spawners, eggs or larvae.

Though Bull Trout are known from the basin, none are expected in this reach.

Site Description: Site B

Site B is located on the right bank (west) side of the south channel 750 meters below the upstream end of Eagle Island, and consists of an alcove and backchannel complex that is approximately 220 meters long (45.935751N -122.689128E, Fig.1).

This site is located on river right across from the Site A side-channel outlet. This site contains numerous meander-scar traces from historical mainstem channel locations. The upstream portion of the site consists of a large alcove and the downstream portion consists of an exposed bar and low-flow backwater channel. The low-flow backwater channel is part of an abandoned channel that begins just downstream of the alcove. The upstream portion of the channel is filled with silty sand and is overgrown with vegetation. The inlet is just upstream of a riffle in the main channel and the outlet enters the main channel downstream of the riffle. There is some ponding of water in this overflow channel. This area appeared to contain an active side-channel in the 1974 aerial photos and a connected backwater channel as recently as 1996.

This site contains moderate channel complexity but few pieces of LWD with the exception of a large log jam on the terrace at the southern end of the alcove. This jam is likely a relic of the 1996 flood.

This area is characterized by shallow water habitats, emergent wetlands, and shrub/scrub habitats. Vegetation is a combination of common wetland shrub species such as red-osier dogwood (*Cornus sericea*), pacific ninebark (*Physocarpus capitatus*), willows, spirea, and areas of dense reed canarygrass. Emergent wetland species include soft rush (*Juncus effuses*), toad rush (*Juncus buffoensis*), dagger tipped rush (*Juncus ensifolius*), bur-reed (*Sparganium erectum*), and slough sedge (*Carex obnupta*).

Evidence of past Chinook spawning (redd features) in this area were observed during a field visit.

Site Description: Site C

Site C is located on the right bank (west) side of the south channel 1120 meters below the upstream end of Eagle Island, and consists of a perennially-active side-channel that is approximately 350 meters long (45.931993N -122.688658E, Fig.1). Site C is located approximately 1,500 feet downstream of Site B and the outlet of Site A. The site consists of a low-water side-channel complex. Most of the bar/island is overtopped above bankfull flows. There is very little LWD in this side-channel. The island is dominated by willows and there are mature riparian trees at the upstream end of the island. The river right streambank is composed of willows, spirea, reed canary grass, and some mature cottonwood.

5. Project Objective(s)

The main objective of this project is to provide more spawning and juvenile rearing habitat for the 6 populations of salmonids that use the North Fork Lewis River, thus helping to increase the abundance

and distribution of those species along the entire Lewis River System. To accomplish this, we will restore and enhance the riparian zone, in-stream habitat and channel form at two sites in the Eagle Island reach of the south channel of the Lewis River. Native plantings and invasive plant removal will help perpetuate the complexity of the system by providing wood and other organic inputs.

6. Tasks

- Task 1: Landowner coordination and whole-project scheduling
- Task 2: Apply for necessary permits, (Right of entry, HPA, JARPA, ESA limit 8 SPIF)
- Task 3: RFQ and hiring of contractors for construction, invasive species removal and planting
- Task 4: Coordinate purchase and delivery of plant materials LWD materials
- Task 5: Project implementation: Site Access
- Task 6: Project implementation: Excavation and LWD placement
- Task 7: Project implementation: Invasive removal and plantings
- Task 8: Assess planting installation success/ prepare short report
- Task 9: Prepare as-built plans
- Task 10: Conduct monitoring to assess survivorship of plantings, construction efficacy
- Task 11: Prepare monitoring report

7. Methods

Site B Treatment Approach:

Site B provides an excellent opportunity to enhance existing complexity by adding a series of apex jams designed to split flow into historical channel scar depressions. The preliminary design includes three bar apex jams to enhance channel dynamics and split flow conditions. Bar apex jams are expected to capture additional wood during floods. The development of large jams is likely to re-establish a dynamic, shifting channel condition in this reach, adding to habitat complexity. Construction of a lateral scour pool jam in the alcove will enhance pool scour and cover. Habitat cover wood in the existing backwater channel will increase habitat cover and complexity. Placement of floodplain wood will provide roughness elements that are lacking due to the absence of a robust native riparian vegetation community.

