**FINAL Meeting Notes**
**Lewis River License Implementation**
**Aquatic Coordination Committee (ACC) Meeting**
**December 14, 2006**
**Ariel, WA**

**ACC Participants Present (20)**

Dan Barrett, Consultant
Jim Byrne, WDFW
Clifford Casseseka, Yakama Nation (via teleconference)
Michelle Day, NMFS (via teleconference)
Diana Gritten-MacDonald, Cowlitz PUD
Adam Haspiel, USDA Forest Service
LouEllyn Jones, USFWS (via teleconference)
Kaitlin Lovell, Trout Unlimited (via teleconference 9:30am)
Eric Kinne, WDFW
George Lee, Yakama Nation
Erik Lesko, PacifiCorp Energy
Tammy Mackey, American River & Trout Unlimited (via teleconference 9:45am)
Jim Malinowski, Fish First
Kimberly McCune, PacifiCorp Energy
Todd Olson, PacifiCorp Energy
Frank Shrier, PacifiCorp Energy
Shelley Spalding – USFWS (via teleconference 9:00 – 10:15am)
Karen Thompson, USDA Forest Service
Steve Vigg, WDFW
Shannon Wills, Cowlitz Indian Tribe

**Calendar:**

| | | |
|---|---|---|
| Jan. 10, 2007 | TCC Meeting | Merwin Hydro |
| Jan. 11, 2007 | ACC Meeting | Merwin Hydro |
| Jan. 30, 2007 | Engineering Subgroup Meeting | Merwin Hydro |

| **Assignments from December 14th Meeting:** | **Status:** |
|---|---|
| Keown: Requested ACC comments on the *Draft Hatchery and Genetic Management Plan (HGMP) – North Fork Lewis River Late Winter Steelhead Program* via email at keownkk@dfw.wa.gov **on or before Monday, January 8, 2007.** | **Complete – 1/11/07** |
| Olson: Include time on the 1/10/07 TCC agenda for ACC discussion with the wildlife biologists relating to their concerns about terrestrial issues. | **Complete – 1/3/07** |
| McCune: Ask Mitch Wainwright (USFS) to provide the ACC with the number of elk which are of concern in the Crab Creek winter range area. | **Complete - 12/19/06** |
| Shrier: PacifiCorp will work to organize a workshop relating to identifying the knowledge base we have for sharing of expertise | **Complete – 12/21/06** |

| | |
|---|---|
| relating to the Independent Scientific Review Panel Pre-proposal Discussion. | |
| Shrier: PacifiCorp to form technical committee consisting of the USFS, the Tribes and Utilities in order to nail down the acclimation sites. | **On going** |

| **Assignments from November 9th Meeting:** | **Status:** |
|---|---|
| McCune: Email link to ACC for viewing Storm photos on the Lewis River website. | **Complete – 11/9/06** |
| McCune: Email the Aquatic Fund Pre-Proposal conference call details to the ACC. | **Complete – 11/9/06** |
| McCune: Email the updated *Timeline of H&S Actions to the ACC.* | **Complete – 11/9/06** |
| Jones: Contact Frank Shrier no later than Tuesday, November 14th with her comments regarding the constructed channel. | **Complete – 11/9/06** |
| Shrier: Request a new *Bull Trout Limiting Factors Analysis* timeline and present to ACC. | **Complete – 11/16/06** |

| **Assignments from October 12th Meeting:** | **Status:** |
|---|---|
| Olson/MacDonald: Schedule a meeting with the Cowlitz County commissioners to discuss length of permitting process. | **Olson spoke with both Cowlitz & Skamania County rep's in Jan. 2007.** |
| Keith Keown (WDFW): Bring the model to the November ACC meeting to illustrate a variety of scenarios for ACC review. | **Cancelled** |

| **Assignments from September 14th Meeting:** | **Status:** |
|---|---|
| George Lee: Discuss the tribes ceremonial and subsistence needs in more detail with the appropriate tribal staff person to determine the fish number they need annually and get information to Craig Burley (WDFW). | **WDFW looking for information from YN** |

**Opening, Review of Agenda and Meeting Notes**

Frank Shrier (PacifiCorp Energy) called the meeting to order at 9:10 a.m. He conducted a review of the agenda for the day and called out attendees names for those participating via teleconference. Shrier asked if attendees had any changes to the Agenda; no changes were requested. However, Shrier informed the ACC attendees that time would be provided on the Agenda for USFWS to discuss an Independent Scientific Review Panel Pre-proposal relating to the 2006/2007 Aquatic Funding.

Shrier requested comments and/or changes to the ACC Draft 11/09/06, 11/30/06 and the 12/5/06 meeting notes. The ACC attendees present accepted these meeting notes without any changes at 9:20am.

Todd Olson (PacifiCorp Energy) provided an update on the assignment indicated below. The Utilities hope to gain an audience with a county commissioner and set the stage for the projects coming in, the background of the project(s), the intent and request that the

County act quickly on the permitting process. The scheduling of the meeting is currently pending.

| **Assignments from October 12th Meeting:** | **Status:** |
|---|---|
| Olson/MacDonald: Schedule a meeting with the Cowlitz County commissioners to discuss length of permitting process. | **Pending** |

In addition, Olson informed the ACC attendees that full proposal request letters relating to the 2006/07 Aquatic Funding were mailed to the USDA Forest Service and Cowlitz Indian Tribe on 12/13/06.

**Update – BiOp Status and License Issuance**

Michelle Day (NMFS) informed the ACC attendees present that the expected completion of the BiOp is January 2007. Shrier communicated that based upon this timeline, License issuance is expected the end of March 2007 or mid April 2007, which is an estimated sixty (60) days after receipt of the BiOp.

**USFWS - Independent Scientific Review Panel Pre-proposal Discussion**

Shelley Spalding (USFWS) communicated to the ACC attendees that a number of plans and reports exist for the Lewis River and in the lower Columbia by the Lower Columbia Fish Recovery Board. She indicated that it would be helpful to get these plans synthesized in some way so there is an idea of what the ACC objective is relating to the Aquatic Fund projects. Spalding presented a document entitled *Independent Scientific Review Panel (ISRP) Pre-proposal for a Pilot Project* (Attachment A), which is based on the BPA ISRP for review and discussion with the ACC. This pilot project is a suggestion to aid the ACC in establishing a clear sense of what is needed for recovery plans.

Jim Malinowski (Fish First) expressed that he does not support spending money on studies and that the Agencies should be funding recovery plans.

Steve Vigg (WDFW) also expressed that he does not support this idea and that the Services should address these studies.

Karen Thompson (USDA Forest Service) expressed that she does not support an additional review process.

Day expressed that she would like to see some internal inquiries regarding completing this same type of thing to take a look at salmon. She further suggested taking a step back to insure we have a concerted understanding of how we are proceeding.

Shrier informed the ACC attendees that this discussion should have come up earlier during the funding protocol process.

The ACC attendees expressed some concern as to whether this is the appropriate time for evaluating the criteria. If the agencies want expertise they can assign experts to review the projects. Seems like this suggestion for a scientific review panel adds another layer of analysis.

Clifford Casseseka (Yakama Nation) expressed that he does not support this idea. In addition, he said that bull trout already takes approximately ½ of the funds. The number of other species requiring funding out-numbers bull trout. The agencies should use the expertise in their departments to address their concerns.

Steve Vigg (WDFW) communicated that this pre-proposal appears to be after the proposal period is over. In addition, Vigg expressed concern about the use of limited funding for the purpose of adding another layer of review.

Day supports the idea of bringing in outside sources to prioritize what is needed in the basin.

Malinowski communicated that the LCFRB has completed a Watershed Plan and a Salmon and Steelhead Restoration Plan and does not think the aquatic funds should be used to reinvent the wheel.

Jim Byrne (WDFW) asked if it is solely the role of the ISRP to review pre-proposals and determine what the priority is. Spalding commented that the ISRP would review the projects and make recommendations to the ACC, but it would be the ACC's final decision regarding which projects are funded.

Shrier thinks it would be good to synthesize some of the existing documents/products, i.e., in this drainage these particular tributaries need this.

Shannon Wills (Cowlitz Indian Tribe) commented that it would be good to review existing documents and look long and hard at what other groups have already completed and make use of these existing resources.

Shrier suggested that perhaps a workshop is the first step to evaluate the USFWS pilot project.

Diana Gritten-MacDonald (Cowlitz PUD) commented on what she believes she is hearing the ACC attendees say:

- Synthesize the available resources
- Don't spend funds until we get this done
- This pre-proposal is outside the funding process for this year

Olson communicated that PacifiCorp will work to organize a workshop relating to identifying the knowledge base we have for sharing of expertise relating to the Independent Scientific Review Panel Pre-proposal Discussion.

Vigg expressed that the projects have already gone through the process and it may be fairer to complete the process for this year and not make any changes.

Olson suggested to the ACC attendees that in preparation for next year he thinks that we should work on the synthesization for the 2007/08 funding cycle. Olson expressed that he struggles with changing the process mid-term in the annual funding.  Olson agreed on conducting the first workshop in January 2007, and ask the forest service and Cowlitz Tribe if their projects are time sensitive.

Gritten-MacDonald clarified that she understands that the ACC attendees have agreed to the following:

- All ACC attendees agreed that the ISRP is not appropriate for this funding cycle.
- To conduct a Synthesis workshop(s) with the first meeting in January 2007
- The ACC attendees have no objection of going forward with full proposals for projects awarded in 2006.

LouEllyn Jones (USFWS) proposed that the purpose of the workshop is to determine the process and criteria for prioritizing projects.

Day expressed that assessing the needs of the species is important so when we get projects the ACC can determine the greatest need.

Shrier said that PacifiCorp will work on our end to get a workshop coordinated.

Kimberly McCune (PacifiCorp Energy) provided a financial reporting on the Aquatics Resource and Bull Trout (7.5) tracking accounts. As of 11/30/06 there is $246,970.17 in the Bull Trout Fund and $349,356.25 in the Aquatics Resource Fund (Attachment B). PacifiCorp will report the 7.5 Fund tracking account activity as of 12/31/06 in the 2006 ACC/TCC Annual Report.

**Pine Creek Instream Project – Approve/disapprove Haspiels' request for additional monitoring funds**

Adam Haspiel (USDA Forest Service) asked for approval from the ACC to receive 100% ($5,000) of the monitoring funds (see Haspiel's email below and Attachment C). Currently USDAFS has approval from the ACC (2005/06 Funding Cycle) for 25% of those monitoring funds. Haspiel expressed that the Forest Service wants to complete pre and post monitoring on instream structures. Karen Thompson (USDA Forest Service) expressed that Haspiel may want to consider asking the Forest Service for matching funds in the fall of 2007 for the 2008 funding year.

Haspiel informed the ACC participants present that the Forest Service would go out and do the monitoring/baseline information and not contract out the work.

*-----Original Message-----*
*From: Adam I Haspiel [mailto:ahaspiel@fs.fed.us]*
*Sent: Friday, November 17, 2006 5:26 PM*
*To: Olson, Todd*
*Subject: Pine Creek Instream Project*

*Hi Todd. When we set up terms to collect funds to do a pilot project in Pine Creek for instream structures we agreed to fund it at 25% of the full*

*project cost. Unfortunately, only 25% of the monitoring costs were included. I would like to ask the ACC group for the full amount of monitoring funds ($5,000) to study the project so we are well informed before we make the decision to go forward with the full project.*
*Thanks*
*Adam*

*Adam I. Haspiel*
*Fisheries Biologist*
*Mount St. Helens National Volcanic Monument*
*ahaspiel@fs.fed.us*
*42218 NE Yale Bridge Rd*
*Amboy, WA 98601*
360-449-7833

Olson expressed that he would like to see the Forest Service look to in-kind contribution efforts since the monitoring does not need to be completed until June 2007.

Fish First, Cowlitz Tribe, PacifiCorp Energy, NMFS, USFWS and WDFW all volunteered for giving of time in the field to assist Haspiel with reducing the $5,000 cost of monitoring efforts.

Malinowski purposed a funding amount of $2,500, up from the original of $1,200. Olson suggested building a payment schedule into the PacifiCorp-USFS Collection Agreement, so if in-kind donations are received a certain payment may not need to be made.

The ACC attendees agreed to provide $2,500 of the total project monitoring funds to the USDA Forest Service for pilot study monitoring.

**Large Woody Debris (LWD) Study – Statement of Qualifications (SOQ's)**

Shrier communicated to the ACC attendees that he received only two SOQ's (Stillwater Sciences and Inter-Fluve) and requested a decision from the ACC as to whom to select (see email dated 12/1/06 – Attachment D).

WDFW and the Cowlitz Indian Tribe both expressed that each consultant is qualified to do the work.

Shrier informed the ACC attendees that each consultant needs to be cost competitive.

Upon ACC review of both SOQ's those in attendance selected Inter-Fluve.

Break <10:50am>
Reconvene <11:00am>

**Acclimation Pond Proposed Sites Discussion – Attachment F**

George Lee (Yakama Nation) expressed that the Tribe prefers that the acclimation pond site be located at the highest point into the system as possible, such as the Crab Creek site (see Lee email below dated 11/17/06).

***From:*** *George Lee [mailto:gdl@yakama.com]*
***Sent:*** *Friday, November 17, 2006 11:38 AM*
***To:*** *McCune, Kimberly; Clifford Casseseka*
***Subject:*** *Re: ACC Draft 11/9/06 Meeting Notes*

*Kimberly,*
*can you pass this on to the ACC for discussion?*
*The Curly Creek area must be visited and there must be more discussion on this. Crab Creek was visited and comments were asked for and now these comments are coming in. In one of the initial documents, Curly Creek was designated that it was or had "Potential Anadromous Barrier". Has the creek been surveyed or updated and is it the right place to have a reintroduction site??*
*In supplementation, it is good if the acclimation sites are located as high as possible in the system. And that the release site is suited for returning adults, such as having spawning areas near. I understand that adults are spawning near the falls........ This seems like the best site for a acclimation site. Furthermore, "leaving a big footprint" is not the idea of using a "portable" acclimation site.*
*The MAIN point is, is that the salmon are given the best chance possible in this reintroduction effort.*

In addition, Casseseka communicated to the ACC that the footprint is temporary so he doesn't see why the Forest Service would be concerned relating to disturbing the habitat. Casseseka's primary concern is that there is a better chance for larger numbers of fish to get up there.

Haspiel informed the ACC attendees that he met with the forest rangers to review the proposed acclimation pond sites and expressed that there is a problem with opening the road to the Crab Creek area in the winter as doing so would be too much disturbance on the elk. The road would have to be plowed, although a helicopter could take up the fish or a snowmobile could be used. Opening this road could cause potential problems with the general public attempting to gain access. In addition, there is chronic slide location which could block access and cultural concerns exist in the Crab Creek area. A primary concern for the Forest Service is that the Crab Creek area is a critical winter range area for big game.

Haspiel also expressed that the Forest Service looked at how high they could get into the system and Curly Creek looked like a good alternative. This site has plowed access directly to it and the pipe can be easily accessed for cleaning and it's up above the two main influences. For clarification, Shrier stated that there is no waterfall on the mainstem at this location but there is a waterfall on Curly Creek.

Day expressed concern about adult fish dispersal and is also a proponent of locating the acclimation ponds up as high in the basin as possible.

Shrier suggested that a technical committee be created consisting of the USFS, the Tribes and Utilities in order to nail down the sites because NEPA, permitting and designs are very time consuming activities. In addition, all US Forest sites will require a special use permit for all the proposed acclimation sites, although not all will require a forest plan amendment.

Olson suggested that part of the January 2007 TCC meeting should include ACC discussion with the wildlife biologists relating to their concerns about terrestrial issues.

Thompson said that she can still purpose the Crab Creek site, however, it may require a Forest Plan amendment and special use permit.

McCune will email Mitch Wainwright (USFS) and request that he provide the ACC with the number of elk which are of concern in the Crab Creek winter range area.

Olson purposed that time be set aside on the January 10, 2007 TCC agenda to discuss and evaluate alternatives then come back to the ACC with the results.

Shrier informed the ACC attendees that the site selection is not yet critical, but the Utilities really need to know the site selection by June 2007.

Dan Barrett (Consultant) expressed concern about water temperatures, water depth, and access to site when evaluating the best location for the acclimation site.

Thompson said that the good thing about portable ponds is the ability to adapt and move the pond, if needed.

**Study Updates**

Shrier provided the following study updates:

*Yale Entrainment Study* – Just received the last of the data on 12/13/06, so PacifiCorp Energy can begin analysis. Shrier will keep the ACC advised of the progress.

*Merwin Tailrace Behavior Study* – PacifiCorp received some comment from WDFW; completed analyzing Chinook video and summer steelhead video. Hope to have the final report by January 2007.

*Merwin Sorting Facility Design* – Have a good foot print now; ergonomics and design in progress; continuing discussion on trap – how well we can meet the ATE. Making good progress.

*Speelyai Hatchery Remodel* – Have a roof but no floor yet. Fish coming out of the incubator.

*Swift Surface Collector Design* – Finished Computation Fluid Design (CFD) model; working on capture velocity and 30% design to bring forward to the ACC. Going up to NHC headquarters next week to do more intricate design.

Constructed Channel – The consultants (NHC) are finishing their draft report and recommendations for habitat enhancement of the constructed channel. This report will be made available to the ACC for review in early January. NHC will present their findings at the February ACC meeting.

Lunch <12:20pm>

Reconvene 12:50m>

**Status of Hatchery & Supplementation Plan – HGMP presentation by Keith Keown (WDFW)**

Keith Keown (WDFW) presented a PowerPoint presentation for ACC attendee review entitled *North Fork Lewis River Late Winter Steelhead Program* as a means to get the Hatchery & Supplementation Program started. The PowerPoint presentation which can be located at http://www.pacificorp.com/Article/Article61767.html is intended as a general overview tool which outlines the *Draft Hatchery and Genetic Management Plan (HGMP) – Lewis River Late Winter Steelhead Program at Merwin Hatchery* (Attachment E).

Keown communicated and discussed the program goal, which is adult supplementation for the upper North Fork of the Lewis River, the general program description, the risks, population productivity, abundance and diversity, program effects on listed fish, broodstock collection recommendations, proposals to reduce hatchery take and preserve wild genes, wild spawner selection & timing, incubation & rearing, release (moving from hatchery influence to natural selection), adaptive management, monitoring & evaluation.

**Next Steps - HGMP**

Keown would like ACC comments on the *Draft Hatchery and Genetic Management Plan (HGMP) – North Fork Lewis River Late Winter Steelhead Program* via email at keownkk@dfw.wa.gov **on or before Monday, January 8, 2007**. An electronic version of the Draft HGMP was sent to the ACC via email on 11/21/06.

**Other Topics**

McCune requested an update from Lee relating to the 9/14/06 assignment indicated below. Lee informed the ACC attendees that 5,000 Spring Chinook is the minimum tribal request.

| Assignments from September 14th Meeting: | Status: |
|---|---|
| George Lee: Discuss the tribes ceremonial and subsistence needs in more detail with the appropriate tribal staff person to determine the fish number they need annually and get information to Craig Burley (WDFW). | |

**Agenda items for January 11, 2007**

- Habitat Prioritization Workshop
- Update - Acclimation Pond Proposed Site Discussion
- Nutrient enhancement discussion - allocation of returning bio-mass (Jim Malinowski)
- Study Updates

**Next Scheduled Meetings – 2nd Thursday of each month throughout 2007**

| | |
|---|---|
| January 11, 2007 | February 8, 2007 |
| Merwin Hydro Facility | Merwin Hydro Facility |
| Ariel, WA | Ariel, WA |
| 9:00am – 3:00pm | 9:00am – 3:00pm |

**Meeting Adjourned at 2:30pm**

**Handouts**

- Final Agenda
- Draft ACC Meeting Notes 11/9/06, 11/30/06 and 12/5/06
- Independent Scientific Review Panel Pre-proposal (Attachment A)
- Draft Hatchery and Genetic Management Plan (HGMP) – Lewis River Late Winter Steelhead Program at Merwin Hatchery, dated 10/23/06 as provided by WDFW (Attachment E)
- Lewis River Acclimation Pond Site Recommendation (Attachment F)
- Update on Upper Release design based on meeting with WDOE

**Attachment A**

## Lewis River Independent Scientific Review Panel (ISRP)

## *(Based on the BPA ISRP)*

## Pre-proposal for a Pilot Project

### Background

Independent scientific review is an established tradition in research and development programs in the United States and much of the world. Scientific review can help decision-makers separate scientific issues from other considerations (political, economic, cultural, etc.) and help ensure that environmental decision making reflects the best available scientific knowledge. In the Lewis River Basin, the local expertise, scientific research undertaken and uncertainties that remain are important components prioritization of bull trout projects. Independent scientific review can identify where there is consensus or disagreement among scientists and help focus implementation of projects on those areas most relevant to recovery of bull trout and the FERC licensing agreement with PacifiCorp.

### Responsibilities of ISRP

**1) Review of projects proposed for direct funding under Aquatic Fund.**

The ISRP would review projects in the context of the Settlement agreement and in regard to whether they:

1. are based on sound science principles;
2. benefit bull trout;
3. have clearly defined objectives and outcomes; and
4. have provisions for monitoring and evaluation of results.

The ISRP reports the results of its review before the ACC adopts funding recommendations. The ACC could use the ISRP review as a basis for making recommendations regarding funding.

**2) Retrospective review of project accomplishments**

If monitoring becomes a part of the Aquatic Fund projects, the ISRP could prepare for the ACC a retrospective report based on a review of results from the projects funded the previous year.

## Implementation of responsibilities

### Description

The Independent Scientific Review Panel would include biologists with local expertise and 3 additional scientist with a regional perspective on and knowledge about restoration projects and recovery of bull trout.  Appointments to the ISRP would be made by the ACC based on recommendations from its members.

### Project review

ISRP reviews would be based on written proposals prepared by project sponsors and submitted in accord with ACC funding procedures. The Panel could also utilize additional written reports and materials that wouldl assist them in understanding the scope and context for the proposal. In some cases, it might be appropriate for the panel to directly communicate with proposers or to conduct site visits, however, there would be  procedures to ensure that all communications were conducted in a fair and open manner that maintains the independence of the panel.

## Project Cost

***Example of a NOAA Recovery Science Review Panel***

## *Part 5:* APPOINTING THE RECOVERY SCIENCE REVIEW PANEL

**The Recovery Science Review Panel** will consist of three to five highly qualified and independent scientists with strong records of sustained scientific contributions in a field relevant to salmon recovery. Members of this Panel should:

1. **Be scientists of international reputation** who have distinguished records of scientific accomplishment in the fields of ecology, evolutionary biology,conservation biology, fisheries biology, or salmon biology.
2. **Have held positions of scientific leadership** during their career.
3. **Have demonstrated fairness** and cooperation during their career.
4. **Meet National Research Council standards** for independence and conflict of interest.

