

# 2006 Final Annual Report – Lewis River Aquatic Fund Projects

## Lewis River Hydroelectric Projects FERC Nos. 935, 2071, 2111, 2213



Submitted by PacifiCorp Energy and Public Utility District  
No. 1 of Cowlitz County



May 9, 2006

## Introduction

This 2006 Final Annual Report prepared by PacifiCorp Energy 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 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 which was 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 2005/2006 funding process, additional projects are expected to be selected and funded annually following a process established by the ACC.

This 2006 report is available to the Public on PacifiCorp Energy’s website at <http://www.pacificorp.com/Article/Article64252.html>. Copies of this report are available from PacifiCorp Energy.

## Background

PacifiCorp Energy 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 Energy. 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 have developed a strategic plan to (a) guide Resource Project development, solicitation, and review; and (b) provide administrative procedures to guide implementation of the Aquatics Fund. The “Aquatics Fund -- Strategic plan and Administrative Procedures” (September 2005) is available on the above website.

On September 9, 2005 PacifiCorp announced the availability of funds for aquatic related projects in the Lewis River Basin (letter to interested parties from T. Olson, PacifiCorp).

The letter requested that individuals or parties interested in obtaining project funding submit a Pre-Proposal to PacifiCorp. Pre-Proposals were due by October 7, 2005.

In response to the announcement letter, three entities provided eight different project Pre-Proposals. They included:

Olympic Resource Mgmt	Little Pine Creek Bridge Removal
USFS	Nutrient Enhancement on Muddy River
USFS	Pine Creek Instream and Floodplain Structures for Bull Trout and Steelhead
USFS	Rush Creek Instream Structures for Bull Trout and Steelhead
USFS	East Fork Lewis Instream Structures Steelhead
USFS	Fish Passage Culvert Replacement – Forest Rd 8322
USFS	Muddy River Tributary Road Decommission 8322700
Lower Columbia Fish Enhancement Group	Assessment and Prescription of aquatic productivity changes in Lewis River reservoirs due to impoundment and operation of the hydroelectric system

Following the Aquatics Fund – Strategic Plan and Administrative Procedures, PacifiCorp and Cowlitz PUD reviewed and evaluated the Pre-Proposals and, on November 10, 2005 provided the ACC with a list of projects recommended for further consideration (memo to ACC from Shrier – PacifiCorp and Gritten-McDonald – Cowlitz PUD) . In general the Utilities evaluation suggested that while additional information is needed before a commitment of funds should be given, all of the above projects with the exception of the LCFEG Assessment and Prescription of Aquatic Productivity study should be solicited for complete Proposals. Although study proposals are not exempt from being funded in this process, the LCFEG study was determined as not necessary given the nutrient enhancement actions taken through the Habitat Preparation Plan and in consideration of the effect of nutrient application on private development near the hydroelectric project reservoirs and associated tributaries.

On December 8, 2005 the ACC selected six aquatic project proposals for additional consideration. Shortly thereafter PacifiCorp notified the project sponsors and requested full proposals by January 25, 2006. Upon the due date, five full proposals were submitted. The project sponsors and proposed projects include:

USFS	Nutrient Enhancement in the Muddy River
USFS	Pine Creek Instream Structures
USFS	Rush Creek Instream Structures
USFS	Fish Culvert Replacement – Forest Rd 8322
USFS	Muddy River Tributary Road Decommission

Olympic Resource Management did not submit a full proposal due to change in staff and timing issues.

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. On February 17, 2006 the ACC was provided a memo (i.e. Annual Report) providing a description of the proposed Resource Projects, the Utilities evaluation of projects, and the Utilities basis for recommending or not recommending a project for funding (memo to ACC from Shrier – PacifiCorp and Gritten-McDonald – Cowlitz PUD).

Following a review period the ACC met on April 13, 2006 to discuss funding the above aquatic projects. Consensus was reached on a final Resource Project list; however some of the projects were modified from original proposal. Not all of the projects were selected for funding. The U.S. Forest Service as “project owner” of considered projects was agreeable to modifications.

### **Projects Selected for Funding**

The following is a summary description of the individual Resource Projects to be funded by the Aquatics Fund. All of such projects are expected to promote the recovery of anadromous fish post re-introduction above 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) Nutrient Enhancement in the Muddy River (moved to Pine Creek)

As originally proposed by the U.S. Forest Service (USFS), the project was to provide nutrient enhancement to the Muddy River via the addition of fish carcasses or carcass analogs. The activity would assist the establishment of new riparian and flood plain vegetation and increase existing plant growth resulting in additional shade over the waterway. The project would also enhance nutrient availability for aquatic biota. Primary production would be increased leading to an increase in secondary production of aquatic macroinvertebrates which juvenile bull trout and other salmonids feed upon. This project requested a funding amount of \$38,000 and would be completed in the winter of 2006-2007.

Following ACC review and discussion, the geographic location of the project was moved to Pine Creek where a greater resource value could be gained at this new location. The methodology was also slightly modified to include the use of black-bagging some of the carcasses to expedite decomposition prior to distribution into project area. Project was granted funding of \$38,000. The final Resource Project Plan is provided in Appendix B.

The Lewis River hydroelectric projects are currently fish passage barriers to anadromous fish. Without fish passage, salmon and steelhead have been eliminated from historic areas in the upper basin where they once returned to spawn. This impact has resulted in a decrease of nutrients derived from outside of the basin to these areas. Nutrient enhancement via the placement of salmon carcasses or carcass analogs would help offset this effect in an area of historical anadromy. This function will enhance ecological processes in preparation for the reintroduction of salmon and steelhead to the upper basin above the dams.

## 2) Pine Creek Instream and Floodplain Structures for Bull Trout and Steelhead

Originally proposed by the USFS, this project included the placement of at least 150 pieces of Large Woody Material (LWM) per mile over several miles of Pine Creek. The main objective of the project is to amass spawning gravel in the creek. The LWM would slow water velocities and allow opportunities for gravel collection. LWM would also create resting areas for adult bull trout and salmon, and rearing habitat for juvenile fish. The original funding request was for \$95,000. The project would occur in summer 2007 and be completed by July 31, 2007.

Although many ACC members agreed on the benefits of increasing habitat structure in Pine Creek, there was great concern about this project's ability to meet its intent. At issue was the long-term stability and retention of placed LWM. Pine Creek is an unstable system given periodic high flows and volcanic geomorphology. The concern was that a great effort to place LWM would be marginalized by environmental conditions; a winter high flow could move LWM resulting in little habitat benefit. To address this uncertainty, the ACC decided to modify this project to only be completed in a smaller reach. A few LWM structure would be placed in a 500 to 800 foot long reach. A cost cap of \$23,750 (25% of original request) was established as the funding amount, however ACC agreed that if project LWM were shown to remain in place and be successful over a two year period, full funding would be available for original project. The final Resource Project Plan is provided in Appendix C.

The placement of instream LWM will directly enhance instream habitat areas historically used by anadromous species and currently identified as key spawning and rearing areas for bull trout. Instream structures may reduce surface and fill-slope erosion, increase infiltration rates, and restore surface and subsurface flow patterns and hydrologic processes. If successful, the LWM structures will provide stable gravel deposits, velocity breaks and cover for bull trout and other salmonid species. These benefits would enhance the Utilities anadromous fish re-introduction and ESA programs.

## 3) Rush Creek Instream Structures for Bull Trout and Steelhead

As proposed by the USFS, this project consisted of placing a variety of log structures into Rush Creek to capture suitable sized spawning gravel for adult bull trout and steelhead. Structures would also provide slow-water pockets for juvenile fish rearing. The project included a 1.7 mile section of the creek and a funding request of \$100,000.