The vegetation enhancement strategy in this area will focus on establishing a medium-density tree canopy and creating isolated patches of shrub cover. Plantings will occur along the banks and low lying portions of the treatment area. Tree species will include those suited to thrive in moist to seasonally flooded conditions, such as Oregon ash and black cottonwood. The goal of these tree plantings is to establish a tree canopy to provide shade over surface waters, increase organic inputs to the stream and provide for future woody debris recruitment. Plantings in this area will be spaced to prevent complete canopy closure, which could result in the loss of the shade intolerant emergent species currently located in the treatment area. In addition to the proposed tree plantings, a small amount of native shrub species will also be planted in isolated clusters throughout the treatment area. Shrub species will be limited to willows (*Salix spp*) and spirea. The goal of the shrub plantings is to increase wildlife habitat values, provide opportunities for amphibian egg laying, and stabilization of soils.

Lastly, in order to increase the success of the proposed plantings and limit the spread of invasives, Himalayan blackberry eradication will be necessary within and adjacent to the enhancement areas. Himalayan blackberry can be effectively eliminated with herbicide applications in the fall followed up

with spot treatments the following spring. This is the most effective way to eliminate existing spot patches of Himalayan blackberry.

The general types and function of Site B large woody debris installations, as well as riparian planting zones, are detailed in the 30% design plans (attached as Appendix "C")

Site B Anticipated Benefits:

This project will benefit off-channel and near-shore rearing for salmon and steelhead, and will provide spawning habitat in the connected side channel. Construction of apex jams and activation of side-channels will enhance channel complexity. Other wood placements will increase the availability of pools and wood cover that will provide refuge habitats for salmonid rearing and holding. The vegetation enhancements will result in increased habitat complexity and native plant species diversity. In addition, water quality benefits such as reduced stream water temperatures and attenuation of sediments should be achieved once riparian plantings have matured.

Site C Treatment Approach:

Site C contains moderate complexity in the form of a multi-thread channel, but LWD quantities are very low or non-existent, and complex rearing cover is virtually absent. The preliminary design includes the construction of two apex jams to encourage the continuation of split flow conditions. Two to three lateral scour pool jams are included to promote pool scour and provide cover. Multiple placements of habitat cover wood provide additional rearing cover and complexity.

The island itself currently contains high numbers of willow and red-osier dogwood saplings and therefore the revegetation plan does not include any planting on the island. Revegetation on the island will only be necessary in areas disturbed during construction. Although the river-right streambank on Eagle Island does contain some mature black cottonwoods, the current number of trees and shrubs is generally low. Plantings in this area will increase wildlife habitat values, provide bank stability, and eventually outcompete reed canarygrass stands through shading. Suitable species for planting in this area include Oregon ash, black cottonwood, red alder, willow, dogwood, and spirea.

Lastly, in order to increase the success of the proposed plantings and limit the spread of invasives, Himalayan blackberry eradication will be necessary within and adjacent to the enhancement areas. As in the previous treatment site, chemical control methods will be the most effective way to eliminate existing spot patches of Himalayan blackberry.

The general types and function of Site C large woody debris installations, as well as riparian planting zones, are detailed in the 30% design plans (attached as Appendix "C")

Site C Anticipated Benefits:

This project will benefit off-channel and near-shore rearing for salmon and steelhead and will provide spawning habitat in the connected side channel. Construction of apex jams and activation of side-channels will enhance channel complexity. Other wood placements will increase the availability of pools and wood cover that will provide refuge habitats for salmonid rearing and holding.

8. Specific Work Products

There will be 5 specific work products:

1. Stakeholder meetings to bring the existing 30% designs to 100% completion, including stamped engineering plans
2. Construction and placement of around 170 sticks of LWD in the following structures (Sites B and C combined):
 - 5 apex jams
 - 3 lateral pool scour jams
 - 7 placements of floodplain wood
 - 2 placements of habitat cover wood
3. Native riparian zone plantings
4. Construction completion report detailing final construction, lessons learned and photographs of the finished project
5. A final report describing the entire process and the state of the project two years out (two years after implementation)

9. Project Duration

Once this project is successfully funded by both the ACC and the SRFB, stakeholder meetings, final design and permitting will begin in late 2011-early 2012 with a construction start date target of late summer 2012. Initial narrative reports will be completed and distributed in late 2012. Multi-year monitoring and effectiveness monitoring will continue until 2022. Multi-year herbicide treatments may be necessary as well; the last treatments will be applied in 2015. A final report will be submitted in 2015.