Candidates for the Panel are being solicited through a Federal Register notice (see 64 FR 56329, October 19, 1999) to encourage a broad set of nominations from scientific societies, academic institutions, established scientific bodies in the region, tribes, states, other co-managers and stakeholders, and Federal agencies. The nominations will be reviewed by an independent panel of scientists who will forward a list of qualified candidates to NMFS for selection.

The Panel will not have any NMFS members, but one or more NMFS scientists will be associated with the Panel to (1) facilitate coordination with Technical Recovery Teams, (2) provide background information and an historical context for salmon management, and (3) help fill any information requests from the Panel.

Initially, the Recovery Science Review Panelists will be appointed for a three-year term. At that point, the terms

| | |
|---|---|
| | for all members will be reviewed, taking into consideration workloads, other commitments, and recovery planning progress and future needs. |

Attachment B

**Lewis River Hydro Projects**
**Fund 7.5-Bull Trout**
November 30, 2006

| Date | Days in Month | Beginning Balance | Funds Received | Funds Disbursed | Interest Accrued | Ending Balance | WSJ Prime Rate | Average Monthly Balance |
|---|---|---|---|---|---|---|---|---|
| Jan-05 | 31 | | - | - | - | - | 5.250% | - |
| Feb-05 | 28 | - | | | - | - | 5.500% | - |
| Mar-05 | 31 | - | | | - | - | 5.750% | - |
| Apr-05 | 30 | - | 154,338.07 | | 24.31 | 154,362.38 | 5.750% | 5,145 |
| May-05 | 31 | 154,362.38 | | | 786.61 | 155,148.99 | 6.000% | 154,362 |
| Jun-05 | 30 | 155,148.99 | | | 797.00 | 155,945.99 | 6.250% | 155,149 |
| Jul-05 | 31 | 155,945.99 | | | 827.80 | 156,773.79 | 6.250% | 155,946 |
| Aug-05 | 31 | 156,773.79 | | | 865.48 | 157,639.27 | 6.500% | 156,774 |
| Sep-05 | 30 | 157,639.27 | | | 874.57 | 158,513.84 | 6.750% | 157,639 |
| Oct-05 | 31 | 158,513.84 | | | 908.74 | 159,422.58 | 6.750% | 158,514 |
| Nov-05 | 30 | 159,422.58 | | | 917.23 | 160,339.81 | 7.000% | 159,423 |
| Dec-05 | 31 | 160,339.81 | | | 987.30 | 161,327.11 | 7.250% | 160,340 |
| Jan-06 | 31 | 161,327.11 | | | 1,027.63 | 162,354.74 | 7.500% | 161,327 |
| Feb-06 | 28 | 162,354.74 | | | 934.10 | 163,288.84 | 7.500% | 162,355 |
| Mar-06 | 31 | 163,288.84 | | | 1,074.80 | 164,363.64 | 7.750% | 163,289 |
| Apr-06 | 30 | 164,363.64 | 106,086.01 | | 1,069.50 | 271,519.15 | 7.750% | 167,900 |
| May-06 | 31 | 271,519.15 | | | 1,844.84 | 273,363.99 | 8.000% | 271,519 |
| Jun-06 | 30 | 273,363.99 | | | 1,853.63 | 275,217.62 | 8.250% | 273,364 |
| Jul-06 | 31 | 275,217.62 | | | 1,928.41 | 277,146.03 | 8.250% | 275,218 |
| Aug-06 | 31 | 277,146.03 | | | 1,941.92 | 279,087.95 | 8.250% | 277,146 |
| Sep-06 | 30 | 279,087.95 | | | 1,892.45 | 280,980.40 | 8.250% | 279,088 |
| Oct-06 | 31 | 280,980.40 | | | 1,968.79 | 282,949.19 | 8.250% | 280,980 |
| Nov-06 | 30 | 282,949.19 | | 37,889.08 | 1,910.06 | 246,970.17 | 8.250% | 281,686 |
| Dec-06 | 31 | - | | | - | - | 0.000% | - |
| Jan-07 | 31 | - | | | - | - | 0.000% | - |
| Feb-07 | 28 | - | | | - | - | 0.000% | - |
| Mar-07 | 31 | - | | | - | - | 0.000% | - |
| Apr-07 | 30 | - | | | - | - | 0.000% | - |
| May-07 | 31 | - | | | - | - | 0.000% | - |
| Jun-07 | 30 | - | | | - | - | 0.000% | - |
| Jul-07 | 31 | - | | | - | - | 0.000% | - |
| Aug-07 | 31 | - | | | - | - | 0.000% | - |
| Sep-07 | 30 | - | | | - | - | 0.000% | - |
| Oct-07 | 31 | - | | | - | - | 0.000% | - |
| Nov-07 | 30 | - | | | - | - | 0.000% | - |
| Dec-07 | | | | | | | | |

Default Year is 365 Days

7.7 Management of Aquatics Fund and In Lieu Fund

PacifiCorp and Cowlitz PUD shall each hold or cause to be held in a Tracking Account monies that it provides to the Aquatics Fund, and PacifiCorp shall hold monies provided to the In Lieu Fund, until expenditures for Resource Projects or mitigation measures are made. Each Licensee's contributions shall be made in 2004 dollars, Adjusted for Inflation. Each Licensee shall credit interest on its respective Fund monies from the date the monies are due to be placed into the Fund until expended. Interest will be calculated monthly at the prime interest rate, as published on the last day of the month in the Wall Street Journal, based on the average monthly balance. If such rate ceases to be published in the Wall Street Journal*, the Parties shall agree upon an alternate source for the prime interest rate. The Licensees shall notify and Consult with the ACC with respect to the Aquatics Fund if it appears that a given project's costs will be significantly higher than expected, and PacifiCorp shall do the same with respect to the In Lieu Fund. Based on Consultation with the ACC, the Licensees (or PacifiCorp with respect to the In Lieu Fund) may determine not to proceed with or to modify that project. Funds not expended in any given year shall be carried over to the subsequent year.

Attachment B

**Lewis River Hydro Projects**
**Fund 7.5-Aquatics Resource**
November 30, 2006

| Date | Days in Month | Beginning Balance | Funds Received | Funds Disbursed | Interest Accrued | Ending Balance | Manual Entry WSJ Prime Rate | Average Monthly Balance |
|---|---|---|---|---|---|---|---|---|
| Jan-05 | 31 | | - | - | - | - | 5.250% | - |
| Feb-05 | 28 | - | | | - | - | 5.500% | - |
| Mar-05 | 31 | - | | | - | - | 5.750% | - |
| Apr-05 | 30 | - | 154,338.07 | | 24.31 | 154,362.38 | 5.750% | 5,145 |
| May-05 | 31 | 154,362.38 | | | 786.61 | 155,148.99 | 6.000% | 154,362 |
| Jun-05 | 30 | 155,148.99 | | | 797.00 | 155,945.99 | 6.250% | 155,149 |
| Jul-05 | 31 | 155,945.99 | | | 827.80 | 156,773.79 | 6.250% | 155,946 |
| Aug-05 | 31 | 156,773.79 | | | 865.48 | 157,639.27 | 6.500% | 156,774 |
| Sep-05 | 30 | 157,639.27 | | | 874.57 | 158,513.84 | 6.750% | 157,639 |
| Oct-05 | 31 | 158,513.84 | | | 908.74 | 159,422.58 | 6.750% | 158,514 |
| Nov-05 | 30 | 159,422.58 | | | 917.23 | 160,339.81 | 7.000% | 159,423 |
| Dec-05 | 31 | 160,339.81 | | | 987.30 | 161,327.11 | 7.250% | 160,340 |
| Jan-06 | 31 | 161,327.11 | | | 1,027.63 | 162,354.74 | 7.500% | 161,327 |
| Feb-06 | 28 | 162,354.74 | | | 934.10 | 163,288.84 | 7.500% | 162,355 |
| Mar-06 | 31 | 163,288.84 | | | 1,074.80 | 164,363.64 | 7.750% | 163,289 |
| Apr-06 | 30 | 164,363.64 | 212,172.03 | | 1,092.02 | 377,627.69 | 7.750% | 171,436 |
| May-06 | 31 | 377,627.69 | | | 2,565.80 | 380,193.49 | 8.000% | 377,628 |
| Jun-06 | 30 | 380,193.49 | | | 2,578.02 | 382,771.51 | 8.250% | 380,193 |
| Jul-06 | 31 | 382,771.51 | | | 2,682.02 | 385,453.53 | 8.250% | 382,772 |
| Aug-06 | 31 | 385,453.53 | | | 2,700.81 | 388,154.34 | 8.250% | 385,454 |
| Sep-06 | 30 | 388,154.34 | | 46,000.00 | 2,434.46 | 344,588.80 | 8.250% | 359,021 |
| Oct-06 | 31 | 344,588.80 | | | 2,414.48 | 347,003.28 | 8.250% | 344,589 |
| Nov-06 | 30 | 347,003.28 | | | 2,352.97 | 349,356.25 | 8.250% | 347,003 |
| Dec-06 | 31 | - | | | - | - | 0.000% | - |
| Jan-07 | 31 | - | | | - | - | 0.000% | - |
| Feb-07 | 28 | - | | | - | - | 0.000% | - |
| Mar-07 | 31 | - | | | - | - | 0.000% | - |
| Apr-07 | 30 | - | | | - | - | 0.000% | - |
| May-07 | 31 | - | | | - | - | 0.000% | - |
| Jun-07 | 30 | - | | | - | - | 0.000% | - |
| Jul-07 | 31 | - | | | - | - | 0.000% | - |
| Aug-07 | 31 | - | | | - | - | 0.000% | - |
| Sep-07 | 30 | - | | | - | - | 0.000% | - |
| Oct-07 | 31 | - | | | - | - | 0.000% | - |
| Nov-07 | 30 | - | | | - | - | 0.000% | - |
| Dec-07 | | | | | | | | |

Default Year is 365 Days

7.7 Management of Aquatics Fund and In Lieu Fund

PacifiCorp and Cowlitz PUD shall each hold or cause to be held in a Tracking Account monies that it provides to the Aquatics Fund, and PacifiCorp shall hold monies provided to the In Lieu Fund, until expenditures for Resource Projects or mitigation measures are made. Each Licensee's contributions shall be made in 2004 dollars, Adjusted for Inflation. Each Licensee shall credit interest on its respective Fund monies from the date the monies are due to be placed into the Fund until expended. Interest will be calculated monthly at the prime interest rate, as published on the last day of the month in the Wall Street Journal, based on the average monthly balance. If such rate ceases to be published in the Wall Street Journal*, the Parties shall agree upon an alternate source for the prime interest rate. The Licensees shall notify and Consult with the ACC with respect to the Aquatics Fund if it appears that a given project's costs will be significantly higher than expected, and PacifiCorp shall do the same with respect to the In Lieu Fund. Based on Consultation with the ACC, the Licensees (or PacifiCorp with respect to the In Lieu Fund) may determine not to proceed with or to modify that project. Funds not expended in any given year shall be carried over to the subsequent year.

Attachment C

## McCune, Kimberly

**From:** McCune, Kimberly
**Sent:** Monday, November 20, 2006 10:21 AM
**To:** Adam Haspiel (ahaspiel@fs.fed.us); Al McKee; Athena Sanchez (pebbles@yakama.com); Bill Bakke; 'Brett Swift'; Bryan Nordlund; Clifford Casseseka; 'Craig Burley'; Curt Leigh; Dan Barrett (spchinook@comcast.net); Darlene Johnson; Diana MacDonald; Eric Kinne; 'George Lee'; 'Jeff Breckel'; Jim Byrne (byrnejbb@dfw.wa.gov); Jim Eychaner; Jim Hough ('houghj@ci.woodland.wa.us'); 'Jim Malinowski'; 'Joel Rupley'; 'John Clapp'; John Weinheimer; Kaitlin Lovell; 'Karen Thompson'; Kathryn Miller (kmiller@tu.org); Lesko, Erik; LouEllyn Jones; Mariah Stoll-Smith Reese; Melody Tereski; Michelle Day; Olson, Todd; Paul Pearce (pearce@co.skamania.wa.us); Rhidian Morgan (plasnewydd@dslnorthwest.net); Rich.Turner@noaa.gov (Rich.Turner@noaa.gov); 'Ruth Tracy'; 'Ryan Lopossa'; Shannon Wills; Shrier, Frank; Steve Manlow (smanlow@lcfrb.gen.wa.us); Steve Vigg; 'Susan Rosebrough'; Tammy Mackey
**Subject:** RE: Pine Creek Instream Project

Attn: ACC Participants

Please note that I forwarding Adam Haspiel's email below for consideration and discussion at our next ACC meeting on Thursday, December 14th.

Due to timing of the project and this request, please be prepared to approve/disapprove at the December meeting.

Best Regards,

Kimberly L. McCune - PacifiCorp Energy
Hydro Licensing Project Coordinator
Phone: 503-813-6078
Fax: 503-813-6633
kimberly.mccune@pacificorp.com

-----Original Message-----
From: Adam I Haspiel [mailto:ahaspiel@fs.fed.us]
Sent: Friday, November 17, 2006 5:26 PM
To: Olson, Todd
Subject: Pine Creek Instream Project

Hi Todd. When we set up terms to collect funds to do a pilot project in Pine Creek for instream structures we agreed to fund it at 25% of the full project cost. Unfortunately, only 25% of the monitoring costs were included. I would like to ask the ACC group for the full amount of monitoring funds ($5,000) to study the project so we are well informed before we make the decision to go forward with the full project. Thanks
Adam

Adam I. Haspiel
Fisheries Biologist
Mount St. Helens National Volcanic Monument
ahaspiel@fs.fed.us
42218 NE Yale Bridge Rd
Amboy, WA 98601
360-449-7833

Attachment D

**McCune, Kimberly**

| | |
|---|---|
| **From:** | McCune, Kimberly |
| **Sent:** | Friday, December 01, 2006 2:11 PM |
| **To:** | Adam Haspiel (ahaspiel@fs.fed.us); Al McKee; Athena Sanchez (pebbles@yakama.com); Bill Bakke; 'Brett Swift'; Bryan Nordlund; Clifford Casseseka; 'Craig Burley'; Curt Leigh; Dan Barrett (spchinook@comcast.net); Darlene Johnson; Diana MacDonald; Eric Kinne; 'George Lee'; 'Jeff Breckel'; Jim Byrne (byrnejbb@dfw.wa.gov); Jim Eychaner; Jim Hough ('houghj@ci.woodland.wa.us'); 'Jim Malinowski'; 'Joel Rupley'; 'John Clapp'; John Weinheimer; Kaitlin Lovell; 'Karen Thompson'; Kathryn Miller (kmiller@tu.org); Lesko, Erik; LouEllyn Jones; Mariah Stoll-Smith Reese; Melody Tereski; Michelle Day; Olson, Todd; Paul Pearce (pearce@co.skamania.wa.us); Rhidian Morgan (plasnewydd@dslnorthwest.net); Rich.Turner@noaa.gov (Rich.Turner@noaa.gov); 'Ruth Tracy'; 'Ryan Lopossa'; Shannon Wills; Shrier, Frank; Steve Manlow (smanlow@lcfrb.gen.wa.us); Steve Vigg; 'Susan Rosebrough'; Tammy Mackey |
| **Subject:** | Lewis River LWD Study - SOQ's |
| **Attachments:** | 11282006 LR - Stillwater SOQ_Large Woody Debris.pdf; 12012006 LR - Inter-Fluve SOQ Large Woody Debris.pdf |

Attn: ACC Participants

Please find attached the statement of qualifications (SOQ's) from Inter-Fluve, Inc. and Stillwater Sciences relating to the Lewis River Large Woody Debris Study (LWD). Please review and be prepared for discussion and selection of the consultant at the next ACC meeting on **Thursday, December 14, 2006**.

Thank you.

*Kimberly L. McCune - PacifiCorp Energy*
*Hydro Licensing Project Coordinator*
*Phone: 503-813-6078*
*Fax: 503-813-6633*
*kimberly.mccune@pacificorp.com*

Attachment E

**DRAFT ONLY**

# HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

| | |
|---|---|
| **Hatchery Program:** | N.F. Lewis River Late Winter Steelhead Program |
| **Species or ` Hatchery Stock:** | Lewis River Late Winter Steelhead at Merwin Hatchery *(Oncorhynchus mykiss)* |
| **Agency/Operator:** | Washington Department of Fish and Wildlife |
| **Watershed and Region:** | Lewis Subbasin/Lower Columbia Province |
| **Date Submitted:** | |
| **Date Last Updated:** | October 23, 2006 |

## SECTION 1. GENERAL PROGRAM DESCRIPTION

### 1.1) Name of hatchery or program.

Lewis River Late Winter Steelhead Program at Merwin Hatchery

### 1.2) Species and population (or stock) under propagation, and ESA status.

*State common and scientific names.*
Lewis River Winter Steelhead *(Oncorhynchus mykiss)*.
ESA Status: Listed as part of the Lower Columbia River Steelhead ESU as Threatened.

### 1.3) Responsible organization and individuals

*Indicate lead contact and on-site operations staff lead.*

*Hatchery Operations Staff Lead Contact*
**Name (and title):** Eric Kinne, Lewis River/Washougal River Complex Manager
**Agency or Tribe:** Washington Department of Fish and Wildlife
**Address:** 600 Capitol Way N. Olympia WA 98501
**Telephone:** (360) 225-4390
**Fax:** (360) 225-4392
**Email:** kinneebk@dfw.wa.gov

*Fish Management Staff Lead Contact*
**Name (and title):** John Weinheimer, District Fish Biologist
**Agency or Tribe:** Washington Dept. of Fish and Wildlife
**Address:** 2108 Grand Boulevard, Mail Stop: S-19, Vancouver, WA 98661-4624
**Telephone:** (360) 906-6746
**Fax:** (360) 906-6776
**Email:** weinheimerj@dfw.wa.gov

**Other agencies, tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:**

**PacifiCorp and Cowlitz PUD:** FERC license operators for Lewis River Hydroelectric Projects consisting of the Merwin Project (Project No. 935), Yale Project (Project No. 2071), Swift No. 2 Project (Project No. 2213), and Swift No. 1 Project (Project No. 2111) (each individually referred to as a "Project" and collectively as the Projects"). PacifiCorp provides operational funding for fish and wildlife projects in the Projects and coordination of the Aquatic Coordination Committee (ACC).

*PacifiCorp Staff Lead Contact*
**Name (and title):**
**Agency or Tribe:**
**Address:**
**Telephone:**
**Fax:**
**Email:**

**Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program.**

In December 2004, as parties to the Lewis River Hydroelectric Projects Settlement Agreement (Section 14), the list of names and organizations they represent below were appointed as members of the Aquatics Coordination Committee (ACC). The ACC is tasked to coordinate implementation of the aquatics PM&E Measures described in Section 3 (Anadromous Fish Re-introduction Outcome Goals) through Section 9 of the Settlement Agreement. The committee meets monthly in a collaborative setting to provide coordination and decision making on implementing the Settlement Agreement. The ACC will review and come to final agreement on the Draft HGMP that will be submitted to NOAA Fisheries for the Lewis River Late Winter Steelhead program.

**American Rivers/Trout Unlimited:** Tammy Mackey - Aquatic Coordination Committee member.

**Cowlitz Nation:** Janne Kaje, Shannon Wills - Co-manager and Aquatic Coordination Committee member.

**Cowlitz PUD:** Diana Gritten-MacDonald - **-** Aquatic Coordination Committee member.

**Fish First:** Jim Malinowski - Aquatic Coordination Committee member.

**Lewis River Citizens at-large:** John Clapp - Aquatic Coordination Committee member.

**Lewis River Community Council:** Mariah Stoll-Smith Reese - Aquatic Coordination Committee member.

**Lower Columbia River Fish Recovery Board:** Jeff Breckel - Aquatic Coordination Committee member.

**NMFS: Rich Turner -** Aquatic Coordination Committee member.

**PacifiCorp Energy:** Eric Lesko, Kimberly McCune, Todd Olsen-Aquatic Coordination Committee members.

**Stillwater Sciences:** Byron Amerson, Steve Ralph - Aquatic Coordination Committee members.

**Trout Unlimited:** Kaitlin Lovell - Aquatic Coordination Committee member.

**USDA Forest Service:** Adam Haspiel, Karen Thompson - Aquatic Coordination Committee members.

**Yakama Nation:** Clifford Cassesaka, Co-manager and Aquatic Coordination Committee member.

***Note: ACC should forward a complete list of current voting members if all members to be included.***

### 1.4) Funding source, staffing level, and annual hatchery program operational costs.

PacifiCorp and the Public Utility District No. 1 of Cowlitz County presently funds production of mitigation fish including spring Chinook, coho and steelhead that are released in the Lewis River system. Staff and Annual Operating Cost, as indicated below, applies cumulatively to all Merwin Hatchery operations and cannot be broken down specifically by program. Proportioning the wild late winter steelhead pounds, or numbers produced, as a percent of total would not be able to capture the real costs associated with this program.

*Funding:* 100% PacifiCorp and the Public Utility District No. 1 of Cowlitz County
*Merwin Hatchery Staffing level:* 3.00 FTEs Current - Fish Hatchery Specialist 2, Fish Hatchery Specialist 3, Fish Hatchery Specialist 4.

*Annual Operational costs* – Merwin Hatchery (FY 2004-2005): $318,347.000
*Annual Monitoring and Evaluation/Coordination/Planning* – Monitoring and Evaluation Costs not determined at this time.

### 1.5) Location(s) of hatchery and associated facilities.

*Include name of stream, river kilometer location, basin name, and state. Also include watershed code (e.g. WRIA number), regional mark processing center code, or other sufficient information for GIS entry. See "Instruction E" for guidance in responding.*

Merwin Hatchery is located just downstream of Merwin Dam at RKm 30.6, near the town of Ariel, Washington. It is located adjacent to the N.F. Lewis River (WRIA 27).

**Broodstock collection locations:** Merwin Dam (RKm 30.8) blocks the lower N.F. Lewis to upstream migration. The Fish Collection Facility (FCF) is approximately 60 feet long, 12 feet wide, and 7 feet deep. The Merwin Trap is part of the structure (Fish Collection Facility – FCF) and is used to collect adult steelhead along with spring Chinook, and coho for the Lewis River Hatchery Complex.

Depending on the success of collection at the Merwin FCF, additional Lower Lewis River collection sites or techniques including netting or hook and line could also be considered in the N.F. Lewis River.

**Adult holding location:** Adults would be transported to holding ponds at Merwin Hatchery located on the North Fork Lewis River at RKm 30.6 (WRIA 27).

**Spawning location:** Broodstock would be spawned at Merwin Hatchery located on the North Fork Lewis River at RKm 30.6 (WRIA 27).

**Incubation location:** Eggs would incubated and hatched at Merwin Hatchery located on the North Fork Lewis River at RKm 30.6 (WRIA 27).