Like the Pine Creek project, the ACC generally agreed on the need for some increased spawning habitat in Rush Creek, however, there were concerns that the project would not provide that much benefit to bull trout given its cost. Rush Creek has a very high gradient with old-growth riparian areas, it is not impacted by land management activities, and it has been observed to hold the greatest number of spawning bull trout. Although the ACC discussed funding a smaller project in a confined reach, some representatives opposed any activity while others supported the complete project. In the end, the ACC elected to not fund this project.

#### 4) Fish Passage Culvert Replacement on Forest Road 8322

This USFS project will replace an undersized culvert to provide fish passage during all life stages year-round. The new culvert will eliminate a 1.7 foot vertical leap, and provide passable flow velocities. The project to take place in 2007 will re-connect approximately one mile of stream habitat within historic bull trout and anadromous fish distribution. USFS has requested a funding amount of \$80,000 from the Aquatic Fund.

ACC representatives have agreed to fund this project as originally proposed. The final Resource Project Plan is provided in Appendix D.

The replacement of road-stream crossings that are anadromous salmon and bull trout passage barriers would provide fish passage, restore aquatic connectivity, and restore the flow of sediment and organic material that is typically trapped upstream of undersized culverts. Increasing the available anadromous fish habitat will support the Utilities re-introduction program. Anadromous fish have been absent in the upper Lewis Basin since 1931 and properly functioning habitat is needed for program success. Providing additional habitat for bull trout will assist an ESA species found within the hydroelectric project area.

#### 5) Muddy River Tributary Road Decommission of Forest Road 8322700

Proposed by the USFS, this project is the decommissioning of 1.8 miles of a forest road that is no longer needed. The project will eliminate active sediment delivery and reduce the risks of larger sediment deliveries to a tributary of the Muddy River. Decommissioning will remove barriers to two fish-bearing tributaries and open up 0.1 miles of quality habitat and 0.4 miles of intermittent habitat. It will return stream crossing areas to bankfull widths and stabilize banks through contouring and re-vegetation. The project is to be completed in 2006 and the amount of funding requested by the USFS is \$46,000.

ACC representatives have agreed to fund this project as originally proposed. The final Resource Project Plan is provided in Appendix E.

Completion of this project will assist the anadromous fish re-introduction program and improve resident bull trout habitat. It will address an acute aquatic habitat limitation by removing fish passage barriers related to land management. Road decommissioning and stabilization will benefit aquatic and riparian processes by facilitating the transport of large wood during high flow events, by reducing aquatic and riparian habitat

fragmentation within Riparian Reserves, reduce surface and fill-slope erosion and road-related mass wasting hazards, and by increasing infiltration rates and restoring surface and subsurface flow patterns and hydrologic processes. The removal of culverts and road prisms allows the passage and delivery of sediment (spawning gravel sources) and organic matter to downstream reaches. The replacement of road-stream crossings that are anadromous salmon and bull trout passage barriers would provide fish passage, restore aquatic connectivity, and restore the flow of sediment and organic material that is typically trapped upstream of culverts. Given the above benefits, this Resource Project is expected to have a positive effect on fish species affected by the hydroelectric projects.

## **Conclusion**

This report provides the final 2006 Resource Project descriptions and plans for aquatic projects to be funded from the Lewis River Aquatics Fund. Per Consultation with the ACC, certain Resource Projects have been modified with acceptance by the Project owner. Distribution of funds to these projects will reduce the current Aquatic Fund by \$187,750. In addition, \$71,250 has been set aside for the Pine Creek Instream and Floodplain Structures for Bull Trout and Steelhead project should the smaller project be successful. Of the projects selected by the ACC, the Nutrient Enhancement in the Muddy River (moved to Pine Creek), the Pine Creek Instream and Floodplain Structures for Bull Trout and Steelhead, the Fish Passage Culvert Replacement on Forest Road 8322, and the Muddy River Tributary Road Decommission of Forest Road 8322700 can be attributed to bull trout habitat enhancements. With distributions, the Aquatic Fund now contains \$390,277. This remaining amount will accrue interest according to SA article 7.5.

Per 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.

## Appendix A

### Lewis River Settlement Agreement Article 7.5:

7.5 Aquatics Fund. PacifiCorp 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 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 20<sup>th</sup> 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 21<sup>st</sup> 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

### U.S. Forest Service -- Nutrient Enhancement on Pine Creek.

#### Project Manager

#### Adam Haspiel

Mt. St. Helens National Volcanic Monument

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Amboy, WA 98604

360-449-7833

360-449-7801 (fax)

[ahaspiel@fs.fed.us](mailto:ahaspiel@fs.fed.us)

#### Identification of problem or opportunity to be addressed

Pine Creek was affected by the eruption of Mount St. Helens in 1980 when a lahar scoured the length of it, eventually depositing sediment into Swift Reservoir. As a result of the eruption, nutrient levels decreased due to loss of allochthonous materials and decreased primary production (Lower Lewis River Watershed Analysis (WA) 1995). Additionally, the floods of 1996 removed much of the river's newly established riparian vegetation.

Presently, several opportunities exist that would improve the nutrient levels of Pine Creek and associated flood plains and riparian areas. For example, the addition of carcasses or carcass analogs in the river would enhance nutrient availability for aquatic biota. Nutrients added to the riparian area and flood plains would help establish new vegetation, and increase existing tree vigor in these areas, thus, providing shade to the water. The areas along Pine Creek that could be reached by vehicles would be treated by hand, while inaccessible areas would be treated by helicopter. A total of eight miles are available to be treated in Pine Creek depending upon partnership funding, ACC funding will allow us to apply nutrients to approximately four miles. The project will benefit bull trout and all species of introduced anadromous fish.

#### Background

The Lower Lewis River Watershed Analysis (WA) (1995), and "A study of ecological responses to the 1980 eruption of Mount St. Helens (2005) have identified Pine Creek and its associated floodplains and riparian areas as containing high priority restoration needs.

#### Project Objective(s)

GOAL: To enhance the quality of fish habitat in Pine Creek.

Objective: To improve the nutrient levels of Pine Creek and associated flood plains and riparian areas.

The addition of nutrients to the riparian areas will accelerate new or existing growth of vegetation similar to a level found in healthy watersheds. As the riparian vegetation

matures, shade will reduce overall stream temperatures. This in turn will benefit bull trout and other fish species.

Increased nutrient availability instream will provide increased primary production - leading to increased secondary production of aquatic macroinvertebrates, which juvenile bull trout and other salmonids feed upon. Pine Creek is an important spawning tributary for bull trout in the Upper Lewis River Sub basin. It is one of only a few streams (Rush Creek and possibly sections of Muddy River) with cold enough summer water temperatures to allow for successful bull trout spawning and egg incubation.

This project addresses the following Lewis River Aquatic Fund priorities.

**Priority 1:** *Benefit fish recovery throughout the North Fork Lewis River, with priority to federal ESA-listed species.*

- Bull trout are listed as a threatened species under the ESA.
- Steelhead trout are listed as a threatened species under the ESA
- Coho Salmon are listed as a threatened species under the ESA

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

Nutrients will enhance the growth and production of anadromous fish.

**Priority 3:** *Enhance fish habitat in the Lewis River Basin-, with priority given to the North Fork Lewis River.*

The Washington Department of Fish and Wildlife (WDFW) has produced a report titled “*Pacific Salmon and Wildlife Ecological Contexts, Relationships, and Implications for Management*” (Cedarholm et. al, 2000) showing a 50% increase in the size of coho in streams enriched with salmon carcasses. It is assumed bull trout and steelhead juveniles will respond in similar fashion.

**Tasks:**

- 1) Secure funding.
- 2) Acquire required permits.
- 3) Secure carcasses and/or carcass analogs.
- 4) Enlist volunteer groups to help distribute carcasses by truck/hand where applicable.
- 5) Contract to secure helicopter for distribution of carcasses and/or analogs to areas inaccessible to trucks or hand distribution.