10. Permits

This project will need five permits. As a partner in development of this project, WDFW (the landowner) has indicated that right of entry and permission to implement the project in this proposal will be granted. SEPA review is bypassed via the fish habitat exemption. ESA consultation requirements will be met under the limit 8 process through SRFB funded grants. This project meets the criteria for the Washington State Streamlined Joint Aquatics Resource Permit Application (JARPA) process as well as the Nationwide Permit 27 (USACE), Section 404 and Section 10, if required. Washington Dept. of Ecology will be notified regarding section 401 water quality certification. A WDFW Hydraulic Project Approval (HPA) will be needed. An Aquatics Land Use Authorization will be needed from Washington State Department of Natural Resources for entry and work on this site.

11. Matching Funds

No in-kind is expected for the ACC award component. As previously noted, however, we intend to use this ACC award of \$85,000 to leverage an additional \$450,000 in funding from the SRFB, for a whole-project total of \$535,000; representing a better-than 6:1 leveraging of funds.

12. Peer Review of Proposed Project

This project has been completed in coordination with a Technical Oversight Group (TOG) made up of local technical stakeholders involved in aquatic habitat management in the Eagle Island area. Each step of this study has been conducted in coordination with the TOG and the TOG has provided reviews of each technical memo produced as part of this effort. TOG members include: Frank Shrier (PacifiCorp Energy), Eli Asher (Lower Columbia Fish Recovery Board), Donna Bighouse, Brian Calkins, and Ron Roler (WA Dept of Fish and Wildlife), Bill Dygert, Pat Lee (Clark County), and Rudy Salakory (Cowlitz Indian Tribe) as project proponent and project manager. In addition to stakeholder review, the 30% plans were also reviewed by Michelle Cramer, Chief Environmental Engineer for WA Department of Fish and Wildlife.

13. Budget

See Appendix "A" for detailed budget

14. Photo Documentation

Photographic documentation of this project from before, during, and after construction will be an integral part of this project. Photographs will be part of the final report, as well as monitoring reports.

REFERENCES:

Bio-Analysts, EDAW, Historical Research Associates, Hardin-Davis, Mason Bruce & Girard, Meridian Environmental, Mobrand Biometrics, Montgomery Watson Harza, Northwest Hydraulic Consultants, Washington Department of Fish and Wildlife, and Watershed GeoDynamics. 2003. Final Licensee's 2001 technical study status reports for the Lewis River Hydroelectric Projects. FERC No. 935, 2071, 2111, 2213. Prepared for PacifiCorp, Portland, Oregon and Public Utility District No. 1 of Cowlitz County, Longview, Washington.

Interfluve, Cramer Fish Sciences, and Fox Environmental Services. 2008. Lewis River LWD Study. Prepared for PacifiCorp, Portland, OR.

LCFRB (Lower Columbia Fish Recovery Board). 2004a. Kalama, Washougal and Lewis River Habitat Assessments Chapter 3: The North Fork Lewis River Basin. Prepared by R2 Resource Consultants for the LCFRB.

LCFRB (Lower Columbia Fish Recovery Board). 2004b. Lower Columbia Salmon and Steelhead Recovery and Subbasin Plan. Prepared for Northwest Power and Conservation Council.

LCFRB (Lower Columbia Fish Recovery Board). 2009. LCFRB Habitat Strategy. Available on-line at <http://www.lcfbr.gen.wa.us/2008%20HWS.htm>.

Stillwater Sciences. 2006. Lewis River Spawning Gravel Evaluation. Prepared for PacifiCorp, Portland, Oregon and Public Utility District No. 1 of Cowlitz County, Longview, Washington.

Stillwater Sciences. 2009 Lewis River Spawning Gravel Evaluation, Final Report. Prepared for PacifiCorp, Portland, Oregon and Public Utility District No. 1 of Cowlitz County, Longview, Washington.

Wade, G. 2000. Salmon and steelhead habitat limiting factors: water resource inventory area 27. Washington Conservation Commission, Olympia

FIGURES:

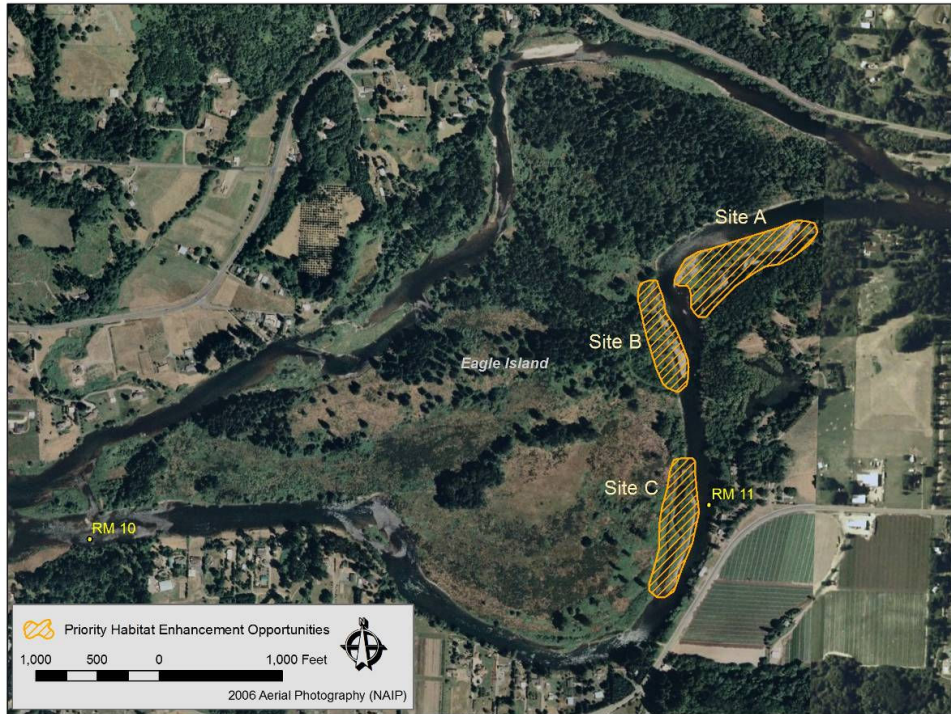


Fig. 1: Locations of Eagle Island Sites B and C within the North Fork Lewis River basin, at approximately RM 11.

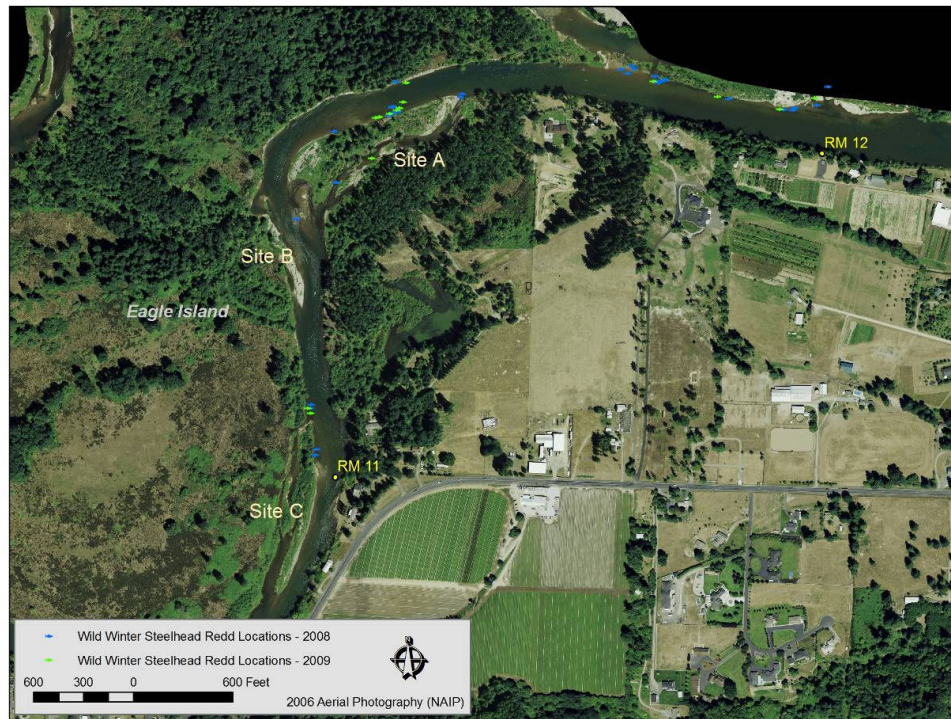


Fig. 2: WDFW data (unpublished) of steelhead redd locations near Eagle Island Sites B and C.