**Rearing, smolt acclimation and release location:** Smolts would be reared full cycle and acclimated at Merwin Hatchery located at the North Fork Lewis River at RKm 30.6. Fish will be trucked from smolt collection ponds from the hatchery. The exact release location has not been determined at this time but as collecting returning adults is a priority, a location as close to the Merwin Trap facilities will be considered.

### 1.6) Type of program.

*Define as either: Integrated Recovery; Integrated Harvest; Isolated Recovery; or Isolated Harvest (see Attachment 1 - Definitions" section for guidance).*

**Integrated Recovery/Conservation Program:**
This would function to re-establish natural spawning (supplemented and eventually self-sustaining) populations in the Upper Lewis River above Swift Reservoir through release of progeny from wild winter steelhead (W x W crosses) to the lower N.F. Lewis River in order to generate adults for the upriver re-introduction goals (H & S Plan).

**The program will occur in two phases:**

*Phase 1: Juvenile supplementation.* This phase would use wild late winter steelhead from the lower N.F. Lewis River as a broodstock source in order to rear and release up to 50,000 smolts at Merwin Hatchery. This release would continue as a program for 15-years to ensure that sufficient genetic diversity was obtained to prevent founder effects (i.e. starting with too little genetic resources). The juvenile supplementation program may be phased out based on the modeled productivity of the upper river and eventual success of smolt collection facilities.

*Phase 2: Adult supplementation.* Upon return, uniquely marked adults from the juvenile supplementation program will be transported above Swift Reservoir in order to build a natural spawning population in the upper N.F. Lewis River watershed. Adult supplementation will occur for 15 years after the first release of smolts. If fish smolt collection facilities in the upper system can meet efficiencies per Settlement Agreement (SA) goals along with projected productivity, the hatchery adult supplementation phase may be discontinued based on upon review by the ACC.

### 1.7) Purpose (Goal) of program.

*Define as either: Augmentation, Mitigation, Restoration, Preservation/Conservation, or Research (for Columbia Basin programs, use NPPC document 99-15 for guidance in providing these definitions of "Purpose"). Provide a one sentence statement of the goal of the program, consistent with the term selected and the response to Section 1.6. Example: "The goal of this program is the restoration of spring chinook salmon in the White River using the indigenous stock".*

1. **Conservation:** The goal will be to re-establish the population of the historically existing N.F. Lewis River winter steelhead population in the watershed above the dams on the Lewis River system. Conservation and recovery of the populations upstream may have a positive effect on the wild populations in the Lower N.F. Lewis River.
2. **Mitigation:** Provide mitigation as specified under the Settlement Agreement proposed by PacifiCorp Energy and Cowlitz County PUD due to construction of the Lewis River Hydroelectric Projects.

### 1.8) Justification for the program.

*Indicate how the hatchery program will enhance or benefit the survival of the listed natural population (integrated or isolated recovery programs), or how the program will be operated to provide fish for harvest while minimizing adverse effects on listed fish (integrated or isolated harvest programs).*

The late winter steelhead program is part of the multi-species Lewis River Hatchery and Supplementation Program (H&S Plan) reintroduction strategy including spring Chinook and coho into stream reaches upstream of Merwin Dam. The H&S Plan is a requirement under Section 8 of the Lewis River Hydroelectric Projects Settlement Agreement (SA) dated November 30, 2004. Goals for the Lewis River system are identified in the Settlement Agreement proposed by PacifiCorp Energy and Cowlitz County PUD for the Lewis River Hydroelectric Projects (FERC Nos. 935, 2071, 2111 and 2213). The Settlement Agreement states that the goals of the Hatchery and Supplementation Program are to support:

*1. Self-sustaining, naturally producing, harvestable native anadromous salmonids species throughout their historical range in the North Fork Lewis River, and*
*2. The continued harvest of resident and native anadromous fish species.*

Smolts from wild parents would be uniquely marked and released below Merwin Dam, which upon return as adults, would be transported and released above Swift Dam, thus constituting the adult supplementation program. The adult supplementation will continue until year fifteen after the start of the program. Broodstock collection is proposed to begin in winter 2006/2007 with the first release of smolts in May of 2008. Wild adult spawners will be lived spawned and those not retained for pathogen screening will returned back to stream to preserve as much genetic material wherever possible. The first returning adults would be available for the adult supplementation phase in winter 2009 and spring 2010. The supplementation program will follow a phased approach for the Lewis River system upstream of Merwin Dam, where winter steelhead (along with coho and spring Chinook) will be reintroduced above Swift Dam (within 6 months of the 3rd anniversary of Merwin license issuance), and then introduced into the habitat located between

Merwin and Swift dams (following the 13th and 17th anniversaries of the new licenses). Smolt collection facilities in Swift Reservoir are being planned to be constructed 4.5 years after issuance of the new operating license, so by the time wild winter steelhead progeny are produced from adults released to upper river habitat, they may be collected and released below Merwin Dam.

Based on higher Recruit/Spawner (R/S) values, the hatchery program (due to higher incubation, hatching, swim up fry - smolt survivals) will generate the adults needed for the upriver goals which currently cannot be produced from natural spawners in the lower N.F. Lewis River. Survival of the smolts will range from 1.4% - 2.8%, resulting in an recruits per spawner of 21.0 as compared with current wild RS values of 4.4 – 5.3 (Lewis River Fish Planning Document, April 2004 & LCFRB EDT Subbasin Reports, 2004). If returning hatchery adults cannot be collected at Merwin Dam Trap at 100% efficiency, F1 generational adults remaining in the lower river may increase the numbers of naturally reproducing N.F. Lewis River steelhead in under-utilized spawning and rearing habitat in the lower river. AHA modeling at 70% of adult trapping efficiency indicates a positive increase to the existing Lower N.F. Lewis River population over several generations (AHA Model at 70% **Appendix 1**). This will be due to high fitness values seen in local origin broodstock hatchery programs that produce fish similar to wild steelhead fitness (Blouin et, al., 2005). Relative fitness of hatchery adults from wild parents ranged from 0.85 – 1.08% (avg. 91%) for three successive brood years from 1996-1998 in Hood River studies from Oregon. Over time, the percentage of Hatchery Origin Spawners (pHOS) in the upper river will be balanced with the proportion of Natural Origin Spawners (pNOS) produced from wild progeny. By the end of the program, wild adults produced by wild smolts could make up the majority of the upper river spawners which may include reducing (< 50%) or completely eliminating the HOS portion resulting in a 100% wild population. Management of the program through these phases will be reviewed and determined by the ACC. The infusion of wild spawners produced from wild smolts upriver may also likely contribute to the population downstream in coming generations if not all upper river productivity choose to recruit to the Merwin Trap or can be trapped at 100% adult efficiencies.

### 1.9) List of program "Performance Standards".

*"Performance Standards" are designed to achieve the program goal/purpose, and are generally measurable, realistic, and time specific. The NPPC "Artificial Production Review" document attached with the instructions for completing the HGMP presents a list of draft "Performance Standards" as examples of standards that could be applied for a hatchery program. If an ESU-wide hatchery plan including your hatchery program is available, use the performance standard list already compiled.*

NMFS *Artificial Propagation Performance Standards and Indicators*, October 24, 2000 Draft)

> *Example: " (1) Conserve the genetic and life history diversity of Upper Columbia River spring chinook populations through a 12 year duration captive broodstock program; (2) Augment, restore and create viable naturally spawning populations using supplementation and reintroduction strategies; (3) Provide fish to satisfy legally mandated harvest in a manner which minimizes the risk of adverse effects to listed wild populations; (4)....".*

**3.1 Legal mandates**
**3.2 Harvest**
**3.3 Conservation of natural spawning populations**
**3.4 Life History Characteristics**

**3.5 Genetic Characteristics**
**3.6 Research Activities**
**3.7 Operation of Artificial Production Facilities**

**1.10) List of program "Performance Indicators", designated by "benefits" and "risks."**

*"Performance Indicators" determine the degree that program standards have been achieved, and indicate the specific parameters to be monitored and evaluated. Adequate monitoring and evaluation must exist to detect and evaluate the success of the hatchery program and any risks to or impairment of recovery of affected, listed fish populations.*

*The NPPC "Artificial Production Review" document referenced above presents a list of draft "Performance Indicators" that, when linked with the appropriate performance standard, stand as examples of indicators that could be applied for the hatchery program. If an ESU-wide hatchery plan is available, use the performance indicator list already compiled. Essential 'Performance Indicators" that should be included are monitoring and evaluation of overall fishery contribution and survival rates, stray rates, and divergence of hatchery fish morphological and behavioral characteristics from natural populations.*

*The list of "Performance Indicators" should be separated into two categories: "benefits" that the hatchery program will provide to the listed species, or in meeting harvest objectives while protecting listed species; and "risks" to listed fish that may be posed by the hatchery program, including indicators that respond to uncertainties regarding program effects associated with a lack of data.*

**1.10.1) "Performance Indicators" addressing benefits**.
(e.g. "*Evaluate smolt-to-adult return rates for program fish to harvest, hatchery broodstock, and natural spawning.*").

3.1.2 Program contributes to mitigation requirements.
- *Number of smolts released as applicable to juvenile supplementation goals.*
- *Number of adult returning to fulfill adult supplementation goals for the upper river as applicable to mitigation requirements.*

3.2.1 Fish are produced and released in a manner enabling effective harvest.
Harvest is not the goal but depending on expected outcomes, a portion could be available for lost harvest opportunities in the upper basin.
- *Hatchery adults as part of the adult supplementation. This would only occur based on meeting and exceeding escapement goals for the upper river.*

3.2.1 Release groups sufficiently marked to assess impacts.
- *Marking rate by type in each group*
- *Sampling rate by collection of returning adults not targeted by selective fisheries*
- *Number of marks by type documented by collection of returning adults not targeted by selective fisheries*

3.3.1 Program contributes to an increasing number of spawners returning to natural spawning areas.
- *Number of spawners on spawning ground and at hatchery by age in the upper*

*watershed above Merwin Dam once the adult supplementation begins (Survey constraints prevent this in the lower river). The project intent is for upper basin adult supplementation.*
- *Number of redds in production index areas.*
- *Spawner-recruit ratios.*

3.3.2 Juvenile releases are sufficiently marked for evaluation.
- *Mark rates by type*
- *Mark recoveries for juveniles and adult returns.*

**1.10.2) "Performance Indicators" addressing risks**.

(From NMFS *Artificial Propagation Performance Standards and Indicators*, October 24, 2000 Draft: numbers specific to that document)

3.4.1 Fish collected for broodstock are taken throughout the return in proportions to the run distribution.
- *Timing of broodstock collection is documented and compared to entire return.*
- *Age composition of broodstock is documented through scale collection at the trap.*

3.4.2 Broodstock collection does not reduce potential juvenile production in natural areas.
- *Broodstock collection and passage numbers are documented, and juvenile production will be documented on a yearly basis. Collection of broodstock will be adjusted (if possible) according to run size. Broodstock collection will initially lead to a reduction of potential juvenile production but will preserve greater numbers of potential smolts through hatchery practices (60% survival to smolt) that would occur in the wild. Returning adults will in time contribute greater number of fit spawners leading to an increase in system productivity (AHA modeling based on 70% collection of adults at Merwin Dam FCF).*

3.4.3 Life history characteristics of artificially produced population do not diverge from natural population.
- *Life history characteristics of natural and endemic hatchery population are measured (age composition of smolts, smolt timing, size at smolting, smolt to adult return, adult sex ratio, age of adult return, fecundity, length/weight at age of return, temporal and spatial spawning distribution of returning adults).*

3.4.4 Annual release numbers do not exceed local, basin and migratory corridor capacities.
- *Annual release numbers of late winter endemic stock and their release locations and times documented.*
- *Natural production (juveniles and smolts) in Cedar Creek watershed(major spawning tributary to the N.F. Lewis system) documented.*
- *Annual release numbers of juveniles and release locations.*

3.5.1 Patterns of genetic variation with natural populations do not change appreciably.
- *Genetic composition of naturally and artificially propagated adults is monitored and compared to eliminate non-local stocks (endemic stock used only).*

3.5.2 Broodstock collection does not adversely affect the genetic diversity of the naturally spawning population.
- *Spawning escapement and composition documented.*
- *Timing of brood collection is documented.*

3.5.3 Artificially produced adults do not exceed appropriate proportion within the naturally spawning population.
- *Observed and estimated numbers of natural and endemic hatchery adults passing traps will be documented. Only identified adults from the juvenile supplementation will be transported to the upper Lewis River system.*

3.5.4 Juveniles are released on-station, or after sufficient acclimation to maximize homing ability to intended return locations.
- *Time, type and locations of hatchery releases are documented*

3.5.5 Fully smolted juveniles are released from hatchery program.
- *Level of smoltification at release is documented.*
- *Size at release of fry plants (if approved by the ACC) is documented.*

3.6.1 Artificial production program uses standard scientific procedures to evaluate aspects of the program.
- *Scientifically based experimental design, with measurable objectives and hypotheses. Both EDT and AHA modeling used for upstream productivity and capacity scenarios.*
- *In hatchery and marine survival estimates (R/S).*

3.6.2 The program is monitored and evaluated on an appropriate schedule and scale to address progress toward achieving objectives.
- *Monitoring and evaluation framework includes timelines.*
- *Annual and final reports are produced.*

3.7.1 Artificial production facilities are operated in compliance with all applicable operational and fish health standards and protocols.
- *Compliance with operational and fish health standards and protocols is documented in annual reports.*

3.7.2 Effluent from facilities will not detrimentally affect natural populations.
- *Discharge water complies with applicable water quality standards, and in this case is outside the basin where the natural population exists (except for acclimation time).*

3.7.3 Water with-drawls will not prevent access to spawning areas, affect spawning behavior of natural populations, or significantly impact juvenile rearing environment.
- *Water withdrawls are documented and for this program are out of target species basin, except for acclimation time at release*
- *NMFS Screening criteria is documented*
- *Adult passage at diversion point is documented.*

3.7.4 Releases do not result in introduction of pathogens into natural production areas.
- *Proposed releases will be Fish-Health-certified prior to release.*

3.7.5 Carcass distribution for nutrient enhancement is in compliance with appropriate regulations.
- *Carcass and/or kelt distribution is documented for the target stream*
- *Compliance is documented*

3.7.6 Broodstock collection does not significantly impede passage or alter spatial/temporal distribution of natural population.
- *Temporal/spatial distribution of population around traps at Merwin FCF or Cedar Creek Trap is documented.*
- *Alternative broodstock collection scenarios (hook and line) protocols developed in consultation with NOAA Fisheries.*

3.7.7 Weirs/traps do not result in significant stress/injury/mortality to natural population.
- *Mortality rates in traps are documented.*
- *Visual observations of fish delay periodically made.*

3.7.8 Predation by artificially produced fish does not significantly reduce natural population.
- *Release information is documented and compared to natural population data.*
- *Majority of releases will occur downstream of juvenile rearing habitat (Downstream of the upper Lewis River watershed).*

## 1.11) Expected size of program.

*In responding to the two elements below, take into account the potential for increased fish production that may result from increased fish survival rates effected by improvements in hatchery rearing methods, or in the productivity of fish habitat.*

### 1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

Proposed annual broodstock collection of wild adults is 50 (25 males and 25 females). This includes motality due to trapping combined with recent holding loss estimated to range from 0 – 4% in Oregon wild steelhead programs (pers.comm.. J. Watkins, ODFW 2006).

Fecundity is unknown but may exhibit a wide range of fecundity. From 1998–2004, egg fecundity ranged from a low of 3,687 (2002) to a high of 4,925 (2003) with an average of 4,307 (Kalama Wild Winter STHD HGMP 2004). The green egg goal will be 80,000 for 50,000 smolts.

### 1.11.2) Proposed annual fish release levels (maximum number) by life stage and location. (*Use standardized life stage definitions by species presented in* Attachment 2).

| Life Stage | Release Location | Annual Release Level |
|---|---|---|
| **Eyed Eggs** | | Unk[1] |
| **Unfed Fry** | | Unk[1] |
| **Fry** | | Unk[1] |
| **Fingerling** | | Unk[1] |
| **Yearling** | Merwin Hatchery to N.F. Lewis River | Up to 50,000 |

[1]If survival at any life stage is significantly higher than projected or egg fecundity is at the higher end, the ACC will determine disposition of various life stages but none will be terminated. .

## 1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

*Provide estimated smolt-to-adult survival rate, total adult production number, and escapement number (to the hatchery and natural areas) data available for the most recent twelve years (roughly three fish generations), or for the number of years of available and dependable information. Indicate program goals for these parameters.*

This is a new program and has no pre-existing performance data. Smolt-to-adult return rates (SAR) for several release years of Merwin early winter stock steelhead cannot be entirely documented as early winter steelhead programs are not CWT'd and cannot be quantified in surveys. Harvest rates up to 70% have reported by WDFW (pers. comm. J. Tipping 2000). However, survival based only on harvest catch has averaged .89% (1986-2004), with another .43% escapement percentage reported back to the hatchery (WDFW Historical Database, 2006).

Potential future smolt-to-adult survival rates based on low, high and median projections for the adult supplementation phase is expected to range from a low of 1.4% to a high of 2.8% with a median of 2.1%. This will yield approximately 700 – 1,400 adults (H & S Plan). The short term adult supplementation goal in the beginning phase is 500 adults (H & S Plan).

Upon return as adults they are transferred above the dams, and where based on Ecosystem Diagnostic Treatment (EDT), habitat production potential has been modeled for low and high ocean survival rates in Table 1 (H & S Plan).

**Table 1**. H & S Plan EDT estimates of adult anadromous fish production potential under current (patient) conditions in the Lewis River basin above Merwin Dam[1].

| Species | Average Ocean | High Ocean | Low Ocean | Range of Ocean Survival[2] |
|---|---|---|---|---|
| Winter Steelhead | 7,018 | 9,232 | 4,804 | 6%-12% |

[1]Estimates assume current habitat conditions below Merwin Dam, historical habitat under the reservoirs, and Properly Functioning Conditions (NMFS model) in the tributaries above Merwin Dam.
[2]High and low marine survival represent averages for a time period (typically 20-40 years) The survival actually varies significantly.

## 1.13) Date program started (years in operation), or is expected to start.

The program is proposing to begin broodstock collection starting during winter 2006 and continuing through late spring 2007. First progeny will be reared throughout 2007 and ready for release as 1+ year smolts in spring of 2008. The program is to continue for a total of 15 years.

## 1.14) Expected duration of program.

The reintroduction strategy will be conducted as a 15-year experiment with no proposed trigger points that would discontinue the program prior to its completion. The 15-year period is required in the Settlement Agreement (Section 8.5.1 of Settlement Agreement). The supplementation program is to continue through year 15 so long as it does not negatively impact the metrics used to determine if the goal for this species has been met. As late winter steelhead populations become established in the upper basin, continued hatchery releases would be reduced or eliminated based on decisions by the ACC.

## 1.15) Watersheds targeted by program.

*Include WRIA or similar stream identification number for desired watershed of return.*
Lewis Subbasin/Lower Columbia Province/N.F. Lewis River (27.0168)

## 1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

### 1.16.1) Brief Overview of Key Issues

Non-endemic hatchery-origin winter and summer steelhead stocks (mainly Chambers and Skamania stocks) were used to develop the current Merwin Hatchery broodstocks to achieve mitigation goals of licensing Merwin, Yale and Swift Reservoirs prior to the current Settlement Agreement (November 2004). Wild-origin adults will be trapped to begin releases of W x W progeny for use in the adult re-introduction phase in the upper Lewis River system. If successful, unused habitat above the dams would generate wild smolts that could be collected and released below the dams. This program will attain program goals including expected outcomes of 700 – 1,400 adult spawners annually for 15 years, but will be dependent on achieving Fish Collection (FC) efficiency goals (LRFPD). Included in the upriver adult supplementation program is a small amount of fish that potentially could be available for harvest based on escapement numbers.

The current adult broodstock trapping facilities at the base of Merwin Dam in the N.F. Lewis River could be inadequate for collecting all returning adults for transferring upstream. Once collected, the broodstock can spawn over a 2-3 month time period making spawning difficult, creating large variance in juvenile fish sizes during rearing, and not allowing adequate time for fish to grow to programmed release sizes. Facilities at Merwin Hatchery is currently inadequate to deal with the large range of juvenile sizes, and available raceway space to rear the individual stocks and could conflict with other programs at Merwin Hatchery.

The non-endemic winter run early timed stock will continue under the new Lewis River Hatchery and Supplementation Plan (FERC Project Nos. 935, 2071, 2111, 2213), April 2006. This program currently protects listed N.F. Lewis winter steelhead stocks by allowing full harvest of hatchery stock only fish. WDFW DRAFT Steelhead Management Plan (1994) and WDFW Lower Columbia Steelhead Conservation Initiative Draft (1998) have reduced impacts to wild steelhead stocks by implementing a number of strategies and actions to reduce the proportion of hatchery spawners in rivers.

## 1.16.2) Potential Alternatives to the Current Program

**Alternative 1:** Utilize current non-local broodstock sources. Merwin early timed steelhead (Chambers stock) in the Lewis River is a non-local stock and unacceptable for use as a wild supplementation stock. Upriver re-introductions are for indigenous anadromous stocks only as they will be more adaptable for the habitat and compatible with the natural Lewis River population in the lower river.

**Alternative 2.** Incorporate generational hatchery fish from W x W crosses into the broodstock. The current rational for only W x W spawners is to based on achieving an effective population size (Ne) in order to maximize genetics in the upriver adult supplementation phase.

**Alternative 3:** Collect more fish for broodstock to reduce the genetic risk from the small founding population size. Until sufficient success in rearing the endemic steelhead has been proven, collecting more fish at this time could unnecessarily "mine" natural origin adults that currently come back to the system.

## 1.16.3) Potential Reforms and Investments

Reform/Investment 1: Upgrade incubation, starter and intermediate rearing containers needed to rear steelhead in groups as small as possible. Modify existing ponds, construct additional rearing ponds, and pipe to the smolt collection facility. Restructure the smolt collection ponds for the option to release fish directly to the river. Additional early rearing tanks are needed to better manage the growth rates of the juveniles produced from the extended spawning cycle. Chilling and heating individual rearing containers will benefit growth rates by allowing grouping of spawn times over 2-3 months.

Reform/Investment 2: Continue improvements of fish collection at the Merwin FCF for both sorting, and to lesson impact on listed fish. The FCF attempts to attract fish at a fish ladder situated at one end at the base of the dam. Finding the ladder entrance is believed difficult due to the turbulence created by the spillway and is being investigated by PacifiCorp.

Reform/Investment 3: Genetic characterization of the natural stock should be elevated to include fish remaining in the N.F. Lewis in order to complete ongoing DNA baseline genetic collection (only fish from the FCF are sampled). Confirmation of historical wild steelhead collected downstream would be the result along with providing the tools to better manage steelhead within the basin.