If monitoring of project is later funded and warranted by the ACC, pre-project monitoring would begin as permits are acquired, and post monitoring efforts would begin when carcasses and/or analogs are distributed. Monitoring could follow a number of protocols including ones used by the Bonneville Power Authority under a contract titled “*Assessment of Three Alternative Methods of Nutrient Enhancement on Biological Communities in Columbia River Tributaries.*” (Sanderson et al. 2004).

**Methods:**

Several methods can/will be used to meet project objectives. Adult carcasses from various hatchery reared and collected salmonids species will be distributed by hand in areas accessible to vehicles, inaccessible areas would be seeded by helicopter. Carcasses may be pretreated by placing in dark bags prior to delivery to streams. This pretreatment is being considered as an option that would enhance decomposition. Mt. Hood National Forest has completed a similar project using a helicopter, carcasses distributed in streams with wood floated less than ¼ mile before lodging up, in streams devoid of wood, carcasses floated further lodging around boulders or in slack waters or pool eddies. WDFW guidelines from their draft nutrient supplementation paper “Protocols and guidelines for distributing salmonids carcasses, salmon carcass analogs, and delayed release fertilizers to enhance stream productivity in Washington State” (Cedarholm et. al, 2000) allow up to 1.9 kg/m<sup>2</sup>. This project will seed at a target rate of 0.4 kg/m<sup>2</sup>, this equates to approximately four tons per mile, or about 800 fish per mile.

Carcass analogs are in an experimental stage and are being studied by a USGS research team in the Wind River Drainage. Analogs are produced from salmon carcasses. The use of carcass analogs is an emerging technology. The concept is that fish carcasses and other fish processing waste material are converted into a solid cake. The cake would be treated to kill associated fish pathogens. The advantage of the analog is that they are lighter in weight per unit of nutrient (when compared to carcasses) and they would present a much lower risk of pathogen transfer. The technology is currently in development and testing, and may be useful in meeting project objectives if analogs can be obtained and permitted for use. A personal conversation with Hal Michaels of WDFW revealed that they would prefer to use analogs if possible.

**Specific Work Products**

The best way to measure project deliverables are number/pounds of carcasses/carcass analogs distributed per stream segment. For project assessment needs, stream segments can be ½ mile increments based on river miles. To verify amounts distributed, hatchery forms documenting numbers of carcasses supplied for the project would be kept on file at the Mt. St. Helens Ranger District. Invoices for purchases of carcass analogs, if used, will also be kept on file at Mt. St. Helens Ranger District.

**Project Duration**

The duration of this project is one season. However it could continue for several years based on results and if the ACC group wants to continue funding it. The year 2010 is when reintroduction of anadromous species is proposed to begin. Continued seeding of nutrients will allow for accelerated riparian vegetation growth (providing streamside shade), and an enhanced aquatic macroinvertebrate population providing greater feeding opportunities for juvenile bull trout and other reintroduced salmonids species.

The project would take place in November, December of 2006 or January 2007 depending upon availability of fish carcasses or analogs.

The project would take 7 to 21 days to complete. Nutrients would be distributed by helicopter over 4 to 8 miles of stream over a 2-5 day period. Hand distribution would occur after helicopter distribution and should be completed by the end of January.

Access may be limited during the months of December and January due to snow, if this is the case, helicopter distribution may occur in areas that were initially identified for hand distribution.

A project closeout meeting would occur at the soonest ACC meeting following project completion and access is available.

### **Permits**

#### **NEPA-**

The Forest Service will do NEPA on this project in time to insure project implementation dates can be met.

**WDFW-** An approval form to distribute both carcasses and carcass analogs will be submitted to WDFW when funding is secured. WDFW coordinates with Department of Ecology (DOE) as part of the approval process. This is the only “permit” the project will need to obtain.

### **Matching Funds and In-kind Contributions**

Land ownership in Pine Creek is comprised of federal and private lands. The Forest Service manages approximately 2 miles of stream in the area proposed for carcass seeding. Olympic Resources Management owns approximately 4 miles of stream in the proposed project area, and Three Rivers Recreational Area owns about 1 mile of stream near the mouth of Pine Creek. Olympic Resources Management and Three Rivers Recreational Area landowners have been contacted and wish to participate in the project. Please see following Budget section for specific in-kind contributions.

### **Professional Review of Proposed Project**

This project proposal was reviewed by Gifford Pinchot National Forest (GPNF) Hydrology program manager, Ruth Tracy, The GPNF Fisheries program manager, Diana Perez, and GPNF North Zone planner and aquatic biologist Karen Thompson.

**Budget**

**Pine Creek Nutrient Enhancement**

	<b>NEPA</b>	<b>Final designs</b>	<b>Permitting</b>	<b>Construction</b>	<b>Monitoring /Reporting</b>
<b>Personnel Costs</b>					
FS - Zone Team or Contract	\$10,000 (IK)				
FS -Fish Bio and Hydrologist		\$5,000 (IK)			
FS - Fish Bio and Hydrologist			\$2,000(IK)		\$6,000 (ACC)
FS - Contract administrator -				\$3,000 (IK)	
FS - Contract Specialist				\$2,000 (IK)	
LCFRB-				\$30,000 (need to submit grant in '06 for 07 funds) (cash)	\$
Title II funds				\$5,000(need to submit grant in '06 for 07 funds) (cash)	
<b>Contract Payables</b>					
Helicopter Contract				\$31,889.08 ACC	
<b>Administrative Overhead</b>	<b>\$3,500(IK)</b>	<b>\$1,500 (IK)</b>			

FS personnel estimated as \$300/day.

**This project can be implemented with funds solely acquired from the ACC and Forest Service in kind contributions allowing for four miles of carcass seeding, if funds from other groups such as LCFEG come through the USFS can treat up to eight miles. Any other funds acquired will be used to extend the area of distribution.**



**PINE CREEK NUTRIENT ENHANCEMENT COST SHEET**

Prepared by R. Pankratz / Helicopter Manager

**Assumptions:**

- 1) Approximately 4 tons of fish carcasses per mile to be distributed along Pine Creek by air for four river miles.
- 2) Calculations based upon utilization of Northwest Helicopters Jet Ranger (206 B-III) with custom fish bucket
- 3) No cost factors considered for delivery of fish to operations site
- 4) No cost factors considered for any personnel other than those required to accommodate safe and effective helicopter delivery of fish.  
Positions considered are helicopter manager, helitack, road guards, streamside safety monitors, forklift operators, fish loaders.
- 5) Two weathered out days have been factored in.
- 6) Swift boat launch will serve as the heliport and staging area for fish carcasses
- 7) Average weight per fish carcass is ten pounds
- 8) It's an approximate 1 mile flight from the Swift boat launch heliport to the confluence of the Pine Creek and Lewis River
- 9) Personnel salary will include necessary aviation safety and logistical planning
- 10) Helicopter rates derived from Region 6 light helicopter contract with cost modifications addressing this operation
- 11) During proj. imp. phase 12 hour days are accounted for to allow for daily prep time, travel times, daily clean-up, contract docs etc.  
Objective is to effectively use aircraft resource during available windows with salary costs secondary to aircraft logistics
- 12) Helicopter mobilization calculated from Olympia, Washington
- 13) Mobilization, recon and operational flight time are all accounted for in separate line items
- 14) A scale is identified for use at heliport as required by regional aviation oversight
- 15) No vehicle costs assumed for project support equip.-will need type 6 engine, several pickups, forklift, equip. trailer and tow rig
- 16) No cost listed for rental of refer trailer to hold fish

