

Lewis River Hydroelectric Projects

FERC Project Nos. 935, 2071, 2111, 2213



2017 Annual Report

Lewis River Aquatic Fund Projects



April 2017

Introduction

This 2017 Annual Report prepared by PacifiCorp and the Public Utility District No. 1 of Cowlitz County, Washington (“Cowlitz PUD”) (collectively the “Utilities”) is provided to the Lewis River Settlement Agreement Parties to fulfill the reporting requirement in Article 7.5.3.2 (5) of the Lewis River Settlement Agreement (SA). This report identifies the actions and selection of Aquatic Resource Projects (Resource Projects) to be funded from the Lewis River Aquatic Fund established under terms of the SA (Article 7.5, see **Appendix A**). Although the funding process was managed by the Utilities, the Aquatic Coordination Committee (ACC) provided final approval of funded projects. This report includes only Resource Projects selected from the 2016/2017 funding process, additional projects are expected to be selected and funded annually following the process established by the ACC.

This 2017 report is available to the Public on PacifiCorp’s website at http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Hydro/Hydro_Licensing/Lewis_River/li/ar/2017%20FINAL%20Annual%20Report-%20LR%20Aquatic%20Fund%20Projects.pdf

Copies of this report are available from PacifiCorp upon request.

Background

PacifiCorp owns the Merwin, Yale, and Swift No. 1 hydroelectric projects on the Lewis River in southwest Washington. Cowlitz PUD owns the Swift No. 2 hydroelectric project, also located on the Lewis River. These projects are operated as a coordinated system by PacifiCorp. On November 30, 2004, the Lewis River Settlement Agreement established the Lewis River Aquatics Fund (Fund). The purpose of the Fund is to support resource protection measures through funding aquatic related projects in the Lewis River basin.

As identified in the SA:

“Resource Projects may include, without limitation, projects that enhance and improve wetlands, riparian, and riverine habitats; projects that enhance and improve riparian and aquatic species connectivity that may be affected by the continued operation of the hydroelectric projects; and projects that increase the probability for a successful reintroduction program upstream of Merwin Dam. Species that are targeted to benefit from Resource Projects include Chinook, steelhead, coho, bull trout, chum, and sea-run cutthroat.”

Under the direction of the SA, the Utilities in Consultation with the ACC developed the “Aquatics Fund -- Strategic Plan and Administrative Procedures” (September 2005 – Revised January 2009, September 2013 and August 2016). This strategic plan provides: (a) a guide to Resource Project development, solicitation, and review; and (b) provides administrative procedures to guide implementation of the Aquatics Fund.

The strategic plan is available to the Public on PacifiCorp's website at: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Hydro/Hydro_Licensing/Lewis_River/li/acc/08292016_LR_Rev%20Lewis%20AQ_Fund_Process.pdf

On September 2, 2016, PacifiCorp announced the availability of calendar year (CY) 2016/2017 funds for aquatic related projects in the Lewis River Basin (Letter to interested parties from T. Olson, PacifiCorp, see **Appendix B**). The letter requested that individuals or parties interested in obtaining project funding submit a Pre-Proposal to PacifiCorp. Pre-Proposals were due by October 3, 2016.

In response to the announcement letter, four entities provided six (6) different project Pre-Proposals. They include:

| Applicant | Project Title |
|---------------------|---|
| Cowlitz Tribe | Colvin Dam Removal Preliminary Design |
| USDA Forest Service | Lewis River 21 Phase I |
| USDA Forest Service | Spencer Creek Alluvial Fan and Channel Rehabilitation |
| LCFEG | Haapa Side Channel Habitat Restoration - Phase II |
| LCFEG | NF Lewis 13.5 River Braiding Project |
| WDFW | Bald Mt. Creek Fish Barrier Correction |

Following the Aquatics Fund – Strategic Plan and Administrative Procedures, PacifiCorp and Cowlitz PUD reviewed and evaluated the Pre-Proposals and, on November 1, 2016, provided the ACC with a list of projects recommended for further consideration (Email to ACC from McCune – PacifiCorp, see **Appendix C**). In general the Utilities' evaluation suggested that, while additional information is needed before a commitment of funds should be given, the following two (2) projects be solicited to provide complete Proposals:

- USDA FS – Lewis River 21 Phase I
- USDA FS – Spencer Creek Alluvial Fan and Channel Rehabilitation

On December 8, 2016, the ACC concurred with the Utilities evaluations, however, a number of ACC participants were not in attendance. To accommodate those ACC participants not in attendance, the Utilities provided an additional 7-day comment period until December 20, 2016, see **Appendix D**. Shortly thereafter, PacifiCorp notified the project sponsors and requested full Proposals by January 27, 2017.

Upon the due date, two (2) full proposals were submitted. Following receipt of the proposals the Utilities' Subject Matter Experts evaluated and scored the above proposals. Evaluations were conducted as outlined in the *Aquatic Fund – Strategic Plan and Administrative Procedures* document.

Consultation with the ACC began February 9, 2017 with presentations of project proposals to include an opportunity for ACC questions and comments. On January 30, 2017, the ACC was provided an email (Subject: Lewis River 2016/2017 Aquatic Fund Full Proposals, 30-day Review and Comment Period), see **Appendix E**

containing a link that included a description of the proposed Resource Projects. The Utilities requested review and ACC comment by March 3, 2017.

The ACC met March 9, 2017 for an Aquatic Project Proposal Decision Meeting. To accommodate those ACC participants not in attendance, the Utilities provided the Evaluation/Comment Matrix and an additional 7-day comment period until March 17, 2017 (**Appendix F**).



Photo courtesy of Jeremiah Doyle – Senior Staff Scientist, PacifiCorp

Consensus was reached on a final Resource Project list as follows:

| Applicant | Project Title | Approved Funding | Decision |
|---------------------|---|-------------------------|-----------------|
| USDA Forest Service | Lewis River 21 Phase I | \$175,000 | YES |
| USDA Forest Service | Spencer Creek Alluvial Fan and Channel Rehabilitation | \$93,750 | YES |

On March 20, 2017 the Utilities notified all ACC Participants of the selected 2016/2017 Aquatic Funding projects approved for full funding (2016/2017 Lewis River Aquatic Fund Projects, Funding Selection - **Appendix G**).

Projects Selected for Funding

The following is a summary description of the individual Resource Projects selected to be funded by the Aquatics Fund. All of these projects are expected to promote the recovery of anadromous fish post re-introduction upstream of the Lewis River dams, and the

federally listed bull trout which spend a portion of their life history in the Lewis River hydroelectric project reservoirs. Included for each project is an overview of the original proposal, any ACC modifications to the project, and identification of Resource Project nexus to the hydroelectric projects. Final Resource Project Plans are provided as appendices to this document.

1) Lewis River 21 Phase I – USFS

The goal of this project is to restore approximately 1,000 feet of Lewis River mainstem habitat on the Lewis River. Benefits to all species of salmonids are expected from these restoration activities and specifically for Chinook salmon, through reduced high flow velocities around the wood structures for high flow refugia, increased pool depth of the high flow side channel located upstream of the Rush Creek confluence, and increased gravel retention for spawning. Focus species that will benefit from restoration actions are Chinook salmon, coho, and bull trout.

Approximately 300 pieces of large woody material, half with rootwads, will be placed along margins in the mainstem to improve rearing habitat. An excavator will anchor woody material into streambanks and a mid-channel gravel bar to create complex rearing habitat for juvenile fish while protecting the mid-channel gravel bar island vegetation. An increase in gravel retention in the upstream pool tail crest is expected from the mid channel gravel bar and combined margin structures. Large woody material will be helicoptered to the Lewis River, due to the sensitive bull trout habitat present at the end of the access route and the cost of a long skidding route.

In addition, log structures will provide optimal holding and cover areas during all flows and will be designed to maintain flow into high quality off channel habitat and to maintain pool scour thus increasing the residual depth of the existing shallow ground water habitat. Large Woody Material for this project will come from USFS Lands and if available, Swift Reservoir cleaning operations.

Project Objectives:

- Improving habitat complexity and diversity in the side channel using large woody material.
- Providing refugia during winter flows for juvenile salmonids.
- Providing rearing opportunities for juvenile salmonids during summer months.
- Providing increased spawning opportunities for adult salmonids.

ACC representatives agreed to fund this project as proposed and granted funding of \$175,000.

The final Resource Project Plan is provided in **Appendix H** and would be completed in accordance with the schedule below:

| | |
|---------------------------------|-------------------------|
| Preliminary Project Design | Completed 2016 |
| Permitting Document/Constr/NEPA | Fall 2017 – Winter 2018 |

Project Implementation

Fall 2017

2) Spencer Creek Alluvial Fan and Channel Rehabilitation - USFS

The goal of the project is to restore instream fish habitat in Spencer Creek and the other is to provide roughness in the alluvial fan at its confluence with the Lewis River to facilitate sediment routing through a defined Spencer Creek channel. These actions provide increased spawning, rearing, and refugia opportunities for Chinook, coho, and steelhead and therefore will increase the abundance of functional habitat in the Upper Lewis River basin.

Approximately 100 pieces of large wood will be used to construct a structure immediately upstream of the Spencer Creek alluvial fan to encourage high flow scour into the lower reaches of Spencer Creek within the North Fork Lewis River floodplain. Approximately seven additional structures using another 100 pieces of large wood will be constructed within the upper Spencer Creek reach to create deeper pools, habitat complexity, and a roughened alluvial fan. These structures are expected to increase spawning gravel retention and increase juvenile salmonid rearing carrying capacity and productivity.

Project Objectives:

- Improving habitat complexity and diversity in the alcove and side channels using large woody material.
- Providing refugia during winter flows for juvenile salmonids.
- Providing rearing opportunities for juvenile salmonids during summer months.
- Providing increased spawning opportunities for adult salmonids.

ACC representatives agreed to fund this project as proposed and granted funding of \$93,750

The final Resource Project Plan is provided in **Appendix I** and would be completed in accordance with the schedule below:

Task 1: Summer/Fall 2017 – May 2018 Complete NEPA document

Task 2: 2016 - Preliminary designs were completed during reconnaissance visits in 2016.

Task 3: July 2018 Project implementation.

Task 4: Prior to project implementation 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.

Conclusion

This report provides the final CY 2016/2017 Resource Project descriptions and plans for aquatic projects to be funded from the Lewis River Aquatics Fund. Distribution of funds to these projects will reduce the current Aquatic Fund - Resource by \$268,750.

According to SA article 7.5.3.2 (5), any ACC member may initiate the Alternative Dispute Resolution Procedures to resolve disputes relating to Resource Projects 30 days after receiving this final report. If no disputes are identified, PacifiCorp and Cowlitz PUD will provide funds to the identified project owners to implement Resource Projects per SA article 7.8.

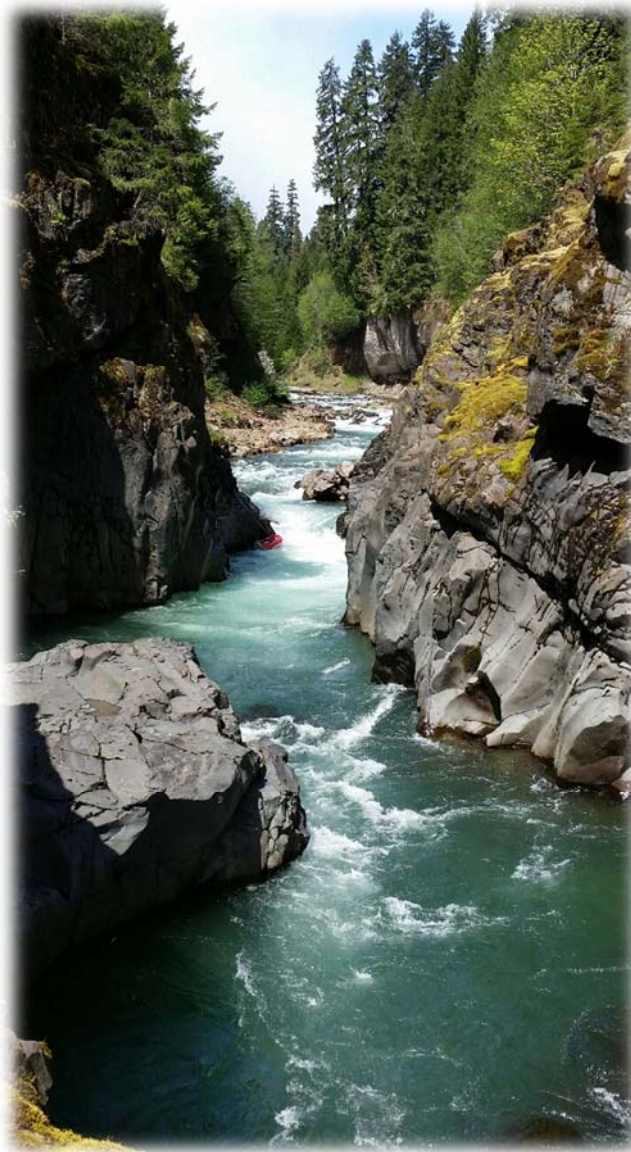


Photo courtesy of Jeremiah Doyle – Senior Staff Scientist, PacifiCorp

APPENDIX A
LEWIS RIVER SETTLEMENT AGREEMENT ARTICLE 7.5

7.5 Aquatics Fund. PacifiCorp Energy and Cowlitz PUD shall establish the Lewis River Aquatics Fund (“Aquatics Fund”) to support resource protection measures (“Resource Projects”). Resource Projects may include, without limitation, projects that enhance and improve wetlands, riparian, and riverine habitats; projects that enhance and improve riparian and aquatic species connectivity that may be affected by the continued operation of the Projects; and projects that increase the probability for a successful reintroduction program. The Aquatics Fund shall be a Tracking Account maintained by the Licensees with all accrued interest being credited to the Aquatics Fund. PacifiCorp Energy shall provide \$5.2 million, in addition to those funds set forth in Section 7.1.1, to enhance, protect, and restore aquatic habitat in the Lewis River Basin as provided below. Cowlitz PUD shall provide or cause to be provided \$520,000 to enhance, protect, and restore aquatic habitat in the Lewis River Basin as provided below; provided that Cowlitz PUD’s funds may only be used for Resource Projects upstream of Swift No. 2, including without limitation the Bypass Reach. The Licensees shall provide such funds according to the schedules set forth below.

7.5.1 PacifiCorp’s Contributions.

a. PacifiCorp shall make funds available as follows: on each April 30 commencing in 2005, \$300,000 per year until 2009 (a total of \$1.5 million).

b. For each of the Merwin, Yale, and Swift No. 1 Projects, PacifiCorp shall make one-third of the following funds available as follows after the Issuance of the New License for that Project: on each April 30 commencing in 2010, \$300,000 per year through 2014 (a total of \$1.5 million); on each April 30 commencing in 2015, \$100,000 per year through 2018 (a total of \$400,000); and on each April 30 commencing in 2019, \$200,000 per year through 2027 (a total of \$1.8 million); provided that, for any New License that has not been Issued by April 30, 2009, the funding obligation for that Project shall be contributed annually in the same amounts but commencing on April 30 following the first anniversary of Issuance of the New License for that Project.

c. PacifiCorp shall contribute \$10,000 annually to the Aquatics Fund as set forth in Section 7.1.1.

7.5.2 Cowlitz PUD’s Contributions. Cowlitz PUD shall make or cause to be made funds available as follows: \$25,000 per year on each April 30 following the first anniversary of the Issuance of the New License for the Swift No. 2 Project through the April 30 following the 20th anniversary of the Issuance of the New License for the Swift No. 2 Project (a total of \$500,000); and a single amount of \$20,000 on the April 30 following the 21st anniversary of the Issuance of the New License for the Swift No. 2 Project.

7.5.3 Use of Funds. Decisions on how to spend the Aquatics Fund, including any accrued interest, shall be made as provided in Section 7.5.3.2 below; provided that (1) at least \$600,000 of such monies shall be designated for projects designed to benefit bull trout according to the following schedule: as of April 30, 2005, \$150,000; as of April 30,

2006, \$100,000; as of April 30, 2007, \$150,000; as of April 30, 2008, \$100,000; and on or before the April 30 following the fifth anniversary of the Issuance of all New Licenses, \$100,000; and such projects shall be consistent with bull trout recovery objectives as determined by USFWS; (2) fund expenditures for the maintenance of the Constructed Channel (Section 4.1.3) shall not exceed \$20,000 per year on average; (3) if studies indicate that inadequate “Reservoir Survival,” defined as the percentage of actively migrating juvenile anadromous fish of each of the species designated in Section 4.1.7 that survive in the reservoir (from reservoir entry points, including tributary mouths to collection points) and are available to be collected, is hindering attainment of the Overall Downstream Survival standard as set forth in Section 3, then at least \$400,000 of such monies shall be used for Resource Projects specifically designed to address reservoir mortality; and (4) \$10,000 annually shall be used for lower river projects as set forth in Section 7.1.1. Projects shall be designed to further the objectives and according to the priorities set forth below in Section 7.5.3.1.

7.5.3.1 Guidance for Resource Project Approval and Aquatics Fund Expenditures.

- a. Resource Projects must be consistent with applicable Federal, State, and local laws and, to the extent feasible, shall be consistent with policies and comprehensive plans in effect at the time the project is proposed. These may include, but are not limited to, Washington’s Wild Salmonid Policy, the Lower Columbia River Bull Trout Recovery Plan, and the Lower Columbia River Anadromous Fish Recovery Plan.
- b. The Aquatics Fund shall not be used to fund Resource Projects that any entity is otherwise required by law to perform (not including obligations under this Agreement or the New Licenses for use of the Aquatics Fund), unless by agreement of the ACC.
- c. The Licensees shall evaluate Resource Projects using the following objectives:
 - (1) benefit fish recovery throughout the North Fork Lewis River, with priority to federal ESA-listed species;
 - (2) support the reintroduction of anadromous fish throughout the Basin; and
 - (3) enhance fish habitat in the Lewis River Basin, with priority given to the North Fork Lewis River.

For the purposes of this Section 7.5, the North Fork Lewis River refers to the portion of the Lewis River from its confluence with the Columbia River upstream to the headwaters, including tributaries except the East Fork of the Lewis River.

The Licensees shall also consider the following factors to reflect the feasibility of projects and give priority to Resource Projects that are more practical to

implement:

- (i) Whether the activity may be planned and initiated within one year,
- (ii) Whether the activity will provide long-term benefits,
- (iii) Whether the activity will be cost-shared with other funding sources,
- (iv) Probability of success, and
- (v) Anticipated benefits relative to cost.

7.5.3.2 Resource Project Proposal, Review, and Selection.

(1) By the first anniversary of the Effective Date, the Licensees shall develop, in Consultation with the ACC, (a) a strategic plan consistent with the guidance in Section 7.5.3.1 above to guide Resource Project development, solicitation, and review; and (b) administrative procedures to guide implementation of the Aquatics Fund. Both may be modified periodically with the approval of the ACC.

(2) Any person or entity, including the Licensees, may propose a Resource Project. In addition, the Licensees may solicit Resource Projects proposals from any person or entity.

(3) The Licensees shall review all Resource Project proposals, applying the guidance set forth in Section 7.5.3.1. The Licensees shall provide an annual report describing proposed Resource Project recommendations to the ACC. The date for submitting such report shall be determined in the strategic plan defined in subsection 7.5.3.2(1) above. The report will include a description of all proposed Resource Projects, an evaluation of each Resource Project, and the basis for recommending or not recommending a project for funding.

(4) The Licensees shall convene a meeting of the ACC on an annual basis, no sooner than 30 days and no later than 60 days after distribution of the report set forth in Section 7.5.3.2(2), for Consultation regarding Resource Projects described in the report.

(5) Licensees shall modify the report on proposed Resource Projects, based on the above Consultation, and submit the final report to the ACC within 45 days after the above Consultation. Any ACC member may, within 30 days after receiving the final report, initiate the ADR Procedures to resolve disputes relating to Resource Projects. If the ADR Procedures are commenced, the Licensees shall defer submission of the

final report on Resource Projects to the Commission, if necessary, until after the ADR Procedures are completed. If the ADR Procedures fail to resolve all disputes, the Licensees shall provide the comments of the ACC to the Commission. If no ACC member initiates the ADR Procedures, the Licensees shall submit the final report to the Commission, if necessary, within 45 days after submission of the final report to the ACC.