Reform/Investment 4: Implement kelt reconditioning for the endemic broodstock program. This investment would allow these fish to preserve genetic diversity. Estimated annual cost for short term reconditioning is ~ <$/year mainly for feed and care of fish while at the hatchery.

## SECTION 2. PROGRAM EFFECTS ON NMFS ESA-LISTED SALMONID POPULATIONS. (USFWS ESA-Listed Salmonid Species and Non-Salmonid Species are addressed in Addendum A)

### 2.1) List all ESA permits or authorizations in hand for the hatchery program.

Biological Opinion on Artificial Propagation in the Columbia River Basin. 1999 (Consultation). This HGMP will be submitted to the National Marine Fisheries Service to determine impacts to populations of listed steelhead, Chinook, coho and chum in the Lower Columbia ESU. NOAA would need to authorize take of listed steelhead as described in this HGMP before the program would begin.

### 2.2) Provide descriptions, status, and projected take actions and levels for NMFS ESA-listed natural populations in the target area.

#### 2.2.1) Description of NMFS ESA-listed salmonid population(s) affected by the program.

*Include information describing: adult age class structure, sex ratio, size range, migrational timing, spawning range, and spawn timing; and juvenile life history strategy, including smolt emigration timing. Emphasize spatial and temporal distribution relative to hatchery fish release locations and weir sites*

**Lower Columbia River Steelhead *(Oncorhynchus mykis*s).** In Washington, the LCR steelhead ESU includes winter and summer steelhead in tributaries to the Columbia River between the Cowlitz River and Wind River were listed as threatened on March 19, 1998 (Federal Register, Vol. 63, No. 53, March 19, 1998). The ESU was relisted in 2005 (71FR 834).

**- Identify the ESA-listed population(s) that may be incidentally affected by the program.**

**Lower Columbia River chinook salmon *(Oncorhynchus tshawytsch*a)** are federally listed as "threatened" under the ESA on March 24, 1999.
**Lower Columbia River coho (*Oncorhynchus kisutch*)** were listed as "threatened" on June 28, 2005.

**Columbia River chum salmon *(Oncorhynchus keta)*** - Mainstem Chum were listed as threatened under the ESA on March 25, 1999.

- **Identify the NMFS ESA-listed population(s) that will be <u>directly</u> affected by the program.** *(Includes listed fish used in supplementation programs or other programs that involve integration of a listed natural population. Identify the natural population targeted for integration).*

N.F. Lewis River wild origin winter steelhead are part of the listed Lower Columbia River Steelhead ESU. Listed steelhead will be directly affected by broodstock collection, which can decrease natural production in the basin by 4.5% - 41% until spawning adults from the program return (Appendix 1).

**- Identify the NMFS ESA-listed population(s) that may be <u>incidentally</u> affected by the program.**
*(Includes ESA-listed fish in target hatchery fish release, adult return, and broodstock collection areas).*

Populations of Lewis River wild spring and fall Chinook, summer steelhead, coho, bull trout and chum populations may be incidentally affected by any facit of the program. Once released, 50,000 steelhead smolts will overlap with the emigration of listed spring and fall Chinook, winter or summer steelhead, coho or chum juveniles in the entire Lewis River system at some point or time in the migration corridor.

**2.2.2) <u>Status of NMFS ESA-listed salmonid population(s) affected by the program.</u>**
*Note: this section is under construction.*
**- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds** (*see definitions in "Attachment 1").*
Twenty-four historical, demographically independent steelhead populations (18 winter run, 6 summer run) are thought to have existed historically in the Lower Columbia River ESU including stocks in the Lewis River system. Several Lower Columbia ESU stocks including N.F. Lewis winter and summer populations are either depressed, extirpated or status unknown with only Kalama wild steelhead stocks considered healthy in the ESU. Winter and summer steelhead were native to the North Fork Lewis River, but construction of three mainstem dams—Merwin (1931), Yale (1953), and Swift (1958)— eliminated access to over 80% of the historical spawning and rearing habitat. Smoker et.al. (1951) estimated that prior to construction of the dams, the combined escapement of both summer and winter steelhead was more than 1,000 fish. Despite attempts to maintain naturally spawning steelhead through a trap-and-haul program over Merwin Dam following its construction in 1931, the winter steelhead population below the dams dwindled to current unknown levels (Parkhurst et al. 1950). Wild winter steelhead spawning takes place below the dams and in tributaries including Cedar and Fossil Creeks with an escapement goal of 698 fish established below Merwin Dam (**SaSI** 2002). Recovery of the N.F. Lewis wild winter steelhead will assist in a regional effort to recover ESA listed Lower Columbia where the stock is a "Contributing" population to steelhead recovery (LCFRB). Successfully returning adults will be transported above Swift Reservoir where 107 miles of useable habitat is available (LRFPD). The reintroduction plans are coordinated with Fish Passage Measures including smolt collection facilities as spelled out in Section 4 of the Settlement Agreement. If late winter steelhead become established in the upper basin, adult supplementation in this area would be reduced to ensure that local adaptation is driven by the natural environment. The intent will be to transition from the juvenile and adult supplementation phase to a self-sustaining population by the 4$^{th}$ generation. This action would not be considered for implementation until at least year 15 for the late winter steelhead. The stock status of both summer and winter steelhead in the Lewis River basin is

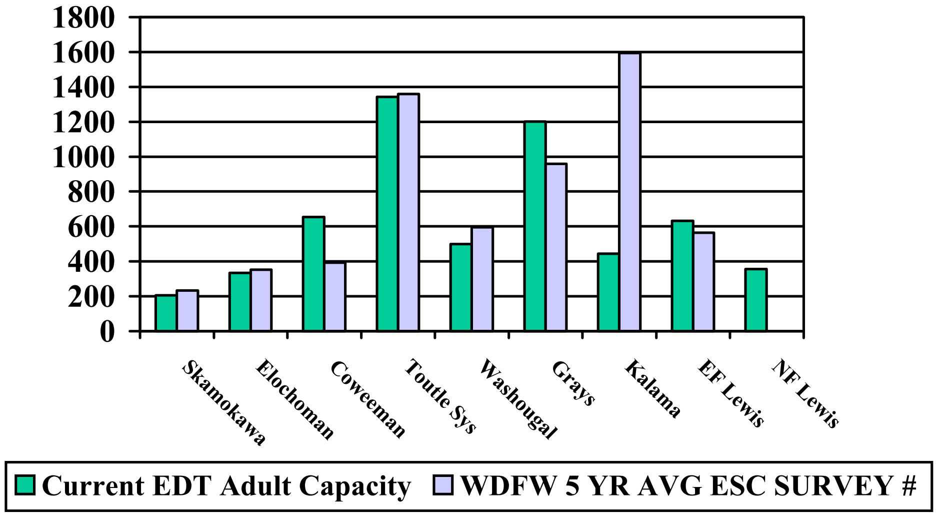
"depressed" due to the loss of access to available habitat upstream of Merwin, Yale, and Swift dams (WDF and WDW 1993). The population is believed to be below replacement in most years, and stochastic events pose significant genetic risk to the population because of low absolute population numbers. Washington established an interim escapement goal in the 1992 SASSI document of 1,200 spawners. Present escapement is unknown in the N.F. Lewis River as carcass or redd surveys cannot be done. WDF (1990) estimated that only 6% of the returning winter steelhead to the North Fork Lewis are wild fish. The wild stock of North Fork summer steelhead is chronically low in abundance and rated as depressed due to loss of access to available habitat upstream of the dams. Wild summer steelhead returns account for less than 7% of the total North Fork run size (WDFW 1998, vol. 1 appendices). Current abundance for the existing N.F. Lewis population is unknown (Table 2). In order to determine risk to the current population of wild N.F. Lewis winter steelhead due to broodstock mining, WDFW has compared EDT adult abundance (LCFRB SubBasin Plans) for the lower River with WDFW escapement averages for known redd expansion surveyed streams and actual trap counts of wild winter steelhead from the Kalama River. That comparison shows the present adult abundance numbers for the average of all surveyed streams of comparable size to be very consistent with EDT values in the recovery plan when averaging the latest five year escapement from those streams from 2002-2005 (Figure 1.). Including Kalama River wild winter steelhead counts indicates the overall escapement from redd expansion surveys (average of all streams) is approximately 14% above the EDT productivity estimates for the same streams. If excluding the Kalama River, the escapement average is 8-9% less than the EDT current productivity figures.

**Table 2. Recovery goals for lower Columbia River steelhead populations*.**

| | Scenario | Viability | | Abundance | | | |
|---|---|---|---|---|---|---|---|
| **Population** | **contrib.** | **Current** | **Goal** | **Current** | **Viable** | **Potential** | **Goal** |
| **Coast Winter** | | | | | | | |
| Grays/Chinook | Primary[1] | Low+ | High | 150 | 600 | 2,300 | 600 |
| Eloch/Skam | Contributing[1] | Low+ | Med | 150 | 600 | 1,000 | 400 |
| Mill/Ab/Germ | Primary[1] | Low+ | High | 150 | 600 | 1,500 | 600 |
| **Cascade Winter** | | | | | | | |
| Lower Cowlitz | Contributing | Low | Med | na | 600 | 1,500 | 300 |
| Coweeman | Primary | Low+ | High | 228 | 800 | 1,200 | 800 |
| S.F. Toutle | Primary | Med | High+ | 453 | 1,400 | 1,900 | 1,600 |
| N.F. Toutle | Primary | Low | High | 176 | 700 | 3,500 | 700 |
| Upper Cowlitz | Contributing | Low | Med | 0 | 600 | 1,600 | 300 |
| Cispus | Contributing | Low | Med | 0 | 600 | 1,200 | 300 |
| Tilton | Contributing | V Low | Low | 0 | 600 | 1,300 | 150 |
| Kalama | Primary | Med+ | High+ | 541 | 600 | 700 | 650 |
| N.F. Lewis | Contributing | Low | Med | na | 600 | 3,400 | 300 |
| E.F. Lewis | Primary | Low+ | High | 77 | 600 | 1,300 | 600 |
| Salmon | Stabilizing | Low | Low | na | 600 | 1,200 | 300 |
| Washougal | Contributing | Low+ | Med | 421 | 600 | 1,000 | 500 |
| Clackamas (OR) | Primary | na | High | 277 | 1,000 | 2,000 | na |
| Sandy (OR) | Primary | na | High | 589 | 1,800 | 3,600 | na |
| **Cascade Summer** | | | | | | | |
| Kalama | Primary | Low+ | High | 291 | 700 | 1,000 | 700 |
| N.F. Lewis | Stabilizing | V Low | V Low | na | 600 | 1,200 | 75 |
| E.F. Lewis | Primary | Low+ | High | 463 | 200 | 400 | 200 |
| Washougal | Primary | Low+ | High+ | 136 | 500 | 900 | 700 |
| **Gorge Winter** | | | | | | | |
| L. Gorge (HHD) | Primary | Low+ | High | na | 200 | 300 | 200 |
| U. Gorge *(Wind)* | Stabilizing | Low+ | Low+ | na | 100 | 100 | 50 |
| Hood (OR) | Primary | na | High | 436 | 1,400 | 2,800 | na |
| **Gorge Summer** | | | | | | | |
| Wind | Primary | Med+ | High+ | 391 | 1,200 | 1,900 | 1,600 |
| Hood (OR) | Primary | na | High | 154 | 600 | 1,200 | na |

*[1] Not listed under the U.S. Endangered Species Act*

**Figure 1.** 5 year Average WDFW ESC Survey Comparison with EDT present Adult Capacity Values (LCFRB SBP 2004).



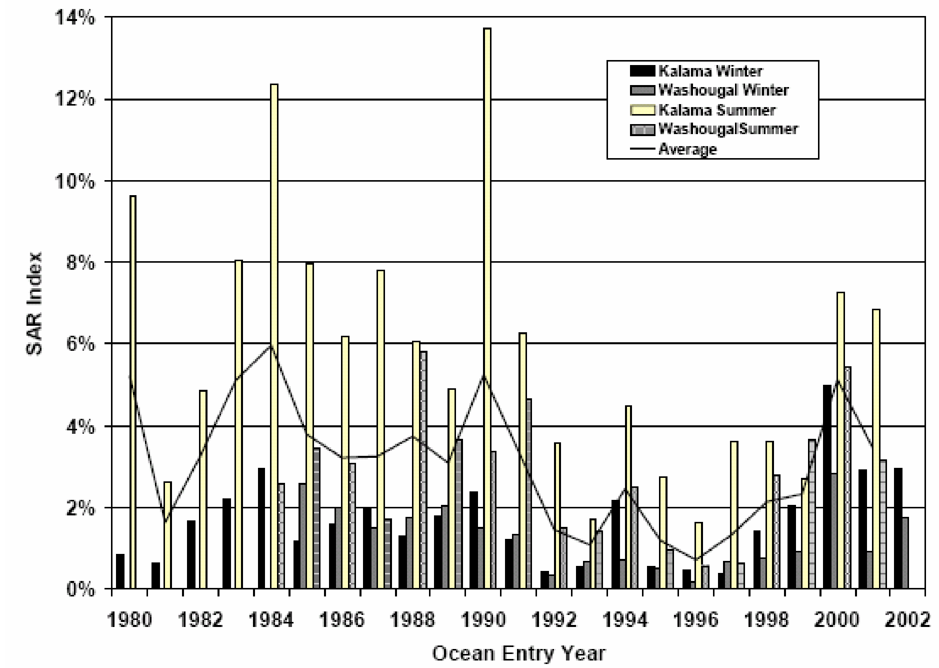

**Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.**

Parent-to-progeny ratio data are not currently available for Lewis River natural-origin winter steelhead. Natural smolt production estimates are not available for the N.F. Lewis River. Smolt monitoring on Cedar Creek (major tributary located at RKm 25.0) has indicated approximately 2,372 steelhead smolts were produced in 2005 from approximately 75 spawners (Groesbeck and Rawding 2006).

<u>Smolt to Adult Return for Lower Columbia Steelhead Populations</u>
Specific SARs for wild steelhead populations including those from Lewis are unknown, but several studies and surveys as those conducted in various Lower Columbia Rivers can be used to document recent trends which has indicated an increase in past years (WDFW, *Oncorhynchus mykiss:* Assessment of Washington State's Anadromous Populations and Programs, Edited by James Scott, Jr., William T. Gill, July 21, 2006).

Indices of the average smolt to adult survival rates for summer and winter steelhead smolts released from four hatchery programs (summer and winter steelhead in the Washougal and Kalama rivers) in the Lower Columbia region showed a similar pattern (Fig. 2). Indices were relatively high for smolts that entered the ocean from 1980 through 1990, generally declined until 1995, and increased until 2000.

**Figure 2.** Average SAR survival indices for summer and winter steelhead smolts released into the Kalama and Washougal rivers.




In the Lower Columbia ESU, stock-recruit analyses also suggest that both the number of spawners and the hatchery SAR index were linked to the number of recruits in the subsequent generation. Although the length of data series was often short, the SAR index for hatchery-origin smolts was a significant predictor ($p < 0.10$) of recruits produced per spawner for 8 of the 10 natural populations with a time series of escapement and recruitment data (Table 3).

**Table 3** Number of observations and p-values for regression model and two predictor variables (spawners and SAR index) for recruits per spawner produced for natural-origin populations of steelhead in the Lower Columbia region.

| Population | Observations | Regression | Spawners | SAR Index |
|---|---|---|---|---|
| Coweeman Winter | 10 | 1.37E-02 | 5.70E-03 | 4.72E-01 |
| Mainstem/NF Toutle Winter | 12 | 4.72E-04 | 1.40E-04 | 1.26E-02 |
| Green Winter | 14 | 4.45E-04 | 1.26E-01 | 1.22E-04 |
| SF Toutle Winter | 17 | 1.25E-02 | 7.33E-03 | 5.96E-02 |
| Kalama Summer | 18 | 1.19E-04 | 9.95E-05 | 2.06E-03 |
| Kalama Winter | 18 | 7.53E-06 | 2.95E-05 | 3.04E-04 |
| EF Lewis Winter | 12 | 1.53E-01 | 6.89E-01 | 4.15E-01 |
| Washougal Summer | 14 | 1.05E-04 | 3.33E-05 | 8.02E-05 |
| Washougal Winter | 8 | 1.66E-02 | 1.85E-02 | 2.43E-02 |
| Wind Summer | 11 | 1.08E-03 | 1.39E-03 | 5.36E-03 |

**- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source o)f these data.** *(Include estimates of juvenile habitat seeding relative to capacity or natural fish densities, if available).*

Estimated natural steelhead in portions of the Lewis River downstream of Merwin Dam is unknown. Natural escapement for two 5 year periods in the last decade of Lower Columbia

River surveyed systems overall indicate an increase in escapement (Figure 1 & Table 4).

**Table 4** Average escapement in 1994 through 1998, 1999 through 2004, % change in escapement, and SaSI status for populations in the Lower Columbia region.

| Population | Average escapement | | | Status |
|---|---|---|---|---|
| | 1994-1998 | 1999-2004 | % Change | |
| Cowlitz Winter[1] | | | | Unknown |
| Coweeman Winter | 214 | 432 | +102% | Depressed |
| Mainstem/NF Toutle Winter | 170 | 257 | +52% | Depressed |
| Green Winter | 132 | 210 | +59% | Depressed |
| SF Toutle Winter | 388 | 794 | +105% | Depressed |
| Kalama Summer | 752 | 425 | -44% | Depressed |
| Kalama Winter | 747 | 1,163 | +56% | Healthy |
| NF Lewis Summer[1] | | | | Unknown |
| NF Lewis Winter[1] | | | | Unknown |
| EF Lewis Summer | 184 | 441 | +139% | Unknown |
| EF Lewis Winter | 186 | 608 | +228% | Depressed |
| Salmon Creek Winter[1] | | | | Unknown |
| Washougal Summer | 135 | 294 | +117% | Unknown |
| Washougal Winter | 163 | 585 | +260% | Depressed |
| Lower Gorge Winter[1] | | | | Unknown |
| Wind Summer | 506 | 516 | +2% | Depressed |
| Wind Winter[1] | | | | Unknown |

[1]There are no adequate abundance data for this stock.

- **Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.**

  Estimates of hatchery populations on the spawning ground in the Lewis River system are not available and only general overlap of hatchery and wild fish are known in many systems (Wild Salmonid Policy, 1994). Adult supplementation of hatchery adults (F1) into the Upper Lewis River system for the first two years will be made up of 100% hatchery origin spawners pHOS. Succeeding years will be made up of a combination of hatchery spawners and natural origin spawners pNOS produced by wild progeny from the upper river. The proportion of wild and hatchery spawners will increase throughout the program when decisions to control or limit pHOS will be determined.

**2.2.3) <u>Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of NMFS listed fish in the target area, and provide estimated annual levels of take</u>** *(see "Attachment 1" for definition of "take")***.**

**- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take**.

(*e.g. "Broodstock collection directed at sockeye salmon has a "high" potential to take listed spring chinook salmon, through migrational delay, capture, handling, and upstream release, during trap operation at Tumwater Falls Dam between July 1 and October 15. Trapping and handling devices and methods may lead to injury to listed fish through descaling, delayed migration and spawning, or delayed mortality as a result of injury or increased susceptibility to predation*").

*See Take Table 1 at end of document.*

Broodstock Trapping/Holding: Anadromous stocks including Chinook, coho, bull trout and steelhead (chum are not seen at the dam) are collected at Merwin Dam FCF, retained or returned back to stream. Fish are sorted on a weekly schedule as dictated by numbers of fish entering the trap. Non-local early winter fish (December – February) are targeted for broodstock and transferred to Merwin Hatchery while wild winter steelhead are encountered in late winter beginning in March (pers. comm. P. Phillips 2006). Fish sorted at the collection facility and released may sustain some physical damage but little or no mortality is documented.

Late winter wild steelhead would be sorted and transferred via overhead brail into a 1,800 gallon tanker truck. Fish would be trucked a short distance from the Merwin FCF (~1/4 mile ) and are released into one of four adult holding ponds. The transfer from Merwin FCF to tanker truck to holding pond is water to water and little or no adult loss is expected. Pre-spawn steelhead captured for use as broodstock will be held until ripe and spawned. Because of a short holding period, and the cool environment during the late winter and spring, broodstock survival to spawning period is expected to be high with minimal loss of adults expected. Combined estimated mortality for trapping, holding and transport of wild winter has been reported to range from 0 – 17% although recently, mortality has been much lower (0 – 4%) reported from Oregon Hatcheries (pers.comm. J. Watkins, ODFW, 2006). Examining circular type fiberglass tanks for adult holding and potential kelt re-conditioning experiments may provide a better holding environment than the current concrete holding ponds.

Hook and Line Collection (Alternative): If broodstock cannot be voluntarily collected at Merwin FCF, then hook and line collection in the N. F. Lewis will be investigated. The best available scientific information suggests hook and release mortality of adult steelhead is low. Hooton (1987) found catch and release mortality of adult steelhead to be 3.4% (n= 3,715 fish) on average when using a variety of fishing tackle, including barbed and barbless hooks, bait and artificial lures. Specific fishing techniques, adult netting materials and holding protocols would be reviewed in consultation with NOAA Fisheries to minimize impact on listed fish. Fish would be transferred to Merwin Hatchery in individual soft-sided plastic or rubber containers with lid and air stones. Fish would be bathed in PolyAqua (5ml/per 10 gallons of holding water) and transferred in 3-5% salt solution to reduce stress.

Broodstock Spawning/Pathology Sampling:
All females will be live-spawned and as many as possible will be released back to river as up to 10.2% may survive to repeat spawn (Kalama River studies, Howell et al. 1985). Also, kelt re-capture studies have indicated greater female survivals (88-91.3%) over males (Branstetter, Whiteaker, and Hatch, 2006, Reconditioning: A Research Project to Enhance Iteroparity in Columbia Basin Steelhead *Oncorhynchus mykiss)*: 2006). Males will be prioritized over females for lethal sampling. After spawning, moribund females or even fresh pond mortality may be kidney/spleen sampled for thorough pathogen screening (Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State Policy, 1998 and Draft Version 2006). Total lethal take for spawning and pathology sampling is projected up to 25 adults.

Kelt Re-conditioning:
A pilot project may occur. This may involve short term re-conditioning to initiate feed and stimulate a feed response. Zero - 10% mortality has been reported for short term kelt re-conditioning studies (Kelt Reconditioning: A Research Project to Enhance Iteroparity in Columbia Basin Steelhead *(Oncorhynchus mykiss)*:Ryan Branstetter, John Whiteaker, Douglas R. Hatch, 2006). A one year winter kelt re-conditioning project on the Cedar river was conducted on wild Lake Washington winter steelhead in 2003 with a high success reported on holding males in circular tanks and feeding live sand shrimp up to two months (pers. comm. B. Antipa, 2006).