**Estimated costs are developed below. . .**

<u>COST ITEM</u>	<u>UNIT</u>	<u># OF UNITS</u>	<u>COST PER UNIT</u>	<u>COST ITEM TOTAL</u>
Helicopter Manager developing project aviation safety plan and logistical planning	day	6	\$271.00	\$1,626.00
Helicopter Manager daily implementation oversight	day	5	\$271.00	\$1,355.00
Helicopter manager overtime	hour	20	\$42.00	\$840.00
Helicopter manager hazard pay for actual flying days	hour	24	\$6.97	\$167.28
Helitack for daily operations = one GS-6	day	4	\$199.00	\$796.00
GS-6 overtime	hour	16	\$24.44	\$391.04
GS-6 hazard pay for actual flying days	hour	24	\$4.07	\$97.68
Helitack for daily operations = two GS-5	day	8	\$130.00	\$1,040.00
GS-5 overtime	hour	32	\$21.21	\$678.72
GS-5 hazard pay for actual flying days	hour	48	\$3.54	\$169.92

Streamside monitoring personnel = two GS-5	day	8	\$130.00	\$1,040.00
GS-5 overtime	hour	32	\$21.21	\$678.72
Road guards for 25 road = two GS-5	day	8	\$130.00	\$1,040.00
GS-5 overtime	hour	32	\$21.21	\$678.72
Fork lift operator GS-9	day	4	\$271.00	\$1,084.00
GS-9 overtime	hour	16	\$42.00	\$672.00
Fish handlers/loaders two GS-9	day	4	\$271.00	\$1,084.00
GS-9 overtime	hour	32	\$42.00	\$1,344.00
Helicopter mobilization flat fee	ea	1	\$500.00	\$500.00
Helicopter demobilization flat fee	ea	1	\$500.00	\$500.00
Helicopter hourly cost mobilization + demobilization	hour	1.5	\$742.00	\$1,113.00
Helicopter hourly cost project recon	hour	0.5	\$742.00	\$371.00
Helicopter hourly cost project implementation	hour	12	\$742.00	\$8,904.00
Helicopter daily guarantee	day	2	\$1,000.00	\$2,000.00
Fuel truck mileage fee	mile	620	\$1.40	\$868.00
Scale for fish as per regional aviation program requirements (if purchased FOB MSHNVM)	ea	1	\$2,500.00	\$2,500.00
Materials and labor to build scale platform	ea	1	\$350.00	\$350.00
<b>Total cost estimate for aviation component of fish carcass placement / Muddy River Project</b>				<b>\$31,889.08</b>

Citations:

Cederholm, C. J., D. H. Johnson, R. E. Bilby, L.G. Dominguez, A. M. Garrett, W. H. Graeber, E. L. Greda, M. D. Kunze, B.G. Marcot, J. F. Palmisano, R. W. Plotnikoff, W. G. Percy, C. A. Simenstad, and P. C. Trotter. 2000. Pacific Salmon and Wildlife - Ecological Contexts, Relationships, and Implications for Management. Special Edition Technical Report, Prepared for D. H. Johnson and T. A. O'Neil (Managing directors), Wildlife-Habitat Relationships in Oregon and Washington. Washington Department of Fish and Wildlife, Olympia, Washington.

Sanderson, Beth, Peter Kiffney, Chau Tran, Kate Macneale, and Holly Coe. 2005. Assessment of Three Alternative Methods of Nutrient Enhancement (Salmon Carcass Analogs, Nutrient Pellets, and Carcasses) on Biological Communities in Columbia River Tributaries, 2003-2004 Annual Report, Project No. 200105500 (BPA Report DOE/BP-00007621-1).

## Appendix C

### **Pine Creek Instream and Floodplain Structures for Bull Trout and Steelhead.**

#### **Project Manager**

#### **Adam Haspiel**

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#### **Identification of problem or opportunity to be addressed**

The Pine Creek system was affected by the eruption of Mount St. Helens in 1980 when a lahar scoured the length of it, eventually dumping sediment into Swift Reservoir. As a result of the eruption and subsequent floods of 1996 much of the instream wood was removed or buried, leaving Pine Creek devoid of instream Large Woody Material (LWM).

A variety of log structures will be placed instream in Pine Creek using helicopters and/or heavy equipment to capture suitable sized spawning gravel for adult bull trout and steelhead. Additionally, the structures will create slow water pockets to enhance juvenile rearing habitat and create resting areas for spawning adult bull trout and steelhead. Floodplain structures will allow point bars to build up and riparian vegetation to become well established and withstand flood waters.

#### **Background**

The overall objective for bull trout restoration in the Upper Lewis watershed focuses on Pine Creek, Cougar Creek, Muddy River and Rush Creek. Currently Pine Creek has the highest use by adult bull trout (Personal communication WDFW). Spawning gravel is limited (but more abundant than Rush Creek) in Pine Creek and it is uncertain what actually is the success rate of spawning adults. Spawning superimposition may occur due to low amounts of available spawning gravel. Therefore, it is desirable to increase the amount of spawning gravel available to bull trout to ensure species recovery.

Reintroduction of salmonids: Steelhead trout will most likely use Pine Creek once reintroduction occurs, and they will be competing with bull trout for spawning gravel. It is likely steelhead will superimpose their redds on bull trout redds because bull trout spawn earlier than steelhead.

A stream survey conducted in 2005 found LWM to vary from 2.2 to 12.3 pieces per mile throughout the entire survey. This is well below the 80 pieces per mile identified in a Properly Functioning Condition (PFC) for west side streams. More wood is found in the lower reaches than in the upper reaches. The pool/ riffle ratio averaged 5/95. Spawning

gravel was found to be in sparse pockets throughout the reach. Streambanks were found to have some erosion and instability.

The above information leads us to believe that placing LWM in Pine Creek would allow useable areas of spawning gravel to form. Placing LWM in flood plains will allow the formation of point bars to occur, eventually leading to establishment of riparian vegetation and creating stable banks.

### **Project Objective(s)**

The main objective of this project is to amass spawning gravel in Pine Creek. The addition of LWM to sections of Pine Creek would slow water velocities, allowing gravels moving through the system to deposit, creating additional spawning opportunities for bull trout and soon to be reintroduced steelhead trout. LWM will also create resting areas for migrating and spawning adults, and rearing habitat for juvenile salmonids, an important feature for territorial fish such as steelhead and bull trout. Additional available spawning gravel in Pine Creek may also eliminate redd superimposition.

Specific project designs would involve the placement of LWM in a 500-800 foot reach proportionate to at least 150 or more pieces of LWM per mile.

Forest Service managed land includes the lower and higher sections of the Pine Creek drainage. Olympic Resources Management (ORM) own the middle sections of the drainage (where much of the spawning probably occurs), and Three Rivers Recreational Area owns the bottom mile of the stream. This project would initially focus on a 500' to 800' pilot area on either Forest Service managed lands or ORM lands. Upon successful pilot project completion and agreement from the Aquatics Coordination Committee that the goals of the project were achieved, the rest of the project would proceed using information gathered in the pilot project.

This project addresses the following ACC priorities.

#### **Priority 1: Benefit fish recovery throughout the North Fork Lewis River, with priority to federal ESA-listed species.**

- Bull trout are listed as a threatened species under the ESA.
- Steelhead trout are listed as a threatened species under the ESA

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

Steelhead trout will use the cold, fast water of Pine Creek to rear and spawn if given the opportunity.

#### **Priority 3: Enhance fish habitat in the Lewis River Basin, with priority given to the North Fork Lewis River.**

This project is composed of large woody material placed instream designed specifically to enhance and restore fish habitat.

**Tasks:**

1. Secure funding.
2. Design project plans
3. Collect baseline data
4. Secure required permits- including NEPA
5. Develop Contract
6. Implement Contract
7. Monitor Results

If monitoring of project is funded and warranted by ACC, pre-project monitoring would begin as permits are acquired, and post monitoring efforts would begin when place LWM has gone through a winter season. Items to monitor could include stability and location of introduced large wood, and amounts of available spawning gravel. Substrate size can also be monitored using Wolman pebble counts.