APPENDIX B

MEMORANDUM DATED SEPTEMBER 2, 2016
LETTER TO INTERESTED PARTIES FROM T. OLSON, PACIFICORP
AVAILABILITY OF FUNDS FOR AQUATIC RELATED PROJECTS

McCune, Kimberly

From: McCune, Kimberly
Sent: Friday, September 02, 2016 7:55 AM
To: Amy Tanska (atanska@mshinstitute.org); Bill Bakke (bmbakke@gmail.com); 'Byron Hinner'; 'Christine Champe'; culture@cowlitz.org; Darlene Johnson; 'Emily Platt'; Erich Gaedeke (Erich.Gaedeke@ferc.gov); 'Evan Haas'; Gardner Johnston (gjohnston@interfluve.com); 'Jim Fisher'; 'jkling@westernrivers.org'; 'Jody Iando'; John Clapp; 'Kemper McMaster'; 'Lisa Moscinski'; Noel Johnson; Patrick Lee; Paul Pearce - NFCSC; Rhidian Morgan (rmmorgan@pnfarm.com); Rudy Salakory (rsalakory@cowlitz.org); Tammy Weisman (TWeisman@lcfeg.org); 'Tony Meyer'; 'toppacific2@msn.com'; '(brichardson@RMEF.org)'; '(ewhite@cowlitz.org)'; 'Amanda Froberg'; 'Bob Nelson (nelson338@aol.com)'; Emmerson, Kendel; 'Eric Holman (holmaewh@dfw.wa.gov)'; 'Fish First (j.malinowski@ieee.org)'; 'Mariah Stoll-Smith Reese' (mariah@lelooska.org); 'Mark Celedonia'; 'Michelle Day (michelle.day@noaa.gov)'; 'Mitch Wainwright'; 'Nathan Reynolds (nreynolds@cowlitz.org)'; Olson, Todd; 'peggy.miller@dfw.wa.gov'; Peterman, Summer; 'Ray Croswell (shedhunt@aol.com)'; 'Weinheimer, John (DFW)'; Asher, Eli; 'Bob Rose (rosb@yakamafish-nsn.gov)'; Bryce Glaser; Bryce Michaelis; David Howe; Doyle, Jeremiah; Ed Meyer; Ferraiolo, Mark; Frazier, Patrick A (DFW); Hudson, Michael; James Byrne; James H Malinowski; 'Kale Bentley'; Karchesky, Chris; Karen Adams; Kelley Jorgensen; Ken Weiman (kwieman@fs.fed.us); Lesko, Erik; 'Melody Tereski'; Mike Bonoff; Morgan, David; Pete Barber (pbarber@cowlitz.org); Roberts, Aaron; 'Ruth Tracy'; Samuel Kolb; Serdar, Carol; Shrier, Frank; Steve Manlow; Taylor Aalvik (taylor.a@cowlitz.org); Weatherly, Briana; Whitesel, Timothy
Cc: 'lpalensky@nwcouncil.org'; 'phil@pctrask.com'
Subject: RE: 2016/2017 Lewis River Aquatic Fund Announcement
Attachments: Attachment A PreProposal Form.doc; Attachment B Master LR AQ Fund Priority Reaches - no bull trout reaches.xlsx; Attachment C Landowner_Acknowledgement.doc; Attachment D Eval Criteria .doc; 09022016 LR - Announcement of AQ Fund OpportunityREV.pdf
Importance: High

Attn: Aquatic and Terrestrial Coordination Committees and Interested Parties

Please see the attached announcement. If you know of other entities that may have an interest in seeking funding, please forward this opportunity to them.

Thank you.

Kimberly McCune

Sr. Project Coordinator
PacifiCorp – Hydro Resources
825 NE Multnomah St., Suite 1500
Portland, OR 97232
Ph: (503) 813-6078
Mobile: (503) 708-4819

September 2, 2016

Subject: Availability of Funds for Aquatic Related Projects in the Lewis River Basin

Dear Interested Party,

PacifiCorp owns the Merwin, Yale, and Swift No. 1 hydroelectric projects on the Lewis River in southwest Washington. Public Utility District No. 1 of Cowlitz County, Washington (Cowlitz PUD) owns the Swift No. 2 hydroelectric project, also located on the Lewis River. These projects are operated as a coordinated system. On November 30, 2004, the Lewis River Settlement Agreement established the Lewis River Aquatics Fund (Fund). On June 26, 2008, the Federal Energy Regulatory Commission acknowledged this fund as a stipulation of project operating licenses. The purpose of the Fund is to support resource protection measures via aquatic related projects (Resource Projects) in the Lewis River basin. The projects are evaluated for funding according to their:

- (1) *Benefit to fish recovery throughout the North Fork Lewis River, with priority to federal ESA-listed species;*
- (2) *Support of the reintroduction of anadromous fish throughout the Basin; and*
- (3) *Enhancement to fish habitat in the Lewis River Basin, with priority given to the North Fork Lewis River.*

This letter is to provide you the opportunity to submit proposals for Resource Project funding. The total Fund amount available this year is limited to \$2,062,624.83 for Resource Projects. If you know of other entities that may have an interest in seeking funding, please forward this opportunity to them.

The Aquatic Fund Subgroup to the Aquatic Coordination Committee has completed a Lewis River Aquatic Fund Priority Reaches (Priority Reaches, **Attachment B**) document which provides priority rankings for stream reaches within the Lewis River watershed. The Priority Reach rating is a refinement derived from the Lower Columbia Fish Recovery Board (LCFRB) Interactive map which is found on their website at www.lcfrb.gen.wa.us. The interactive maps provide a wealth of information that should help project proponents in selecting areas to focus their habitat improvement efforts. For consideration of funding the proponent must demonstrate that they have reviewed both the Priority Reaches and the LCFRB Interactive map and selected appropriate projects/reaches from those two tools.

To be consistent with certain comprehensive plans such as the *Lower Columbia Salmon Recovery Plan* and the *Washington Department of Fish & Wildlife Subbasin Plan (LCFRB 2004)* relating to Lewis River reintroduction efforts and the recovery of ESA listed threatened salmon and steelhead species, higher priority will be given to projects that provide for benefits to priority

fish species and stocks. There is an emphasis on Spring Chinook recovery in the upper basin, but not to the exclusion of recovery of other ESA-listed species.

There is also a parallel effort taking place that is addressing recovery needs for bull trout that is not yet complete. Accordingly, funding for bull trout projects will not occur in 2017 but will likely resume in 2018. Additional reaches may be added to the Priority Reaches list in the future.

The selection of Resource Projects will be conducted in two phases. To be considered, applicants must submit a completed Pre-Proposal Form (see **Attachment A** for Form) by close of business **October 3, 2016** and obtain an acknowledgement from all owners of land needed to access the proposed project. Landowner(s) must sign a Landowner Acknowledgement Form (**Attachment C** for Form) indicating they are aware that the project is being proposed on their property.

Pre-Proposals will be evaluated with some projects appropriately selected for further consideration (see **Attachment D** for evaluation criteria). If selected, applicants will be notified in early December, and be requested to submit a formal proposal by mid-January. The Utilities and representatives of the Lewis River Aquatic Coordination Committee will finalize the list of successful projects in early April 2017 and notify the project owners. Shortly thereafter the Utilities will submit the final list to the Federal Energy Regulatory Commission to meet the submittal deadline of April 15, 2017.

Please give attention to this excellent opportunity. If you have any questions please contact Mr. Frank Shrier, PacifiCorp (503) 813-6622.

We look forward to your response in October.

Sincerely,



Todd Olson
Director, Compliance Hydro Resources

| | |
|-------|--|
| Encl: | Cover Letter |
| | Attachment A – Pre-proposal Form |
| | Attachment B – Lewis River Aquatic Fund Priority Reaches |
| | Attachment C – Landowner Acknowledgement Form |
| | Attachment D – Evaluation Criteria |

APPENDIX C

EMAIL DATED NOVEMBER 1, 2016

EMAIL TO ACC FROM K. McCUNE – PACIFICORP

2016/2017 AQUATIC FUND PRE-PROPOSALS – UTILITIES

COMMENTS/RECOMMENDATIONS

McCune, Kimberly

From: McCune, Kimberly
Sent: Tuesday, November 01, 2016 2:01 PM
To: Amanda Froberg; Amelia Johnson; Asher, Eli; 'Bob Rose (rosb@yakamafish-nsn.gov)'; Bryce Glaser; Bryce Michaelis; David Howe; Doyle, Jeremiah; Ed Meyer; Ferraiolo, Mark; Fish First (j.malinowski@ieee.org); Frazier, Patrick A (DFW); Hudson, Michael; James Byrne; James H Malinowski; 'Kale Bentley'; Karchesky, Chris; Kelley Jorgensen; Ken Weiman (kwieman@fs.fed.us); Lesko, Erik; Mariah Stoll-Smith Reese; Mark Celedonia; 'Melody Tereski'; 'Michelle Day'; Mike Bonoff; Morgan, David; Nathan Reynolds; Olson, Todd; 'Patrick Lee'; Peggy Miller; Rhidian Morgan (rmmorgan@pnfarm.com); Roberts, Aaron; 'Ruth Tracy'; Samuel Kolb; Serdar, Carol; Shrier, Frank; Steve Manlow; Taylor Aalvik (taylor.a@cowlitz.org); Weatherly, Briana; Whitesel, Timothy
Subject: ACC 11/10/16 Meeting Agenda, ACC Draft 10/13/16 Meeting Notes and 2016/2017 Aquatic Fund Pre-proposals Eval Matrix
Attachments: 10132016 - ACC DRAFT Meeting Notes for ACC Review.docx; 11102016 LR - ACC Agenda.docx; 11012016 - ACC Lewis River AQ Fund evaluation (2016-2017) Utilities.xls

Attn: ACC Participants

We received six (6) aquatic fund pre-proposals by the due date of October 3, 2016 and the Utilities have completed its review and provided comments/questions (see attached Evaluation Matrix for summary detail and comments - red tab).

You may also view each detailed Pre-Proposal on the Lewis River website at the link provided below.

<http://www.pacificorp.com/es/hydro/hl/lr.html#>

- License Implementation
- ACC
- Aquatics Coordination Committee 2016
- Scroll down to 2016/2017 Aquatic Fund Pre-Proposals

Thank you.

Kimberly McCune
Sr. Business Administrator
PacifiCorp - Hydro Resources
825 NE Multnomah, Suite 1500
Portland, OR 97232
Ph: (503) 813-6078

APPENDIX D

EMAIL DATED DECEMBER 13, 2016

EMAIL TO ACC FROM K. McCUNE – 2016/2017 AQUATIC FUND PRE-
PROPOSALS; 7-DAY COMMENT PERIOD

McCune, Kimberly

From: McCune, Kimberly
Sent: Tuesday, December 13, 2016 8:30 AM
To: Amanda Froberg; Amelia Johnson; Asher, Eli; 'Bob Rose (rosb@yakamafish-nsn.gov)'; Bryce Glaser; Bryce Michaelis; David Howe; Doyle, Jeremiah; Ed Meyer; Fish First (j.malinowski@ieee.org); Frazier, Patrick A (DFW); Hudson, Michael; James Byrne; James H Malinowski; 'Kale Bentley'; Karchesky, Chris; Kelley Jorgensen; Ken Weiman (kwieman@fs.fed.us); Lesko, Erik; Mariah Stoll-Smith Reese; Mark Celedonia; 'Melody Tereski'; 'Michelle Day'; Mike Bonoff; Morgan, David; Nathan Reynolds; Olson, Todd; 'Patrick Lee'; Peggy Miller; Pete Barber (pbarber@cowlitz.org); Rhidian Morgan (rmmorgan@pnfarm.com); Roberts, Aaron; 'Ruth Tracy'; Samuel Kolb; Serdar. Carol; Shrier, Frank; Steve Manlow; Taylor Aalvik (taylor.a@cowlitz.org); Weatherly, Briana; Whitesel, Timothy
Subject: RE: RESPONSE REQUESTED: 2016/2017 Aquatic Fund PreProposals - 7-day comment period
Attachments: 12132016 - ACC Lewis River AQ Fund evaluation (2016-2017) Utilities (2).xls

Attn: ACC Participants

Please be advised that at the December 8, 2016 ACC meeting the attendees approved going forward to a full proposal for the project indicated below. A comment matrix is attached for your reference.

| Proceed to full Proposal | Applicant | Project Name |
|--------------------------|---------------------|---|
| NO | Cowlitz Tribe | Colvin Dam Removal Preliminary Design |
| YES | USDA Forest Service | Lewis River 21 Phase I |
| YES | USDA Forest Service | Spencer Creek Alluvial Fan and Channel Rehabilitation |
| NO | LCFEG | Haapa Side Channel Habitat Restoration - Phase II |
| NO | LCFEG | NF Lewis 13.5 River Braiding Project |
| NO | WDFW | Bald Mt. Creek Fish Barrier Correction |

Please be advised that to accommodate those ACC participants not in attendance at the December 8, 2016 meeting, the Utilities are providing an additional 7-day comment period **until close of business December 20, 2016**. If you have any objections to this action please send your comments to my attention at kimberly.mccune@pacificorp.com

After the additional 7-day review period PacifiCorp will notify each applicant of the ACC decisions.

Thank you.

Kimberly McCune
Sr. Business Administrator
PacifiCorp – Hydro Resources
825 NE Multnomah St., Suite 1500
Portland, OR 97232
Ph: (503) 813-6078
Mobile: (503) 708-4819

APPENDIX E

EMAIL DATED JANUARY 30, 2017

MEMO TO ACC FROM K. McCUNE – PACIFICORP

LEWIS RIVER 2016/2017 AQUATIC FUND FULL PROPOSALS, 30-DAY REVIEW
AND COMMENT PERIOD

McCune, Kimberly

From: McCune, Kimberly
Sent: Monday, January 30, 2017 9:25 AM
To: Amanda Froberg; Amelia Johnson; Asher, Eli; 'Bob Rose (rosb@yakamafish-nsn.gov)'; Bryce Glaser; Bryce Michaelis; David Howe; Doyle, Jeremiah; Ed Meyer; Fish First (j.malinowski@ieee.org); Frazier, Patrick A (DFW); Greg Robertson; Hudson, Michael; James Byrne; James H Malinowski; 'Kale Bentley'; Karchesky, Chris; Kelley Jorgensen; Ken Weiman (kwieman@fs.fed.us); Lesko, Erik; Mariah Stoll-Smith Reese; Mark Celedonia; 'Melody Tereski'; 'Michelle Day'; Mike Bonoff; Morgan, David; Nathan Reynolds; Olson, Todd; 'Patrick Lee'; Peggy Miller; Rhidian Morgan (rmmorgan@pnfarm.com); Roberts, Aaron; 'Ruth Tracy'; Samuel Kolb; Serdar. Carol; Shrier, Frank; Steve Manlow; Taylor Aalvik (taylor.a@cowlitz.org); Weatherly, Briana; Whitesel, Timothy
Subject: RESPONSE REQUESTED: Lewis River 2016/2017 Aquatic Fund full proposals, 30-DAY REVIEW AND COMMENT PERIOD
Attachments: 12212016 - ACC Lewis River AQ Fund evaluation (2016-2017) Utilities (2).xls
Importance: High

Attn: ACC Participants and interested parties

Please be advised that we received two (2) Lewis River habitat enhancement full proposals by the deadline of January 27, 2017.

- USDA Forest Service - Lewis River 21 - Phase I
- USDA Forest Service - Spencer Creek Alluvial Fan and Channel Rehabilitation

Complete and detailed *electronic copies of the full proposals can be located at: <http://www.pacificorp.com/es/hydro/hl/lr.html#>

- License Implementation
- ACC
- Aquatics Coordination Committee - 2017

*Hard copies available upon request.

A representative from USFS will provide a detailed presentation of their proposed projects to the ACC next Thursday, February 9, 2017.

We ask that you provide your written comments on the full proposals to PacifiCorp **on or before Friday, March 3, 2017** to my attention at kimberly.mccune@pacificorp.com

In addition, I've attached the ACC/Utilities evaluation matrix for your reference.

Thank you.

Kimberly McCune
Sr. Business Administrator
PacifiCorp – Hydro Resources
825 NE Multnomah St., Suite 1500

| | A | B | C | D | E | 2016/2017 LR Aquatic Fund Evaluation Matrix | G | H | I |
|---|----------------------------|---|---------------------|---|---|---|---|---------------|--|
| 1 | | | | | | | | | |
| 2 | ACC | | | | | | | | |
| 3 | Decision for full proposal | | Applicant | Project Title | WDFW | Fish First | LCFRB | Yakama Nation | USFS |
| 4 | NO | 1 | Cowlitz Tribe | Colvin Dam Removal Preliminary Design | Pre-proposal includes sediment modeling only downstream to Cedar Creek. Sediment modeling needs to be conducted downstream of Cedar Creek to the lower end of Eagle Island to show the benefit of this project. It is unclear if estimated sediment input is a one-time occurrence or a continual input of material into the mainstem Lewis. If it is a continual input of material into the mainstem Lewis what amount of sediment will be continually input into the mainstem Lewis? Benefit from tributary habitat is very minimal because allows access to only 0.5 miles to a Tier 4 reach. WDFW is concerned that project provides little to no benefit to re-introduction efforts. WDFW does not recommend moving this project forward for a full proposal because of its lack of benefit to re-introduction efforts focused upstream of Merwin Dam, which is not consistent with the objectives and priorities of the Aquatic Fund. Specifically fund objective 2 which state "Support the Re-introduction of anadromous fish throughout the Basin (Spring Chinook, Winter Steelhead, Coho and Sea-run Cutthroat)". Project will not benefit outmigrating juvenile fish from reintroduction efforts because fish will be collect at upstream dams and transported the town of Woodland for release in to the mainstem Lewis River, thereby not utilizing this reach of river. Does not support but will not block going forward. | | It appears that WDFW is not providing matching funds. What is WDFW's legal obligation for supporting passage at this site? Habitat in Colvin Creek identified for restoration is an EDT tier 3 reach, and passage would be restored to EDT tier 4 reaches, suggesting limited benefits for population recovery in the NF Lewis (Recovery Plan, LCFRB 2010). Benefits to downstream mainstem receiving reaches (e.g., Lewis 7a) are uncertain until assessment of substrate composition is completed. If substrate would be suitable for spawning, it is uncertain whether benefits would be short-term vs long-term. The duration of benefits should be evaluated. It is also uncertain whether lack of spawning substrate in the downstream Lewis 7a reach is a key biological bottleneck. Sediment deposition at the upstream end of Eagle Island has been cited by WDFW as a primary concern for loss of Chinook rearing habitat the north Eagle Island channel. Overall project benefits would accrue primarily in Colvin Creek, which would support coho and steelhead, which are considered contributing populations to regional recovery (LCFRB 2010). No apparent benefits to spring Chinook recovery. This is especially true in terms of downstream migration, because the project site is located between spring Chinook capture and release locations. Application references project is contingent upon receiving \$62,500 in SFRB funds. Project was reviewed by the LCFRB in 2016 and ranked "high" for certainty of success, and "medium" for benefits to fish and cost, and was in the lowest grouping of eligible projects - future funding is uncertain. We recommend the design project move forward to final proposal submittal. However, future support for implementation will depend upon results sediment suitability analysis, contribution of match from WDFW, and assessment of downstream benefits/impacts. | | The Forest Service has reviewed all the Pre-Proposals and believe they all meet Section A. Consistency with Fund Objectives and Priorities of the evaluation criteria. Warrants look in the future - however won't stand in the way of going forward or not |
| 5 | YES | 2 | USDA Forest Service | Lewis River 21 - Phase I | Project occurs in a Tier 2 reach and is listed is included in the Aquatic Fund Priority Reach list. The Recovery Plan identifies this as a Tier 2 reach (see SalmonPort) while Roni evaluation lists as a Tier 1 based on EDT. Should use Recovery Plan tier rankings. Is the project part of a larger vision for actions to be proposed for this reach? If so, larger vision should be presented. Additionally, need to show how this project will function without additional actions in case funding for other actions is not acquired. Need to show how this addresses the limiting factors identified in the Recovery Plan. How will side channel be designed to ensure that water is present when fish will be using this habitat? This reach is a very volatile reach; need to show how structures will function for an extended period of time (e.g. 10 years). WDFW recommends moving this project forward for a full proposal. | | This project targets a high priority reach (EDT tier 2, NF Lewis 21) for regional recovery, with high potential for winter steelhead, medium priority for coho, and low priority for spring Chinook population performance improvements (LCFRB 2010). High priority factors identified in the Recovery Plan for this reach likely to be addressed through this proposal include stream channel habitat structure & bank stability and off channel & side channel habitat. NF Lewis 21 is also identified on the Aquatics Fund Priority Reaches Table based on the Cramer Fish Sciences report, and would address prioritess for spring Chinook spawning and rearing. More details regarding seasonality of side channel connection are required to determine full rearing and spawning benefits of the project. Before and after biological monitoring at the project site could be a benefit to future work in the NF Lewis and analogous systems in the Lower Columbia. Project aligns well with Aquatic Fund priorities, including support for reintroduction species. We recommend the project move forward to final. | | The Forest Service has reviewed all the Pre-Proposals and believe they all meet Section A. Consistency with Fund Objectives and Priorities of the evaluation criteria. Yes, proceed to full proposal. |
| 6 | YES | 3 | USDA Forest Service | Spencer Creek Alluvial Fan and Channel Rehabilitation | Project impacts Spencer Creek, Lewis 23 and Lewis 24 which are all Tier 2 reaches. Spencer Creek included in the Aquatic Fund Priority Reach list, but Lewis 23 and Lewis 24 are not. Need to show how this project addresses the limiting factors in the Recovery Plan. Pre-proposal talks about how this project would increase quality rearing habitat, spawning habitat, and capacity and productivity. Need to quantify the amount of habitat increases that would occur as a result of this project. Need to show how this project will be designed to ensure that water is present when fish will be using the habitat. WDFW recommends moving this project forward for a full proposal. | | This project targets a high priority reach (EDT tier 2, Spencer Creek) for regional recovery, with high potential for winter steelhead and low priority for coho population performance improvements (LCFRB 2010). Medium priority factors identified in the Recovery Plan for this reach likely to be addressed through this proposal include floodplain function and channel migration processes, instream flows, and stream channel habitat structure and bank stability. Spencer Creek is also identified on the Aquatics Fund Priority Reaches Table based on the Cramer Fish Sciences report, and would address priorities for coho and steelhead spanwing, rearing and migration. Increased complexity at the confluence of Spencer Creek and the NF Lewis could also provide important habitat for spring Chinook and other species, in part addressing high priority floodplain function and channel migration process needs in EDT tier 2 reaches Lewis 23 and 24. Project aligns well with Aquatic Fund priorities, including support for reintroduction species. We recommend the project move forward to final. | | The Forest Service has reviewed all the Pre-Proposals and believe they all meet Section A. Consistency with Fund Objectives and Priorities of the evaluation criteria. Yes, proceed to full proposal. |
| 7 | NO | 4 | LCFEG | Haapa Side Channel Habitat Restoration - Phase II | Project would occur in a Tier 1 reach, but this reach is not included on the Aquatic Fund Priority Reach list. Provide a list of benefits from this project, but need to quantify the amount of benefit that will be provided. Since this is part of a larger project need to clearly delineate which benefits and how much benefit is directly a result of this project vs benefits that are provided in the previous phase of this project. Need to show that project will address limiting factors for this reach identified in the Recovery Plan. If SRFB funds are not received with Aquatic Funds be returned to PacifiCorp? WDFW does not recommend moving this project forward for a full proposal because of its lack of benefit to re-introduction efforts focused upstream of Merwin Dam, which is not consistent with the objectives and priorities of the Aquatic Fund. Specifically fund objective 2 which state "Support the Re-introduction of anadromous fish throughout the Basin (Spring Chinook, Winter Steelhead, Coho and Sea-run Cutthroat)". Project will not benefit outmigrating juvenile fish from reintroduction efforts because fish will be collect at upstream dams and transported the town of Woodland for release in to the mainstem Lewis River, thereby not utilizing this reach of river. Does not support but will not block going forward. | | This project targets a high priority reach for regional recovery (EDT tier 1, Lewis 5), with high potential of chum and coho habitat, medium potential for fall Chinook, and low priority for winter steelhead population performance improvements. High priority limiting factors identified in the Recovery Plan for this EDT reach include floodplain function & channel migration processes and off channel & side channel habitat, two factors this project proposes to address. However, Lewis Reach 5 is not identified on the Aquatics Fund Priority Reaches Table based on the Cramer Fish Sciences report. LCFRB TAC reviewed the Phase 2 side channel portion of this project in 2016, and were concerned that: 1) the side-channel inlet may require long-term maintenance and may not provide full side-channel functionality; 2) that side-channel enhancement could reduce fall Chinook spawning habitat area in the main channel of Lewis; and, 3) that WDFW had not yet approved land use. Project does not align well with Aquatic Fund priority for support of spring Chinook reintroduction efforts. This is especially true in terms of downstream migration, because the project site is located between spring Chinook capture and release locations. We recommend the project move forward to final but will not stand in the way of a no decision. | | The Forest Service has reviewed all the Pre-Proposals and believe they all meet Section A. Consistency with Fund Objectives and Priorities of the evaluation criteria. Yes, proceed to full proposal but will not stand in the way of a no decision. |