Rearing: 80,000 green eggs will be taken annually for the program. Green egg losses of up 20% can be expected while total survival from green egg up to smolt will range up to 40% as experienced in other wild integrated steelhead programs (Hulett, et, al.). Projected loss from green egg to smolt is estimated at 37.5%. Up to 250 emergent fry (10 per female) may be sampled for pathogen screening (Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State Policy, 1998 and Draft Version 2006).

Facility Effects:
All operations at Merwin hatchery and at the Merwin FCF including water withdrawal, screening, trapping, pollution abatement, disease control and fish culture practices will be operated within state guidelines with needed improvements communicated to PacifiCorp in order to eliminate impact to listed fish in the system. Environmental monitoring is conducted at WDFW hatcheries to ensure operation under the "Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System (NPDES) general permit which conducts effluent monitoring and reporting and operates within the limitations established in its permit administered by the Washington Department of Ecology (DOE) WAG - 1052. Monitoring parameters include total suspended solids, settable solids, in-hatchery water temperatures and in-hatchery dissolved oxygen. Effluent at outfall areas is rapidly diluted with main stem flows and operation is within permitted guidelines. Monthly and annual reports on water quality sampling, use of chemicals at this facility, compliance records are available from DOE. Water rights are formalized thru DOE trust water right #S2-24939 and monitoring and measurement of water usage is reported in monthly NPDES reports.

Monitoring and Evaluation: All smolts will be marked in order to distinguish the smolts upon return as adults. A left ventral fin clip (with adipose fin intact) has been proposed in the H & S Plan but there is concern over impact on smolt survival and alternative marks may be explored. Contact with wild steelhead during DNA baseline sampling at Merwin Dam and Merwin Hatchery is ongoing for 2005 and 2006 (March through June) has not resulted in any mortality (pers. comm. E. Kinne).

**- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish**.

Steelhead hatchery stocks of winter and summer run fish have been collected for Merwin for Lewis River hatchery programs. The new late winter program is a new program. During collection of hatchery program fish, listed steelhead have been trapped and released back to stream. Approximately 50-150 late winter steelhead have been observed at Merwin FCF annually and returned back to stream (pers. comm. E Kinne, 2004). Inadvertent mortality on all wild steelhead encountered at the trapping site and returned back to stream is estimated to be 0-2 fish yearly.

**Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).**

*Complete the appended "take table" (**Table 1**) for this purpose. Provide a range of potential take numbers to account for alternate or "worst case" scenarios.*

See Tale Table 1 at the end of the document. Up to 50 adults will be taken. Up to 50% could be lethally spawned as they would need to be sacrificed for viral kidney and spleen samples. In order to rear 50,000 smolts, 80,000 green eggs will be taken with a program survival of 62.5%.

**- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this**

**plan for the program.**

(*e.g. "The number of days that steelhead are trapped at Priest Rapids Dam will be reduced if the total mortality of handled fish is projected in season to exceed the 1988-99 maximum observed level of 100 fish."*)

Improvements to the Merwin FCF are being proposed as part of the new SA. There is no indication that take levels beyond what is being projected to be taken as broodstock would exceed take levels. All adults handled will be noted for condition or injuries suffered during holding or spawning. Alternative methods to collect broodstock (hook and line) would have stringent capture, handling or holding protocols developed by WDFW in conjunction with NOAA Fisheries staff. All fish handled would be accounted for and condition noted if spawned and released (if not short term kelt re-conditioned).

# SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

**3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.**

*(e.g. "The hatchery program will be operated consistent with the ESU-wide plan, with the exception of age class at release. Fish will be released as yearlings rather than as sub-yearlings as specified in the ESU-wide plan, to maximize smolt-to-adult survival rates given extremely low run sizes the past four years.").*

Development of the historical late winter steelhead stock in the N.F. Lewis River is a focal species in the Lower Columbia Fish Recovery Board Subbasin and Watershed Management Plan; Volume II – Subbasin Plan Chapter G – NF and EF Lewis (December 15, 2004). Continuing both non-local summer and winter steelhead programs in the Lewis River system and development of the new late winter stock is consistent with the recent PacifiCorp Settlement Agreement.

For ESU-wide hatchery plans, the production of current non-local Merwin winter steelhead is consistent with the following:

- 1999 Biological Opinion on Artificial Propagation in the Columbia River Basin
- 1999 Review of Artificial Production of Anadromous and Resident Fish in the Columbia River Basin
- Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1994)
- The *U.S. v. Oregon* Columbia River Fish Management Plan
- NWPPC Fish and Wildlife Program

For statewide hatchery plan and policies, hatchery programs in the Columbia system adhere to a number of guidelines, policies and permit requirements in order to operate. These constraints are designed to limit adverse effects on cultured fish, wild fish and the environment that might result from hatchery practices:

*Genetic Manual and Guidelines for Pacific Salmon Hatcheries in Washington*. These guidelines define practices that promote maintenance of genetic variability in propagated salmon.. Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapter 5, IHOT 1995).

*Spawning Guidelines for Washington Department of Fisheries Hatcheries*. Assembled to complement the above genetics manual, these guidelines define spawning criteria to be use to maintain genetic variability within the hatchery populations.. Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapter 7, IHOT 1995).

*Stock Transfer Guidelines*. This document provides guidance in determining allowable stocks for release for each hatchery. It is designed to foster development of locally-adapted broodstock and to minimize changes in stock characteristics brought on by transfer of non-local salmonids (WDF 1991).

*WDFW Steelhead Rearing Guidelines.* Details rearing guidelines and rearing parameters statewide (July 31, 2001).

*Fish Health Policy in the Columbia Basin*. Details hatchery practices and operations designed to stop the introduction and/or spread of any diseases within the Columbia Basin. Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Fish Policy Chapter 5, IHOT 1995).

*National Pollutant Discharge Elimination System Permit Requirements* This permit sets forth allowable discharge criteria for hatchery effluent and defines acceptable practices for hatchery operations to ensure that the quality of receiving waters and ecosystems associated with those waters are not impaired.

**3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.** *Indicate whether this HGMP is consistent with these plans and commitments, and explain any discrepancies.*

Steelhead stock management principals described in this HGMP with local and non-local steelhead stock separation, rearing and handling procedures are consistent with the following:

- WDFW Wild Salmonid Policy (Draft Scoping Paper May 1994 and DEIS Wild Salmonid Policy Draft 1997).
- WDFW Draft – Steelhead Management Plan (April 1994)
- WDFW Lower Columbia Steelhead Conservation Initiative Draft (March 1998).

The program operates under the Setttlement Agreement (SA) for the Lewis River Hydroelectric Projects (FERC Nos. 935, 2071, 2111 and 2213). The Hatchery and Supplementation Plan (H&S Plan) was proposed by PacifiCorp Energy and Cowlitz County PUD for the Lewis River Hydroelectric Projects (FERC Nos. 935, 2071, 2111 and 2213). Key elements for planning and goals for the system was based on the Lewis River Fish Planning Document, April 2004. The H&S Plan is required under Section 8 of the Lewis River Hydroelectric Projects Settlement Agreement (Settlement Agreement) dated November 30, 2004. The goals identified by the parties to the Settlement Agreement formed the basis for actions proposed in this plan. PacifiCorp and Cowlitz PUD provided the following requirements to fulfill Section 14.2.6 of the Settlement Agreement. The following Plans and Reports as part of the tasks from the SA were completed in 2005:

- *Terrestrial and Aquatic Coordination Committees Structure and Ground Rules*
- *Merwin Tailrace Fish Behavior Study Plan*
- *Habitat Preparation Plan*
- *Draft Lewis River Hatchery & Supplementation Plan*
- *Lewis River Spawning Gravel Evaluation*

• *Merwin Upstream Collection Facility Design Criteria*
• *Yale Project Entrainment Evaluation Study Plan*
• *Aquatic Fund Strategic Plan and Administrative Procedures*
• *Terrestrial and Aquatic Coordination Committees Structure and Ground Rules*

### 3.3) Relationship to harvest objectives.

*Explain whether artificial production and harvest management have been integrated to provide as many benefits and as few biological risks as possible to the listed species. Reference any harvest plan that describes measures applied to integrate the program with harvest management.*

Selective fisheries were initiated for steelhead in 1986 in the Lower Columbia River tributaries. This regulation requires the release of all wild steelhead. The estimated mortality for wild winter steelhead for these fisheries in lower Columbia River tributaries ranges from 4% to less than 7% per basin. Harvest rates have been reported as high as 70% for hatchery steelhead in the Cowlitz River (pers.comm..J.Tipping 2000). Until wild steelhead populations have recovered, wild steelhead release regulations will be in effect with incidental mortality limited to less than 7% on wild stocks. The harvest rate of hatchery fish is expected to remain greater than 40% for most stocks.

The releases of adipose-fin clipped winter steelhead provide sport harvest opportunity for anglers in the Lewis and lower Columbia Rivers. Fisheries targeting winter steelhead are concentrated from December through February and extend through May 31 on the Lewis River. Selective harvest regulations allow only the harvest of adipose-fin clipped winter steelhead in the lower Columbia River to protect wild winter steelhead. Juveniles released from the Lewis River wild winter program will not be adipose fin clipped in order to protect fish from harvest in the lower river. During the period 1986/87 – 2003/04, recreational harvest from the Lewis River for winter steelhead ranged between 226 ((1997/98) – 2,568 (2001/02) fish annually during a November through March fishery (WDFW Historical Data Base, Appendix 2). These fisheries are consistent with Lower Columbia Steelhead Initiative Goals (1995) and with *U.S. v. Oregon* management plans and principles for Tribal and recreational fisheries. These actions work in concert with focused fishing effort on hatchery origin fish to maximize wild escapement and minimize escapement of hatchery fish of an unacceptable stock. Selective marking of endemic brood releases will regulate their take in fisheries to no more than 2% incidental take.

For Upper Lewis harvest, no targeted harvest would be allowed or is currently planned on steelhead released into the upper basin unless escapement goals are met and exceeded and potential harvest (by catch) impacts to resident bull trout populations are effectively managed. Under the conditions modeled, spawning escapement need in the upper watershed is ~1,200 - 1,300 (Table 5).

**Table 5 Expected outcomes of the Lewis River H&S Plan winter and summer steelhead Program as reported in the H & S Plan.**

| Phase | Brood-stock[1] | NOR's Spawning Naturally | Wild (Supplemented) Spawning Naturally | Mixed Stock Harvest | Terminal Area Harvest | Average Adult Ocean Recruits |
|---|---|---|---|---|---|---|
| Late-winter Supplementation Years (wild broodstock) | 50 | 1,200 | 800 | 65 | 108 | ~2,200 |
| Late-winter After Supplementation (NOR) | NA | 1,300 | NA | 42 | 70 | ~1,400 |
| Winter Segregated Harvest Program | 90 | NA | NA | 55 | 915 | ~1,800* |
| Summer Segregated Harvest Program | 160 | NA | NA | 239 | 2,383 | ~4,000** |

1-Broodstock numbers are an estimate; will vary based on fecundity and survival values for upgraded hatchery facilities
* Includes 779 surplus hatchery fish.
** Includes 1,211 surplus hatchery fish.
NA- Not Applicable

**3.3.1) Describe fisheries benefitting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.** *Also provide estimated future harvest rates on fish propagated by the program, and on listed fish that may be taken while harvesting program fish.*

There will be little fishery benefiting from this conservation program as the intent is to use adults for upper river supplementation

### 3.4) Relationship to habitat protection and recovery strategies.

*Describe the major factors affecting natural production (if known). Describe any habitat protection efforts, and expected natural production benefits over the short- and long-term. For Columbia Basin programs, use NPPC document 99-15, section II.C. as guidance in indicating program linkage with assumptions regarding habitat conditions.*

The development of the Hydroelectric Dams in the Lewis River system has blocked all upstream passage to 80% of the historical anadromous habitat while significant riverine habitat is permanently lost to reservoir storage. Goals as identified in the Settlement Agreement proposed by PacifiCorp Energy and Cowlitz County PUD for the Lewis River Hydroelectric Projects is to provide self-sustaining, naturally producing, harvestable native anadromous salmonids species throughout their historical range in the North Fork Lewis River (FERC Nos. 935, 2071, 2111 and 2213). Options for restoring habitat and the re-introduction of fish have been detailed in the SA. Habitat improvements and productivity models are detailed in the Draft Lewis River Hatchery & Supplementation Plan and the LEWIS RIVER FISH PLANNING DOCUMENT *Prepared for* PacifiCorp and Cowlitz PUD (A*pril 2004).*

*Subbasin Planning and the Lower Columbia Fish Recovery Board (LCFRB):*
The current Lewis System HGMP processes are designed to deal with existing hatchery programs and potential reforms to those programs. A regional sub-basin planning process (Draft Lewis River Subbasin Summary May 17, 2002 was a broad-scale initiative that provided building blocks of recovery plans by the Lower Columbia Fish Recovery Board (LCFRB). The Lower Columbia Fish Recovery Board Recovery Plan has been accepted by NOAA Fisheries as interim document for recovery actions in the ESU (February 2006).

*Habitat Treatment and Protection:*
The Lower Columbia Fish Recovery Board Subbasin Planning conducted habitat inventories within the Lewis River and is consistent with WRIA 27 (Kalama, North Fork Lewis River, and East Fork Lewis River Salmon) habitat limiting factors report (LFA) was completed by the Washington State Conservation Commission (Wade G., March 2001). Ecosystem Diagnosis and Treatment (EDT) compares habitat today to that of the basin in a historically unmodified state. It creates a model to predict fish population outcomes based on habitat modifications. WDFW is also conducting a Salmon Steelhead Habitat Inventory Assessment Program (SSHIAP), which documents barriers to fish passage. WDFW's habitat program issues hydraulic permits for construction or modifications to streams and wetlands. This provides habitat protection to riparian areas and actual watercourses within the watershed.

**3.5) Ecological interactions. [Please review Addendum A before completing this section. If it is necessary to complete Addendum A, then limit this section to NMFS jurisdictional species. Otherwise complete this section as is.]**

*Describe salmonid and non-salmonid fishes or other species that could (1) negatively impact program; (2) be negatively impacted by program; (3) positively impact program; and (4) be positively impacted by program. Give most attention to interactions between listed and "candidate" salmonids and program fish.*

Below are discussions on both negative and positive impacts relative to the Late winter steelhead program and are taken from the Puget Sound listed and non-listed HGMP template (WDFW and NOAA 2003).

*(1) Salmonid and non-salmonid fishes or species that could negatively impact the program:* Merwin hatchery steelhead smolts can be preyed upon through the entire migration corridor from the river subbasin to the mainstem Columbia River and estuary. Northern pikeminnows and introduced spiny rays in the Columbia mainstem sloughs can prey on steelhead smolts as well as avian predators, including terns, gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons. Mammals that can take a heavy toll on migrating smolts and returning adults include: river otters, harbor seals, sea lions and Orcas.

*(2) Salmonid and non-salmonid fishes or species that could be negatively impacted by the program:* The primary impacts to ESA listed and other lower river fish populations' results from the hatchery program. The release of an additional 50,000 smolts to the lower river will have impact on these populations at risk from competition, predation and disease. The H&S Plan attempts to reduce risks by operating the hatchery programs consistent with HSRG guidelines, to the extent possible and as such the program will be operated as a 100% wild broodstock integrated program. Several risk aversion measures including release parameters as smolts will reduce residency time in freshwater and promote downstream migration. This will reduce direct and indirect impacts of competition and predation on listed steelhead, Chinook, coho and chum stocks existing in the habitat downstream of Merwin Dam and in the lower Columbia ESU.

The following activities listed below are identified as general hatchery actions that are identified in the ESA Section 7 Consultation "Biological Opinion on Artificial Propagation in the Columbia River Basin" (March 29, 1999).

***Risk avoidance measures to minimize incidental impacts to wild juveniles resulting from the release of hatchery winter steelhead.***

*Hatchery Production/Density-Dependent Effects*: To minimize the impacts of niche-displacement (or density-dependent effects) releases will be consistent with WDFW Statewide Steelhead Rearing Guidelines (2001) and as recommended by the NMFS (1999 Biological Opinion). Smolts will be closely observed for smolting behavior in order to foster rapid emigration upon release. Parameters of target size at release, condition (k) factors and standard deviations will be monitored through out the rearing period to achieve smolt parameters indicating the hatchery population will migrate successfully (WDFW Statewide Steelhead Rearing Guidelines, 2001).

*Competition / Niche-Displacement:*
Salmon and steelhead feed actively during their downstream migration (Becker 1973)and if they do not migrate they can compete with wild fish. Although competition could occur with listed steelhead, Cedar Creek studies indicate that most wild steelhead have vacated that system which is an important tributary for steelhead by mid-May (D. Rawding et, al.) The program will be managed to have fish ready for release close to the mid-May timeframe which will miss the bulk of listed steelhead downstream through the system. Even so, the SIWG (1984) concluded that "migrant fish will likely be present for too short a period to compete with resident salmonids." Studies conducted in other areas indicate that this program is likely to pose a minimal risk of competition due to the following:

1) Studies and monitoring programs on many systems throughout Washington indicate that salmon and steelhead smolts released from hatchery programs migrate rapidly downstream especially from larger systems where migration rates of approximately 20 river miles per day were observed by steelhead smolts in the Cowlitz River (Harza 1998).
2) NMFS (2002) noted that "...where interspecific populations have evolved sympatrically, chinook salmon and steelhead have evolved slight differences in habitat use patterns that minimize their interactions (Nilsson 1967).
3) Flagg et al. (2000) concluded, "By definition, hatchery and wild salmonids will not compete unless they require the same limiting resource. Thus, the modern enhancement strategy of releasing salmon and steelhead trout as smolts markedly reduces the potential for hatchery and wild fish to compete for resources in the freshwater rearing environment. Miller (1953), Hochachka (1961), and Reimers (1963), among others, have noted that this potential for competition is further reduced by the fact that many hatchery salmonids have developed different habitat and dietary behavior than wild salmonids." Flagg et al (2000) also stated "It is unclear whether or not hatchery and wild chinook salmon utilize similar or different resources in the estuarine environment."

*Disease Transmission:*
Interactions between hatchery reared and naturally produced populations may be a source of pathogen and disease transmission although there is little evidence showing that diseases are transmitted from hatchery fish to wild fish (Steward and Bjornn 1990). Hatchery-reared fish are managed to minimize such effects (IHOT 1995).

***Risk avoidance measures used to minimize incidental impacts to listed species, as a result of hatchery fish presence include:***

WDFW will conduct fish disease examinations to ensure minimal disease transmission and to prevent the introduction and/or spread of any fish diseases. Fish health-monitoring efforts include fish health examinations and virus sampling, abnormal fish loss investigations, virus sampling, and pre-transfer and pre-liberation inspections. All activities are done in accordance with guidelines developed under the *Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State March* (1998 and current revisions 2006).

**Predation**
*Direct Mortality* – Hatchery steelhead released downstream of Merwin Dam may residualize within the subbasin, and may directly prey on naturally produced salmon and steelhead fry. Due to their location, size and time of emergence, newly emerged chinook salmon fry or fingerling are

likely to be the most vulnerable to predation by hatchery released fish (NMFS 1999). Salmonids are believed to prey on fish less than or equal to 1/3 their body length (USFWS 1994). Since steelhead are released at sizes nearly equal in size to wild fish, consumption of wild fish (by hatchery reared steelhead) is unlikely. Direct predation by hatchery fish on naturally produced fish in migration corridors is believed to be low (NMFS 1999).

*Indirect Mortality* - Large groups of hatchery fish may attract additional predators in rearing habitats and migration corridors, such as pinnepeds, birds, and other fish species. Predator attraction theories (and implied indirect mortality) have not been demonstrated to-date.

***Risk avoidance measures to minimize predation on listed species, resulting from the release of hatchery winter steelhead:***

Additional steelhead released into the Lewis river from this program may prey upon listed species of salmonids, but the magnitude of predation will depend upon the characteristic of the listed population of salmonids, the habitat in which the population occurs and the characteristics of the hatchery program (e.g.. release time, location, number released and size upon release). In order to maximize homing back to the Merwin FCF, WDFW is proposing smolt releases at a point closest to Merwin Dam. This will maximize adult collection for the upper system. This is in contrast to the other Merwin steelhead programs that are trucked below I-5 and downstream of miles of rearing habitat in order to reduce predation impact.

Studies have estimated predation risks to listed Chinook which would be the species most available to be impacted (Predation by Juvenile Hatchery Salmonids on Wild Fall Chinook Fry in the Lewis River, Washington, Hawking and Tipping 1999). In this study, coho, steelhead and sea-run cutthroat trout were found to prey on naturally produced chinook fry. Mean chinook fry per stomach sampled ranged from 0.05-0.11 for coho; 0.01-1.13 for steelhead; 0.00-2.13 for sea-run cutthroat. Even so, the authors noted:

- "The substantial increase in predation rates in 1998 probably reflects an increase chinook fry abundance that year. Nearly 3 times more chinook fry appeared to be present in 1998 compared to 1997, based on similar seining effort, timing and sampling sites."
- Releases of hatchery sea-run cutthroat trout on the Lewis River will stop after the 1999 release, due to their consumption of wild chinook fry as smolts and their low return rates as adults."
- "This stock has remained relatively healthy while other lower Columbia River stocks have declined in the last decade."

***Risk avoidance measures to minimize residualization by hatchery steelhead:***

WDFW Statewide Steelhead Rearing Guidelines releases large steelhead (180-240 mm total length, mean forklength = 205), and are consistent with recommendations by the NMFS 1999 Biological Opinion, in order to promote swift out-migration and minimize residualization. Factors that prevent the program from attaining state guidelines including size at release, C or KD factors or CVs, may result in smaller fish that will not be able to smolt and emigrate which will laed to increased predation and competition onlisted fish.

***Estuary and Ocean Effects:***

Competition in the estuary – Juvenile salmon and steelhead, of both natural and hatchery origin, rear for varying lengths of time in the Columbia River estuary and pre-estuary before moving out to sea. The intensity and magnitude of competition in the area depends on location and duration of estuarine residence for the various species of fish (Simenstad et al. 1982, 1992). Once reaching the Columbia River, fish appear to travel quickly. In a study designed to define the migrational characteristics of chinook salmon, coho salmon, and steelhead trout in the Columbia

River estuary, Dawley et al (1984), found the average migration rates for subyearling chinook, yearling chinook, and coho salmon and steelhead, were 22, 18, 17, and 35 RKm/d respectively.

Competition in the ocean – Ocean rearing conditions are dynamic. Consequently, fish culture programs might cause density-dependent effects during years of low ocean productivity, especially in nearshore areas affected by upwelling (Chapman and Witty 1993). To date, research has not demonstrated that hatchery and naturally produced salmonids compete directly in the ocean, or that the survival and return rates of naturally produced and hatchery origin fish are inversely related to the number of hatchery origin smolts entering the ocean. If competition occurs, it most likely occurs in nearshore areas when (a) upwelling is suppressed due to warm ocean temperatures and/or (b) when the abundance or concentration of smolts entering the ocean is relatively high.