**Methods:**

Due to high water velocities introduced wood ideally have a large diameter (24 inches +) and be longer than twice the bankfull width to remain stable. In Pine Creek pieces of wood should be at least 75 to 100 feet long to provide structure stability.

Methods used to place wood include heavy equipment such as all terrain excavators mobile yarders, and large helicopters capable of 25,000lb lift. Large wood can be collected from a variety of sources including logs washed into hydroelectric project reservoirs, trees blown down on Forest Service lands, and hazard trees removed from roadsides. Large wood from reservoirs may be the primary source for the first year, followed by blow down and hazard trees.

**Specific Work Products**

The best way to measure deliverables are amounts of large wood placed instream, and clocked hours on machinery. Other costs such as move-ins and wood delivery can be tracked through invoices.

**Project Duration**

This project would commence in 2007 to allow adequate time for project design, gathering materials, and securing contractors.

WDFW guidelines allow instream work to occur in the Upper Lewis River basin from July 1<sup>st</sup> through July 31<sup>st</sup>. Because of the short work window it would be necessary to stage wood nearby the stream prior to July 1<sup>st</sup>.

A heavy helicopter could move-in July 16<sup>th</sup>, start flying wood in July 17<sup>th</sup> and finish placing wood by July 20, 2007<sup>th</sup>.

## **Permits**

**NEPA-** This project would require NEPA. The Forest Service will complete NEPA for this project in time to meet implementation dates of July 2007.

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

The Gifford Pinchot National Forest has a Memorandum of Understanding (MOU) with the Washington State Department of Fish and Wildlife Regarding Hydraulic Projects conducted by USDA Forest Service Northwest Region (2005). This MOU allows fish habitat restoration without an individual hydraulic project approval (HPA) if the project complies with the provisions of the MOU. 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.

The project is in compliance with all pertinent sections.

## **Matching Funds and In-kind Contributions**

Land ownership in Pine Creek is comprised of federal and private lands. The Forest Service manages approximately 2 miles of stream. Olympic Resources Management owns approximately 4 miles of stream in the proposed project area, and Three Rivers Recreational Area owns about 1 mile of stream near the mouth of Pine Creek. Olympic Resources Management and Three Rivers Recreational Area landowners have been contacted and wish to participate in the project. Please see following Budget section for specific in-kind contributions.

Please see following Budget section for specific in-kind contributions.

## **Professional Review of Proposed Project**

This project proposal was reviewed by Gifford Pinchot National Forest (GPNF) Hydrology program manager, Ruth Tracy, The GPNF Fisheries program manager, Diana Perez, and GPNF North Zone planner and aquatic biologist Karen Thompson.

## Budget

Pine Creek Instream and Floodplain Structures for Bull Trout and Steelhead.

	NEPA	Final designs	Permitting	Construction	Monitoring /Reporting
<b>Personnel Costs</b>					
FS - Zone Team or Contract	\$20,000 (IK)				
FS - Fish Bio and Hydrologist		\$5,000 (IK)			
FS - Fish Bio and Hydrologist			\$2,000(IK)		\$5,000 (ACC)
FS - Contract administrator -				\$3,000 (IK)	
FS - Fish Bio to meet MOU Requirements				\$5,000 (IK)	
FS - Contract Specialist				\$2,000 (IK)	
LCFRB -				\$30,000 (need to submit grant in '06) (cash)	\$
Title II funds				\$20,000 (need to submit grant in '06) (cash)	
<b>Contract Payables</b>					
Helicopter Contract				\$78,000ACC	
Excavator Contract				\$7,000 ACC	
Log haul Contract				\$5,000 ACC	
<b>Administrative Overhead</b>	\$3,500(IK)	\$1,500 (IK)			

FS personnel estimated as \$300/day.

This project can be implemented with funds solely acquired from the ACC and Forest Service in kind contributions, the treated area would be only Forest Service Lands. Any other funds acquired will be used to enlarge the project area and work on private lands. Helicopter costs are approximately \$8,000 per hour. The pilot project has been approved for funding at 25% of the total cost of the project.

## Appendix D

### Fish Passage Culvert Replacement – FR 8322

#### Project Manager

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#### Identification of problem or opportunity to be addressed

An undersized culvert on a tributary to the Muddy River crossing Forest Road 8322 at milepost 4.5 is impeding fish passage. The tributary flows into the Muddy River at about RM 8.5. The vertical leap distance at the culvert outlet is 1.7 feet, and the culvert is narrower than the tributary's bankfull width resulting in excessive velocity. The culvert replacement will reconnect 1.0 mile of primarily rearing habitat above the culvert for historic anadromous fish (steelhead, chinook, coho), existing resident fish (coastal cutthroat and rainbow trout), and potential bull trout. A 30 foot high waterfall within a 54% gradient stream section is the upper most limit of available anadromous habitat.

This tributary is important to the reproductive success of all fish species within the Muddy River stream system because during high water or warm water events, juvenile fish from Muddy River will have access to the tributary and the delivery of large wood and other allocthonous material supporting spawning habitat downstream would not be impeded. Long term benefits include increased fish population numbers, enhanced "metapopulation" structure that will increase fish population resiliency in face of an environmental perturbation, and restored connectivity of aquatic habitat.

The undersized culvert will be replaced with an appropriately sized culvert that will pass all fish during all life stages year-round. The appropriate size and type of culvert will be determined by an interdisciplinary Forest Service Team comprised of a fish biologist, hydrologist and engineer.

Replacing this culvert is an opportunity to implementing a project on the Lower Columbia Fish Recovery Board's (LCFRB) 6-Year Habitat Workplan for the Upper North Fork Lewis River watershed. This culvert blockage was also noted in the Forest Service's Muddy River Watershed Assessment as a high priority fish passage issue.

The Forest Service is the designated management agency for meeting Clean Water Act requirements on National Forest Lands. The Gifford Pinchot NF recognized the need to correct all fish passage culvert barriers and has started the Environmental Analysis required by the National Environmental Policy Act prior to actions on the ground. However, no laws exist that necessitate the Forest Service to correct all fish passage culvert barriers in a certain timeframe or solely with appropriated funds. The Gifford



Pinchot NF will seek partnership funding for the implementation of this project with Sout Zone Resource Advisory Committee (Title II funds).

### **Background**

The watershed objectives are in line with the Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan Chapter G – NF and EF Lewis Habitat Measures. These measures, in priority order are:

1. Restore Access through hydropower system
2. Protect stream corridor structure and function
3. Protect hillslope processes.
4. Restore degraded hillslope processes
5. Restore riparian conditions throughout the basin
6. Restore degraded water quality with emphasis on stream temperatures
7. Restore access to habitat blocked by artificial barriers
8. Restore channel structure and stability
9. Provide for adequate instream flows during critical periods.

This project restores access to blocked habitat in a tributary of the Muddy River R1A – a Tier 2 reach within the Upper North Fork Lewis River of the Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan.

No natural barriers to fish exist below this tributary road crossing, downstream through the Muddy River and Lewis River, to Swift Reservoir. Therefore, the barrier removal increases available habitat for reintroduced anadromous fish (spring chinook, coho and winter steelhead), and possibly bull trout.

Available fish habitat within the tributary above and below the culvert barrier consists of pools typical for low gradient streams with long tail-outs. These pools were relatively long pools with good cover and residual depth for fish. Several side channels also offer some rearing habitat. The riparian area adjacent to the stream is predominately red alder with minor conifer component outside the floodplain influence.

Bull trout within the Muddy River system would have access to available habitat following the culvert replacement. Bull trout have been identified in the Muddy River at RM 2.0 and have not been surveyed for extensively in the upper portions of the Muddy River system. It is believed that in the long-term, as the bull trout population increases with increasing habitat conditions, this tributary would provide some rearing habitat for juvenile fish.