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| | A | B | C | D | E | 2016/2017 LR Aquatic Fund Evaluation Matrix | G | H | I |
| 2 | ACC | | | | | | | | |
| 3 | Decision for full proposal | Applicant | Project Title | WDFW | Fish First | LCFRB | Yakama Nation | USFS | |
| 8 | NO | 5 | LCFEG | NF Lewis 13.5 River Braiding Project | Project would occur in a Tier 1 reach, but this reach is not included on the Aquatic Fund Priority Reach list. Provide a list of benefits from this project, but need to quantify the amount of benefit that will be provided. Since this is part of a larger project need to clearly delineate which benefits and how much benefit is directly a result of this project vs benefits that are provided in the previous phase of this project. Need to show that project will address limiting factors for this reach identified in the Recovery Plan. WDFW does not recommend moving this project forward for a full proposal because of its lack of benefit to re-introduction efforts focused upstream of Merwin Dam, which is not consistent with the objectives and priorities of the Aquatic Fund. Specifically fund objective 2 which state “Support the Re-introduction of anadromous fish throughout the Basin (Spring Chinook, Winter Steelhead, Coho and Sea-run Cutthroat)”. Project will not benefit outmigrating juvenile fish from reintroduction efforts because fish will be collect at upstream dams and transported the town of Woodland for release in to the mainstem Lewis River, thereby not utilizing this reach of river. Does not support but will not block going forward. | | This project targets a high priority reach for regional recovery (EDT tier 1, Lewis 5), with high potential of chum and coho habitat, medium potential for fall Chinook, and low priority for winter steelhead population performance improvements. High priority limiting factors identified in the Recovery Plan for this EDT reach include floodplain function & channel migration processes, off channel & side channel habitat, and stream channel habitat structure & bank stability, three factors this project proposes to address. However, Lewis Reach 5 is not identified on the Aquatics Fund Priority Reaches Table based on the Cramer Fish Sciences report. It is not clear what the seasonality of the side channel connectivity will be, so it is difficult to determine rearing and spawning habitat benefits. Project does not align well with Aquatic Fund priority for support of spring Chinook reintroduction efforts. This is especially true in terms of downstream migration, because the project site is located between spring Chinook capture and release locations. We recommend the project move forward to final. If this projet does no align well with Spring Chinook they will not stand in the way of a no decision. | | The Forest Service has reviewed all the Pre-Proposals and believe they all meet Section A. Consistency with Fund Objectives and Priorities of the evaluation criteria. Yes, proceed to full proposal but will not stand in the way of a no decision. |
| 9 | NO | 6 | WDFW | Bald Mt. Creek Fish Barrier Correction | Project would occur on a Tier 4 reach that is not listed on the Aquatic Fund Priority Reach list. Additionally, this reach shows only low reach potential for coho and winter steelhead and no reach potential for other species. Benefit from tributary habitat is very minimal because allows access to only 1.36 miles of habitat and cost appears to be high for the limited amount of additional habitat opened up for access. Need to provide data that indicates that fish are utilizing stream section just downstream of crossing, and would therefore likely migrate upstream to access habitat made available by this project. Crossing is located on a small stream in the upper watershed of a tributary to Lewis River; therefore, it will have minimal benefit to ESA listed species and no benefit to reintroduced species. WDFW does not recommend moving this project forward for a full proposal because of its lack of benefit to re-introduction efforts focused upstream of Merwin Dam, which is not consistent with the objectives and priorities of the Aquatic Fund. Specifically fund objective 2 which state “Support the Re-introduction of anadromous fish throughout the Basin (Spring Chinook, Winter Steelhead, Coho and Sea-run Cutthroat). Project will not benefit outmigrating juvenile fish from reintroduction efforts because fish will be collect at upstream dams and transported the town of Woodland for release in to the mainstem Lewis River, thereby not utilizing this reach of river. Additionally, it location in the basin would suggest that the project would have minimal benefit to ESA species in general, which is also not consistent with the objectives and priorities of the Aquatic Fund. Specifically fund objective 1 which states “Benefit fish recovery throughout the North Fork Lewis River, priority to federal ESA-listed species (Bull Trout, Chinook, Steelhead and Chum)”. Does not recommend going forward. | | This project targets a low priority reach for regional recovery (EDT tier 4, Cedar Creek LB Trib 2B), with low potential for both winter steelhead and coho population performance improvements (LCFRB 2010). Although restoration needs identified in this project will likely increase access to habitat for salmonids, there are limited multi-species benefits from working in this habitat, and restoration funds may more effectively address recovery in higher priority reaches in the NF Lewis. Project does not align well with Aquatic Fund priority for support of reintroduction efforts. Lack of information on documented fish use in the affected streams. We recommend that the project not move forward to final. | | Project does not support reintroduction efforts. No, do not proceed to full proposal. |

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| 3 | Cowlitz Indian Tribe | USFWS | Utilities | NMFS | Next Step |
| 4 | <p>The project is located on Colvin Creek at the reach break between Colvin 1 and 2, Tier 3 and 4, respectively. Providing fish passage would directly benefit coho and winter steelhead, and releasing impounded gravels and restoring sediment transport processes would provide downstream benefits for multiple species. The proposal appears thoroughly researched and appropriately scoped for what is likely to be a technically challenging project to design and implement. The lead engineer has ample experience with dam removal projects, increasing likelihood of success. The resulting project is likely to be very expensive for the benefit, but is one of a very few opportunities to restore watershed process in the highly modified lower river. Mainstem incision and simplification is a continuing and serious concern; increasing coarse sediments should provide some relief from that trend. Removal of the dam would increase pressure on WSDOT to address the highway barrier upstream, potentially opening much more habitat. Recommended for full proposal: Yes, but will not stand in the way of a no decision.</p> | Neutral | <p>This project is contingent upon securing \$62,500 SRFB funds in 2017. Support Task 1: sediment analysis. If composition is primarily silt/sand we do not need to evaluate further. If composition core samples are deemed beneficial than I support moving forward with the project. Would like to know if further talks have happened with DAHP & if will be removed from the registry? If mitigation is warranted will Cowlitz Tribe fund? In favor of going to full proposal. This reach is not on the priority list but it is a good project. Need more detail on how the hatchery intake will be protected. Will not stand in the way of a no decision.</p> | <p>Does not support reintroduction efforts into North Fork. Does not meet criteria or emphasis on Spring Chinook . No, do not proceed to full proposal.</p> | |
| 5 | <p>The project appears to be proposed in Lewis 21, a Tier 2 reach (not Tier 1, as identified in the proposal narrative) of the Lewis River, but is one of the highest priority reaches in the most recent ACC guidance. The proposed project would likely benefit multiple species. The proposed approach is not clearly articulated; the final proposal should clearly show the proposed treatment areas, describe the treatments, and explain the rationale for the approach. Conceptual design drawings, at a minimum, will be essential to determine likely long-term benefits. This is a high-energy, mainstem reach of the Lewis River. Stability of wood placements and nature (size, species) of material proposed should be fully explained. The project description seems to suggest that the project would directly interact with material delivered by Rush Creek, but the project area is located upstream of the confluence with Rush Creek. The project scope is fairly small, and requires substantial mobilization investments. The proposal title indicates future phase(s), but plans for future work are not described. A more comprehensive design and permitting/environmental compliance phase followed by one or more implementation phases may be a more efficient, effective approach in this relatively unconstrained reach. Recommend full proposal: Yes.</p> | Neutral | <p>Do not believe that LWD placement in the mainstem has as much value as focusing funds on tributary streams or side channel habitat that do not have a high probability of "washing away" LWD structures. How can we be assured the wood will continue to function as intended? There are better location options available such as tributaries. Priority Reach - in favor of going to full proposal.There needs to be a budget sheet that defines tasks and associated dollars. Other than the monitoring, it is not clear who is performing what task. LWD placed in the upper mainstem has an extremely low likelihood of staying in place given the frequency and severity of recent high water events.</p> | <p>Agree to move forward to full proposal</p> | |
| 6 | <p>The project is proposed in Spencer Creek and Lewis 24, both Tier 2. Spencer Creek is a highly rated opportunity for restoration in the latest ACC guidance. The proposed project would likely benefit multiple species. The proposed approach is not clearly articulated; the final proposal should clearly show the proposed treatment areas, describe the treatments, and explain the rationale for the approach. Conceptual design drawings would be helpful, as would a description of the proposed design process. Photos showing boulder/cobble bed material in Spencer Creek seem to indicate a fairly high-energy reach. A discussion of the watershed processes that led to Spencer Creek’s degraded condition would be helpful in evaluating the appropriateness of proposed treatments. Stability of wood placements and nature (size, species) of material proposed should be fully explained. Recommend full proposal: Yes.</p> | Neutral | <p>Spencer Creek would benefit from wood placement and gravel retention. Priority Reach/Key Habitat - in favor of going to full proposal. There needs to be a budget sheet that defines tasks and associated dollars. Other than the monitoring, it is not clear who is performing what task. Spencer Creek rehab. work would benefit that stream basin and should go to full proposal.</p> | <p>Yes, proceed to full proposal.</p> | |
| 7 | <p>Project is proposed in a Tier 1 reach of the lower North Fork Lewis and would likely benefit multiple species. It is not located in a highly rated reach per the most recent ACC guidance, but the sponsor explains the reach parallels. Sidechannel and off-channel habitat enhancement are important multi-species actions for the reach. The Summary of Project section, however, apparently includes all benefits of previously funded, proposed, and other components, not just the benefits of the proposed work. Benefits of this project as described elsewhere in the pre-proposal are largely contingent upon receiving SRFB funds to connect the backwater channel to a new sidechannel upstream. The sponsor notes that proximity of this project with the 13.5 River Braiding Project reduces construction costs, but does not quantify the reduction, or explain how costs would be covered if only one project were funded. The sponsor secured funding for the first phase of construction of the Haapa project from SRFB in 2014, but according to the billings available on PRISM, has completed very little work to date.</p> <p>If this project proceeds to full proposal, the sponsor should either commit to securing additional funds to complete work necessary to fully implement the project, or remove descriptions of benefits that would not be accrued through backwater enhancement alone. The backwater channel work proposed relies on 3,815CY of streambed material borrowed from the channel upstream. If the upstream channel is not funded, this design element will need substantial revision, and costs will change markedly. The request of nearly \$300,000 is expensive compared with the benefit of adding complexity to backwater habitat that could probably be substantially improved with a lower-intensity effort. The level of treatment appears much more appropriate for a flow-through channel. Recommend final proposal: Yes (with reservations), but will not stand in the way of a no decision.</p> | Neutral | <p>Expect to see a land use agreement submitted with the full proposal. The proposal states that ACC funds will be used entirely for backwater pool enhancement with LWD. Presently, there is an existing pool with substantial vegetation cover. I realize this amount will be matched according to the proposal which is the only reason I would support moving forward. Without the match, the project can not be justified in my opinion. Increases habitat quantity and diversity - in favor of going to full proposal, but will not stand in the way of a no decision.This reach is not on the priority list. Proponent has not always been timely with obtaining permitting and consequently completing projects. What happens if SRFB funding is not awarded?</p> | <p>Do not proceed to full proposal.</p> | |

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| | J | K | L 2016/2017 LR Aquatics Fund Evaluation | Matrix | M | N |
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| 3 | Cowlitz Indian Tribe | USFWS | Utilities | NMFS | Next Step | |
| | <p>Project is proposed in a Tier 1 reach of the lower North Fork Lewis and would likely benefit multiple species. It is not located in a highly rated reach per the most recent ACC guidance, but the sponsor explains the reach parallels. The treatments proposed align with reach priorities and species' needs. A similar proposal was previously funded by the ACC, but funds were returned when the sponsor failed to secure SRFB funding in back-to-back years to fulfill match obligations. The sponsor claims that this was a result of a reduction in regional funding of SRFB, but the regional allocation was stable through the two years that the project was selected as an alternate; the regional allocation was reduced in 2016. The reason that the SRFB did not fund the project in back-to-back grant rounds was that it did not score highly in the regional LCFRB process. Leveraging Aquatic Fund dollars for additional Lewis River work was one of the attractive features of that proposal, a benefit not offered by this approach.</p> <p>The sponsor claims that this is a second phase of a previously designed and completed project, but this "phase" does not appear in the original design or design report provided to SRFB, and appears to have been sketched by Inter-Fluve in support of a grant application, rather than carefully designed and vetted as claimed in the pre-proposal. The main-stem treatments shown on the provided conceptual design appear to be superimposed on existing work—no rationale is provided for this action, but it is unclear from the proposal narrative whether the main-stem treatments are actually being proposed, or are an artifact from previous proposals. The side channel proposed for enhancement appears to be currently functional as high-flow refuge habitat, with stranding as an issue. The value of deepening and adding wood to the channel should be weighed against cost and other potential treatments such as comprehensive planting efforts. The proposed timeline is quite long at 4 years. Recommend final proposal: No.</p> | Neutral | <p>Is aquatic lease needed from DNR? This project continues the previous work at 13.5 which improved spawning and juvenile rearing habitat. When is the side channel flooded? Is it accessible by juvenile salmonids at the appropriate time of year? Expand on how this project meshes with previous work. Creates side channel habitat, increasing diversity - in favor of going to full proposal, but will not stand in the way of a no decision. This reach is not on the priority list. Proponent has not always been timely with obtaining permitting and consequently completing projects. What happens if SRFB funding is not awarded?</p> | Do not proceed to full proposal. | | |
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| | <p>The project is proposed in a small tributary to Cedar Creek, a Tier 4 (lowest priority anadromous) reach. The tributary is not identified on the most recent ACC guidance. The project proposes to improve passage by replacing two culvert crossings with bridges and conducting modest in-stream and riparian work associated with the bridge installations. Fish passage is generally a high-certainty action to improve abundance and resilience of fish populations, especially when adult upstream passage has been blocked. This project would benefit coho and potentially steelhead (both Contributing populations per the Recovery Plan), primarily by improving upstream juvenile passage. The project will not benefit Chinook or Chum, the Primary populations in the subbasin. The project does not support reintroduction. The request is extremely high relative to the value to fish; most project value appears to accrue to landowners, who are proposing no substantial contribution. The argument that Aquatic Fund monies should be used to bring private landowners into compliance with RCWs is not compelling, especially given the Settlement Agreement language in Article 7.5.3.1(b), which states that Aquatics Fund should not be spent on projects that other entities are legally mandated to complete (unless agreed by the ACC). The pre-proposal narrative suggests that this project would provide off-channel rearing benefits to Cedar Creek, which is extremely dubious given the project site's distance from Cedar Creek proper. Recommend for full proposal: No.</p> | Neutral | <p>Is any other landowner access agreements needed for access to site?? Not supportive of using ACC funds for culvert removal on private land unless there is a documented benefit. While coho juveniles and cutthroat have been observed in the project area no steelhead or Chinook have been observed. There just doesn't seem to be enough documented use downstream of the culverts to justify the costs of this proposal. Why did they not apply through their department's Fish Barrier Removal Board? And if they did why was project denied? Benefits to Spring Chinook? Pictures? This amount of money could benefit a larger number of fish in the priority reaches? Not in favor of going to full proposal.This reach is not on the priority list and is actually a Tier 4 reach on Cedar Creek that does not directly benefit spring Chinook.</p> | Do not proceed to full proposal. | | |
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APPENDIX F
EMAIL DATED MARCH 9, 2017
TO THE ACC FROM K. McCUNE – PACIFICORP
CY 2016/2017 LEWIS RIVER AQUATIC FUND PROJECTS –FUNDING SELECTION
& EVALUATION MATRIX

McCune, Kimberly

From: McCune, Kimberly
Sent: Thursday, March 09, 2017 1:58 PM
To: Amanda Froberg; Amelia Johnson; Asher, Eli; 'Bob Rose (rosb@yakamafish-nsn.gov)'; Bryce Glaser; Bryce Michaelis; David Howe; Doyle, Jeremiah; Ed Meyer; Ferraiolo, Mark; Fish First (j.malinowski@ieee.org); Frazier, Patrick A (DFW); Greg Robertson; Hudson, Michael; James Byrne; James H Malinowski; 'Kale Bentley'; Karchesky, Chris; Kelley Jorgensen; Ken Weiman (kwieman@fs.fed.us); Lesko, Erik; Mariah Stoll-Smith Reese; Mark Celedonia; 'Melody Tereski'; 'Michelle Day'; Mike Bonoff; Morgan, David; Nathan Reynolds; Olson, Todd; 'Patrick Lee'; Peggy Miller; Pienovi, Levi; Rhidian Morgan (rmmorgan@pnfarm.com); Roberts, Aaron; 'Ruth Tracy'; Samuel Kolb; Serdar. Carol; Shrier, Frank; Steve Manlow; Taylor Aalvik (taylor.a@cowlitz.org); Weatherly, Briana; Whitesel, Timothy
Subject: RESPONSE REQUESTED: 2016/2017 Lewis River Aquatic Fund Projects - FUNDING SELECTION
Attachments: 03092017 - ACC Lewis River AQ Fund evaluation (2016-2017) Utilities.xls
Importance: High

Attn: ACC Participants

Please be advised that consensus was reached at the March 9, 2017 ACC meeting for those Aquatic Fund Projects identified on the attached excel spreadsheet. To accommodate those ACC participants not in attendance today, the Utilities are providing an additional 7-day comment period. Please see the Tab labeled *ACC & Utilities Fund Decisions*.

For those who have yet to comment, please provide your comments and decisions to my attention **on or before close of business March 17, 2017.**

In addition, you may view each Full Proposal on the Lewis River website at the link provided below:

<http://www.pacificorp.com/es/hydro/hl/lr.html>

- License Implementation
- ACC
- Aquatics Coordination Committee 2017
- 2016/2017 Aquatic Fund Full Proposals

Thank you.