***Risk avoidance measures to minimize impacts in the estuary and ocean by hatchery steelhead:*** WDFW releases large steelhead (180-240 mm total length, mean forklength = 205), as recommended by the NMFS 1999 Biological Opinion, to promote swift out-migration and minimize long range effects on the estuary while fish will disperse in the ocean quickly.

*3) Salmonid and non-salmonid fishes or other species that could positively impact the program.* Multiple programs including spring chinook and coho programs are released from the Lewis River facilities and natural production of chinook, coho, chum and steelhead occurs in this system along with non-salmonid fishes (sculpins, lampreys and sucker etc.). All could provide forage for the program or intra species interactions key to behavioral survival traits.

*4) Salmonid and non-salmonid fishes or species that could be positively impacted by the program.* Merwin steelhead smolts can be preyed upon release thru the entire migration corridor from the river subbasin to the mainstem Columbia River and estuary. Northern pikeminnows and introduced spiny rays in the Columbia mainstem sloughs can predate on steelhead smolts as well as avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons. Mammals that benefit from migrating smolts (river otters), and returning adults include: harbor seals, sea lions and Orcas. While not always desired from a production standpoint, these hatchery fish provide an additional food source to natural predators that might otherwise consume listed fish and may overwhelm established predators providing a beneficial, protective effect to co-occurring wild fish. The hatchery program may be filling an ecological niche in the freshwater and marine ecosystem. A large number of species are known to utilize juvenile and adult salmon as a nutrient and food base (Groot and Margolis 1991; and McNeil and Himsworth 1980). Wild co-occurring salmonid populations might be benefited as hatchery fish migrate through an area. The migrating hatchery fish may overwhelm predator populations, providing a protective effect to the co-occurring wild populations. Pacific salmon carcasses are also important for nutrient input back to freshwater streams (Cederholm et al. 1999). Successful or non-successfully spawner adults originating from this program may provide a source of nutrients in oligotrohic coastal river systems and stimulate stream productivity. Carcasses from returning adult salmonids have been found to elevate stream productivity through several pathways, including: 1) the releases of nutrients from decaying carcasses has been observed to stimulate primary productivity (Wipfli et al. 1998); 2) the decaying carcasses have been found to enrich the food base of aquatic invertebrates juvenile salmonids have been observed to feed directly on the carcasses. The Lewis River drainage is thought to be inadequately seeded with anadromous fish carcasses throughout the basin. Three species are not meeting escapement goals in the North Fork Lewis River; winter and summer steelhead, and coho salmon. Very few chum salmon return to the watershed; however, at one time the estimated escapement from the Lewis River was 3,000 fish (WDF 1951). These low escapement numbers mean a loss of ocean-derived nutrients from salmon carcasses that could be a limiting factor within the basin.

## SECTION 4. WATER SOURCE

**4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.**

*For integrated programs, identify any differences between hatchery water and source, and "natal" water used by the naturally spawning population. Also, describe any methods applied in the hatchery that affect water temperature regimes or quality. Include information on water withdrawal permits, National Pollutant Discharge Elimination System (NPDES) permits, and compliance with NMFS screening criteria.*

Water used will be same as the existing source in the N.F. Lewis River that wild winter steelhead spawn, incubate and rear in. The holding ponds at the Merwin site are supplied with 100% Lake Merwin water (600 gallons per minute (gpm)). Water temperatures range below and above generally acceptable levels (42ºF-61ºF degrees). Water clarity is good. Water for incubation and rearing is from the same source and feeds 15 vertical incubators, six intermediate ponds, four shallow troughs, ten raceways (9.5' x 80' x 2.5') and four 1/4-acre rearing ponds. Total flow to these is approximately 5,000 gpm.

Total available flow is 5,000 gpm, which is pumped from Lake Merwin. Two intakes are used at depths of 15 and 110 feet. This facility has ozonation capabilities to treat a capacity of 3,800 gpm. The late winter steelhead program may be reared on ozonated water through out most of the duration of the program although fish could be taken off ozone water a few weeks prior to release in order to present immune system challenges to the population. There is some limitation to ozone treated water to be directed and piped to specific ponds in the facility. Current upgrades to replace the existing ozone system with current technology, and add a small backup system for incubation is being planned (H & S Plan). Chiller and additional individual heater systems might be needed in future upgrades

**4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.**

*(e.g. "Hatchery intake screens conform with NMFS screening guidelines to minimize the risk of entrainment of juvenile listed fish.").*

**Merwin Hatchery:** Water for raceways are formalized thru DOE trust water right #S2-24939 from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports. This facility operates under the "Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System (NPDES) general permit which conducts effluent monitoring and reporting and operates within the limitations established in its permit administered by the Washington Department of Ecology (DOE). WAG 13-1052. Monthly and annual reports on water quality sampling, use of chemicals at this facility, compliance records are available from DOE.

Discharges from the cleaning treatment system are monitored as follows: *Total Suspended Solids (TSS)* C1 to 2 times per month on composite effluent, maximum effluent and influent samples. *Settleable Solids (SS)* C1 to 2 times per week on effluent and influent samples. *In-hatchery Water Temperature* - daily maximum and minimum readings.

## SECTION 5. FACILITIES

*Provide descriptions of the hatchery facilities that are to be included in this plan (see "Guidelines for Providing Responses" Item E), including dimensions of trapping, holding incubation, and rearing facilities. Indicate the fish life stage held or reared in each. Also describe any instance where operation of the hatchery facilities, or new construction, results in destruction or adverse modification of critical habitat designated for listed salmonid species.*

### 5.1) Broodstock collection facilities (or methods).

Broodstock will be collected at an adult trap located at the Merwin Dam Fish Collection Facility (FCF). A ladder leads the migrating adults to a V weir holding trap where fish are sorted. During the late winter and early spring, personnel will check the trap daily for fish. Depending on a weekly schedule fish would be sorted and decisions to retain the fish for broodstock will be made. The trap may be checked more than once a day if many fish are expected to be captured. Fish are hoisted by brail from the trap box, and placed in a tanker truck for transport to Merwin hatchery adult holding ponds. Transfer is water to water. Broodstock may have scales and DNA samples collected from them.

Based on numbers of fish available at this location, other methods or locations in the system could be investigated for broodstock collection. Hook and line retention could be employed based on decisions by WDFW and the ACC. Cedar Creek located on Cedar Creek (RM 10.0) is a possible location as would hook and line options in the E.F. Lewis River which is a major tributary of the Lewis River system.

Methods to collect adults by hook and line techniques will be reviewed with approved protocols developed to optimize handling of listed adults.

### 5.2) Fish transportation equipment (description of pen, tank truck, or container used).

Tanker trucks of 1,800 and 1,000 gallon capacities are used to haul fish from the Merwin Trap. Trucks are plumbed for aeration and oxygen systems. If alternative collection methods are employed such as hook and line, fish transport equipment would be tailored to maximize fish survival based on consultation with NOAA Fisheries staff.

### 5.3) Broodstock holding and spawning facilities.

Adult holding ponds are located with in the facility grounds adjacent to the visitor center. Ponds are under roof cover and in a secure location. Four ponds exist consisting of approximately 1,732 cf3. Pond length is 33' x 7.5' wide and 7' deep. Current flow into each pond is restricted by pipe diameter size to 180 gallons per minute.

### 5.4) Incubation facilities.

The incubation/starter building consists of six 4.5' x 34' x 2' foot intermediate raceways, four 20 cubic foot fry troughs and 15 double stack Mari Source incubators. It is fitted with back-up pumps to maintain flow through the troughs in emergency situations, and with secondary packed columns to maintain water oxygenation above 10 ppm. Flow monitors will sound an alarm if flow through the incubation troughs is interrupted. The water used to supply the Mari stack incubators at Merwin Hatchery is pumped directly from Lake Merwin, treated with ozone, and passed through an enclosed stripper. Water quality is generally very good; however, high water temperatures in the summer (58°F to 59°F) can be a problem but not through incubation or early rearing (Tetra Tech/KCM 2002).

### 5.5) Rearing facilities.

After fish are started in four 20 cubic foot fry troughs and will be moved to 4.5' x 34' x 2' foot intermediate raceways in the incubation building. When fish reach approximately 100 ffp or clear viral sampling, they may be moved to the outside four quarter-acre rearing ponds, or transferred to 9.5 x 80 x 2.5 foot fingerling raceways.

**5.6) Acclimation/release facilities.**

Merwin Hatchery facilities include four quarter-acre rearing ponds, ten 9.5 x 80 x 2.5 foot fingerling raceways. Steelhead may be final reared in one of the four quarter acre ponds. During smolting behavior, fish can make their way to two smolt collection ponds where they will transported to the river for release.

**5.7) Describe operational difficulties or disasters that led to significant fish mortality.**

Difficulties experienced with the existing steelhead programs are mentioned here. Despite the fact that all water supplied during incubation and early rearing is ozone treated, periods of high mortality can exist. These losses would be in the category of difficulties rather than disasters. The condition or diseases associated with these losses are *saprolegniasis* and Low Temperature Disease *(Cytophaga psychrophila.).* High losses in the adults (primarily summer steelhead) being held for spawning for long periods of time have been due to *saprolegniasis* and IHN.

**5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.**

*(e.g. "The hatchery will be staffed full-time, and equipped with a low-water alarm system to help prevent catastrophic fish loss resulting from water system failure.").*

Several upgrades are scheduled for Merwin Hatchery to improve operations on rearing fish and reducing stress to fish populations (see Schedule 8.7 of the Settlement Agreement).

Also as a component of the Settlement Agreement, PacifiCorp Energy is modifying the existing Merwin Dam trap as needed to improve worker safety and increase fish handling efficiency without introducing additional risk to fish (PacifiCorp and Cowlitz PUD 2004a). PacifiCorp Energy has repaired the fyke portion of the Merwin Dam trap in an effort to decrease the risk of injury to fish in the facility (LRFPD, 2004).

## SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

**Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.**

**6.1) Source**.

*List all historical sources of broodstock for the program. Be specific (e.g., natural spawners from Bear Creek, fish returning to the Loon Creek Hatchery trap, etc.).*

Broodstock for the program will come from wild late winter steelhead returning to the Merwin Trap. Late winter steelhead are thought to be representative of native Lewis River steelhead stock with arrival from late winter through mid- spring. Baseline DNA microsatellite data collection has been ongoing at several Lower Columbia River tributaries including samples taken from Merwin Dam in 2006 (E. Kinne, 2006). Continuing to sample all broodstock spawners in subsequent years will be vital to identifying only historical stock but will also be able to determine potential repeat spawner success of live spawned adults released back to stream, determine successful kelt re-condiitoning % if collected in subsequent years and determine parentage of succeeding F1 generational smolts or adults.

Another option would be to try and collect additional wild fish in the lower N.F. Lewis River system by hook and line or from major tributaries part of the Lewis River system (Cedar Creek or E.F. Lewis River). Alternative broodstock collection scenarios will be determined by the ACC if not enough broodstock can be collected at the primary source for the program. The WDFW/Co-

Mgrs and the ACC would consult with NOAA Fisheries on the possibility of these alternate scenarios before considering Kalama River wild winter steelhead as the contingency option.

## 6.2) Supporting information.

### 6.2.1) History.

*Provide a brief narrative history of the broodstock sources. For listed natural populations, specify its status relative to critical and viable population thresholds (use section 2.2.2 if appropriate). For existing hatchery stocks, include information on how and when they were founded, sources of broodstock since founding, and any purposeful or inadvertent selection applied that changed characteristics of the founding broodstock.*

They is no history of endemic broodstock used for hatchery production in the system. Non-local winter stocks of Beaver Creek and Skamania winter steelhead (both Chambers derivatives) were first introduced into the Lewis River basin in 1946. Since their introduction, these stocks have been used extensively at the Lewis River Hatchery Complex and some interbreeding has likely occurred with the native Lewis River stocks (PacifiCorp and Cowlitz PUD 2000). Beaver Creek winter steelhead are from the Elochoman River and Chambers Creek (Puget Sound) origin. In the last 15 years, an average of just under 500,000 winter and summer steelhead have been released into the Lewis River basin annually (Figure 4.8-4) (PSMFC 2001). The vast majority of the releases have been yearlings from the Merwin Hatchery (post 1993), as well as the Skamania, Vancouver, and Beaver Creek hatcheries.

### 6.2.2) Annual size.

*Provide estimates of the proportion of the natural population that will be collected for broodstock. Specify number of each sex, or total number and sex ratio, if known. For broodstocks originating from natural populations, explain how their use will affect their population status relative to critical and viable thresholds.*

The proposed use of up to 50 adults (collected and spawned) of steelhead for broodstock represents an unknown amount of the wild population spawning in the N.F. Lewis Wild steelhead adults show up at the Merwin FCF to be enumerated and they may more likely home into to lower river areas or certain tributaries where spawning and rearing occurred. EDT indicates productivity capacity in the lower river at approximately 450 adults (capacity) with an equilibrium of 298 based on current conditions (Lewis River Fish Planning Document, 2004).

The number of broodstock will produce enough hatchery smolts to achieve upper river system adult supplementation goals as outlined in the Hatchery & Supplementation Plan and achieve an effective population size (Ne) threshold as necessary to maintain inbreeding depression and detectable decrease in viability over a 2-5 generation period (Hatchery Scientific Review Group (HSRG). WDFW wild winter steelhead abundance estimates (Index Redd Surveys) are not possible in the N.F. Lewis so the percentage that the 50 broodstock represents out of the wild N.F. Lewis River population is unknown. Broodstock removal is a temporary risk to the lower river population although meeting integrated broodstock collection guidelines of 30% broodstock collection for wild populations of 150 (HSRG Operational Guidelines C-3, 2004). Besides the numbers of adults trapped yearly at the Merwin Dam Fish Trap (FCF) additional spawners are monitored at Cedar Creek Trap (WDFW Historical Database). The trend of increased escapement in nearby Lower Columbia River systems as reported in Section 2.2 and a current equilibrium population of 298 based on habitat productivity (LRFPD), also indicates a reduced risk to the existing population.

### 6.2.3) Past and proposed level of natural fish in broodstock.

*If using an existing hatchery stock, include specific information on how many natural fish were incorporated into the broodstock annually.*

This is a new program. The late winter steelhead juvenile supplementation program will be composed of composed of 100% wild late winter steelhead for 12 consecutive years.

### 6.2.4) Genetic or ecological differences.

*Describe any known genotypic, phenotypic, or behavioral differences between current or proposed hatchery stocks and natural stocks in the target area.*

Broodstock will be wild natural-origin adults representative of the historical genetic structure of the natural population. Genetic samples (fin clips or punches) could be collected from hatchery and natural-origin winter steelhead in the Lewis River and other LCR systems. Samples will periodically be analyzed for population structure and genetic variation. Returning adults from the juvenile supplementation program will not be utilized as broodstock but will be transported to the upper watershed.

Indigenous wild winter steelhead are genetically and behaviorally distinct from the hatchery winter steelhead traditionally stocked in the target basin (Lewis River) as judged by allozyme methods, run timing and spawn timing in this and other river systems including the Kalama (Sharpe et al. 2000; Leider et al. 1984, 1986). Early hatchery winter steelhead are Chambers (via Beaver Creek) stock derivatives successfully returning back to the hatchery. Since Merwin Dam was completed in 1932, natural steelhead distribution has remained in the lower and mainstem portions of the North Fork Lewis River below RM 19.4. Other steelhead distribution includes populations in the E.F. Lewis River. A dam located on Cedar Creek (tributary to the North Fork) was removed in 1946, and in combination with stream improvements, spawning now occurs throughout most of Cedar Creek from RM 0 to RM 18.2 (Hymer et al. 1993). In addition to these reaches, winter and summer steelhead also utilize portions of Big, Rock, Chelatchie, Cold, Copper, Coyote, and Johnson creeks, and several smaller tributaries.

***Risk avoidance measures to minimize impacts due to genetic introgression by hatchery steelhead:***

Overlap of non-local winter steelhead stocks with late wild stocks in the Lower Columbia tributaries was approximately 25% with a wide overlap of summer steelhead from 15% - 80% wild steelhead stocks was a concern (WDFW DRAFT Wild Salmonid Policy, 1994). Several management actions to reduce impacts on wild steelhead including hatchery and wild steelhead overlap have been implemented since then in order to separate location and timing of hatchery and existing wild late stocks (WDFW Draft Steelhead Management Plan, April 1994 and the DRAFT Lower Columbia Steelhead Initiative (March 1998). The difference in spawn timing presently is 3 months earlier for Merwin early winter steelhead as compared to wild winter stock in the N.F. Lewis which spawn from April 9 - May 20 (pers. comm. D. Rawding 2006). Poor reproductive success for these fish in the wild (Hulett et al. 1998) and spatial separation at spawning have helped to maintain genetic differences between hatchery and wild fish.

### 6.2.5) Reasons for choosing.

*Describe any special traits or characteristics for which broodstock was selected.*

The current Lewis winter early steelhead program was developed from Beaver Creek and Skamania stocks (both Chambers Creek derivatives), and does not represent the historical wild stock. Although the non-local stock is prevalent in the system, wild late returning adult winter steelhead are trapped at the Merwin FCF and returned back to stream to the lower Lewis River. These fish would be the obvious first choice to develop a wild steelhead broodstock in the Lewis. Endemic steelhead are optimally adapted for survival in the Lewis River and will be most capable of surviving, returning to and effectively spawning in the Upper Lewis River system.

WDFW may propose alternatives to the contingency broodstock plan below. This involves exploring additional local broodstock collection from the N.F. Lewis, E.F. Lewis or Cedar Creek before utilizing Kalama River stocks.

***Contingency option as proposed in the H & S Plan:***

Kalama wild winter steelhead has been identified as the potential contingency broodstock for the proposed Lewis River wild winter steelhead program if sufficient wild steelhead could not be collected in the Lewis River system. The Kalama River population is the closest geographically to the Lewis River basin. Also, because of the recent development of a wild winter steelhead hatchery program on the Kalama River, facilities and operations are in place for collecting returning wild adults. Furthermore, the Kalama River winter steelhead population is potentially the healthiest of all lower Columbia populations, and therefore, would be the most able to withstand withdrawals from the population. Finally, Kalama wild winter steelhead have maintained the 'late' run timing characteristic of lower Columbia wild winter steelhead stocks; this timing would assist in segregating returning adults (and hence, emerging fry) of wild winter steelhead (LRFPD 2004).

### 6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

(e.g. "*The risk of among population genetic diversity loss will be reduced by selecting the indigenous chinook salmon population for use as broodstock in the supplementation program*.").

Use of endemic wild adult steelhead for broodstock will provide the greatest protection of the population's genetic structure in a conservation/recovery program. Only adults with the highest probability of being endemic late stock through genetic analysis or return and maturity timing characteristics will be considered. First generational hatchery returns (F1) from this program will not be used as broodstock even though their lineage is of W x W crosses.

Baseline DNA microsatellite data collection has been ongoing at several Lower Columbia River tributaries including samples taken from Merwin Dam in 2006 (E. Kinne, 2006). Continuing to sample all broodstock spawners in subsequent years will be vital to identifying only historical stock but will also be able to determine potential repeat spawner success of live spawned adults released back to stream, determine successful kelt re-condiitoning % if collected in subsequent years and determine parentage of succeeding F1 generational smolts or adults.

*Pilot Project/Re-condition Endemic Kelts after Spawning:*
Steelhead have the ability to spawn more than once given the proper survival conditions (Newsom, T. 2004. 2002-2004 Re-conditioned kelt radio tracking. 2004 Yakima Klickitat Fish Program Annual Review). Other projects in the Columbia River basin have successfully reconditioned post-spawned fish, and released them back into the natural stream for additional spawning. This management alternative provides an option to increase natural spawning in the river, and maintain genetic diversity (2005 Annual Report - Kelt Reconditioning: A Research Project to Enhance Iteroparity in Columbia Basin Steelhead *(Oncorhynchus mykiss)*. Merwin Hatchery will be investigating short term kelt reconditioning possibilities at the hatchery. In the future re-model, several capital expenditures will need to be reviewed with PacifiCorp in order to accommodate this possibility.

## SECTION 7. BROODSTOCK COLLECTION

*Broodstock Strategy:* Strategy will be to collect enough fish representative of the historical wild winter steelhead population in the N.F. Lewis. The focus will be to collect them at the Merwin Dam Fish Collection Facility (FCF). Additional spawners are believed to be available in the lower system although spawner or redd surveys are not conducted by WDFW. The current scenario for starting this integrated program is consistent with HRSG Recommendations for collection of broodstock - "If the wild Population is 150 or more, limit collection of wild broodstock to 30%" (HSRG Technical Discussion Paper #3, March, 2005). The program is of high likelihood that it meets this recommendation. Effective population size (Ne) of 500 for steelhead at a 4 year cycle (125), is met with 50 broodstock and perhaps almost 300 fish remaining in the river will prevent inbreeding depression and may prevent Ryman-Laikre effects (HSRG Paper # 3, March 2005). Results are also consistent with estimating the effective number of breeders (Nb) by "IntDesign3" which is a spreadsheet model for design of integrated hatchery programs, including estimation of effective number of breeders Nb and Ne based on Wang and Ryman (C. Busack 2006, **Appendix 3**). Wild broodstock collection will continue annually for twelve consecutive years which will maximize effective genetic population size (Ne). If needing to reuse males more than once, WDFW will use the estimator model to calculate the effective number of breeders – Nb (pers. comm.- C.Busack 2006). Broodstock will be live spawned and except those not needed for pathology samples will be returned back to stream in order to preserve genetic material.

Investigating alternate collection scenarios may occur if not enough fish are available from year to year at this location and will be investigated by the Aquatics Conservation Committee (ACC). The current contingency broodstock option is Kalama River wild winter run which have been reared as a hatchery program in the Kalama Hatchery and is part of the same ESU as Lewis winter steelhead (H&S Plan). Extra precautions, handling and transfer protocols will be instituted for alternate broodstock collection scenarios. Populations of wild winter steelhead utilize Cedar Creek which is considered to be an important wild steelhead spawning tributary. These options would be investigated for 2-3 generations over initiating the contingent plan of using Kalama wild winter steelhead (LRFPD, 2004).