This tributary and one other tributary just south of this tributary maintain summer temperatures at 12°C and are two drainages to the Muddy River that are connected to the source of cold waters from the flanks of Mt. St. Helens, similar to the mainstem of the headwaters of the Muddy River. These tributaries provide important thermal refuge for fish in the summer when the mainstem warms (flows at 18°C) which is due to the significant flow contribution from the warm waters of Smith Creek and the exposed wide surface area in the mainstem as it flows through the wide, flat floodplain. By replacing

this culvert, more access to cooler temperature waters in the Muddy River system would be available to fish.

The tributary also provides high flow refuge from the Muddy River which continues to carry a high sediment load caused by the 1980 Mt. St. Helens Volcanic Eruption.

**Project Objective(s)**

The goal of this culvert replacement is to replace an undersized fish barrier culvert on a tributary to the Muddy River with a culvert that will pass all fish during all life stages year-round. The objective is to replace the culvert that has been designed with the stream simulation so that the culvert has proper vertical leap distance, velocities, flow capacity and natural substrate.

This project supports the recovery of federal ESA-listed species (Spring Chinook, Winter Steelhead, coho and bull trout), and benefits the reintroduction of anadromous fish above Swift Reservoir by opening access to 1.0 miles of quality rearing habitat in a cold water tributary to the Muddy River, a significant tributary to the North Fork Lewis River.

**Tasks:**

The undersized culvert will be replaced with a larger culvert designed using the stream simulation. All disturbed areas, with the exception of the culvert armoring and road surface will be revegetated. Re-vegetation with native species of the disturbed areas will be implemented at a time that will best assure the survival of the plants. Long term re-vegetation will be monitored for successful native re-vegetation within five years.

Monitoring will follow the GPNF Effectiveness Monitoring Protocol (1998).

**Methods:**

The methods will be to have heavy equipment remove the existing culvert and replace with a new culvert.

Best Management Practices include the following:

- Where work necessitates the operation of heavy equipment within the bankfull width of a stream crossing, the timing and extent of this work will be minimized. Accumulations of soil or debris shall be removed from drive mechanisms and undercarriage of all heavy equipment prior to its working within the bankfull width. Every effort will be made to avoid stream crossing with heavy equipment.
- The fish bearing stream crossing will be dewatered or isolated from flowing waters prior to removal of the culvert, to prevent generation of sediment and minimize turbidity.
- Large wood and/or appropriately sized rock, where available on-site, may be placed within the reestablished streambed to mimic the natural streambed characteristics and/or prevent erosion of the new streambed and banks.
- Control of invasive weeds will occur where deemed necessary, prior to and after earth disturbing activities.

- Erosion control measures will be implemented and at a minimum include a heavy application of mulch immediately after work is completed. Seeding may also occur and may be delayed till September when cooler, moister weather conditions would aid the survival of the seed.
- Riparian vegetation such as willow and alder trees will be planted outside the road prism of the crossing to provide shade. Planting may be delayed till the following spring, to aid the survival of the young trees.
- Project will be implemented between July 1 – July 31, the allowable work times for freshwater in the North Fork Lewis River between Merwin dam and the Lower Falls, as defined by the Washington Department of Fish and Wildlife.

### **Specific Work Products**

Deliverables include appropriately sized culvert, position of culvert (culvert inlet and outlet elevations and orientation), culvert armoring specifications and road surface specifications.

### **Project Duration**

This project will take 10-15 days to complete and is expected to be implemented between July 1 and July 31, 2007. The following is a tentative schedule of milestones. A project close-out site visit with ACC representatives will be provided upon project completion.

- The NEPA and Design for this project was initiated in October 2005.
- Contract Implementation is proposed for after July 4, 2007.
- Earth disturbing heavy equipment activities to be completed by July 31, 2007.
- Mulching of all disturbed areas by August 3, 2007.
- Seeding of all disturbed areas by September 14, 2007.
- First planting of willow, alder and cedar trees by July, 2008.

### **Permits**

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

The Gifford Pinchot National Forest has a Memorandum of Understanding (MOU) with the Washington State Department of Fish and Wildlife Regarding Hydraulic Projects conducted by USDA Forest Service Northwest Region (2005). This MOU allows culvert replacements without an individual hydraulic project approval (HPA) if the project complies with the provisions of the MOU. This culvert replacement 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.

This project will be in compliance with the requirements found in US Fish and Wildlife Service Biological Opinion for USDA Forest Service Fish Passage Restoration Activities in Eastern Oregon and Washington 2004-2008 and NOAA Fisheries Biological Opinion for Programmatic Culvert Replacement Activities in Washington and Eastern Oregon (2003/00676).

The NEPA and Design for this project has been initiated by a Forest Service Interdisciplinary Team with an expected completion date of Early Summer 2006.

**Matching Funds and In-kind Contributions**

A grant application for this project has been submitted to the Community Salmon Fund requesting \$25,000. Community involvement will be achieved by establishing working relationship and trust with local members of the community, begin community outreach to foster project development in the Muddy River Watershed, and provide work to support local contractors.

The partnership between Lower Columbia Fish Enhancement Group (LCFEG) and Gifford Pinchot National Forest (GPNF) was formed in an effort to make this project cost-effective and competitive and get timely project completion. The Community Salmon Fund Grant mentioned the pre-proposal was not approved. A Title II grant proposal will be submitted in April 2006.

Lower Columbia Fish Enhancement Group	\$2,000 (IK)(Co)
Gifford Pinchot National Forest	\$20,000 (IK)(Co)
Title II – Skamania County	\$25,000 (Cash) (Future)
Lewis River Aquatics Fund	\$80,000

**Professional Review of Proposed Project**

This project was reviewed by the Lower Columbia Fish Recovery Board during the fall of 2005 and included a field visit on August 30, 2005.

**Budget**

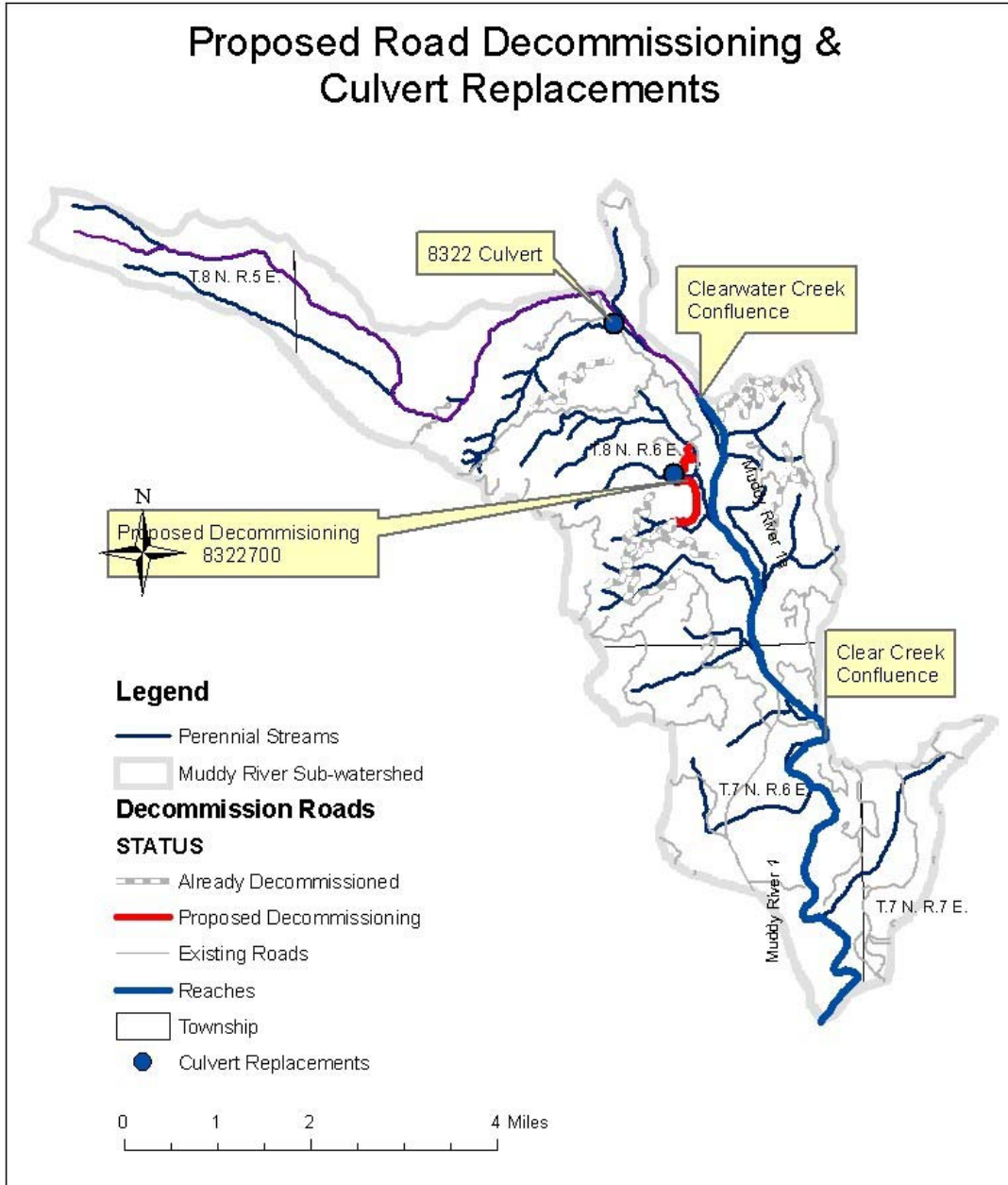
**Muddy River Tributary Culvert Replacement**