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Portland, OR 97232
Ph: (503) 813-6078

| ACC/Utilities | | | | | | | |
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| Decision for Funding | | | | | | | |
| | | Applicant | Project Title | Funding | WDFW | Fish First | LCFRB |
| | No. | Applicant | Project Title | | Comments | Comments | Comments |
| Yes | 1 | USDA Forest Service | Lewis River 21 - Phase I | \$175,000 | This proposal was reviewed by several members of WDFW Habitat and Fish Program with differing input. The project will benefit Lewis Reach 21, which is a Tier 2 reach. The project does not address sediment, which is a key limiting factor for the incubation life stage for any species. The project does the primary limiting factor of habitat quantity for winter steelhead, spring chinook and coho, which will benefit the age 0 rearing/migration life stage by improving rearing habitat throughout the year, cover, pool depths and gravel sorting function. The project is located near a recent avulsion in Rush Creek. WDFW has some concerns that another avulsion could occur in that location that would limit the future benefits of this project. The project does provide a good opportunity to test habitat restoration in the dynamic mainstem Lewis River and provides much needed structure and LWD to this reach. Project is well located in that several other projects completed recently in this portion of the basin. Project is well designed and sponsor is has good expertise to implement this project. Project has excellent match with sponsor providing 49% of the cost of the project. WDFW recommends funding this project. | | This project targets a high priority reach (EDT tier 2, NF Lewis 21) for regional recovery, with high potential for winter steelhead, medium priority for coho, and low priority for spring Chinook population performance improvements (LCFRB 2010). NF Lewis 21 is also identified as a priority for spring Chinook on the Aquatics Fund Priority Reaches Table based on the Cramer Fish Sciences report. This project would address summer and winter rearing needs for juvenile salmonids as well as increasing spawning opportunities. Questions raised at the pre-proposal stage were addressed in the final application and presentation. However, we suggest the sponsor consider adding roughness structures in the relict side channel to provide complexity in case the channel initiates a shift back to its original course. Project aligns well with Aquatic Fund priorities, including support for reintroduction species. We recommend that this project receive funding. |
| Yes | 2 | USDA Forest Service | Spencer Creek Alluvial Fan and Channel Rehabilitation | \$93,750 | This proposal was reviewed by several members of WDFW Habitat and Fish Program with differing input. The project will benefit Spencer Creek and Lewis Reach 23/24, which are all Tier 2 reaches. WDFW questions benefit to summer rearing because is an ephemeral reach. Additionally, concern regarding potential stranding or increased predation for fish using pools for summer rearing. Project does address key life stages and primary limiting factors for winter steelhead and coho in Spencer Creek and for winter steelhead and spring chinook in the mainstem Lewis by providing winter refugia, rearing habitat for age 0 fish and increases spawning habitat. Project is well located in that several other projects completed recently in this portion of the basin. Project is well designed and sponsor is has good expertise to implement this project. Project has excellent match with sponsor providing 52% of the cost of the project. WDFW recommends funding this project. | | This project targets a high priority reach (EDT tier 2, Spencer Creek) for regional recovery, with high potential for winter steelhead and low priority for coho population performance improvements (LCFRB 2010). Spencer Creek is also identified on the Aquatics Fund Priority Reaches Table based on the Cramer Fish Sciences report, and would address priorities for coho and steelhead spawning, rearing and migration. Increased complexity at the confluence of Spencer Creek and the NF Lewis could also provide important habitat for spring Chinook and other species, in part addressing high priority floodplain function and channel migration process needs in EDT tier 2 reaches Lewis 23 and 24. Questions raised at the pre-proposal stage were addressed in the final application and presentation. However, it is important to ensure the project incorporates a roughened channel design that allows for continued fish passage if boulders, large wood and substrate shift. The design should not rely too heavily on cross-channel weirs, which may lead to increased jump heights if downstream structures fail. The addition of large woody material would aggrade sediment, and create greater habitat complexity and food web benefits. Project aligns well with Aquatic Fund priorities, including support for reintroduction species. We recommend that this project receive funding. |

| Yakama Nation | | Cowlitz Indian Tribe | | | |
|---------------|----------------------------|--|----------|----------------------------|--|
| USFS | | USFWS Utilities NMFS | | | |
| Comments | Comments | Comments | Comments | Comments | Comments |
| | Yes, proceed with funding. | <p>This project is proposed in a high-priority reach, and if successful, would benefit multiple populations including spring Chinook.</p> <p>The Tribe appreciates the conceptual design typical drawings provided, but the proposed design approach appears to be inadequate to assure structural stability over the long term. The Tribe considers a basic topographic survey, hydrologic analysis, and 1-D hydraulic model minimum first-steps in developing sound designs for high-energy, mainstem reaches. The project proposal includes a lengthy example of wood stability calculations, but the underlying assumptions (e.g., soil cohesiveness, no erosion potential, relatively low stream velocities) do not appear applicable to the site. Similarly, the conceptual design drawings and narrative suggest that pile embedment two feet below maximum probable scour would provide adequate structural stability in a high-energy reach. This is demonstrably false. Additionally, the practice of measuring residual pool depth in the reach to use as a surrogate for maximum probable scour ignores live-bed scour potential and sediment deposition on the receding limb of the hydrograph during flood events. There is a substantial body of engineering knowledge that, when applied, ensures that scour is adequately predicted to ensure structural stability. Embedment beyond 2 times the anticipated scour depth is generally required for structural stability in apex-style jams to counteract calculated scour, sheer, and buoyancy. The low proposed design budget, with the assertion that preliminary designs were developed during a site reconnaissance trip, reinforces the Tribe’s skepticism of the proposed design methodology. Several entities requested details of the other phases that the Forest Service has apparently identified in the reach. The proposal narrative provides little detail in response, instead noting that the other phases are geomorphically independent. This does not adequately address the Tribe’s question and concern with regard to mobilization costs and proper scoping. A properly designed, reach-level approach would save time and money in the end, and would yield a project more likely to achieve and maintain desired habitat outcomes. This would also allow a consolidated NEPA coverage document, rather than the proposed approach, which will presumably cost \$72,000 or more for the three-phase approach conducted separately (based on the current request).</p> <p>While the proposal correctly explains that risk to habitat or infrastructure is low, we see a substantial risk to any investment by the ACC. The likelihood of project failure based on the designs provided is extremely high.</p> <p>We do not recommend funding this proposal.</p> | | Yes, proceed with funding. | Do not proceed with funding but will not stand in the way. |
| | Yes, proceed with funding. | <p>Spencer Creek Alluvial Fan and Channel Rehabilitation</p> <p>This project is proposed in a high-priority reach, and if successful, would benefit multiple populations including spring Chinook. Spencer Creek proper is less likely to benefit adult Spring Chinook than work in the adjoining mainstem Lewis.</p> <p>The Tribe appreciates the conceptual design typical drawings provided, but the proposed design approach appears to be inadequate to assure structural stability over the long term for the proposed mainstem structure. The Tribe considers a basic topographic survey, hydrologic analysis, and 1-D hydraulic model minimum first-steps in developing sound designs for high-energy, mainstem reaches. The project proposal includes a lengthy example of wood stability calculations, but the underlying assumptions (e.g., soil cohesiveness, no erosion potential, relatively low stream velocities) do not appear applicable to the site. Similarly, the conceptual design drawings and narrative suggest that pile embedment two feet below maximum probable scour would provide adequate structural stability in a high-energy reach. This is demonstrably false. Additionally, the practice of measuring residual pool depth in the reach to use as a surrogate for maximum probable scour ignores live-bed scour potential and sediment deposition on the receding limb of the hydrograph during flood events. There is a substantial body of engineering knowledge that, when applied, ensures that scour is adequately predicted to ensure structural stability. Embedment beyond 2 times the anticipated scour depth is generally required for structural stability in apex-style jams to counteract sheer and buoyancy. The low proposed design budget, with the assertion that preliminary designs were developed during a site reconnaissance trip, reinforces the Tribe’s skepticism of the proposed design methodology. The proposed work in Spencer Creek is less concerning because the likelihood of catastrophic failure is lower, and wood movement and reorganization would not render the project a total loss in the case of structural deformation. It is not clear from the proposal, however, if the Spencer Creek structures would provide full functional benefits without the influence of the mainstem structure. The project overall is a fairly high cost endeavor relative to the amount of work on the ground, so eliminating the mainstem structure may render the project less cost effective—the proposal narrative is at odds with the budget template regarding the number of logs used in the project (200 vs. 100 logs, respectively). This may be a result of uncertainty with Swift wood supply, but is not explained.</p> <p>The Tribe does not recommend funding this project, but would entertain discussion of partial funding for work in Spencer Creek.</p> | | Yes, proceed with funding. | Do not proceed with funding but will not stand in the way. |

APPENDIX G
EMAIL DATED MARCH 20, 2017
TO THE ACC FROM K. McCUNE – PACIFICORP
CY 2016/2017 LEWIS RIVER AQUATIC FUND PROJECTS,
FUNDING SELECTION

McCune, Kimberly

From: McCune, Kimberly
Sent: Monday, March 20, 2017 7:45 AM
To: Amanda Froberg; Amelia Johnson; Asher, Eli; 'Bob Rose (rosb@yakamafish-nsn.gov)'; Bryce Glaser; Bryce Michaelis; David Howe; Doyle, Jeremiah; Ed Meyer; Ferraiolo, Mark; Fish First (j.malinowski@ieee.org); Frazier, Patrick A (DFW); Greg Robertson; Hudson, Michael; James Byrne; James H Malinowski; 'Kale Bentley'; Karchesky, Chris; Kelley Jorgensen; Ken Weiman (kwieman@fs.fed.us); Lesko, Erik; Mariah Stoll-Smith Reese; Mark Celedonia; 'Melody Tereski'; 'Michelle Day'; Mike Bonoff; Morgan, David; Nathan Reynolds; Olson, Todd; 'Patrick Lee'; Peggy Miller; Pienovi, Levi; Rhidian Morgan (rmmorgan@pnfarm.com); Roberts, Aaron; 'Ruth Tracy'; Samuel Kolb; Serdar Carol; Shrier, Frank; Steve Manlow; Taylor Aalvik (taylor.a@cowlitz.org); Weatherly, Briana; Whitesel, Timothy
Subject: RE: RESPONSE REQUESTED: 2016/2017 Lewis River Aquatic Fund Projects - FUNDING SELECTION

Attn: ACC Participants

Please be advised that no additional comments were received by the March 17, 2017 deadline. PacifiCorp will proceed with contracting and funding the following 2016/2017 ACC approved projects:

- USFS: Lewis River 21 – Phase 1 (\$175,000)
- USFS: Spencer Creek Alluvial Fan (\$93,750)

Thank you.

Kimberly McCune

Sr. Business Administrator
PacifiCorp – Hydro Resources
825 NE Multnomah St., Suite 1500
Portland, OR 97232
Ph: (503) 813-6078

From: McCune, Kimberly
Sent: Thursday, March 09, 2017 1:58 PM
To: Amanda Froberg <afroberg@cowlitzpud.org>; Amelia Johnson <ajohnson@lcfrb.gen.wa.us>; Asher, Eli <easher@cowlitz.org>; 'Bob Rose (rosb@yakamafish-nsn.gov)' <rosb@yakamafish-nsn.gov>; Bryce Glaser <glasebgg@dfw.wa.gov>; Bryce Michaelis <bymichaelis@fs.fed.us>; David Howe <David.Howe@dfw.wa.gov>; Doyle, Jeremiah <Jeremiah.Doyle@pacificorp.com>; Ed Meyer <ed.meyer@noaa.gov>; Ferraiolo, Mark <Mark.Ferraiolo@pacificorp.com>; Fish First (j.malinowski@ieee.org) <j.malinowski@ieee.org>; Frazier, Patrick A (DFW) <Patrick.Frazier@dfw.wa.gov>; Greg Robertson <gregrobertson@fs.fed.us>; Hudson, Michael <michael_hudson@fws.gov>; James Byrne <byrnejim7@gmail.com>; James H Malinowski <jim.malinowski@icloud.com>; 'Kale Bentley' <kale.bentley@dfw.wa.gov>; Karchesky, Chris <Chris.Karchesky@pacificorp.com>; Kelley Jorgensen <kjorgensen@pnfarm.com>; Ken Weiman (kwieman@fs.fed.us) <kwieman@fs.fed.us>; Lesko, Erik <Erik.Lesko@pacificorp.com>; Mariah Stoll-Smith Reese <mariah@lelooska.org>; Mark Celedonia <mark_celedonia@fws.gov>; 'Melody Tereski' <Melodyt@lcfrb.gen.wa.us>; 'Michelle Day'

<michelle.day@noaa.gov>; Mike Bonoff <mbonoff@masonbruce.com>; Morgan, David <dmorgan@pnfarm.com>; Nathan Reynolds <nreynolds@cowlitz.org>; Olson, Todd <Todd.Olson@pacificorp.com>; 'Patrick Lee' <patrick.lee@clark.wa.gov>; Peggy Miller <peggy.miller@dfw.wa.gov>; Pienovi, Levi <Levi.Pienovi@pacificorp.com>; Rhidian Morgan (rmmorgan@pnfarm.com) <rmmorgan@pnfarm.com>; Roberts, Aaron <Aaron.roberts@dfw.wa.gov>; 'Ruth Tracy' <rtracy@fs.fed.us>; Samuel Kolb <samuel.kolb@dfw.wa.gov>; Serdar. Carol <cser461@ECY.WA.GOV>; Shrier, Frank <Frank.Shrier@pacificorp.com>; Steve Manlow <smanlow@lcfrb.gen.wa.us>; Taylor Aalvik (taylor.a@cowlitz.org) <taylor.a@cowlitz.org>; Weatherly, Briana <Briana.Weatherly@pacificorp.com>; Whitesel, Timothy <Timothy_Whitesel@fws.gov>

Subject: RESPONSE REQUESTED: 2016/2017 Lewis River Aquatic Fund Projects - FUNDING SELECTION

Importance: High

Attn: ACC Participants

Please be advised that consensus was reached at the March 9, 2017 ACC meeting for those Aquatic Fund Projects identified on the attached excel spreadsheet. To accommodate those ACC participants not in attendance today, the Utilities are providing an additional 7-day comment period. Please see the Tab labeled *ACC & Utilities Fund Decisions*.

For those who have yet to comment, please provide your comments and decisions to my attention **on or before close of business March 17, 2017.**

In addition, you may view each Full Proposal on the Lewis River website at the link provided below:

<http://www.pacificorp.com/es/hydro/hl/lr.html>

- License Implementation
- ACC
- Aquatics Coordination Committee 2017
- 2016/2017 Aquatic Fund Full Proposals

Thank you.

Kimberly McCune
Sr. Business Administrator
PacifiCorp - Hydro Resources
825 NE Multnomah, Suite 1500
Portland, OR 97232
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APPENDIX H
Lewis River 21 Phase I

Lewis River Aquatic Fund Full Proposal for the 2016-2017 Funding Cycle

Prepared for the Lewis River Aquatic Coordination Committee Working Group
by the Gifford Pinchot National Forest

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Project Title

Lewis River 21 Phase I

Project Manager

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Identification of problem or opportunity to be addressed

Problem:

Minimal high quality side channel spawning and rearing habitat exists in the Upper North Fork Lewis River. This habitat is essential for species listed under the Endangered Species Act (ESA) that use the Lewis River Basin and include Chinook, coho, steelhead, and bull trout. Effects to their habitats include past land management activities such as logging, road building, and development of hydro-resources, which until the recently implemented trap and haul operations has blocked all anadromous species access into the Upper North Fork Lewis River. To ensure reintroduction efforts of salmon and steelhead into the watersheds above the dams are successful, the Forest Service has worked with PacifiCorp on a variety of projects including streambank and instream fish habitat restoration, migration barrier culvert replacement with a bridge, and supported the construction of several acclimation ponds for juvenile spring Chinook on national forest lands.

The 2010 Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan six year habitat work schedule identifies Lewis River 21 as a Tier 2 reach (LCFRB 2010). Roni and Timm (2016) reported pools formed by conifers as low, large wood debris and riparian function rated moderate and a high percentage of fines (21.9%) for Lewis River Reach 21. Based on the low percent pools and large wood along with a high storage of sediment within the reach, Roni and Timm (2016) restoration measures recommended large woody debris enhancements along with road decommissioning. The Forest Service has completed NEPA to close/stabilize or decommission roads in areas draining into Lewis River above Reach 21. The Gifford Pinchot road restoration projects will be implemented in the next five years and will be decommissioning 1.0 mile and close and stabilizing 5.9 miles of road within the Big and Little Creek subwatersheds, which flow into the Lewis River above Reach 21.

Opportunity:

Lewis River 21 Phase I is the first of a series of proposals to address the recommendations of large woody debris enhancements. Phase 1 will add large wood complexes to the mainstem Lewis River near Rush Creek, which is the lowest extent of Lewis River 21 and is the first in a series of restoration

proposals being developed by the Forest Service for this 1 mile reach. Habitat in this reach can be utilized by Chinook, coho, steelhead, and offers some benefit to migrating adult bull trout. This project will contribute to providing functioning high quality habitat that supports fish reintroduction efforts in the upper North Fork Lewis River.

Lewis River 21 Phase 1 will restore a quarter mile section Lewis River 21 by adding four complex wood structures which will provide quality spawning, summer rearing and overwintering habitat. The woody material would also create high quality hiding cover and increased residual pool depths in the side channel. Structures will facilitate gravel sorting by reducing bed shear stresses and thus increasing spawning opportunities for Chinook salmon in the mainstem reach.

This phase of work will be the first of three expected phases within the Lewis River Reach 21 due to the contractual timing constraints and the staging of material to complete the construction. Phase 2 and 3 will occur upstream on the river right side channel and upstream of that, respectively. Phase 2 and 3 will be geomorphically independent of Lewis River 21 Phase 1.

The project is located in the Lewis River about 900 feet upstream of the current confluence with Rush Creek. During the December 2015 Flood, Rush Creek recruited several large (~48" DBH) Douglas fir trees (Figure 1) about 500 feet upstream of the Lewis River which avulsed the creek and created a new channel within the most eastern side of the Rush Creek alluvial fan. Consequently, this avulsion has the likelihood of diverting the majority of flow into the newly formed channel which joins the Lewis River Reach 21 about 900 feet east of the original confluence. The addition of the structures in Phase 1 will complement the avulsion of Rush Creek should it happen in the future by storing spawning gravels and creating a lower gradient channel on Rush Creek with the confluence of the Lewis River. The project area will be accessed from the decommissioned road (9000410) off Forest Service Road 90 near Rush Creek and use the banks of the Lewis River to access the project area upstream.



Figure 1. Picture of large trees in the main channel of Rush Creek that caused a channel avulsion to the east end of the Rush Creek alluvial fan at the confluence of the Lewis River.

Background

Ecosystem Diagnosis and Treatment (EDT) analysis identifies production potential as medium for spring Chinook, high for winter steelhead, and low for coho. This reach has a Primary population designation for Spring Chinook and coho, and a contributing population designation for winter steelhead. EDT results suggest channel structure, and off channel and side channel habitat restoration are high priorities for all species in the reach (Mobrand Biometrics, Inc. 2004).

The U.S. Forest Service identified the Upper Lewis River mainstem habitat as high priority reaches for Chinook and steelhead. While side channels and other slow water habitats were identified as high priority for coho. The mainstem habitat have been negatively impacted by past timber harvest and

sediment producing floods that also widened channels, which has caused unstable channel conditions that still haven't fully recovered (USFS 1995b).

Project Objective(s)

GOAL:

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

- ◆ Improving habitat complexity and diversity in the side channel using LWM
- ◆ Providing refugia during winter flows for juvenile salmonids.
- ◆ Providing rearing opportunities for juvenile salmonids during summer months.
- ◆ 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.*

Chinook, coho, and steelhead trout are listed as a threatened species under the ESA. This project will contribute to the recovery of these species by increasing the amount and quality of rearing pools in side channels. In addition, spawning areas will be associated with the log complexes.

Lower Columbia ESU coho salmon are listed as a threatened species under the ESA

Lower Columbia ESU steelhead trout are listed as a threatened species under the ESA

Lower Columbia ESU Chinook Salmon are listed as a threatened species under the ESA

Priority 2: *Support the reintroduction of anadromous fish throughout the basin.*

Juvenile anadromous salmonids will have a quality rearing and refugia when this project is complete, contributing to survival and promotion of Spring Chinook and coho salmon and steelhead trout during reintroduction efforts.

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 North Fork Lewis River Basin, Lewis River Reach 21. It is well documented that coho salmon juveniles prefer slow water habitats with large wood components and Chinook salmon prefer mainstem spawning habitat. This project restores and creates greater spawning area in the mainstem channel and higher quality slow water habitat off of the mainstem North Fork Lewis River.

Tasks:

Task 1: NEPA and required permits.

- 1) Complete NEPA documentation. Field work for this NEPA document would be accomplished during the fall and winter of 2017. The final document should be completed and signed by winter 2017, and the project would be implemented July 2018.
- 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 the District Ranger is supportive of this project.

Task 2: Project Design.

- 1) Finalize project design and project preparation details. Preliminary designs were completed during reconnaissance visits in 2016.
- 2) An engineer survey will be done to develop project specific elevations for excavation and final structure design. This includes longitudinal profile and cross-sectional information that will be used as designs are finalized.
- 3) A 35 acre Peppercat timber sale unit is set aside to use for fish habitat restoration activities over the next ten years. An area within this stand will be designated for harvest operations and laid out to thin for this project. Additional material may be acquired from PacifiCorp Swift Reservoir Cleaning operations.

Task 3: Project Implementation

- 1) Develop equipment and logging contract. A standard Request For Quotation 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 allow 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 after project 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.

Methods:

The Gifford Pinchot National Forest Service will oversee all phases of this project including project design, implementation and monitoring.