The plan is to eliminate any genetic introgression potential from non-local steelhead stock planted in the system which will continue under the new Lewis River Hydroelectric Projects Settlement Agreement (SA). Currently, genetic sampling (2005-2006) and testing is on-going at several Lower Columbia River tributaries with results available by the end of 2006 (pers. comm. T. Kassler, 2006). Continuing to sample all broodstock spawners in subsequent years will be vital to identifying only historical stock but will also be able to determine potential repeat spawner success of live spawned adults released back to stream, determine successful kelt re-condiitoning % if collected in subsequent years and determine parentage of succeeding F1 generational smolts or adults. In the Kalama River, research studies indicate that "early stock" winter run arriving at the Kalama Falls Hatchery trap occurs from November through February but are rare in March and April (pers. comm. Pat Hulett 2006). Return data from brood year 1999-2000 indicated only 1% (30/3128) of the early stock return showed up in March and 0.1% (3/3128) in April, although a direct correlation between run timing and spawn timing varies. A review of historic hatchery spawning time data for several early stock hatchery steelhead programs suggests that few hatchery fish spawn after March 15 (pers. comm. D. Rawding 2006). Broodstock collection from March on has a high likelihood of eliminating non-local genetic introgression. Preserving broodstock collection and spawn timing across the "entire run" temporal spawn period will be balanced against risk of using adipose fin present fish arriving from December thru February. This is because some Merwin Hatchery early winter steelhead releases could arrive as full adipose fin present adults based on a 1.58% missed mass mark clip rate from 2001-2006 (WDFW Future Brood Document Database).

### 7.1) Life-history stage to be collected (adults, eggs, or juveniles).

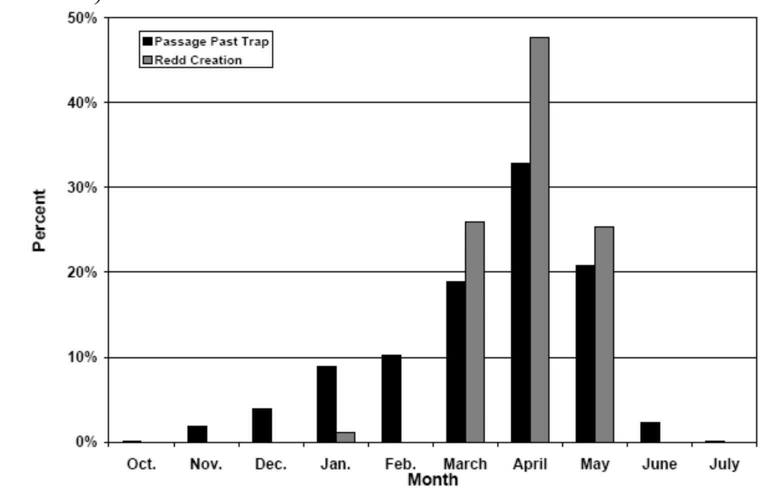
Late winter adult steelhead.

### 7.2) Collection or sampling design.

*Include information on the location, time, and method of capture (e.g. weir trap, beach seine, etc.) Describe capture efficiency and measures to reduce sources of bias that* *could lead to a non-representative sample of the desired broodstock source.*

In the lower Columbia, natural winter steelhead populations are believed to have been spread out over a wider temporal range than exists in some systems today. But, due to potential overlap of non-local winter steelhead in the system, the program may rely on later segments of the natural run. In the future and dependent results from current 2006 DNA analysis, wild segments encountered before March would be only be incorporated if they are DNA sampled. Because existing wild stock is believed to be predominately preserved in the later run timing (March on), much of the collection is expected to occur March – May (Figure 3).

**Figure 3.** Average timing of natural-origin winter steelhead passage at the Kalama River trap (1976-1977 through 1995-1996 seasons) and redd creation (1979-1980 through 1981-1982 seasons).




The program could investigate future use of hormonal implants designed to accelerate and synchronize final maturation of broodstock. This has been done at the Kalama research station on wild steelhead programs with a 75 microgram implant of gonadotropin (GnRHa; Ovaplant [R], Syndel Laboratories Ltd, Vancouver BC, www.syndel.com). This reduced spawn time from approximately 12-17 weeks for wild summer steelhead to a 5 week period (Kalama River Report Investigations, 2003). Although winter steelhead will not have as long a maturation period before spawning, later segments in May or early June could be hormone advanced enough to allow egg takes. The overall mortality of 2004 eggs (21%) from the hormonal implants was slightly higher than a 1999-2003 program average (18%) and found to be well within range for the past five years of wild steelhead egg mortalities in the Kalama Program (10-28%).

## 7.3) Identity.

*Describe method for identifying (a) target population if more than one population may be present; and (b) hatchery origin fish from naturally spawned fish.*

Wild winter steelhead are native to the N.F. Lewis River. Wild origin steelhead will be unmarked while all non-local stock presently released into Lower Columbia River tributaries including the Lewis River receive an adipose fin clip. Only steelhead identified by full adipose fin and dorsal fin presence will be considered along with appropriate run timing for broodstock selection. See also HGMP section 7.2. Other steelhead produced from other local stock winter steelhead programs such as Kalama or smolts produced from the Upper Cowlitz will be distinctly marked by a combination of ventral fin clips or CWT cheek marks if they stray to the Merwin Trap.

## 7.4) Proposed number to be collected:

### 7.4.1) Program goal (assuming 1:1 sex ratio for adults):

Up to 50 adults. The number of eggs taken from each female will depend on survival of the broodstock, individual fecundity and ripeness of each spawning female.

Fecundity for wild Kalama winter broodstock averaged 4,306 from 1998-2004 (Kalama Steelhead Research Progress Reports, 2004). If Lewis wild steelhead fecundity is similar or greater such as seen in Oregon (Clackmas Wild Winter Steelhead -ODFW HGMP Website), all females may not be spawned at 100% of fecundity so less eggs per female could be taken in order to increase the genetic material as much as possible within a given year. As there is a repeat spawner potential, as many females as possible will be live spawned and returned back to stream. For females that have been live spawned and determined to retain a portion of unripe eggs in the body cavity, they will not be spawned a second time and would be returned back to stream.

#### 7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

This new program is slated to begin broodstock collection in late winter 2006 (early 2007).

### 7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

*Describe procedures for remaining within programmed broodstock collection or allowable upstream hatchery fish escapement levels, including culling.*

Wild broodstock will be "live-spawned" and as many as possible will be returned to the lower river. Fish will be transported below Merwin Dam or to other locations in the N.F. Lewis River system as agreed upon by the ACC. Unlike other species of *Oncorhynchus*, except *O. clarki* (cutthroat trout), steelhead are capable of spawning more than once before they die (Busby et al. 1996).

Current WDFW/Co-Mgr Fish Health Statewide guidelines will require kidney/spleen virology sampling. For hatchery lots, 60 fish lots are policy for viral samples, but ESA listed stocks are handled case by case. WDFW has indicated that 50% sampling of ESA listed steelhead for the program would be required. Carcass distribution will require the approval of WDFW's pathologist to ensure proper disease control measures.

Returning adults from the juvenile supplementation program will be transported for the adult supplementation program above Swift Reservoir starting in 2010.

### 7.6) Fish transportation and holding methods.

*Describe procedures for the transportation (if necessary) and holding of fish, especially if captured unripe or as juveniles. Include length of time in transit and care before and during transit and holding, including application of anesthetics, salves, and antibiotics.*

Adults would be transported from Merwin Dam FCF to Merwin Hatchery by 1800 or 1100 gallon capacity tanker trucks. Transit time is 5-12 minutes. Fish can be held in raceways or holding ponds for maturation. To ameliorate hauling stress, salt (NaCl) is added to the water in quantities appropriate to the tub or tank volume (as described in WDFW Fish health manual).

If other broodstock collection alternatives are explored (hook or line or at other trapping sites), protocols to hold and transport fish would be determined by WDFW in consultation with NOAA Fisheries. This would include bathing of adults with PolyAqua at a dose of 5ml/10 gallons of water (KPD-32) and transported in individually safe containers equipped with air stones and oxygen (if needed) to the hatchery.

### 7.7) Describe fish health maintenance and sanitation procedures applied.

Broodstock could receive routine prophylactic formalin treatments at 1:6000 to minimize fungal infections if needed. Additional treatments as per Integrated Hatchery Operations Team (IHOT), Pacific Northwest Fish Health Protection committee (PNFHPC), WDFW's Fish Health Manual November 1966, updated March 30, 1998 or C-Mgrs. guidelines are followed. Fish health Specialists make monthly visits and consult with staff on the procedures needed to maintain fish health. Liquamycin (LA-200) injections may be warranted but currently not planned as fish may only be held for a month or less.

WDFW will need to sample brood stock (and emergent fry) for the presence of viral reportable pathogens. In order to preserve as many fish as possible for return back to stream, lethal sampling for kidney and spleens will be directed to mostly males and moribund females after live spawning. Up to 10 emergent fry from each female may be sampled to represent samples from females not kidney/spleen sampled.

The adult holding area is separated from all other hatchery operations. All equipment and personnel use disinfection (chlorine) procedures upon entering or exiting the area. Disinfection procedures that prevent pathogen transmission between stocks of fish are implemented during spawning. Spawning implements are rinsed with an iodophor solution, and spawning area and implements are disinfected with iodophor solution at the days end of spawning.

### 7.8) Disposition of carcasses.

*Include information for spawned and unspawned carcasses, sale or other disposal methods, and use for stream reseeding.*

As many females as possible will be live-spawned and returned to the N.F. Lewis River. Males or females in poor condition that are lethally spawned will be kidney spleen sampled and be used for nutrient enhancement if needed.

### 7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

*(e.g. "The risk of fish disease amplification will be minimized by following Co-manager Fish Health Policy sanitation and fish health maintenance and monitoring guidelines").*

WDFW will attempt to collect broodstock throughout the late winter run period (March to May) to prevent run timing divergence from the natural population. In order to insure that broodstock represent N.F. Lewis late winter wild stock, fish in January and February may be avoided until genetic sampling will be able to accurately determine origin of any adipose fin present fish.

Adults will be selected randomly without regard for size or appearance from trapping at Merwin Dam FCF or alternative sites and if by hook and line in order to minimize unintentional selection pressures. Severely damaged (seal bites) and wounded fish may be avoided and returned to stream if holding fish may result in mortality.

Special protocols will be used when handling listed to minimize stress and harm. All adults will be handled with soft fabric or rubber coated dip nets during handling. Pond holding containers may be epoxy painted if problems are encountered with current cement pond walls, and covered if needed be to prevent jumping loss. Exploring the option to utilize circular tanks for holding steelhead broodstock and kelt re-conditioning studies may be investigated.

Returning as many females as possible back to stream for repeat spawner potential is a priority in order to preserve genetic material. Females will be live spawned and those that retain significant portions of unripe or un-extruded eggs in the cavity could be released back to the river rather than trying to retain the fish for a second spawn. Air spawning may be used to prevent loss of protective mucus that may be encountered by strip spawning. Females that successfully extrude all eggs from the body cavity would be released or be candidates for a potential short term kelt re-conditioning pilot project. The project would be patterned after the Yakima River study of trying to re-establish feed response and assimilation by being fed a diet of krill for the duration (3-5 weeks) of their captivity. All short-term kelts may receive oxytetracycline and formalin to improve fish health during captivity. The option to mark fish or expand the numbers used in the reconditioning project will be determined in the future by the ACC.

First generational hatchery returns (F1) from this program will not be used as broodstock even though their lineage is of W x W crosses. All would be transported to the upper river. Priorities for usage by generation has been proposed in Table 6 (H & S Plan)

**Table 6.** Priorities for use of hatchery and natural-origin late winter steelhead broodstock

| **Generation after Introduction** | **Broodstock Source, Number and Composition** |
|---|---|
| 1st Generation | All broodstock for juvenile releases obtained from wild adults (50); all returns from the juvenile program transferred to the upper watershed; 500 minimum total adults is the target but not be met early in the program. |
| 2nd Generation | All broodstock for juvenile supplementation releases obtained from wild adults (not adult returns from supplemented juveniles); all adult returns from the juvenile supplementation; 500 minimum total adults is the escapement target |
| 3rd Generation | All broodstock for juvenile supplementation releases obtained from wild adults (not adult returns from supplemented juveniles); all adult returns from the juvenile supplementation; 500 minimum total adults is the escapement target |
| 4th Generation | Juvenile supplementation program suspended; all adults with intact adipose fins arriving at Merwin released above Swift No.1 Dam.* |

*WDFW and NOAA will need to establish the adult handling policy to be followed once late winter steelhead production meets abundance targets. If NOR late winter steelhead from the upper basin are marked, agencies have the ability to sort out lower basin wild fish from upper basin steelhead.

## SECTION 8. MATING

**Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously**.

### 8.1) Selection method.

*Specify how spawners are chosen (e.g. randomly over whole run, randomly from ripe fish on a certain day, selectively chosen, or prioritized based on hatchery or natural origin).*

All fish will be of wild origin selected randomly from the Merwin Dam FCF, or from other trapping locations or by hook and line techniques. Fish may be excluded from broodstock with significant damage such as seal bites or scrapes. Those with a low likelihood of surviving transport and holding stress will be returned back to stream. Males and females that have been collected for broodstock will be examined weekly during holding to determine ripeness.

### 8.2) Males.

*Specify expected use of backup males, precocious males (jacks), and repeat spawners.*

Adult males will be given priority in factorial crosses. When males are not available to meet factorial scenarios on a given spawn day, males may be used more than once. In those circumstances, males will be limited to no more than four times as primary spawners except in extreme cases (egg equivalent = 2 females). If males are used more than once, they would be tagged for identification purposes after they have been spawned to track the number times a particular male may contribute. The effective spawner population Nb, will be calculated to determine the effective number of broodstock used for a given generation based on "Effective Spawners Calculation Model" – **Appendix 2.** (C. Busack, 2006).

Jacks or smaller males (<20" TL) would be used as a proportion for mating as they occur in the population as either a factorial spawner or back-up male especially if milt quantity or quality has been poor. They could be valuable on a given spawn date as smaller males may tend to invest more energy in gonad growth than larger fish and produce more sperm per body size than larger males (Vladic and Jarvi, 2001). If needed, a jack could be a surrogate male in event that a viable male is not available on a given spawn date. If more than one jack is available for a given female, they could be used in tandem equally as part of the matrix cross for one female (pers.comm. C Busack 2006).

### 8.3) Fertilization.

*Describe spawning protocols applied, including the fertilization scheme used (such as equal sex ratios and 1:1 individual matings; equal sex ratios and pooled gametes; or factorial matings). Explain any fish health and sanitation procedures used for disease prevention.*

As there is only up to 25 pair to spawn with maturation spread over several weeks, the small number of fish ripe on individual days could potentially limit spawning options. On a given spawn, fertilization will occur in factorial crosses (2 x 2 or even 3 x 3) as much as possible. In order to ensure a high likelihood of genetic expression and fertilization potential, if equal factorial crosses are not present on a given spawn date, other matings could be used to increase the number of overall crosses. For factorial matings, water will be introduced after mixing milt. After 30 secounds, staff will combine eggs to one container in order to provide a minimal male back-up role.

Where insufficient males are available, males may be used as primary more than once. In those circumstances, males will try to be limited to no more than four times as primary spawners (egg equivalent = 2 females).

Sperm motility may be checked prior to mixing with eggs. After fertilization, eggs are rinsed in a buffered iodine solution (100 ppm) to control viral and bacterial disease, and allowed to water harden for one hour in the same solution.

### 8.4) Cryopreserved gametes.

*If used, describe number of donors, year of collection, number of times donors were used in the past, and expected and observed viability.*

Cryopreservation is not planned at this time, but may be used in future brood years to increase genetic diversity if warranted.

### 8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

(*e.g. "A factorial mating scheme will be applied to reduce the risk of loss of within population genetic diversity for the small chum salmon population that is the subject of this supplementation program".*).

Broodstock collection protocol will ensure that adults represent a proportional, temporal distribution of the late winter natural population but at the same time ensuring non-local stock fish are not used in the mating. Until on demand DNA testing can be secured in future funding, early components will be avoided as they may be unclipped Chambers derivatives or F1 adults from Chambers stock. Spawning later timed broodstock past early May may not allow the hatchery to produce 1 year age smolts and will not be taken at this time. By taking broodstock from the peak period (late March – early May), early and late genetics will be equally preserved to express early or late time genetic segments. This strategy is also used at the Kalama River Research Station (pers. comm. C. Sharpe 2006). In the future, if heating individual starter units is possible, later takes may be investigated to include later components.

Females will be air spawned to prevent mucus loss associated with stripping of the body cavity. Females that retain a percentage of eggs that are still green, will be returned back to stream to preserve as much genetic material as possible.

Kelt re-conditioning will be tested at this station. Short term success on males and females will be investigated and dependent on securing circular ponds and other improvements tot he facility. A factorial-mating scheme (as described in section 8.3) is used to reduce the risk of loss of within population genetic diversity. Other fertilization schemes while maintaining a 1:1 male to female spawning ratio as much as possible will be applied as needed. The total pool size is small and potentially could be spread out over a significant timeframe spawn timeframe.

After fertilization, eggs are rinsed in a buffered iodine solution (100 ppm) to control viral and bacterial disease, and allowed to water harden for one hour in the same solution.

## SECTION 9. INCUBATION AND REARING -

**Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.**

*Rearing Strategy:* Because the progeny will be of W x W crosses, rearing fish to mimic wild steelhead growth will remain a future option although the program goal will be to rear smolts to meet program size, condition factor parameters and to release them at time that maximizes survival to achieve adult supplementation goals. Rearing and growth parameters will be monitored monthly for size, condition (K or C) factor, and coefficient of variation (CV).

In order to minimize hatchery influences, rearing may employ several techniques for integrated programs such as reducing densities, treating traditional rearing receptacles with camouflage netting or natural paint schemes or different feed presentations per Hatchery Scientific Review Group (HSRG) Principals and Recommendations (April 2004). Heating or chilling water during incubation and early rearing cycles would allow multiple egg takes across 2-3 months period be combined. This will facilitate more effective feeding groups that will result in the needed growth patterns. In order to minimize disease transmission within the population, fish will need to be reared in as small a group size as the current facility permits in order to segregate lots from each other as long as facilities permit. Staff will be identifying needed improvements to the current facility, as it is not conducive to several of these needs.

The intent will be to rear a 1+ year age smolt, but if smolts cannot be achieved after one year, 2-yr rearing plans could remain an option for undersized ESA listed yearlings. In order to determine growth, the population will be monitored during monthly sampling inventory processes. During this time or during the marking procedure, staff will be able to separate smaller fish to catch fish up to size before returning them back to the general population. Wild steelhead smolts typically spend 2 years in freshwater (91%) or 3 years (9%) and return after spending 1 (.04%), 2 (73%) or 3 years (21%) in salt water (NOAA-NWFSC Tech Memo-27: Status Review of West Coast Steelhead Populations). It is unknown if ocean residency is altered by accelerating to a 1 year smolt release, but survival rates were indifferent to age at release as yearling (1+ year) versus 2-year smolts. At two Oregon hatcheries, results showed that return rates were nearly identical for similar size fish (Evenson 1993). If a significant portion of spawning occurs into late May or early June, it will pose a challenge to rearing the entire population within guidelines (pers. comm. C. Wageman, 2006). Current facility and logistical operations would need to be reviewed in order to accommodate the possibility of rearing multiple year class smolts that would combine with overlapping brood year cycles in succeeding years.

## 9.1) Incubation:

### 9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

*Provide data for the most recent twelve years (1988-99), or for years dependable data are available.*

This is a new program and the first egg take is scheduled for late winter/early spring 2007. The egg take goal is 80,000 with an approximate survival projections for ~50,000 smolts. Fecundity per female is anticipated to vary from spawner to spawner with a potential range from 3,000 – 5,500 eggs. The Kalama River wild winter steelhead program indicates an average fecundity of ~4,100 (HGMP 2004). The total green egg to smolt survival for this new program is projected to be approximately 62.5%. A survival range from 61% – 68% is based on Kalama River Wild Winter Steelhead data from 1998-2004 (Hulett et, al.). Total expected survival by stage:

- Average green egg to eyed egg survival (~82%) based on Kalama River Wild Winter Steelhead data.
- Eyed egg to ponding survival (~99%) based on Kalama River Wild Winter Steelhead data.
- Fry to fingerling survival (86%) based on Kalama River Wild Winter Steelhead data.
- Sub-yearling to yearling survival (95%) based on Kalama River Wild Winter Steelhead data.

### 9.1.2) Cause for, and disposition of surplus egg takes.

*Describe circumstances where extra eggs may be taken (e.g. as a safeguard against potential incubation losses), and the disposition of surplus fish safely carried through to the eyed eggs or fry stage to prevent exceeding of programmed levels.*

As fecundity will vary, different amounts of eggs could be collected from individual females. If additional eggs are taken, it is anticipated that this would not exceed 10% of the total needed for production. Because this is a new program, estimated egg take needs and fecundity can only be approximated from available data of other programs. If any phase of the green egg to smolt survival is higher than projected, additional progeny could be carried throughout the entire rearing cycle in order to ensure reaching the smolt goal. Furthermore, the disease history of natural broodstock is not known and retaining additional eggs, fry or fish will help ensure the goal is met in case of unexpected loss. Eggs from females determined to be viral positive would not necessarily be destroyed but maintained in isolation as long as possible including rearing stages. Excess eggs, or resultant fry or fingerlings produced from the program may be released within the Lewis River basin in areas of underseeded habitat as determined by the ACC.

### 9.1.3) Loading densities applied during incubation.

*Provide egg size data, standard incubator flows, standard loading per Heath tray (or other incubation density parameters).*

Eggs from individual females (10.5 - 27 oz. ; 2,499 – 5,544) will be incubated individually in Heath Techna trays through eye-up. Water flow through each tray is 6 gallons per minute (GPM). After eye-up, eggs may be placed in hatching baskets with a capacity of 20,000 eggs each within a shallow trough although staff will be examining ways to separate individual lots (by female) through-out the rearing period.

**9.1.4) Incubation conditions.**

*Describe monitoring methods, temperature regimes, minimum dissolved oxygen criteria (influent/effluent), and silt management procedures (if applicable), and any other parameters monitored.*

The incubation building is fitted with back-up pumps to maintain flow through the troughs in emergency situations and with secondary packed columns to maintain water oxygenation above 10 ppm. Flow monitors will sound an alarm if flow through the incubation troughs is interrupted. The water used to supply the Mari stack incubators at Merwin Hatchery is pumped directly from Lake Merwin, treated with ozone, and passed through an enclosed stripper. Water quality is generally very good, however, high water temperatures in the summer (58°F to 59°F) can be a problem but not through incubation or early rearing (Tetra Tech/KCM 2002). Heating water (or chilling) during incubation to fingerling stage may be planned to safely synchronize different lots of eggs and fry into intermediate troughs.

Single fish pool spawnings will be incubated separately during the green to eyed-egg stage to monitor for disease. Water temperatures are monitored continuously during incubation and formalin would be used to control fungus and ecto-parasites. DO is monitored weekly, and generally falls within 9-10 ppm.