	<b>NEPA</b>	<b>Final designs</b>	<b>Permitting</b>	<b>Construction</b>	<b>Monitoring /Reporting</b>
<b>Personnel Costs</b>					
FS - Zone Team	\$15,000 (IK)				
FS -Fish Biologist, Engineer and Hydrologist		\$5,000 (IK), \$5,000 - ACC			
FS - Fish bio and Hydrologist			\$2,000(IK)		\$2,000 - ACC
FS - Contract administrator - engineer				\$4,000 - ACC	
FS - Fish Bio to meet MOU Requirements				\$2,000 - ACC	
FS - Contract Specialist				\$3,000 - ACC	
LCFEG - Personnel					\$2,000 (IK - LCFEG)
<b>Contract Payables</b>					
Bottomless Structure				\$25,000 - Title II	
Dewatering				\$1,000 - ACC	
Work Site Restoration				\$3,000 - ACC	
Quantity of Material Placement (cubic yards)				\$10,000 - ACC	
Culvert Installment				\$41,000 -ACC	
Roadbed Reconstruction				\$2,000 - ACC	
Move In Move Out				\$7,000 ACC	
<b>Administrative Overhead</b>	<b>\$4,500(IK)</b>	<b>\$1,500 (IK)</b>			

FS personnel estimated as \$300/day.

Total ACC request - \$80,000

## Proposed Road Decommissioning & Culvert Replacements



## Appendix E

### Muddy River Tributary Road Decommission 8322700

#### Project Manager

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#### Identification of problem or opportunity to be addressed

The Gifford Pinchot National Forest would like to address the problem of ongoing sediment delivery from a culvert failure at milepost 1.9 along Forest Road 8322700. The Gifford Pinchot Roads Analysis recommends this road be decommissioned due to discontinued access needs. The Gifford Pinchot Maintenance Plan designates this road as a Level II road which results in maintenance only when resource concerns are identified.

This 1.8 mile road decommission will eliminate existing sediment delivery from the culvert failure to one tributary crossing and reduce the risk of similar sediment delivery of other culvert failures from this non-maintained road. The quantity of potential sediment directly delivered to live streams could be estimated as the amount of road fill to be removed at the two major culvert crossings along with four other stream crossings. The total quantity of sediment that would be removed from the two fish bearing stream crossing is approximately 4400 cubic yards with an additional 13,100 cubic yards removed from 4 other stream crossings totaling approximately 17,500 cubic yard of sediment (See Sediment Removal table at end of document). The two major culvert crossings are fish barriers with one having 0.1 mile of quality upstream habitat and the other having 0.4 mile of intermittent habitat.

The Forest Service is the designated management agency for meeting Clean Water Act requirements on National Forest Lands. The Gifford Pinchot NF recognized the need to remediate the road crossing failure on this road and has started the Environmental Analysis required by the National Environmental Policy Act prior to actions on the ground. However, no laws exist that necessitate the Forest Service to remediate failed road crossings with solely appropriated funds. The Gifford Pinchot NF has secured some partnership funding for the implementation of this project with both the Salmon Recovery Fund and Title II funds.

Decommissioning Forest Road 8322700 will not eliminate access to the upper reaches of the Muddy River and Smith Creek. Forest Road 8322 also provides access to the upper reaches of the Muddy River and Smith Creek and it will remain open which will enable access for activities such as survey and inventories, carcass transport, and hunting.

## **Background**

The watershed objectives are in line with the Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan Chapter G – NF and EF Lewis Habitat Measures. These measures, in priority order are:

1. Restore Access through hydropower system
2. Protect stream corridor structure and function
3. Protect hillslope processes.
4. Restore degraded hillslope processes
5. Restore riparian conditions throughout the basin
6. Restore degraded water quality with emphasis on stream temperatures
7. Restore access to habitat blocked by artificial barriers
8. Restore channel structure and stability
9. Provide for adequate instream flows during critical periods.

One of the two submeasures under #4 Restore degraded hillslope processes is Upgrade or remove problem forest roads.

This project eliminates active sediment delivery and reduces the risk of sediment delivery to a tributary of the Muddy River R1A – a Tier 2 reach within the Upper North Fork Lewis River of the Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan. In this plan, habitat factor analysis lists the primary factors affecting the most critical species and life stages as sediment and channel stability for Upper Lewis Spring Chinook and Upper Lewis Coho egg incubation, and sediment for Upper Lewis Winter Steelhead egg incubation.

No fish barriers exist below the tributary road crossings to Swift Reservoir and therefore will be available habitat for reintroduced anadromous fish (spring chinook, coho and winter steelhead), existing cutthroat trout, and potentially bull trout.

The fish bearing tributary habitat has a lot of pool habitat and is considered good rearing habitat. Side channels provide good rearing habitat also. Spawning habitat is marginal due to the lack of pool depth although ample spawning substrate of adequate size and distribution exists. Substrate embeddedness and percent composition of fine sands and silt would not preclude successful spawning and egg-to-fry survival. Sections of bedrock intrusion are also present. Riparian habitat includes predominately alder trees adjacent to the streams, with conifer component outside the floodplain.

This tributary and one other tributary just north of this tributary maintain summer temperatures at 12°C and are two drainages to the Muddy River that are connected to the source of cold waters from the flanks of Mt. St. Helens, similar to the mainstem of the headwaters of the Muddy River. The tributaries are a thermal refuge for fish in the summer when the mainstem warms (flows at 18°C) which is due to the significant flow contribution from the warm waters of Smith Creek and the exposed wide surface area in the mainstem as it flows through the wide, flat floodplain.



Bull trout have access to this habitat. Stream surveys conducted to date are not rigorous enough to determine the presence of bull trout. Bull trout have been identified in the Muddy River at RM 2.0. The tributaries that cross this road decommission join together and enter the Muddy River at about RM 7.5.

**Project Objective(s)**

The objective of this proposal is to reduce sediment delivery to a cold water tributary of the Muddy River by decommissioning Forest Road 8322700.