Approximately 300 pieces of large woody material, half with rootwads, will be placed along the margins and a vegetated gravel bar in the mainstem. An excavator will be used to anchor woody material into streambanks and a mid-channel gravel bar to create complex rearing habitat for juvenile fish while protecting the mid-channel gravel bar island vegetation (Figure 2). An increase in gravel retention in the upstream pool tail crest is expected from the mid-channel gravel bar and combined margin structures. Trees will be helicoptered to the Lewis River due to the sensitive bull trout habitat present at the end of the access route and to avoid resource damage and costs of a long skidding route. Equipment access will be a decommissioned road bed off the Forest Service 90 road which will be closed to public access during project implementation. The decommissioned road will be returned to its decommissioned status after project implementation.

In addition, log structures will provide optimal holding and cover areas during all flows and will be designed to maintain flow into high quality off channel habitat and to maintain pool scour, thus increasing the residual depth of the existing shallow channel. Large Woody Material for this project will come from USFS Lands and if available, Swift Reservoir cleaning operations. Typical size of wood from the USFS lands are about 14" diameter by 55' in length Douglas fir and the large wood procured from the Swift Reservoir are typically larger mixed species that can be up to 36" diameter in size. These larger pieces of large wood would serve as key pieces in the construction of structures to increase the longevity and durability through time.

Established US Forest Service protocol to prevent introduction of non- native species will be followed during project implementation. This involves pressure washing machinery offsite to remove all dirt and debris, inspecting machinery prior to project implementation, and mulching exposed areas of soil to prevent the establishment of non-native vegetation. Follow up monitoring will occur after project implementation for three years and non-native vegetation will be treated if found.

Structure Design

Conceptual structure designs are based on past projects from similar rivers within the Pacific Northwest Region. Figure 2 shows the plan view of the Lewis 21 Phase I project area. Each structure site are placed where naturally occurring wood deposition would and has occurred. The predicted geomorphic result of the combination of structures 1a, 1b, and structure 2 are to reduce the high flow hydraulic gradient upstream of those structures. Multiple objectives would be met from those structures but the primary benefits would increase spawning gravel deposition in the pool tail upstream and would create greater side channel habitat complexity through increased and maintained pool depth scour, cover, high flow refugia, and rearing opportunities. In addition, and depending on the magnitude of flow, these structures are also expected to increase the availability for the river to access the floodplain. Structure conceptual design drawings will be discussed further in the document (Figures 3, 4 and 5).

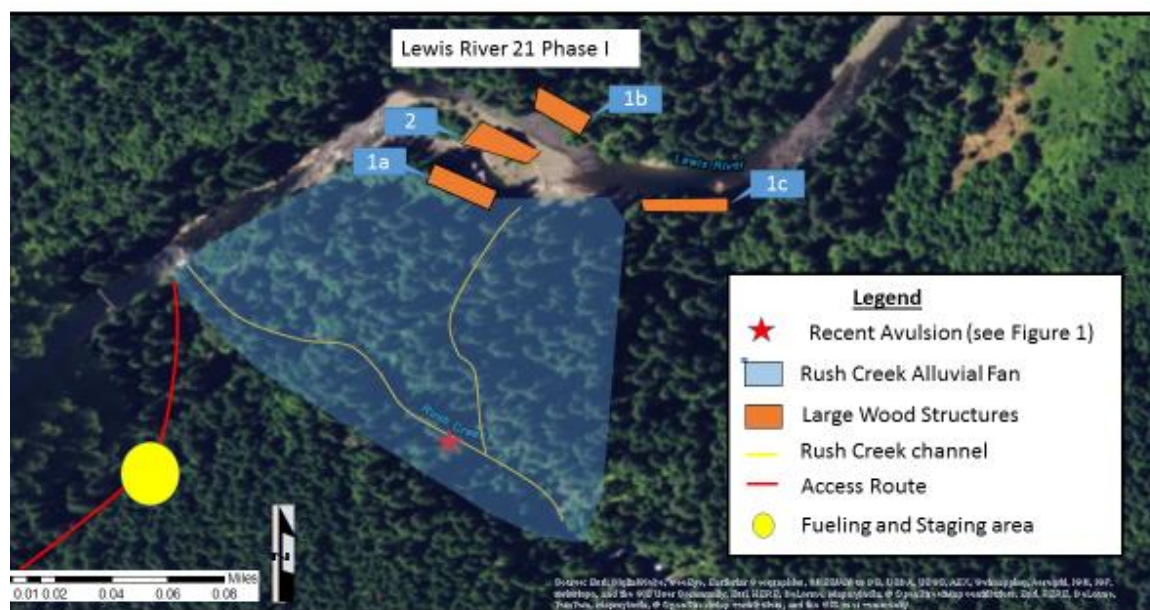


Figure 2. Plan view of Lewis River 21 Phase I project site.

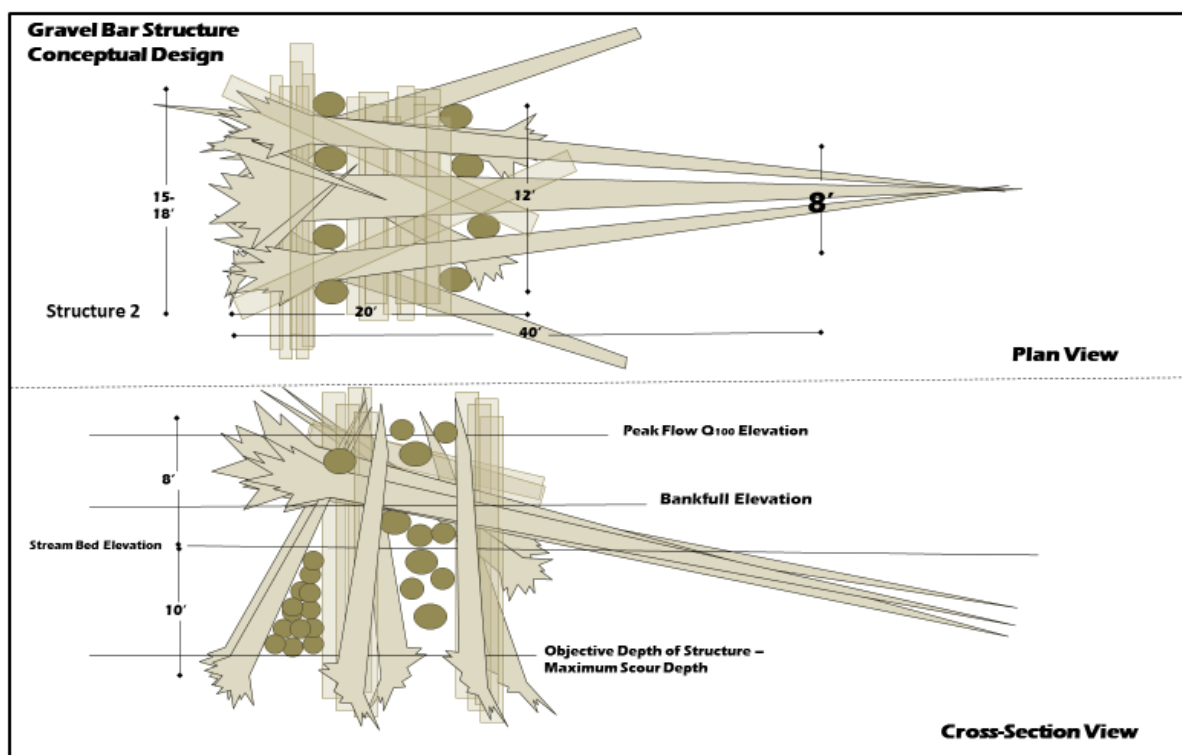


Figure 3. Plan and cross-section conceptual view of the gravel bar structure.

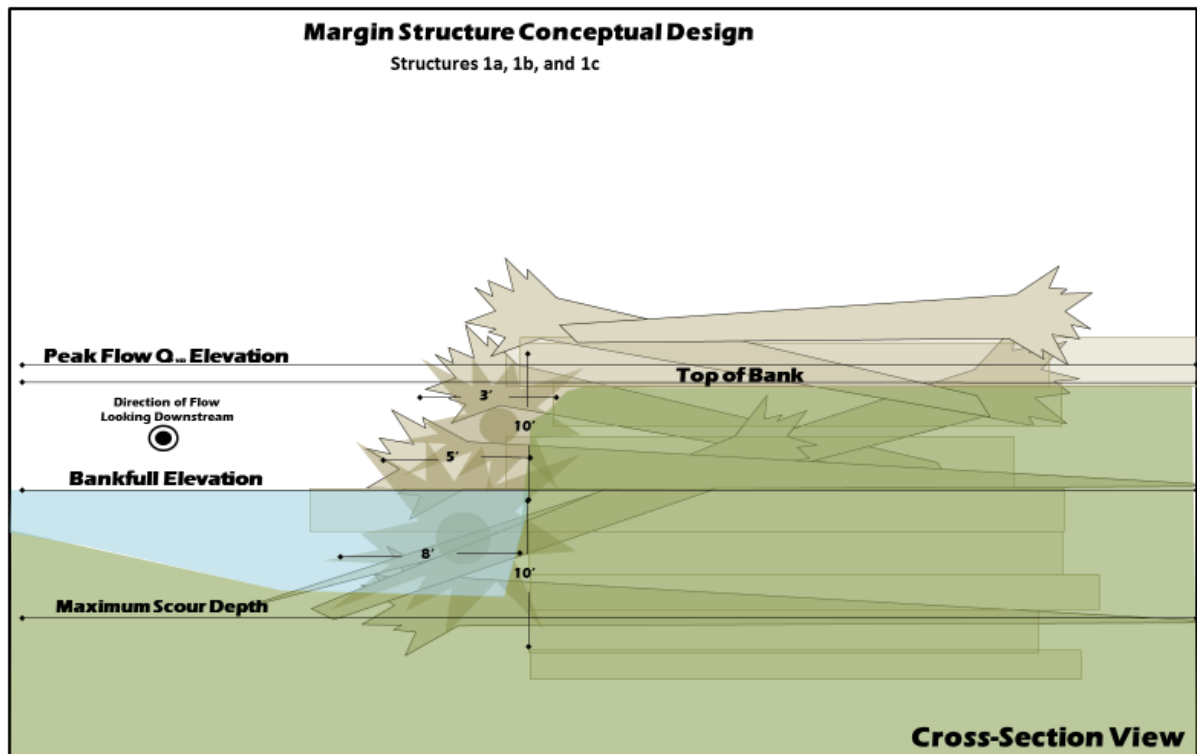


Figure 4. Cross-section conceptual view of the margin structures.

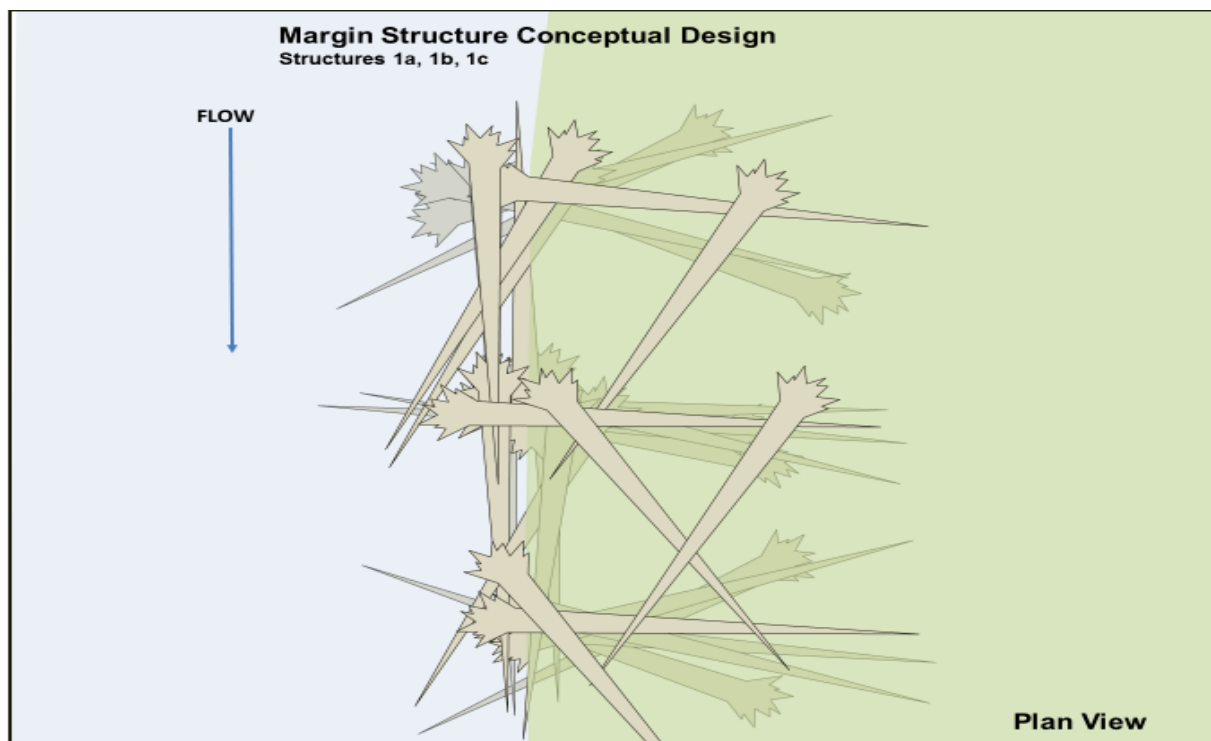


Figure 5. Plan view conceptual design for margin structures.

Project and Structure Risk and Durability Assessment

The risks of failure, the failure mode, and potential consequences and effects to the system and lives and property associated with each component of the Lewis River 21 Phase 1 design are considered within the following matrix adapted from Niezgoda and Johnson (2007) where restoration failure mechanisms are evaluated for relative risk of occurrence (Table 1). Higher numbers indicate higher risk of occurrence with design. For higher risk priority numbers, recommended actions are identified to address potential failure modes and may include new design elements, inspections, monitoring procedures, and/or design modifications.

Lewis River 21 Phase 1 includes several treatments or structure types. For each treatment, there is a potential for failure, and a range of effects that may occur as a result of the failure and potential causes or mechanisms. Risk of treatment failures for this project and anticipated effects are quantified in Table 3 along with recommended design checks. Lewis River Reach 21 Phase 1 risk of potential failure mode was rated 5 or less for all three structure types; Margin Structures, Gravel Bar and Point Bar Structures, and Grade Control – Floodplain Connectivity Structures. The risk of potential failure mode was rated greater than 5 only for Excessive Scouring of Bed for Margin Structures and was rated a 7. The design check to minimize this risk is to Follow Design Guidelines for Structures Scour/ Shear Stress.

Table 1. Restoration design components and potential risks, causes and effects of failure.

| Treatment | Potential Failure Mode | Potential Effects of Failure | Potential Causes or Mechanisms | *Risk Priority #, (1-10, 1-low, 10-high) | Design Checks |
|-------------------|-------------------------------|--------------------------------------|--|---|--|
| Margin Structures | Burial by Incoming Sediment | Project Not Effective | Insufficient Design and Placement Considerations | 3 | Allowable Shear Stress Check |
| | Rapid Lateral Migration | Property or Infrastructure Damage | Improper Design Specifications | 5 | Design Experience and Construction Oversight |
| | Erosion of opposite Bank | Minimal, some sediment input | Improper Design, Placement or Alignment | 2 | Design Experience |
| | Structure Displacement | Minimal, reduce design effectiveness | Improper Material Sizing, or Design | 3 | Use Largest Cost Effective Materials |
| | Excessive Scouring of Bed | Potential to cause structure failure | Improper Design | 7 | Follow Design Guidelines for Structures, Scour/ Shear Stress Check |

| Treatment | Potential Failure Mode | Potential Effects of Failure | Potential Causes or Mechanisms | *Risk Priority #, (1-10, 1-low, 10-high) | Design Checks |
|--|---|--------------------------------------|---|---|--|
| Gravel Bar and Point Bar Structures | Burial by Incoming Sediment | Minimal | Insufficient Design Capacity | 3 | Allowable Shear Stress Check |
| | Rapid Lateral Migration | Property or Infrastructure Damage | Improper Design, Placement or Alignment | 5 | Design Experience and Construction Oversight |
| | Erosion of opposite Bank | Minimal, some sediment input | Improper Design, Placement or Alignment | 2 | Design Experience |
| | Structure Displacement | Potential to cause structure failure | Improper Design | 3 | Follow Design Guidelines for Structures |
| Grade Control – Floodplain Connectivity Structures | Burial by Incoming Sediment | Minimal | Insufficient Design | 3 | Allowable Shear Stress Check |
| | Rapid Lateral Migration | Property or Infrastructure Damage | Improper Design, Placement or Alignment | 5 | Design Experience and Construction Oversight |
| | Undermining or Degradation of Grade Control | Minimal, some sediment input | Improper Design, Placement or Alignment | 2 | Design Experience |
| | Structure Displacement | Potential to cause structure failure | Improper Design | 3 | Follow Design Guidelines for Structures |

Most structure failures are the result of improper design or placement of structures, or design specifications. For instance, trees and logs keyed into the stream bank or bed needs to be deep enough or buried far enough into the stream bank or terrace to resist bed shear forces generated from higher flow events. The frequency and effects of large flow events and how they interact with structures is important to consider in assessing risks to treatments and in evaluating what could happen to materials such as large woody debris that is transported downstream.

Structure Stability

Margin and gravel bar structures are built as interwoven complexes with significant portions of the structures buried into the stream bed, bank or terrace for ballast. All of these structures have vertical members which function similar to pilings providing torsional support. In addition, cobble and boulders will be placed in the core of each structure for additional ballast. Figures 3, 4 and 5 provide the conceptual design to visualize the concept. The construction elements of these structures are designed to minimize risk of failure yet provide maximum effectiveness of meeting specific objectives and enhancement of fish habitat and aesthetically and functionally emulate natural wood deposits. Specifically, the Lewis River 21 Phase 1 structures are based on engineering principals, assessment of natural wood accumulations and multiple years of on the ground experience in a wide range of fluvial systems in the Pacific Northwest and Alaska.

A synopsis of structure durability calculations on a similarly sized river using similar sized large wood on the Olympic National Forest was summarized by Marzullo (2009). For simplicity, a 35 foot Douglas fir log, 3.0 feet in diameter will be used to illustrate the calculation process with an assumption that about 15ft of its length is buried into the bank and stream velocities are 6 feet per second. The log is assumed to be projecting out perpendicular to the current and bank and horizontal to the bed and entirely under the surface of the water. This example also assumes there will be no scour at the log/stream bank interface.

The forces acting on a LWD structure include a drag force from the water flow, a buoyancy force, and impact forces from debris. Since impact forces are less predictable it was decided to include potential impact forces into the equation by increasing the debris or safety factor (Worster 2003).

The drag force (F_d) of the moving water can be found from:

$$F_d = \rho A C_d (V^2 / 2g) \text{ (Chow, 1959)}$$

Where ρ = water density at 62.4 lb/ft³.
 A = area of structure normal to the current
 C_d = coefficient of drag, 1 for large blunt objects.
 V = velocity of current, given as 6 ft/s above.
 g = gravity constant, 32.2 ft/s²

Equation 1. Drag Force, Chow 1959.

Assuming the surface of the log is round. About 1/2 of the circumference of the log is exposed to the current. Half the circumference is 1/2 x 2 π r = 4.7 feet, therefore the area of the exposed portion of the log is 94 square feet.

Since the area of the log is round, the current will act upon it at an average angle of 45° (90° at the middle point of the upstream face and 0° at the top and bottom). The cosine of a 45° angle is 0.707 and we will factor that into our equation.

The force of the water acting on the log is $F_d = ((62.4 \text{ lb/ft}^3)(94 \text{ ft}^2)(6 \text{ ft/s})^2 / (2 \times 32.2 \text{ ft/s}^2))0.707 = 2318.2 \text{ lbf}$.

$$F_b = V(\gamma_w - \gamma_{LWD})$$

V = volume of LWD submerged in cubic feet = $\pi r^2 l = 141.4 \text{ cf}$
 $\gamma_w = 62.4 \text{ lb/ft}^3$
 $\gamma_{LWD} = GS \gamma_w$

where GS is the specific gravity of wood = .48 for coastal Douglas fir (Worster, 2003)
and $w = 1 + \text{moisture content} = 1.12$
So $F_b = 918.7 \text{ lbf}$

Equation 2. Buoyant Force, Worster 2003.

Therefore the total force on the exposed portion of log is:

$$F_{T(\text{anchor})} = SF(F_d + F_b) / A_n$$

Equation 3. Total Force Calculation.

Where:

$$F_{T(\text{anchor})} = \text{total force per anchor in lbf}$$

SF = safety factor (typically ranges from 1.5 (when limited impact loads are expected and soil characteristics are known) to 3.0 (when impact loads are expected and/or soil characteristics are unknown))

$$A_n = \# \text{ of anchors}$$

$$F_T = 2318.2 + 918.7 = 3236.9 \text{ lbf}$$

Using a SF of 3,

$$F_T = 9710.7 \text{ lbf}$$

Resistance factors on the bank end: To be balanced then the moment applied at the bank end must equal the stream end. The bank piece has a moment arm 15 feet in length. If the moment were to equal 194,214 ft lb, the resistance at the furthest bank end should be 12,947.6 ft lb.