Eagle Island Habitat Enhancement: Sites B and C

**Appendix A:
Working budget for the full project**

Project Name	Eagle Island Sites B and C							
Granting Agency	PacifiCorp ACC/ State of Washington SFRB							
Name of preparer	Rudy Salakory, Nathan Reynolds							
Date Prepared	1/21/2011							
Section A: Personnel	Status	Hrs/Wk	Weeks	FTE	Annual Hours	Hourly Rate	Personnel Cost	Total Amount
CIT Executive Coordination	Contin	3	36	0.05	108	\$ 60.00	\$ 6,480	
Accountant	Contin	4	36	0.07	144	\$ 60.00	\$ 8,640	
NRD Project Manager (A&E)	Contin	12	52	0.3	624	\$ 30.00	\$ 18,720	
NRD Project Manager (Construction)	Contin	28	6	0.08	168	\$ 30.00	\$ 5,040	
sum of continuous staff FTE				0.5			Personnel	\$ 38,880.00
Section B: Payroll Taxes & Benefits						%	Amount	
Payroll Taxes and Benefits for all staff						33.15%	\$ 12,888	
							Payroll Taxes & Benefits	\$ 12,888.00
Section C: Travel		Rate/ Mile	Miles/ Round trip		Trips/ Week	weeks	Travel Cost	
Car Miles		0.500	80		1	40	\$ 1,600	
							Travel	\$ 1,600
Section E: Supplies				Unit	Qty	Unit cost	Cost	
Large Woody Debris				EACH	170	\$ 600.00	\$ 102,000	
Straw Mulch				ACRE	2.75	\$ 1,500.00	\$ 4,125	
Boulders				EACH	303	\$ 100.00	\$ 30,300	
							Supplies	\$ 136,425
Section F: Contractual Costs				Unit	Qty	Unit cost	Cost	
Additional Design				EACH	1	\$ 45,000.00	\$ 45,000	
Permitting				EACH	1	\$ 12,000.00	\$ 12,000	
							Contractual Costs	\$ 57,000
Section G: Construction Costs				Unit	Qty	Unit cost	Cost	
Plantings (Cuttings)				EACH	1800	\$ 3.25	\$ 5,850	
Plantings (Bare Root)				EACH	2325	\$ 5.25	\$ 12,206	
Seed Installation				ACRE	2.25	\$ 400.00	\$ 900	
Cultural Resources Survey				EACH	2	\$ 3,000.00	\$ 6,000	
Large Woody Debris Placement				Stick	170	\$ 400.00	\$ 68,000	
Bulk Excavation				CY	1000	\$ 12.00	\$ 12,000	
Construction Oversight				EACH	1	\$ 20,000.00	\$ 20,000	
Invasive Species Control				ACRE	2.75	\$ 500.00	\$ 1,375	
Mobilization Insurance and Bonding				EACH	1	\$ 30,000.00	\$ 30,000	
Erosion Control				EACH	2	\$ 10,000.00	\$ 20,000	
Site Access/Temporary Bridge				LS	1	\$ 80,000.00	\$ 80,000	
Stone Construction Entrance				LS	1	\$ 5,000.00	\$ 5,000	
Coffer Dams				LF	740	\$ 35.00	\$ 25,900	
							Construction Costs	\$ 287,231
							Total Budget	\$ 534,024.00

Appendix B:

Types and function of woody debris structures described in the 30% designs.

Bar Apex Jams:

Bar apex jams are positioned with the intent of creating or maintaining a split flow condition around the jam. These jams consist of key members oriented parallel to the flow with raked members positioned perpendicular to the flow along the upstream portion of the jam. Bar apex jams create scour just upstream of the jam and deposition just downstream. They are designed to capture additional fluvial wood from upstream. These jams provide habitat cover and velocity refuge but are mainly designed to enhance channel complexity.

Lateral Scour Pool Jams:

Lateral scour pool log jams are positioned to induce pool scour. They are typically placed along the outside of meander bends, though they may be placed at other locations along the channel boundary as appropriate. These jams provide the functions of habitat cover wood, but also maintain pools, sort gravels, and capture additional wood.

Habitat Cover Wood:

Habitat cover wood consists of individual placements or small accumulations (1-10 pieces) within the active channel that are designed to provide holding and rearing cover. These structures provide velocity refuge during high flow, provide cover from predators, and provide a substrate for macro-invertebrate colonization.

Floodplain Wood:

Floodplain wood consists of individual pieces or small accumulations of wood placed on the floodplain surface to increase floodplain roughness where natural floodplain roughness elements (e.g. vegetation or logs) are insufficient. These placements reduce avulsion risk and erosion associated with unstable channels until a point at which natural vegetation and natural wood recruitment are able to provide natural stability.

Appendix C:

30% Designs for Site B and Site C are attached.