This project will benefit recovery of federal ESA-listed species (Spring Chinook, Winter Steelhead, and Coho (proposed)) by improving tributary habitat that reintroduced fish and/or their offspring can access above Swift Reservoir and prevent further degradation of spawning and rearing habitat in a cold water tributary to the Muddy River.

**Tasks:**

The road decommission will remove all the culverts along the last 1.8 miles of Forest Road 8322700. At each culvert removal site, a channel will be reconstructed to bankfull width and stream banks contoured to 1.5:1, or to match the natural stream banks slopes. Appendix A – Sediment Quantities lists the recommended bankfull widths at each crossing and approximates the quantity of road fill that will be removed and place in a stable configuration outside the bankfull area.

Re-vegetation with native species of the disturbed areas will implemented at a time that will best assure the survival of the plants. Long term re-vegetation will be monitored for successful native re-vegetation within five years.

**Methods:**

The methods will be to have an excavator remove the culvert and road fill from the stream crossing and then reconstruct the bankfull width and recontour the streambanks. The road fill material will be placed on the existing road outside of the floodable area.

Best Management Practices include the following:

- Where work necessitates the operation of heavy equipment within the bankfull width of stream crossings, the timing and extent of this work will be conducted to minimize negative impacts to fish. Accumulations of soil or debris shall be removed from drive mechanisms and undercarriage of all heavy equipment prior to its working within the bankfull width. Every effort will be made to avoid stream crossing with heavy equipment.
- Fish bearing stream crossings will be dewatered or isolated from flowing waters prior to removal of the culvert, to prevent generation of sediment and minimize turbidity.
- A waterbar will be constructed across the road with an outlet onto the forest floor on any upgrade side of the crossing to prevent the existing road ditch flow to access the newly established stream banks.

- Large wood and/or appropriately sized rock, where available on-site, may be placed within the reestablished streambed to mimic the natural streambed characteristics and/or prevent erosion of the new streambed and banks.
- Control of invasive weeds will occur where deemed necessary, prior to and after earth disturbing activities.
- Erosion control measures will be implemented and at a minimum include a heavy application of mulch immediately after work is completed. Seeding may also occur and may be delayed until September when cooler, moister weather conditions would aid the survival of the seed.
- Riparian vegetation such as willow, alder, and cedar trees will be planted at the three crossings where bankfull width is 20 feet or wider to provide shade and future sources of large woody debris. Planting may be delayed until the following spring, to aid the survival of the young trees.

### **Specific Work Products**

Deliverables include quantities of material removed from culvert crossings and crossing bankfull widths and stream banks configured to required specifications.

### **Project Duration**

This project will take 10-15 days to complete and will be implemented during the 2006 field season. The following is a tentative schedule of milestones. A project close-out site visit with ACC representatives will be provided upon project completion.

- The NEPA and Design for this project was initiated in July 2005.
- Contract Implementation is proposed for after July 10, 2006.
- Earth disturbing heavy equipment activities, mulching and seeding of all disturbed areas by September 30, 2006.
- First planting of willow, alder and cedar trees by June 29, 2007.

### **Permits**

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

The Gifford Pinchot National Forest has a Memorandum of Understanding (MOU) with the Washington State Department of Fish and Wildlife Regarding Hydraulic Projects conducted by USDA Forest Service Northwest Region (2005). This MOU allows road decommission without an individual hydraulic project approval (HPA) if the project complies with the provisions of the MOU. This road decommission 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.

This project will be in compliance with the requirements found in US Fish and Wildlife Service Biological Opinion for USDA Forest Service Fish Passage Restoration Activities in Eastern Oregon and Washington 2004-2008 and NOAA Fisheries Biological Opinion for Programmatic Culvert Replacement Activities in Washington and Eastern Oregon (2003/00676).

**Matching Funds and In-kind Contributions**

The partnership between Lower Columbia Fish Enhancement Group (LCFEG) and Gifford Pinchot National Forest (GPNF) was formed in an effort to make this project cost-effective and competitive and get timely project completion. Partial funding for this project has been secured with Title II and Salmon Recovery Board funds.

Lower Columbia Fish Enhancement Group	\$2,000 (IK)(Co)
Gifford Pinchot National Forest	\$20,000 (IK)(Co)
Title II – Skamania County	\$15,000 (C) (Co)
Lower Columbia Fish Recovery Board Grant	\$61,000 (C) (Co)
Lewis River Aquatics Fund	\$46,000

**Professional Review of Proposed Project**

This project was reviewed by the Lower Columbia Fish Recovery Board during the fall of 2005 and included a field visit on August 30, 2005.

**Budget**

**Muddy River Tributary Road Decommission**

	NEPA	Final designs	Permitting	Construction	Monitoring /Reporting
<b>Personnel Costs</b>					
FS - Zone Team	\$15,000 (IK)				
FS -Engineer and Hydrologist		\$5,000 (IK)			
FS - Fish bio and Hydrologist			\$2,000(IK)		\$2,000 (SRFB)
FS - Contract administrator - engineer				\$4,000 - SRFB	
FS - Fish Bio to meet MOU Requirements				\$1,000 - SRFB	
FS - Contract Specialist				\$2,000 - SRFB	
LCFEG - Personnel					\$2,000 (SRFB)
LCFEG - Personnel					\$2,000 (IK - LCFEG)
<b>Contract Payables</b>					
Dewatering (3 sites)				\$3,000 - SRFB	
Work Site Restoration @ \$1,000/culvert				\$18,000 - Title II	
yds x equip (250\$/HR) at 50 yds/hr				\$100,630 (\$46,000 ACC, 55,000 SRFB)	
Move In Move Out				\$3,000 SRFB	
<b>Administrative Overhead</b>	\$4,500(IK)	\$1,500 (IK)			

FS personnel estimated as \$300/day.

**Sediment Removal Estimates**

	section info	cubic yards	yds x \$ 5 /cy	yds x equip (250\$/HR) at 50 yds/hr
49+50				
bottom width	14			
height	12.6			
end area	375			
		544	\$2,722	\$2,613
46+00				
bottom width	10			
height	18.3			
end area	838			
		1446	\$7,232	\$6,942
42+60				
bottom width	5			
height	12			
end area	364			
		391	\$1,955	\$1,877

39+25					
bottom width	5				
height	7.2				
end area	191	137	\$686	\$659	
31+50					
bottom width	5				
height	11				
end area	327	327	\$1,635	\$1,570	
29+75					
bottom width	8				
height	10				
end area	256	265	\$1,327	\$1,274	
26+10					
bottom width	5				
height	6.4				
end area	167	110	\$550	\$528	
8+65					
bottom width	6				
height	12				
end area	352	391	\$1,956	\$1,877	
5+40					
bottom width	20				
height	29.3				
end area	1645	4789	\$23,944	\$22,986	
2+54					
bottom width	4				
height	6				
end area	187	111	\$554	\$532	
MP 1.85					
bottom width	30				
height	18.5				
end area	1065	2643	\$13,214	\$12,685	
MP 1.83					
bottom width	4				
height	4.8				
end area	132	66	\$332	\$319	
MP 1.71					
bottom width	4				
height	7.1				
end area	193	130	\$650	\$624	
MP 1.62					

bottom width	4			
height	23.1			
end area	1287	2393	\$11,964	\$11,486
MP 1.59				
bottom width	10			
height	24.4			
end area	2072	4512	\$22,562	\$21,659
MP 1.43				
bottom width	4			
height	6.6			
end area	152	97	\$484	\$465
MP 1.3				
bottom width	6			
height	14.2			
end area	596	759	\$3,797	\$3,645
MP 1.29				
bottom width	30			
height	17.5			
end area	723	1741	\$8,703	\$8,355
MP 1.15				
bottom width	4			
height	6.5			
end area	176	111	\$554	\$532
		TOTAL COSTS	\$104,822	\$100,629