To maintain the log there is a nominal requirement of 12,947.6 ft lb. One cubic feet of loam soil is about 116 lb. Average rock has a specific gravity of about $2.65 * 62.4 \text{ lb/cu ft} * 0.7$ (assuming 30% porosity). Assuming 35 feet of soil backing, not accounting for the added resistance of soil shear strength, which an average value for cohesive soil is 0.35 ft lbs/sq. ft (2.5 N/sq m). There is also the strength that roots may provide which can be in on the order of kPa (1000's N/ sq m) or 100's of ft lbs/sq. ft. In any case a bank running parallel with current is for all practical purposes infinite in strength. A useful analogy to the buried portion of log may be that of deadman anchor—a very effective, and cheap way to provide tensional strength, particular on a vector at an oblique angle or horizontal to the ground.

In summary, burying 50% of the log into the bank will result in a safety factor of 2. One of the primary design criteria for the large wood structures discussed in this document is to key them in the bank or stream bed as far as possible (preferably at least 2:1 over stream projection) while leaving the minimum amount exposed to stream flow to meet the intended objectives.

The structures for the Lewis River 21 phase I project will be keyed into banks and terraces to at least 3:1 or greater to increase the safety factor. All structures are strategically placed along historic and predicted stable channel patterns and natural areas for large wood depositional areas.

Potential Failure Mechanisms

Structure failure is defined as the point at which the structure is degraded by excessive erosion, buoyancy, buried by incoming sediments or abandoned to the point of being ineffective. The four primary modes of failure are 1) stream bed scour, 2) increased Surface Area – Debris Loading, 3) buoyancy, and 4) burial and abandonment. These mechanisms can lead to disposition of the structure, partial failure and catastrophic failure. Structure disposition occurs when flow forces shift or re-orient the structure from its original constructed form. Though the structure largely remains intact it may or may not function as designed. Partial failure occurs when part of the structure is lost due to scour, buoyancy or burial. In the event of catastrophic structure failure, the majority if not the entire structure would be lost from its original position and transported downstream. Catastrophic failure could occur from a variety of mechanisms such as excessive debris loading causing an increased surface area, excessive scour and undermining of the structure, buoyancy, large wood and boulder debris torrents during flood events or any combination thereof.

In the unlikely event that these structures fail, large woody debris used for the structures would be transported downstream and either re-deposited elsewhere or transported to Swift Reservoir. There is a relatively low risk that this material will cause a risk to areas downstream, especially at bridges. Downstream bridges have design flow capacities that currently accommodate large wood transported by the river. Large wood is a natural component of flood material in rivers, and the amount that could be generated from these structures will not exceed what is normally observed in rivers at flood stage.

Correct placement, orientation and construction of structures are critical to preventing failures. High velocity regions and depositional areas need to be identified and accounted for during the design process. Portions of the structure exposed to the highest velocities must be oriented correctly and armored with the appropriate materials including preloading upstream regions with slash and other smaller woody material.

Stream Bed Scour

The mechanism with the highest risk priority number for possible structure failure is bed scour around or adjacent to the structure. Margin structures are designed to scour pools and reduce near bank shear stress by focusing the energy away from the bank or terrace. The gravel bar structure are designed to initiate deposition upstream as an arcuate bar and downstream as a central bar where vegetation can persist, however, scour on the upstream face is common and a crescentic pool is formed (Abbe and Montgomery 1996).

The Lewis River 21 project area is a relatively high energy reach because of the moderate slope (2-3%). Stream slope is a direct measure of energy where streams that are considered high energy have slopes greater than 2% (Castro 2009). The energy generated in the form of bed shear stresses has the ability to mobilize the bed material around the structures and excavate an estimated 10 feet of scour depth. Maximum residual pool depths measured in the reach were 8 feet or less. These pools were created by various types of scour; bend scour, local, constriction, and jet scour. The deepest residual pool depth found in the surveys was 8 feet, immediately upstream of the structure locations and was caused by a pool head constriction from a bedrock outcrop.

To reduce the risk associated with bed scour, structure depth will exceed the depth of the calculated scour within the project area by at least a 25 % or approximately 10 feet residual scour depth, and possibly deeper, depending on site conditions.

Increased Surface Area – Debris Loading

During large flood events large amounts of woody debris can be transported downstream and collect on structures and other natural areas of deposition. Excessive debris loading can dramatically increase the surface area of the structure leading to extreme moment forces which can lead to catastrophic failure by shearing the structure from the stream bed or bank/terrace. To prevent catastrophic failure from excessive debris loading and increased surface area, significant portions of the structure are buried for ballast and vertical members are installed to provide further resistance to shear. In addition, vertical members will be placed at spacing intervals of 15 feet or less and the flanks of gravel bar structure will be designed to be oriented downstream to release excess debris.

Buoyancy

The Lewis River 21 Phase I project area is a high velocity system where flood flows can reach ~8,000 cfs or greater with flood water elevations reaching 8 feet or higher above the existing stream bed. Therefore buoyancy and rafting could lead to partial or catastrophic structure failure. Design measures to reduce failure risk associated with buoyancy are to insure structure heights exceed the estimated Q100 water surface elevation to prevent the structure from being overtopped during large flood events. In addition, placement of vertical members above the Q100 water surface elevation will retain and collect additional debris further increasing long term stability.

Burial and Abandonment

Burial of the structure from upstream sediment sources or structure abandonment due to channel avulsions are failure mechanisms that have been considered during this design process. Burial or abandonment during extreme flood events could occur regardless of the level of design and analysis. However, evaluating the dominant historic flow paths reduce the risk of structure burial, abandonment and excessive scour and therefore increases the probability of long term structure stability and effectiveness. This project area is stable in channel orientation due to the Rush Creek alluvial fan deposits and the bedrock present both upstream and downstream of the structures.

Specific Work Products

Deliverable 1: Completed project.

Deliverable 2: A report describing the project. Report to include project narrative, financial information, and photographs of completed projects.

Deliverable 3: Monitoring Report.

Project Duration

Monitoring for this project would begin during the summer of 2018. Project implementation would occur July 15th 2018 and is expected to take three weeks to complete. 'As built' documents will be completed by December 31st, 2017. An initial report documenting fish response to the structures will be completed by December 31st, 2018. The first monitoring report with pre and post project data will be available December 31, 2019.

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

Permits

NEPA- Field work will be completed during the fall and winter of 2017/2018, NEPA document will be completed winter 2017. 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.

Washington State Department of Fish and Wildlife HPA- 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 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.

Army Corps of Engineers- 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 administered by the Forest Service. The project is wholly on public lands.

Matching Funds and In-kind Contributions

Table 1. Matching funds and in-kind contributions for the Lewis River Phase 1 restoration.

| Partner | Contribution | Funds |
|--------------------------|--|-------------------|
| Forest Service | Project development, Contracting, Permitting, Monitoring | \$29,000 In-kind |
| Materials from USFS | Trees with rootwads | \$150,000 In-kind |
| Mt. St. Helens Institute | Monitoring | \$3,000 In-kind |

Professional Review of Proposed Project

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

Budget

Table 2. Overall budget for the Lewis River Phase 1 restoration.

| | NEPA | Final designs | Project Mgmt | Construction | Monitoring/Labor /Reporting/Coord. | |
|---|---------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------------------------------|---------|
| Personnel Costs | | | | | | |
| FS - Zone Team or Contract | \$12,000 (IK) \$12,000 (ACC) | | | | | |
| FS –Fish Bio and Hydrologist | | \$3,000 (IK) \$3,000 (ACC) | | | | |
| FS - Fish Bio and Bio technician | | | \$5,000 (IK) \$5,000 (ACC) | | \$1,000 (IK) \$1,000 (ACC) | |
| FS - Contract administrator - | | | | \$5,000 (IK) \$5,000 (ACC) | | |
| FS - Contract Specialist | | | | \$2,000 (IK) | | |
| Mt St. Helens Institute | | | | | \$3,000 (IK) | |
| Mt. St. Helens Institute Community Education | | | | | \$3,000 (ACC) | |
| Travel | | | \$1,000 (IK) \$1,000 (ACC) | | | |
| Materials | | | | | | |
| Forest Service 300 Pieces of LWM with rootwads | | | | \$150,000 (IK) | | |
| Contract Payables | | | | | | |
| Helicopter Contract | | | | \$90,000 (ACC) | | |
| Excavator Contract | | | | \$25,000 (ACC) | | |
| Logging and hauling of trees | | | | \$30, 000 (ACC) | | |
| Materials and Supplies | | | | | | |
| Total ACC Funds | \$175,000 | \$12,000 | \$3,000 | \$5,000 | \$150,000 | \$4,000 |
| Total FS Funds | \$179,000 | \$12,000 | \$3,000 | \$5,000 | \$157,000 | \$1,000 |
| Total Partner Funds | \$3,000 | | | | | \$3,000 |
| Project Total | \$357,000 | | | | | |

Table 2. Lewis River 21 Phase 1 Expanded Budget for the Lewis River Phase 1 restoration.

| Item | Personnel | Estimated Days/units* | Cost Per Unit | Total* |
|--|------------------------------|-----------------------|---------------------------|----------------|
| NEPA Environmental Assessment required by Federal Law | Fish Biologist | 10 | \$400 per day per person | \$12,000 (ACC) |
| | Wildlife Biologist | 6 | | \$12,000 (IK) |
| | Hydrologist | 5 | | |
| | Botanist | 8 | | |
| | Archeologist | 10 | | |
| | Soil Scientist | 3 | | |
| | Recreation | 3 | | |
| | NEPA Coordinator | 15 | | |
| Final Designs | Fish Biologist | 7 | \$400 per day per person | \$3,000 (IK) |
| | Hydrologist | 2 | | \$3,000 (ACC) |
| | Fish Technician | 6 | | |
| Project Management | Fish Biologist | 15 | \$400 per day per person | \$5,000 (IK) |
| | Fish Technician | 10 | | \$5,000 (ACC) |
| | Mileage | | | |
| Travel | ½ ton PU | Fleet Cost | \$500 | \$1,000 (IK) |
| | | 2000 miles | \$0.75/mile | \$1,000 (ACC) |
| Construction | Contract Administration/Prep | 30 | \$400 per day per person | \$7,000 (IK) |
| | Helicopter contract | | | \$5,000 (ACC) |
| | Excavator Contract | | | \$90,000 (ACC) |
| | Logging and Haul contract | | | \$30,000(ACC) |
| | | | | \$25,000 (ACC) |
| Trees with rootwads | | 300 | | \$150,000 (IK) |
| Monitoring <i>MSHI</i> | Supervisor | 25 | \$300 per day per person | \$1,000 (IK) |
| | Assistant | | | \$2,500 (ACC) |
| | Volunteers | 20 | \$100/EA 1.00/mile | \$2,000 (IK) |

| | | | | |
|--------------|-----------------|-----|-----------|------------------|
| | Travel | 500 | | \$500 (ACC) |
| | | | \$400/day | \$1000 (ACC) |
| | Fish Technician | 2 | \$400/day | \$1000 (IK) |
| Total | | | | \$357,000 |

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

Table 3. Lewis River 21 Phase 1 Equipment Budget for the Lewis River restoration.

| Item | Cost per unit | Number of units | ACC cost | Total Cost |
|--|---------------|-----------------|------------------|------------------|
| Helicopter contract Based on pervious Contracts | \$90,000 | 1 | \$90,000 | 90,000 |
| Excavator Cost | \$250 | 100 | \$25,000 | \$25,000 |
| Logging and Hauling cost: Based on Previous Contracts | \$30,000 | 1 | \$30,000 | \$30,000 |
| Total | | | \$145,000 | \$145,000 |

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

Photo documentation will be provided by photo point locations marked by rebar and will include latitude and longitude points. To provide a similar pre and post photographic view, azimuths will be included. Each photo will be labeled with a date, time, project name, photographer's name, and documentation of the subject activity. Both close up and panoramic views will be included.

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.

The U.S. Forest Service meets these requirements and requires its contractors to be bonded.

References:

Abbe and Montgomery. 1996. Large Woody Debris Jams, Channel Hydraulics and Habitat Formation in Large Rivers. *Regulated Rivers; Research & Management*, Vol. 12, 201-221.

Castro, J. 2009. Stream Energy, Erosion, and Flooding – Presented to Touchet River Landowners, Waitsburg, WA, August 26, 2009.

Lower Columbia Fish Recovery Board. 2010. Final Washington Lower Columbia Salmon Recovery and Fish & Wildlife Subbasin Plan.

Marzullo. 2009. Engineered Structure Design Calculations. South Fork Skokomish River Design Report. Olympic National Forest, Hoodspport, WA.

Mobrand Biometrics, Inc. 2004. Appendix E: Upper Lewis EDT Analysis. Prepared for PacifiCorp relicensing report.

Roni, P. and R. Timm. 2016. Identification of Restoration Alternatives in North Fork Lewis River. Cramer Fish Sciences.

S. L. Niezgoda, and P. A. Johnson. 2007. Case Study in Cost-Based Risk Assessment for Selecting a Stream Restoration Design Method for a Channel Relocation Project. *Journal of Hydraulic Engineering*, ASCE.

U.S. Forest Service (USFS). 1995b. Upper Lewis River Watershed analysis. Gifford Pinchot National Forest.

Worster, K. R. 2003. Civil Design Engineer. USDA-NRCS National Design Construction and Soil Mechanics Center. Anchoring Methods for Large Woody Debris.

Appendix A.

Lewis River 21 Phase 1 ACC Group Questions

WDFW-

- 1. Is the project part of a larger vision for actions to be proposed for this reach? If so, larger vision should be presented. Additionally, need to show how this project will function without additional actions in case funding for other actions is not acquired.**
-Additional upstream actions are independent of the expected geomorphic changes that will occur from this project. Phase I was named because additional opportunities exist within the LR21 reach, specifically the side channel and floodplain upstream of the immediate project area.
- 2. Need to show how this addresses the limiting factors identified in the Recovery Plan.**
-Spawning gravel accumulation, rearing, etc.
- 3. How will side channel be designed to ensure that water is present when fish will be using this habitat?**
-The project will include scour inducing structures to ensure pool depth maintenance/persistence throughout the summer months.
- 4. This reach is a very volatile reach; need to show how structures will function for an extended period of time (e.g. 10 years).**
-These types of structures have been used in similar rivers with great success. The structure durability assessment within the document explains methods and rational for each mode of failure.

LCFRB-

- 1. More details regarding seasonality of side channel connection are required to determine full rearing and spawning benefits of the project.**
-The side channel design will be constructed to have perennial flow with pools and cover habitat elements.
- 2. Before and after biological monitoring at the project site could be a benefit to future work in the NF Lewis and analogous systems in the Lower Columbia. Project aligns well with Aquatic Fund priorities, including support for reintroduction species**
-Habitat monitoring will occur pre and post construction as well as redd surveys. Snorkeling for juveniles may be an option to explore.

Cowlitz Indian Tribe-

- 1. The proposed approach is not clearly articulated; the final proposal should clearly show the proposed treatment areas, describe the treatments, and explain the rationale for the approach.**
-This is answered in detail in the document.

- 2. Conceptual design drawings, at a minimum, will be essential to determine likely long-term benefits.**

-This is answered in detail in the document.

- 3. This is a high-energy, mainstem reach of the Lewis River. Stability of wood placements and nature (size, species) of material proposed should be fully explained.**

-This is answered in detail in the document.

- 4. The project description seems to suggest that the project would directly interact with material delivered by Rush Creek, but the project area is located upstream of the confluence with Rush Creek.**

-This is answered in detail in the document.

- 5. The project scope is fairly small, and requires substantial mobilization investments. The proposal title indicates future phase(s), but plans for future work are not described. A more comprehensive design and permitting/environmental compliance phase followed by one or more implementation phases may be a more efficient, effective approach in this relatively unconstrained reach.**

-A complete NEPA review is not needed because the area has already been previously analyzed. A less detailed analysis is required. The project timeline fits into the working window for instream work.

Utilities-

- 1. Do not believe that LWD placement in the mainstem has as much value as focusing funds on tributary streams or side channel habitat that do not have a high probability of "washing away" LWD structures. How can we be assured the wood will continue to function as intended? There are better location options available such as tributaries.**

- See WDFW answer to question #4. Mainstem structures are needed to maintain the persistence of side channel habitats. Structures are placed where natural wood accumulations would occur.

- 2. There needs to be a budget sheet that defines tasks and associated dollars. Other than the monitoring, it is not clear who is performing what task.**

-A detailed budget is included in the proposal.

- 3. LWD placed in the upper mainstem has an extremely low likelihood of staying in place given the frequency and severity of recent high water events.**

-See WDFW answer to question #4. A power point presentation is set for February 9th and there will be photos of similar log structures to show case the methodology.

APPENDIX I
Spencer Creek Alluvial Fan and Channel Rehabilitation

Lewis River Aquatic Fund Full Proposal for the 2016-2017 Funding Cycle

Prepared for the Lewis River Aquatic Coordination Committee Working Group
by the Gifford Pinchot National Forest

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Project Title

Spencer Creek Alluvial Fan and Channel Rehabilitation

Project Manager

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Identification of problem or opportunity to be addressed

Problem:

Minimal high quality side channel spawning and rearing habitat exists in the Upper North Fork Lewis River. This habitat is essential for species listed under the Endangered Species Act (ESA) that use the Lewis River Basin and include coho and Chinook salmon, steelhead trout, and bull trout. Effects to their habitats include past land management activities such as logging, road building, and development of hydro-resources, which until recently has blocked all anadromous species access into the Upper North Fork Lewis River. Stand replacing fires from the Yacolt burn and the following large fires have created a mid-seral uniformed aged tree stand which has reduced the potential for large wood recruitment. Murphy and Koski (1989) have estimated it will take >250 years for large wood recruitment to return to background levels following a stand replacing event. The current average stand age in the Spencer Creek watershed is ~80 years old.

The 2010 Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan six year habitat work schedule identifies Spencer Creek as a Tier 2 reach and is the delineation line between Lewis River Reach 23 and 24, both of which are identified as Tier 2 reaches (LCFRB 2010). Roni and Timm (2016) reported Spencer Creek as a Tier 1 reach with low levels of large wood debris and pool area. Based on the low percent pools and large wood in the Ecosystem Diagnosis and Treatment (EDT) analysis, Roni and Timm (2016) recommended large woody debris enhancements to increase pool area to address limiting key habitat that affects all three species (Chinook, coho and Steelhead) in summer months.

Opportunity:

The Forest Service proposes to restore Spencer Creek from the confluence with the North Fork Lewis River upstream approximately 1000 feet (Figure 1). The channel currently has low levels of large wood and few pools greater than one foot in residual depth.

This project has two components. One is to restore instream fish habitat in Spencer Creek and the other is to provide roughness in the alluvial fan at its confluence with the Lewis River to facilitate sediment routing through a defined Spencer Creek channel. These actions will restore the lower anadromous Spencer Creek habitat to its full potential, provide increased spawning, rearing, and refugia opportunities for Chinook, coho, and steelhead and therefore will increase the abundance of functional habitat in the Upper Lewis River basin.

The Spencer Creek proposal addresses the recommendations of large woody debris enhancements (Roni and Timm 2016) and creates seven or more pools with greater residual depths than currently present in Spencer Creek. These large wood structures will also provide roughness in the channel and the alluvial fan to facilitate sediment routing and maintain a defined channel in Spencer Creek. The Spencer Creek proposal will also add a large wood gravel bar structure to the margin of the mainstem Lewis River, which is on the cusp of the lowest extent of Lewis River Reach 24 and the upper extent of Lewis River Reach 23.

Approximately 100 pieces of large wood will be used to construct a structure immediately upstream of the Spencer Creek alluvial fan to encourage high flow scour into the lower reaches of Spencer Creek within the North Fork Lewis River floodplain. Approximately seven additional structures using another 100 pieces of large wood will be constructed within the upper Spencer Creek reach to create deeper pools, habitat complexity, and a roughened alluvial fan. These structures are expected to increase spawning gravel retention and increase juvenile salmonid rearing carrying capacity and productivity.

The Forest Service will hire a contractor to haul Large Woody Material (LWM) to the site, and use an excavator and skidder to place wood in strategic locations. A tracked excavator and skidder will access the area via a legacy logging road, and will build the instream structures. Wood for this project will come from a Forest Service timber sale unit (Peppercat unit 21) with half of the large wood will have rootwads and be approximately ~14" diameter and 55 feet in length. Key pieces of large wood will come from Swift Reservoir cleaning operations which will likely provide larger ~36" diameter pieces. Forest Road 9000480 will be used for excavator access and large wood transport.

Background

Reconnaissance surveys conducted for this project occurred during September and December 2016 and juvenile salmonids were observed in the lower reach of Spencer Creek, even though the reach lacks complexity and deep pools. Each Spencer Creek channel structure will create a pool providing overwintering and summer rearing habitat for a combination of juvenile coho and steelhead. A benefit to adult Chinook salmon within the alluvial fan and mainstem margins and within the Spencer Creek channel during high flow events are expected. Structures will facilitate gravel sorting, increasing spawning opportunities, while provide hiding cover and an increase in habitat complexity for resident and anadromous fishes.

Out-migrating Chinook salmon juveniles are expected to benefit from high flow refugia and mainstem spawning opportunities provided by the structure at the confluence with the North Fork Lewis River and the Spencer Creek alluvial fan (Figure 4). Coho salmon and steelhead trout will benefit from the Spencer Creek large wood complexes by providing spawning gravel, cover, food sources and pools greater than 1 foot residual depth.

Project Objective(s)

GOAL:

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

- Improving habitat complexity and diversity in the alcove and side channels using LWM
- Providing refugia during winter flows for juvenile salmonids.
- Providing rearing opportunities for juvenile salmonids during summer months.
- 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.*

- Chinook, coho, and steelhead trout are listed as a threatened species under the ESA. This project will contribute to the recovery of these species by increasing the amount and quality of rearing pools in side channels. In addition, spawning areas will be associated with the log complexes.
- Lower Columbia ESU coho salmon are listed as a threatened species under the ESA
- Lower Columbia ESU steelhead trout are listed as a threatened species under the ESA
- Lower Columbia ESU Chinook Salmon are listed as a threatened species under the ESA

Priority 2: *Support the reintroduction of anadromous fish throughout the basin.*

Juvenile anadromous salmonids will have a quality rearing and refugia area when this project is complete, thus ensuring survival and promotion of the various species during reintroduction efforts.

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 North Fork Lewis River basin. This project consists of large woody material placed instream in an alcove and side channels, designed specifically to enhance and restore fish habitat. This project will increase instream habitat diversity, and in turn it is expected that this project will contribute to increasing fish production in this area.

Tasks:

Task 1: NEPA and required permits.

Complete NEPA documentation. Field work for this NEPA document would be accomplished during the summer and fall of 2017. The final document should be completed and signed by May 2018, and the project would be implemented July 2018.

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

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

Task 2: Project Design.

Finalize project design and project preparation details. Preliminary designs were completed during reconnaissance visits in 2016.

An engineer survey will be done to develop project specific elevations for excavation and final structure design. This includes longitudinal profile and cross-sectional information that will be used as designs are finalized.

Secure materials. We have a 35-acre timber sale unit set aside to use for fish habitat restoration activities over the next ten years. We will layout an area within this stand to thin and prepare for harvest operations. Additional material may be acquired from PacifiCorp Swift Reservoir Cleaning operations.

Task 3: Project Implementation

Develop equipment and logging contract. A standard Request for Quotation 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 allow us the flexibility to make changes to the project as implementation is occurring.

Administer contract. A Fish Biologist or Fisheries Technician will administer the contract to ensure contract compliance and project specifications are met.

Task 4: Monitoring

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.

Perform after project 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 and be supervised by the Forest Service.

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.

Methods:

The Gifford Pinchot National Forest will oversee all phases of this project including project design, implementation and monitoring.

Approximately 100 pieces of LWM would be harvested during thinning operations from a nearby timber sale unit which would allow us to use long stems (60+ feet) with attached rootwads. Woody material will be trucked via Forest Road 9039 and the reopened 9000480 road. Wood will be stockpiled at the end of the 9000480 Road. From there, the wood will be transported to the river using a skidder and stockpiled in the river with an excavator which will then cross the river and stockpile the trees on the river bank. This will minimize river crossings by equipment. Once at the site the logs will be moved and placed by an excavator. Wood for this project would primarily come from National Forest System lands; however any opportunity to acquire large wood from Swift Reservoir cleaning operations will also be pursued.

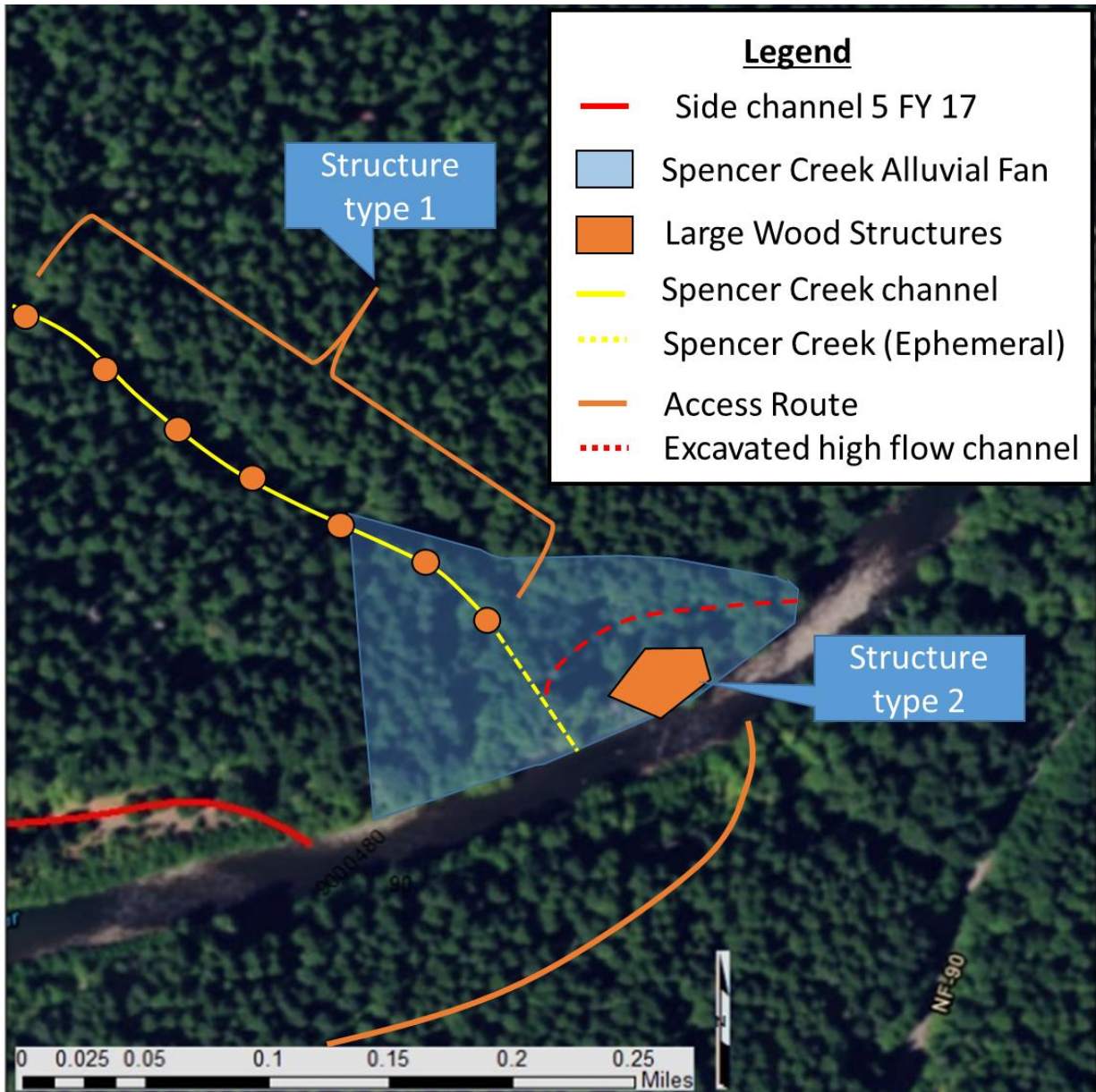


Figure 1. Plan view of the Spencer Creek project area.

Approximately 8 to 12 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 moment forces 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 and ballast the wood. Existing boulders will be manipulated to create pools and capture gravels, seal grade control logs, and create pool head scour structures. Floodplain structures will be designed to add roughness to the alluvial fan to promote a defined channel and route sediment to the mainstem Lewis River. The overall design will appear natural and meet scenery management objectives.

Established US Forest Service protocol to prevent introduction of non- native species will be followed during project implementation. This involves pressure washing machinery offsite to remove all dirt and debris, inspecting machinery prior to project implementation, and mulching exposed areas of soil to prevent the establishment of non-native vegetation. Follow up monitoring will occur after project implementation for three years and non-native vegetation will be treated if found.

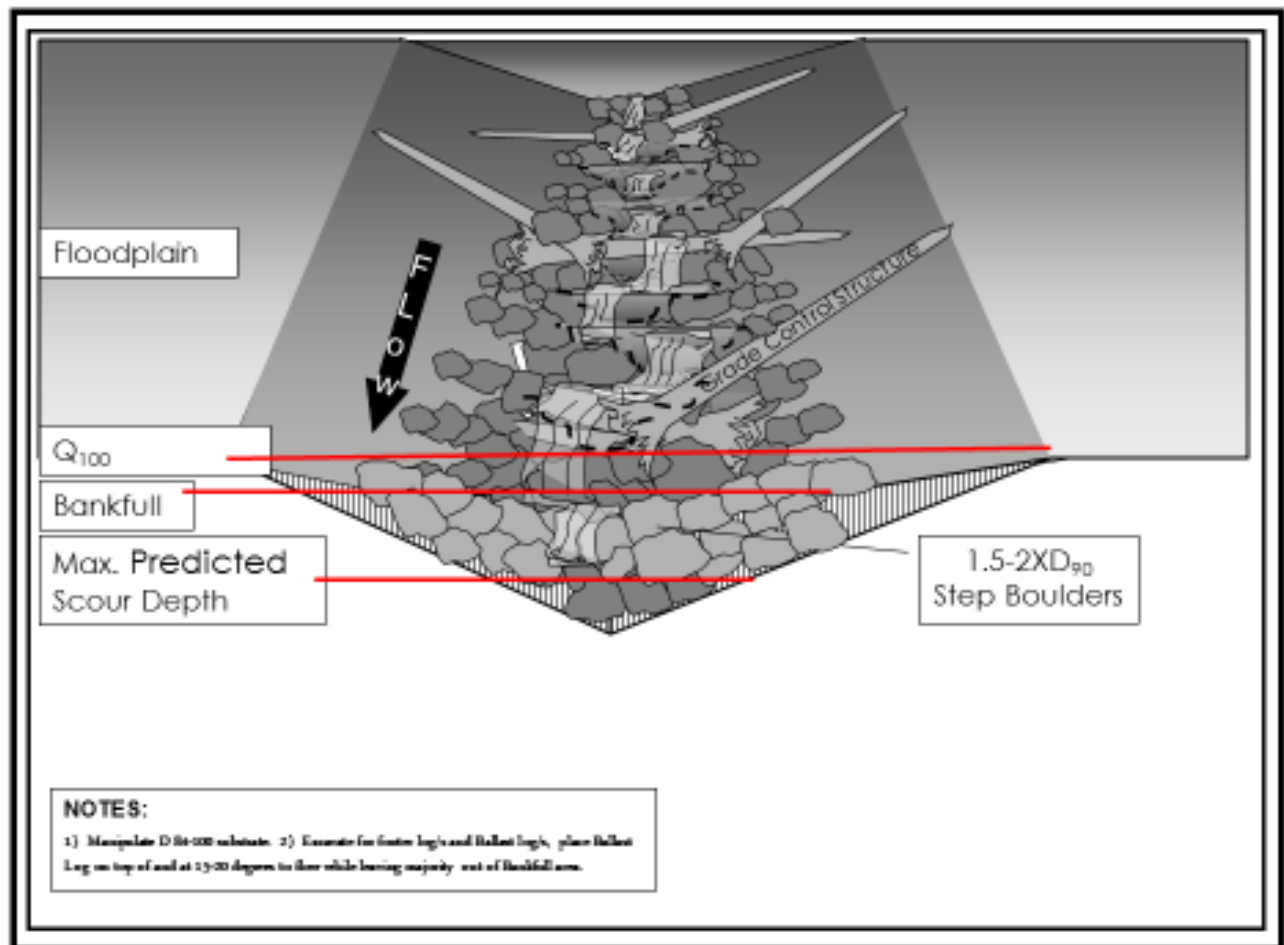


Figure 2. Plan view of the Spencer Creek conceptual channel design.

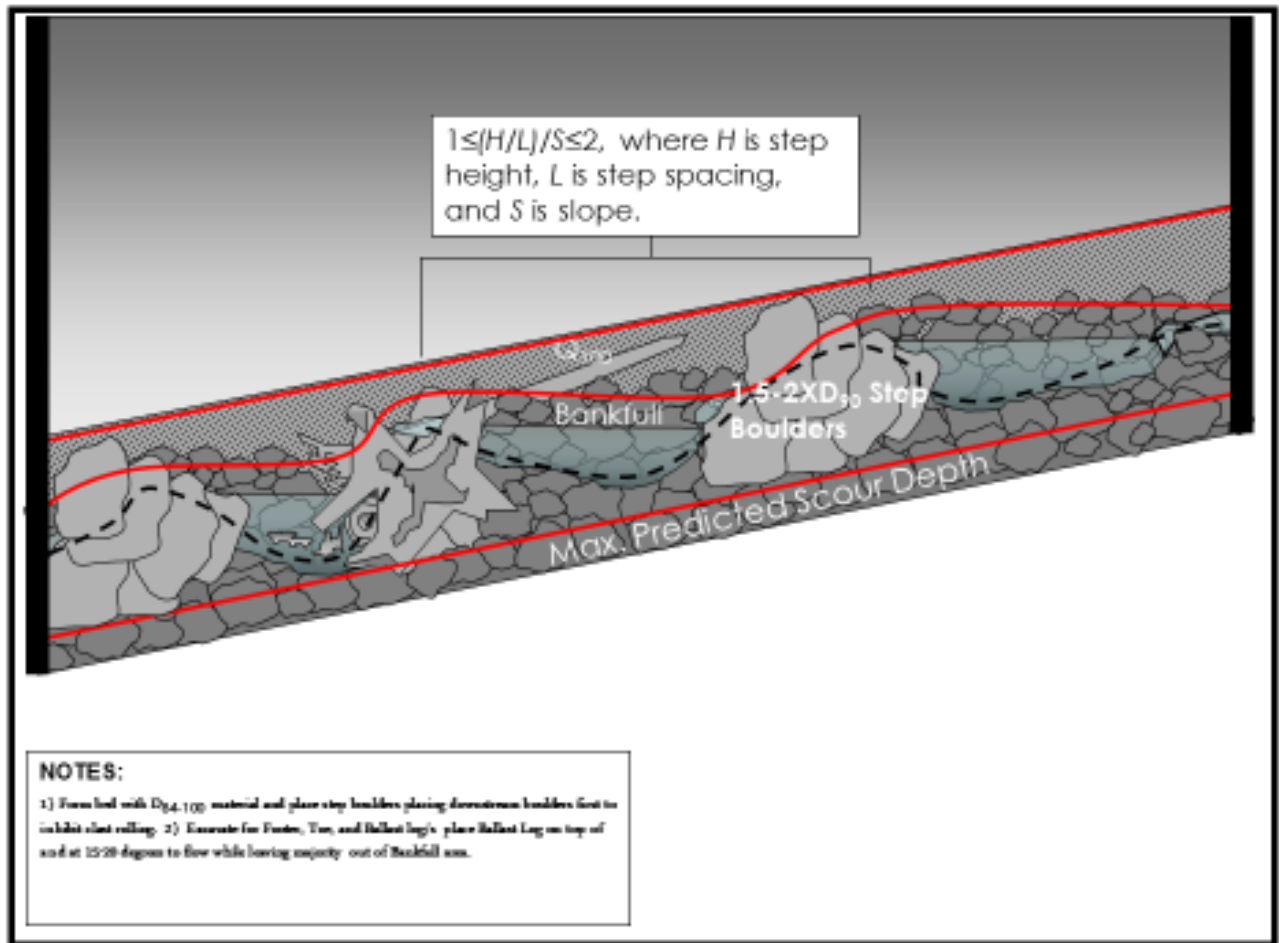


Figure 3. Cross-section view of the Spencer Creek conceptual channel design.

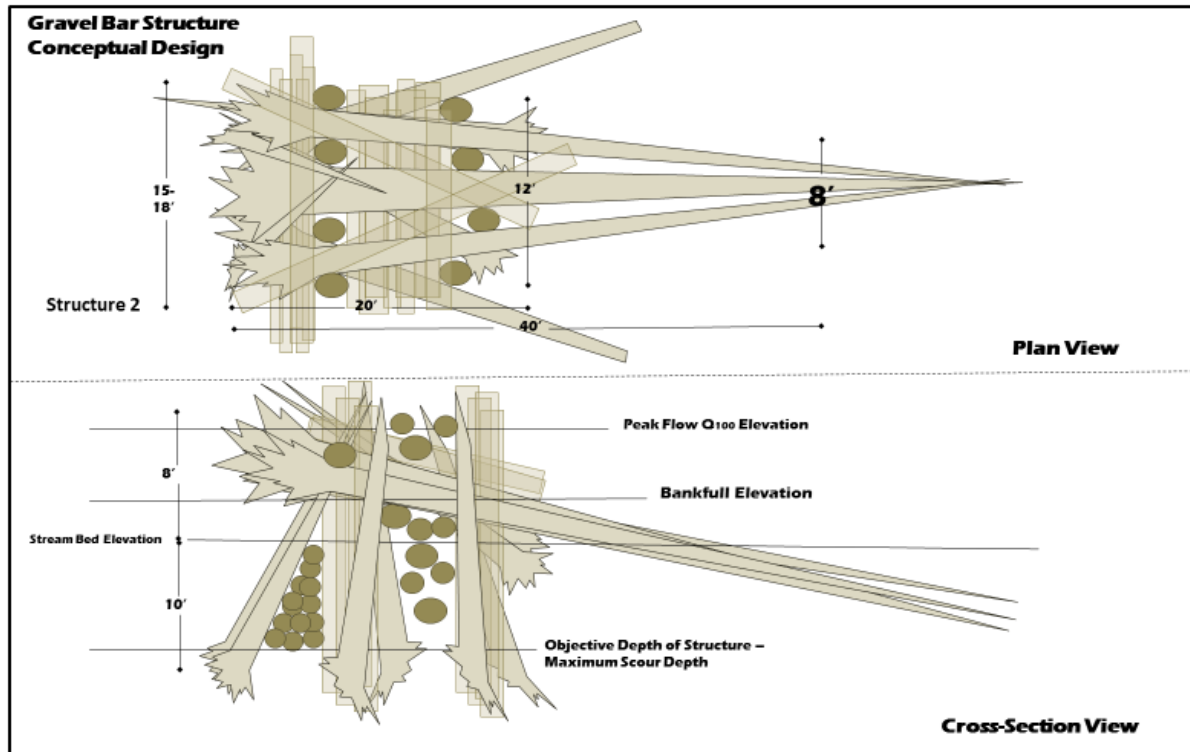


Figure 4. Plan and cross-section view of the gravel bar structure for the Spencer Creek alluvial fan.

Project and Structure Risk and Durability Assessment

The risks of failure, the failure mode, and potential consequences and effects to the system and lives and property associated with each component of the Spencer Creek design are considered within the following matrix adapted from Niezgoda and Johnson (2007) where restoration failure mechanisms are evaluated for relative risk of occurrence. Higher numbers indicate higher risk of occurrence with design. For higher risk priority numbers, recommended actions are identified to address potential failure modes and may include new design elements, inspections, monitoring procedures, and/or design modifications.

The Spencer Creek design includes several treatments or structure types. For each treatment, there is a potential for failure, and a range of effects that may occur as a result of the failure and potential causes or mechanisms. Risk of treatment failures for this project and anticipated effects are quantified in Table 3 along with recommended design checks. The Spencer Creek design risk of potential failure mode was rated five or less for all three structure types; Margin Structures, Gravel Bar and Grade Control – Floodplain Connectivity Structures. The risk of potential failure mode was rated greater than five only for Excessive Scouring of Bed for Margin Structures and was rated a seven. The design check to minimize this risk is to Follow Design Guidelines for Structures Scour/ Shear Stress.

Table 1. Restoration design components and potential risks, causes and effects of failure.

| Treatment | Potential Failure Mode | Potential Effects of Failure | Potential Causes or Mechanisms | *Risk Priority #, (1-10, 1-low, 10-high) | Design Checks |
|--|---|--------------------------------------|--|---|--|
| Margin Structures | Burial by Incoming Sediment | Project Not Effective | Insufficient Design and Placement Considerations | 3 | Allowable Shear Stress Check |
| | Rapid Lateral Migration | Property or Infrastructure Damage | Improper Design Specifications | 5 | Design Experience and Construction Oversight |
| | Erosion of opposite Bank | Minimal, some sediment input | Improper Design, Placement or Alignment | 2 | Design Experience |
| | Structure Displacement | Minimal, reduce design effectiveness | Improper Material Sizing, or Design | 3 | Use Largest Cost Effective Materials |
| | Excessive Scouring of Bed | Potential to cause structure failure | Improper Design | 7 | Follow Design Guidelines for Structures, Scour/ Shear Stress Check |
| Gravel Bar and Point Bar Structures | Burial by Incoming Sediment | Minimal | Insufficient Design Capacity | 3 | Allowable Shear Stress Check |
| | Rapid Lateral Migration | Property or Infrastructure Damage | Improper Design, Placement or Alignment | 5 | Design Experience and Construction Oversight |
| | Erosion of opposite Bank | Minimal, some sediment input | Improper Design, Placement or Alignment | 2 | Design Experience |
| | Structure Displacement | Potential to cause structure failure | Improper Design | 3 | Follow Design Guidelines for Structures |
| Grade Control – Floodplain Connectivity Structures | Burial by Incoming Sediment | Minimal | Insufficient Design | 3 | Allowable Shear Stress Check |
| | Rapid Lateral Migration | Property or Infrastructure Damage | Improper Design, Placement or Alignment | 5 | Design Experience and Construction Oversight |
| | Undermining or Degradation of Grade Control | Minimal, some sediment input | Improper Design, Placement or Alignment | 2 | Design Experience |
| | Structure Displacement | Potential to cause structure failure | Improper Design | 3 | Follow Design Guidelines for Structures |

Most structure failures are the result of improper design or placement of structures, or design specifications. For instance, trees and logs keyed into the stream bank or bed needs to be deep enough or buried far enough into the stream bank or terrace to resist bed shear forces generated from higher flow events. The frequency and effects of large flow events and how they interact with structures is important to consider in assessing risks to treatments and in evaluating what could happen to materials such as large woody debris that is transported downstream.

Structure Stability

Margin and gravel bar structures are built as interwoven complexes with significant portions of the structures buried into the stream bed, bank or terrace for ballast. All of these structures have vertical members which function similar to pilings providing torsional support. In addition, cobble and boulders will be placed in the core of each structure for additional ballast. Figure 4 provide the conceptual design to visualize the concept. The construction elements of these structures are designed to minimize risk of failure yet provide maximum effectiveness of meeting specific objectives and enhancement of fish habitat and aesthetically and functionally emulate natural wood deposits. Specifically, the Spencer Creek structures are based on engineering principals, assessment of natural wood accumulations and multiple years of on the ground experience in a wide range of fluvial systems in the Pacific Northwest and Alaska.

A synopsis of structure durability calculations on a similarly sized river using similar sized large wood on the Olympic National Forest is summarized (Marzullo 2009). For simplicity, a 35-foot Douglas fir log, 3.0 feet in diameter will be used to illustrate the calculation process with an assumption that about 15ft of its length is buried into the bank and stream velocities are 6 feet per second. The log is assumed to be projecting out perpendicular to the current and bank and horizontal to the bed and entirely under the surface of the water. This example also assumes there will be no scour at the log/stream bank interface.

The forces acting on a LWD structure include a drag force from the water flow, a buoyancy force, and impact forces from debris. Since impact forces are less predictable it was decided to include potential impact forces into the equation by increasing the debris or safety factor (Worster 2003).

The drag force (F_d) of the moving water can be found from:

$$F_d = \rho A C_d (V^2 / 2g) \text{ (Chow, 1959)}$$

Where ρ = water density at 62.4 lb/ft³.
 A = area of structure normal to the current
 C_d = coefficient of drag, 1 for large blunt objects.
 V = velocity of current, given as 6 ft/s above.
 g = gravity constant, 32.2 ft/s²

Equation 1. Drag Force, Chow 1959.

Assuming the surface of the log is round. About 1/2 of the circumference of the log is exposed to the current. Half the circumference is 1/2 x 2 π r = 4.7 feet, therefore the area of the exposed portion of the log is 94 square feet.

Since the area of the log is round, the current will act upon it at an average angle of 45° (90° at the middle point of the upstream face and 0° at the top and bottom). The cosine of a 45° angle is 0.707 and we will factor that into our equation.

The force of the water acting on the log is $F_d = ((62.4 \text{ lb/ft}^3)(94 \text{ ft}^2)(6 \text{ ft/s})^2 / (2 \times 32.2 \text{ ft/s}^2))0.707 = 2318.2 \text{ lbf}$.

$$F_b = V(\gamma_w - \gamma_{LWD})$$

V = volume of LWD submerged in cubic feet = $\pi r^2 l = 141.4 \text{ cf}$
 $\gamma_w = 62.4 \text{ lb/ft}^3$
 $\gamma_{LWD} = GS \gamma_{ww}$

where GS is the specific gravity of wood = .48 for coastal Douglas fir (Worster, 2003)
and $w = 1 + \text{moisture content} = 1.12$
So $F_b = 918.7 \text{ lbf}$

Equation 2. Buoyant Force, Worster 2003.

Therefore the total force on the exposed portion of log is:

$$F_{T(\text{anchor})} = SF(F_d + F_b) / A_n$$

Equation 3. Total Force Calculation.

Where:

$$F_{T(\text{anchor})} = \text{total force per anchor in lbf}$$

SF = safety factor (typically ranges from 1.5 (when limited impact loads are expected and soil characteristics are known) to 3.0 (when impact loads are expected and/or soil characteristics are unknown))

$$A_n = \# \text{ of anchors}$$

$$F_T = 2318.2 + 918.7 = 3236.9 \text{ lbf}$$

Using a SF of 3,

$$F_T = 9710.7 \text{ lbf}$$

Resistance factors on the bank end: To be balanced then the moment applied at the bank end must equal the stream end. The bank piece has a moment arm 15 feet in length. If the moment were to equal 194,214 ft lb, the resistance at the furthest bank end should be 12,947.6 ft lb.

To maintain the log there is a nominal requirement of 12,947.6 ft lb. One cubic feet of loam soil is about 116 lb. Average rock has a specific gravity of about $2.65 * 62.4 \text{ lb/cu ft} * 0.7$ (assuming 30% porosity). Assuming 35 feet of soil backing, not accounting for the added resistance of soil shear strength, which an average value for cohesive soil is 0.35 ft lbs/sq. ft (2.5 N/sq m). There is also the strength that roots may provide which can be in on the order of kPa (1000's N/ sq m) or 100's of ft lbs/sq. ft. In any case a bank running parallel with current is for all practical purposes infinite in strength. A useful analogy to the buried portion of log may be that of deadman anchor—a very effective, and cheap way to provide tensional strength, particular on a vector at an oblique angle or horizontal to the ground.

In summary, burying 50% of the log into the bank will result in a safety factor of 2. One of the primary design criteria for the large wood structures discussed in this document is to key them in the bank or stream bed as far as possible (preferably at least 2:1 over stream projection) while leaving the minimum amount exposed to stream flow to meet the intended objectives.

The structures for the Spencer Creek channel and alluvial fan project will be keyed into banks and terraces to at least 3:1 or greater to increase the safety factor. All structures are strategically placed along historic and predicted stabile channel patterns and natural areas for large wood depositional areas.

Potential Failure Mechanisms

Structure failure is defined as the point at which the structure is degraded by excessive erosion, buoyancy, buried by incoming sediments or abandoned to the point of being ineffective. The four primary modes of failure are 1) stream bed scour, 2) increased Surface Area – Debris Loading, 3) buoyancy, and 4) burial and abandonment. These mechanisms can lead to disposition of the structure, partial failure and catastrophic failure. Structure disposition occurs when flow forces shift or re-orient the structure from its original constructed form. Though the structure largely remains intact it may or may not function as designed. Partial failure occurs when part of the structure is lost due to scour,

buoyancy or burial. In the event of catastrophic structure failure, the majority if not the entire structure would be lost from its original position and transported downstream. Catastrophic failure could occur from a variety of mechanisms such as excessive debris loading causing an increased surface area, excessive scour and undermining of the structure, buoyancy, large wood and boulder debris torrents during flood events or any combination thereof.

In the unlikely event that these structures fail, large woody debris used for the structures would be transported downstream and either re-deposited elsewhere or transported to Swift Reservoir. There is a relatively low risk that this material will cause a risk to areas downstream, especially at bridges. Downstream bridges have design flow capacities that currently accommodate large wood transported by the river. Large wood is a natural component of flood material in rivers, and the amount that could be generated from these structures will not exceed what is normally observed in rivers at flood stage.

Correct placement, orientation and construction of structures are critical to preventing failures. High velocity regions and depositional areas need to be identified and accounted for during the design process. Portions of the structure exposed to the highest velocities must be oriented correctly and armored with the appropriate materials including preloading upstream regions with slash and other smaller woody material.

Stream Bed Scour

The mechanism with the highest risk priority number for possible structure failure is bed scour around or adjacent to the structure. Margin structures are designed to scour pools and reduce near bank shear stress by focusing the energy away from the bank or terrace. The gravel bar structure are designed to initiate deposition upstream as an arcuate bar and downstream as a central bar where vegetation can persist, however, scour on the upstream face is common and a crescentic pool is formed (Abbe and Montgomery 1996).

The Spencer Creek and the Lewis River 23 and 24 project areas are relatively high energy reaches because of the moderate slope (2-3%). Stream slope is a direct measure of energy where streams that are considered high energy have slopes greater than 2% (Castro 2009). The energy generated in the form of bed shear stresses has the ability to mobilize the bed material around the structures and excavate an estimated 10 feet of scour depth on the mainstem and 3 feet in Spencer Creek. Maximum residual pool depths on the mainstem were measured at 8 feet or less and 3 feet or less on Spencer Creek. These pools were created by various types of scour; bend scour, local, constriction, and jet scour. The deepest residual pool depth found in the surveys was 8 feet upstream of the structure locations on the mainstem and was caused by bend scour on a bedrock outcrop.

To reduce the risk associated with bed scour, structure depth will exceed the depth of the calculated scour within the project area by at least a 25 % or approximately 10 feet residual scour depth on the gravel bar structure and 3 feet within the Spencer Creek channel, and possibly deeper, depending on site conditions.

Increased Surface Area – Debris Loading

During large flood events large amounts of woody debris can be transported downstream and collect on structures and other natural areas of deposition. Excessive debris loading can dramatically increase the surface area of the structure leading to extreme moment forces which can lead to catastrophic failure by shearing the structure from the stream bed or bank/terrace. To prevent catastrophic failure from excessive debris loading and increased surface area, significant portions of the structure are buried for ballast and vertical members are installed to provide further resistance to shear. In addition, vertical

members will be placed at spacing intervals of 15 feet or less and the flanks of gravel bar structure will be designed to be oriented downstream to release excess debris.

Buoyancy

The Spencer Creek project area is a high velocity system where flood flows can reach ~8,000 cfs or greater with flood water elevations reaching 8 feet or higher above the existing stream bed in the mainstem and an estimated 300 cfs in the Spencer Creek channel. Therefore, buoyancy and rafting could lead to partial or catastrophic structure failure. Design measures to reduce failure risk associated with buoyancy are to insure structure heights exceed the estimated Q100 water surface elevation to prevent the structure from being overtopped during large flood events. In addition, placement of vertical members above the Q100 water surface elevation will retain and collect additional debris further increasing long term stability.

Burial and Abandonment

Burial of the structure from upstream sediment sources or structure abandonment due to channel avulsions are failure mechanisms that have been considered during this design process. Burial or abandonment during extreme flood events could occur regardless of the level of design and analysis. However, evaluating the dominant historic flow paths reduce the risk of structure burial, abandonment and excessive scour and therefore increases the probability of long term structure stability and

Specific Work Products

Deliverable 1: Completed project.

Deliverable 2: A report describing the project. Report to include project narrative, financial information, and photographs of completed projects.

Deliverable 3: Monitoring Report.

Project Duration

Monitoring for this project would begin during the summer of 2017. Project implementation would occur after July 16, 2018 and is expected to take two weeks to complete. 'As built' documents will be completed by December 31, 2018 and an initial report documenting fish response to the structures will be completed by December 31, 2018. The first monitoring report with pre and post project data will be available December 31, 2018. 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.

Permits/Regulatory Compliance

NEPA- Field work will be completed during the summer and fall of 2017, NEPA document will be completed spring 2018

Washington State Department of Ecology (DOE)- 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.

WDFW HPA- 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 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.

Army Corps of Engineers- 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 administered by the Forest Service. The project is wholly on public lands.

Matching Funds and In-kind Contributions

Table 1. Matching funds and in-kind contributions for the Spencer Creek restoration project.

| Partner | Contribution | Funds |
|------------------------------------|--|------------------|
| Forest Service | Project development, Contracting, Permitting, Monitoring | \$29,000 In-kind |
| Materials from U.S. Forest Service | Trees with rootwads | \$50,000 In-kind |
| | | |
| Mt. St. Helens Institute | Monitoring | \$4,000 In-kind |

Professional Review of Proposed Project

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

Budget

Table 2. Over-all budget for the Spencer Creek and alluvial fan restoration project.

| | NEPA | Final designs | Project Mgmt | Construction | Monitoring/Labor /Reporting/Coord. |
|---|---------------------------------|-------------------------------|-------------------------------|-------------------------------|---------------------------------------|
| Personnel Costs | | | | | |
| FS - Zone Team or Contract | \$12,000 (IK) \$12,000 (ACC) | | | | |
| FS –Fish Bio and Hydrologist | | \$3,000 (IK) \$3,000 (ACC) | | | |
| FS - Fish Bio and Bio technician | | | \$5,000 (IK) \$5,000 (ACC) | | \$1,000 (IK) \$1,000 (ACC) |
| FS - Contract administrator - | | | | \$5,000 (IK) \$5,000 (ACC) | |
| FS - Contract Specialist | | | | \$2,000 (IK) | |
| Mt St. Helens Institute | | | | | \$4,000 (IK) |
| Mt. St. Helens Institute Community Education | | | | | \$4,000 (ACC) |
| Travel | | | \$1,000 (IK) \$1,000 (ACC) | | |
| Materials | | | | | |
| Forest Service 100 Pieces of LWM with rootwads | | | | \$50,000 (IK) | |
| Contract Payables | | | | | |
| Equipment Contract | | | | \$22,750 (ACC) | |
| Logging and hauling of trees | | | | \$40, 000 (ACC) | |
| Total ACC Funds | \$93,750 | \$12,000 | \$3,000 | \$6,000 | \$67,750 |
| Total FS Funds | \$83,000 | \$12,000 | \$3,000 | \$6,000 | \$57,000 |
| Total Partner Funds | \$4,000 | | | | \$4,000 |
| Project Total | \$180,750 | | | | |
| FS personnel estimated as \$400/day. | | | | | |

Table 3. Spencer Creek Alluvial Fan and Channel Restoration expanded budget 2017

| Item | Personnel | Estimated Days/units* | Cost Per Unit | Total* |
|---------------------------|------------------------------|-----------------------|---|----------------|
| NEPA | Fish Biologist | 10 | \$400 per day per person | \$12,000 (ACC) |
| | Wildlife Biologist | 6 | | \$12,000 (IK) |
| | Hydrologist | 5 | | |
| | Botanist | 8 | | |
| | Archeologist | 10 | | |
| | Soil Scientist | 3 | | |
| | Recreation Planner | 3 | | |
| | NEPA Coordinator | 15 | | |
| Final Designs | Fish Biologist | 7 | \$400 per day per person | \$3,000 (IK) |
| | Hydrologist | 2 | | \$3,000 (ACC) |
| | Fish Technician | 6 | | |
| Project Management | Fish Biologist | 15 | \$400 per day per person | \$5,000 (IK) |
| | Fish Technician | 10 | | \$5,000 (ACC) |
| | Mileage | | | |
| Travel | ½ ton PU | Fleet Cost | \$500 | \$1,000 (IK) |
| | | 2000 miles | \$0.75/mile | \$1,000 (ACC) |
| Construction | Contract Administration/Prep | 30 | \$400 per day per person | \$7,000 (IK) |
| | | | | \$5,000 (ACC) |
| | Logging contract | | | \$40,000(ACC) |
| | Equipment contract | | | \$22,750 (ACC) |
| Trees with rootwads | | 100 | | \$50,000 (IK) |
| Monitoring <i>MSHI</i> | Supervisor | 25 | \$300 per day per person \$100/EA 1.00/mile \$400/day | \$2,000 (IK) |
| | Assistant | | | \$3,500 (ACC) |
| | Volunteers | 20 | | \$2,000 (IK) |
| | Travel | 500 | | \$500 (ACC) |
| | | | | |
| <i>USFS</i> | Fish Biologist | 2.5 | | \$1,000 (IK) |
| | Fish Technician | 2.5 | | \$1,000 (ACC) |
| Total | | | | \$177,750 |
| | | | | |

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

Table 4. Spencer Creek Alluvial Fan and Channel Rehabilitation Equipment Budget 2017

| Item | Cost per unit | Number of units | ACC cost | Total Cost |
|---|---------------|-----------------|----------|------------|
| Excavator/Skidder Operator/Fuel/ Supplies, misc. | \$175 hour | 130 | \$22,750 | \$22,750 |
| | | | | |
| Equipment Move in/out | \$1,500 | 1 | \$1,500 | \$1,500 |
| Logging and Hauling cost: Based on Previous Contract | \$35,000 | 1 | \$40,000 | \$40,000 |
| Total | | | \$64,250 | \$64,250 |

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

Photo documentation will be provided by photo point locations marked by rebar and will include latitude and longitude points. To provide a similar pre and post photographic view, azimuths will be included. Each photo will be labeled with a date, time, project name, photographer's name, and documentation of the subject activity. Both close up and panoramic views will be included.

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.

The U.S. Forest Service meets these requirements and requires its contractors to be bonded.

References:

- Abbe and Montgomery. 1996. Large Woody Debris Jams, Channel Hydraulics and Habitat Formation in Large Rivers. *Regulated Rivers; Research & Management*, Vol. 12, 201-221.
- Castro, J. 2009. Stream Energy, Erosion, and Flooding – Presented to Touchet River Landowners, Waitsburg, WA, August 26, 2009.
- Lower Columbia Fish Recovery Board. 2010. Final Washington Lower Columbia Salmon Recovery and Fish & Wildlife Subbasin Plan.
- Marzullo. 2009. Engineered Structure Design Calculations. South Fork Skokomish River Design Report. Olympic National Forest, Hoodspport, WA.
- Murphy, M. L, and K. V. Koski. 1989. Input and depletion of woody debris in Alaska streams and implications for streamside management. *North American Journal of Fisheries Management* 9: 427-436.
- Mobrand Biometrics, Inc. 2004. Appendix E: Upper Lewis EDT Analysis. Prepared for PacifiCorp relicensing report.
- Roni, P. and R. Timm. 2016. Identification of Restoration Alternatives in North Fork Lewis River. Cramer Fish Sciences.
- S. L. Niezgoda, and P. A. Johnson. 2007. Case Study in Cost-Based Risk Assessment for Selecting a Stream Restoration Design Method for a Channel Relocation Project. *Journal of Hydraulic Engineering, ASCE*.
- U.S. Forest Service (USFS). 1995b. Upper Lewis River Watershed analysis. Gifford Pinchot National Forest.
- Worster, K. R. 2003. Civil Design Engineer. USDA-NRCS National Design Construction and Soil Mechanics Center. Anchoring Methods for Large Woody Debris.

Appendix A

Spencer Creek Alluvial Fan and Channel Rehabilitation Questions from the ACC Work Group

WDFW-

1. Need to show how this project addresses the limiting factors in the Recovery Plan.

Three of the six restoration needs identified in the LCFRB interactive map for Spencer Creek are 1) stream channel habitat structure and bank stability, 2) floodplain function and channel migration processes, and 3) off channel and side channel habitat. The way this project addresses these

restoration needs are providing habitat structure in the channel by constructing seven large wood forced pools, adding large wood roughness to the Spencer Creek alluvial fan that will route sediment through the alluvial fan and maintain a defined channel. This will increase floodplain function and channel migration processes. Additionally, a large wood structure and constructed channel on the margin and toe of the Spencer Creek alluvial fan will provide high flow refugia side channel habitat.

Roni and Timm (2016) identified key habitat as the limiting factor for Spencer Creek and pool forming conifers as zero (low). The restoration measure recommended was LWD (large woody debris) with the rationale being poor LWD and pool area that all three species (Chinook, coho, and steelhead). The key habitat feature that this project mainly addresses is pool formation and maintenance.

2. Pre-proposal talks about how this project would increase quality rearing habitat, spawning habitat, and capacity and productivity.

Wood forced pools and boulder manipulation plans to create a series of complex pool and riffle sequences that will provide adult steelhead and coho spawning with juvenile rearing. Juvenile Chinook, coho, and steelhead would also have high flow refugia during peak flow events on the mainstem Lewis River.

3. Need to quantify the amount of habitat increases that would occur as a result of this project.

Seven additional pools greater than one foot in residual depth will be created in a third of the perennial reach which has the lower gradient.

4. Need to show how this project will be designed to ensure that water is present when fish will be using the habitat.

Water will continue to be present within the perennial channel but with greater numbers of pools that have deep residual depths and complexity. The project will enhance the ephemeral reach on the alluvial fan to concentrate flow and route sediment that will likely create a series of shaded and wetted rearing pools during the summer months.

LCFRB-

- 1. Medium priority factors identified in the Recovery Plan for this reach likely to be addressed through this proposal include floodplain function and channel migration processes, instream flows, and stream channel habitat structure and bank stability.**

Cowlitz Indian Tribe-

- 1. The proposed approach is not clearly articulated; the final proposal should clearly show the proposed treatment areas, describe the treatments, and explain the rationale for the approach.**

The full proposal clearly articulates the description and the rationale for the treatment area.

- 2. Conceptual design drawings would be helpful, as would a description of the proposed design process.**

Conceptual drawing are provided in the full proposal.

- 3. Photos showing boulder/cobble bed material in Spencer Creek seem to indicate a fairly high-energy reach.**

Yes, the slope and sediment size does indicate high stream power.

- 4. Discussion of the watershed processes that led to Spencer Creek's degraded condition would be helpful in evaluating the appropriateness of proposed treatments.**

Past stand replacing fires have reduced the large wood recruitment in Spencer Creek drainage and the upper Lewis River watershed.

- 5. Stability of wood placements and nature (size, species) of material proposed should be fully explained.**

This is explained in the proposal.

Utilities-

- 1. There needs to be a budget sheet that defines tasks and associated dollars. Other than the monitoring, it is not clear who is performing what task.**

A budget sheet is provided within the proposal explaining tasks and funding allocation on pages 20-22.