**9.1.5) Ponding**.

*Describe degree of button up, cumulative temperature units, and mean length and weight (and distribution around the mean) at ponding. State dates of ponding, and whether swim up and ponding are volitional or forced.*

As a new program, mean dates are not available. Approximately 550 temperature units (TU) will be needed to develop eggs from green to the eyed stage (~ 42 days at 45ºF), fish will hatch at 650-675 TU and develop to fry stage at 925-950 TU (@ ~ 2,500 – 2,600 fry/lb). At a constant 45ºF, total time to ponding will take approximately 73 days. Depending on heating water, the *total time to ponding could be reduced to 41 days (increasing to 55ºF) or 38 days (increasing to 58ºF). Fish hatch within the stack incubators and upon swim–up are moved to intermediate shallow troughs or internal raceways (usually at about 800 fish/lb). Feed is introduced after all are buttoned up (usually 1-3 days post swim-up).

**9.1.6) Fish health maintenance and monitoring.**

*Describe fungus control methods, disease monitoring and treatment procedures, incidence of yolk-sac malformation, and egg mortality removal methods.*

Eggs will be examined daily by hatchery personnel. Prophylactic treatment of eggs for the control of fungus is prescribed by a WDFW fish health specialist and may include treatment with formalin or other accepted fungicides. Treatments are administered every other day at 1,666 part per million (ppm), for 15 minutes. Non-viable eggs and sac-fry are removed by bulb-syringe. After eye development (~400 T.U.), eggs will be "shocked", picked, and enumerated. Fry mortalities will be handpicked at ponding in rearing receptacles within the hatchery building.

**9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.**

(*e.g. "Eggs will be incubated using well water only to minimize the risk of catastrophic loss due to siltation.")*

Eggs may be incubated in pathogen free (ozonated), silt free well water to ensure maximum egg survival and minimize potential loss from disease. The hatchery incubation room is protected by a separate low water alarm system. Both water supplies and the power supply are alarmed to notify hatchery personnel if a failure occurs. Both water supplies are hooked to a back-up generator in case of a power failure. Hatchery staff is available 24 hrs/day.

## 9.2) Rearing:

### 9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available.

This is a new program and the first egg take is scheduled for late winter/early spring 2007. The egg take goal is 80,000 with an approximate survival projections for ~ 50,000 smolts. The total green egg to smolt survival for this new program is projected to be approximately 62.5% with a survival range from 61%–68% based on Kalama River Wild Winter Steelhead data from 1998-2004 (pers. comm. P.Huelett).

- Green egg to eyed egg mortality has ranged from 10-28% based on Kalama River Wild Winter Steelhead data.
- Fry to fingerling survival (86%) based on Kalama River Wild Winter Steelhead data.
- Sub-yearling to yearling survival (95%) based on Kalama River Wild Winter Steelhead data.

### 9.2.2) Density and loading criteria (goals and actual levels).

*Include density targets (lbs fish/gpm, lbs fish/ft3 rearing volume, etc).*

The fish are reared using the loading densities recommended by Piper et al. 1982. In all facilities within the Lewis River system, densities are kept at or below 3.3 lbs /gpm and 0.5 lbs /cu ft. before the last loading reduction in the fall of the year. Trough maximum loading is 40 lbs at 12 gpm (3.33 lbs/gpm). Tank and raceway maximum loading for early rearing is 132 lbs for the tanks at 40 gpm (3.3 lbs/gpm) and 800 lbs per raceway at 300 gpm (2.66 lbs/gpm). The final loading per raceway is approximately 3200 lbs. at 300 gpm (10.6 lbs/gpm).

### 9.2.3) Fish rearing conditions

*(Describe monitoring methods, temperature regimes, minimum dissolved oxygen, carbon dioxide, total gas pressure criteria (influent/effluent if available), and standard pond management procedures applied to rear fish).*

Ozone water sterilization will be used to meet fish health needs and about two-thirds of the flow is ozone disinfected prior to use. A maximum flow of 3,800 gpm can be sterilized and supplied to the hatchery building, raceways, and rearing ponds. The disinfected water is used in incubation and adult holding. The remaining water is routed to outdoor rearing ponds after passing through packed column degassing units. In addition to treating a portion of the incoming water, all water exiting the adult holding ponds and incubation building is routed into two effluent settling ponds (Tetra Tech/KCM, Inc. 2002). Additional plumbing for separating rearing units may need to be investigated.

Oxygen levels range between 10-12 ppm entering, to 8-10 ppm leaving the raceway, depending on ambient air temperature and number of fish in the raceway. Flow index (FLI) is monitored monthly at all facilities and would not exceeds 80% of the allowable loading (1982 Piper). Raceways are cleaned three times a week by brushing to remove accumulated uneaten feed and fecal material. Feeding is by pneumatic presentation from timed feeders or by hand presentation.

### 9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

Being a new program, the growth rate will attempt to approach what has been reported from the Kalama Research Station although the program will attempt to rear fish to an average of 5.5 ffp by May as conditions permit. Below is the growth rate of steelhead as reported from the Kalama River wild winter steelhead program (Kalama Wild Winter STHD HGMP 2004).

| Rearing Period | Length (mm) | Weight (fpp) | Condition Factor | Growth Rate |
|---|---|---|---|---|
| August | NA | 105.0 | NA | NA |
| September | NA | 46.0 | NA | 0.562 |
| October | NA | 30.0 | NA | 0.348 |
| November | NA | 25.0 | NA | 0.167 |
| January | 139.1 | 14.4 | 1.2 | 0.424 |
| March | 153.1 – 166.3 | 11.6 – 8.7 | 1.1 | 0.194 – 0.250 |
| April | 174.7 – 187.9 | 7.5 – 6.1 | 1.1 | 0.138 – 0.187 |
| Averages | 191.1 | 6.7 | 1.0 | NA |

**9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available**.

*Contrast fall and spring growth rates for yearling smolt programs. If available, indicate hepatosomatic index (liver weight/body weight) and body moisture content as an estimate of body fat concentration data collected during rearing.*

See above tables.

**9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).**

Fry/fingerling will be fed an appropriate commercial dry or semi-moist trout/salmon diet. Feeding occurs several times daily as necessary to provide the diet at a range of 0.7 – 1.1% B.W./day. As start-up fry, steelhead are hand-fed every 30 minutes. Once steelhead begin feeding regularly, they are hand-fed four times per day; additionally, they could be supplemented with automatic feeders throughout the day. Steelhead are fed between 3% and 5% body weight (BW) depending on their size and ambient water temperature. Feed conversion is expected to fall in a range of 1.1 – 1.4 pounds fed to pounds produced. Due to the duration of spawning time from the natural steelhead, a variety of starter diets and feed schedules may be used to achieve a similar size among the fish before they are moved outside to the rearing raceways. This strategy will reduce the variation (CV's) in size of juveniles within the population, and may reduce the number of residuals observed when fish are eventually released as smolts. Food types used to rear winter steelhead from fry to fingerling include:

- Bio Diet Starter #2
- Bio Diet Starter #3
- Bio Moist Grower 1.0 mm
- Bio Moist Grower 1.3 mm
- Bio Moist Grower 1.5 mm

**9.2.7) Fish health monitoring, disease treatment, and sanitation procedures**.

A WDFW Fish Health Specialist monitors fish health as least once a month. Prior to this examination, whenever abnormal behavior or mortality is observed, staff will contact the fish health specialist. Policy guidance includes: *Fish Health Policy in the Columbia Basin and current WDFW/Co Mgrs Fish Health Policy Draft 2006 Version)*. Based on pathological or visual signs by the crew, age of fish and the history of the facility, the pathologist determines the appropriate tests. External signs such as lesions, discolorations, and fungal growths will lead to internal examinations of skin, gills and organs. Mortality can result in kidney and spleen checks for bacterial kidney disease (BKD). Blood is checked for signs of anemia or other pathogens. Additional tests for virus or parasites are done if warranted. Treatment for disease is provided by Hatchery Specialists under the direction of the Fish Health Specialist. Sanitation consists of raceway cleaning three times each week by brushing and disinfecting equipment between raceways and/or between species on the hatchery site. Reporting and control of selected fish pathogens are done in accordance with the Co-managers Fish Disease Control Policy and IHOT guidelines.

All eggs brought to the facility are surface-disinfected with iodophor (as per disease policy). All equipment (nets, tanks, boots, etc.) is disinfected with iodophor between different fish/egg lots. Different fish/egg lots are physically isolated from each other by separate ponds or incubation units. The intent of these activities is to prevent the horizontal spread of pathogens by splashing water. Tank trucks are disinfected between the hauling of adult and juvenile fish. Foot baths containing disinfectant are strategically located on the hatchery grounds to prevent spread of pathogens.

Mortality is collected and disposed of at a landfill. Fish health and treatment reports are kept on file.

### 9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.

The program goal will be to release fish based on time, size and condition factor parameters. Pre-liberation samples will note smolt development visually based on degree of silvering, presence/absence of parr marks, fin clarity and banding of the caudal fin. No gill ATPase activity or blood chemistry samples to determine degree of smoltification or to guide fish release timing is anticipated.

### 9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

Several methods to make the rearing receptacles represent some semi-natural features may be planned by staff including; camouflage covers over the outside rearing units, paint so that the walls and bottoms are of nearly natural coloration and texture which will promote natural looking fish. Demand or pneumatic feeders may also be used where possible to limit human interaction.

### 9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

(*e.g. "Fish will be reared to sub-yearling smolt size to mimic the natural fish emigration strategy and to minimize the risk of domestication effects that may be imparted through rearing to yearling size.")*

The program will isolate rear individual pools of fish (each female) as long as possible and at least until viral testing for disease is complete. The current facilities do not allow for long term isolate rearing techniques but several facility upgrades or needed improvements will be communicated as the program continues.

Fish will be reared to achieve a size and condition factor at a time that represents the best chance for survival in order to meet adult supplementation goals. Professional personnel trained in fish cultural procedures man Lewis River Complex facilities. Facilities are state-of-the-art to provide a safe and secure rearing environment through the use of alarm systems, backup generators, and water re-use pumping systems to prevent catastrophic fish losses.

The hatchery environment is secured behind fencing, with the adult holding pond strategically located within the complex of buildings. Incubation and starter units are within the hatchery building with several safeguard features to notify staff of water loss. Fish will be reared under camouflage covers to maintain fright response to humans and other potential predators. Fish released from this program will be reared, imprinted, acclimated on river water to provide 100% acclimation and imprinting.

## SECTION 10. RELEASE

**Describe fish release levels, and release practices applied through the hatchery program.**
*Specify any management goals (e.g. number, size or age at release, population uniformity, residualization controls) that the hatchery is operating under for the hatchery stock in the appropriate sections below.*

### 10.1) Proposed fish release levels. *(Use standardized life stage definitions by species presented in **Attachment 2**. "Location" is watershed planted (e.g. "Elwha River").)*

| Age Class | Maximum Number | Size (fpp) | Release Date |
|---|---|---|---|
| Eggs | | | |
| Unfed Fry | | | |
| Fry | | | |
| Fingerling | | | |
| Yearling | 50,000 | 5 - 8[1] | April 15 – May 15[2] |

[1]Size goals as indicated in the H & S Plan. Target size will be a mean of 205 mm fl.

[2]Target release date will be from May 1st on and will depend on size, condition factor and behavior. Release dates past May 15th could occur if size parameters have not been met and could occur up to the last week in May.

### 10.2) Specific location(s) of proposed release(s).

**Stream, river, or watercourse:** *(include name and watershed code (e.g. WRIA) number)*
N.F. Lewis River
**Release point:** (*river kilometer location, or latitude/longitude*)
Location as close to Merwin Dam/Merwin FCF located at RKm 30.8.
**Major watershed:** *(e.g. "Skagit River")*
Lewis River system
**Basin or Region:** *(e.g. "Puget Sound")*
Lower Columbia River ESU Region

### 10.3) Actual numbers and sizes of fish released by age class through the program.

*For existing programs, provide fish release number and size data for the past *three fish generations, or approximately the past 12 years, if available. Use standardized life stage definitions by species presented in **Attachment 2**. Cite the data source for this information.*

Spring 2008 will be the first year of release with a goal of up to 50,000 smolts.

### 10.4) Actual dates of release and description of release protocols.

*Provide the recent five year release date ranges by life stage produced (mo/day/yr). Also indicate the rationale for choosing release dates, how fish are released (volitionally, forced, volitionally then forced) and any culling procedures applied for non-migrants.*

The release will be dependent on time, size, condition factor and smolt behavior. This period will overlap the wild smolt emigration in the N.F. Lewis River system. Peak migration of wild steelhead smolts occurred from April 17-May 14 (82% of the population) in Cedar Creek smolt monitoring studies (Rawding et, al., 2006).

The ¼ acre rearing pond leads to one of the two smolt collection ponds so when fish "smolt" they can emigrate to one of these lower ponds. Fish will be seined out from these ponds and transferred for release to the N.F Lewis River. If fish meet time, size, and condition factor goals, pond levels can be lowered to encourage fish to move to the smolt collection ponds which would then be trucked to the river. In studies, forced releases meeting size, time and condition factor parameters have performed similar to volitional releases (Wagner 1968; Evenson and Ewing 1992)

### 10.5) Fish transportation procedures, if applicable.

*Describe fish transportation procedures for off-station release. Include length of time in transit, fish loading densities, and temperature control and oxygenation* methods.

Fish will be transported from Merwin Hatchery smolt collection ponds to a N.F. Lewis River release sites adjacent to or above the hatchery by tanker truck. This would be less than ¼ mile trip and take less than 10 minutes.

### 10.6) Acclimation procedures (*methods applied and length of time*).

Fish will be reared at Merwin Hatchery the entire cycle until release by May. Rearing will occur on Lewis River (Merwin Reservoir) water, which provides acclimation and imprinting to the chemistry and temperature regime of the N.F. Lewis River basin.

### 10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

The program originally was to be marked at a 100% RV clipped rate with adipose fin intact. WDFW will explore other options due to the impact on survival with a ventral mark. For wild natural smolts eventually produced by the adult supplementation program above Swift Reservoir, the adipose fin will remain intact and coded wire tag implants in the cheek 9right) will be used.

### 10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

Monitoring of fish numbers, growth and mortality at the hatchery will provide reasonably accurate estimates of live fish throughout their rearing life. Only if extremely high survival (unexpected) of progeny from the green egg stage occurred would surplus fish be identified during the rearing cycle. Depending on success of higher survival or lower survival, egg takes will be adjusted in order to reach needed goals.

### 10.9) Fish health certification procedures applied pre-release.

Prior to release, the population health and condition will be monitored daily by staff and monthly by the WDFW Area Fish Health Specialist. As the release period approaches, the population wll be checked 1-3 weeks pre-release by the Fish Health Specialist. All pathological results are reported on the WDFW fish health forms.

Standard Fish Health Procedures:

- All fish health monitoring will be conducted by a qualified WDFW fish health specialist.
- Conduct examinations of juvenile fish at least monthly and more often as necessary. A

representative sample of healthy and moribund fish from each lot of fish will be examined. The number of fish examined will be at the discretion of the fish health specialist.
• Investigate abnormal levels of fish loss when they occur.
• Determine fish health status prior to release or transfer to another facility. The exam may occur during the regular monthly monitoring visit, i.e. within 1 month of release.
• Appropriate actions including drug or chemical treatments will be recommended as necessary. If a bacterial pathogen requires treatment with antibiotics a drug sensitivity profile will be generated when possible.
• Findings and results of fish health monitoring will be recorded on a standard fish health reporting form and maintained in a fish health database.
• Fish culture practices will be reviewed as necessary with facility personnel. Where pertinent; nutrition, water flow and chemistry, loading and density indices, handling, disinfecting procedures, and treatments will be discussed.

### 10.10) Emergency release procedures in response to flooding or water system failure.

Under conditions requiring release of fish at either hatchery in response to a water system failure or unlikely flooding, all fish could be hauled by truck to the river and released. This type of emergency procedure has not been necessary at this station on existing steelhead programs in the past.

### 10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

(*e.g. "All yearling coho salmon will be released in early June in the lower mainstem of the Green River to minimize the likelihood for interaction, and adverse ecological effects, to listed natural chinook salmon juveniles, which rear in up-river areas and migrate seaward as sub-yearling smolts predominately in May").*

For the duration of the program, all fish will be released into the N.F. Lewis. The release of smolts fosters rapid seaward migration with minimal rearing of delay in the rivers, limiting interactions with naturally produced steelhead juveniles. Since the standard release strategy will consist of releasing smolts only, most will orient to the river for a short time (1-10 days) and then emigrate. The program is not planning to release undersized fish or stages not of yearling development at this time but will review the program based on the first year of results.

As the late winter steelhead program will need to maximize adult homing instinct back to the Merwin FCF, smolts will be released as far upstream as possible in the lower N.F. Lewis. Non-local winter (early) and summer steelhead programs are trucked downstream of I-5 in order to minimize impact of large numbers of smolts through known wild stock rearing areas.

Section 8.3.2.4 in the Settlement Agreement has identified procedure for adaptive management actions for unacceptable impacts from hatchery production including covered by the SA.

## SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

*This section describes how "Performance Indicators" listed in Section 1.10 will be monitored. Results of "Performance Indicator" monitoring will be evaluated annually and used to adaptively manage the hatchery program, as needed, to meet "Performance Standards".*

### 11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

#### 11.1.1) Describe plans and methods proposed to collect data necessary to respond

**to each "Performance Indicator" identified for the program.**
Monitoring of Hatchery and Supplementation Program. The Licensees shall include in the M&E Plan all elements required to monitor the effectiveness of the Hatchery and Supplementation Plan in meeting the goals set out in Section 8.1 above, including, without limitation, the items listed in Section 9.5 (H & S Plan) and subsequent M & E plans as indicated in the Settlement Agreement).

***Estimate the contribution of Integrated Recovery program - origin winter steelhead (late) steelhead to the basin and compare performance to the natural population***.

Indicators: *3.1.2, 3.2.1, 3.2.2, 3.3.1, 3.3.2, 3.4.3, 3.4.2, 3.5.1, 3.5.3, 3.5.4, 3.5.5.*

1. Differentially mark all hatchery-reared late winter steelhead smolts to allow for distinction from natural-origin fish upon return as adults used for Upper Lewis River supplementation. This will be accomplished by a right ventral (RV) fin clip or other mark determined to be less of an impact to survival.

Indicators: *3.1.2, 3.2.2, 3.3.1, 3.3.2, 3.4.1, 3.4.2, 3.4.3, 3.5.3, 3.7.6, 3.7.7.*

2. Conduct trapping at permanent and temporary trap locations throughout the winter steelhead return (December to June) to collect broodstock for the hatchery Integrated Recovery program, enumerate overall returns, and to collect information regarding fish origin for the spawning escapement, and age class composition.

Indicators: *3.2.1, 3.3.1, 3.3.2, 3.4.4, 3.5.2, 3.7.6.*

3. Enumerate the proportions of natural, endemic brood hatchery, and other hatchery-origin steelhead in the spawning population in the upper watershed.

Indicators: *3.1.2, 3.2.1, 3.3.1, 3.3.2, 3.4.2, 3.5.3, 6.*

4. Enumerate the number of hatchery-origin winter steelhead contributing to the Upper Lewis River adult supplementation program. Phase out hatchery adults as smolt collection facilities are proven to trap wild smolts for release downstream of the dams and adults returning from identified wild smolt will replace hatchery origin adults in the upper watershed depending on productivity and fish collection efficiencies.

Indicators: *3.1.2, 3.2.1, 3.2.2, 3.3.2, 3.4.4, 3.5.4, 3.5.5.*

5. Estimate SARs by brood year to determine if fish meet survival goals of smolts produced from adult re-introduction efforts in the upper basin spawning grounds and any harvest opportunities.

***Monitor and evaluate any changes in the genetic, phenotypic, or ecological characteristics of the populations potentially affected by the program.***

Indicators: *3.5.1*

1. Compare or collect additional GSI data (allozyme or DNA-based) from regional winter steelhead adult populations to determine the degree to which discrete populations persist in the Lewis River watersheds including major tributaries. Allozyme collections will be used for comparison with past results to monitor changes in allelic characteristics and with the intent to assess whether the hatchery endemic broodstock program negatively affects the genetic diversity of the natural population in the Lewis River.

Indicators: *3.4.3, 3.4.2, 3.5.3.*

2. Collect length and scale samples from all adults (natural and hatchery) returning to traps on the Lewis River system or broodstock collected by other methods. Assess age structure of returning hatchery-origin fish and compare with natural fish. Compare length at age of natural and hatchery-reared returning adults (Cedar Creek monitoring will be used).

Indicators: *3.2.2, 3.3.2, 3.4.3, 3.4.4, 3.5.5.*

4. Wild smolt production or collection of adult kelts will commence with the development and installation of collection facilities in the upper basin based on the Settlement Agreement Section 9.1 Monitoring and Evaluation Plan. Operate a smolt/audlt kelt trap in the Upper Lewis Basin (above Swift Reservoir) to: 1) Estimate the number, timing, and age composition of natural-origin steelhead smolts from the upper basin and 2) estimate the Fish Collection Efficiency (FCE) of the proposed smolt collection facilities from releases of endemic stock hatchery steelhead in the upper basin.

***Assess the need and methods for improvement of mitigation / conservation activities in order to meet program objectives, or the need to discontinue the program because of failure to meet objectives.***

Indicators: *3.4.3, 3.4.4, 3.5.4, 3.5.5, 3.6.1, 3.6.2*

1. Determine the pre-spawning and green egg to released smolt survivals for the program.
    a. Monitor growth and feed conversion for fingerling.
    b. Determine green egg to eyed egg, eyed egg to fry, and fry to smolt survival rates.
    c. Maintain and compile records of cultural techniques used for each life stage, such as: collection and handling procedures, and trap holding durations for broodstock, fish and egg condition at time of spawning, fertilization procedures, incubation methods/densities, temperature unit records by developmental stage, shocking methods, and fungus treatment methods for eggs, ponding methods, rearing/pond loading densities, feeding schedules and rates for juveniles, and release methods. Summarize results of tasks for presentation in annual reports.
    d. Identify where the hatchery program is falling short of objectives and make recommendations for improved production as needed.

Indicators: *3.4.1, 3.4.2, 3.4.3, 3.5.2, 3.6.2, 3.7.1, 3.7.6, 3.7.7.*

2. Determine if broodstock procurement methods are collecting the required number of adults that represent the demographics of the donor population with minimal injuries and stress to the fish.
    a. Monitor operation of adult trapping operations to ensure compliance with established broodstock collection protocols.
    b. Monitor timing, duration, and composition of adults collected at alternative sites.
    c. Maintain daily records of trap operation and maintenance (e.g. time of collection), number and condition of fish trapped, and environmental conditions (e.g. river level, water temperature).
    d. Collect biological information on collection-related mortalities. Determine causes of mortality and use carcasses for stock profile sampling, if possible.
    e. Summarize results for presentation in annual reports. Provide recommendations on means to improve broodstock collection and refine protocols, if needed for application in subsequent seasons.

Indicators: *3.7.1, 3.7.4*

2. Monitor fish health, specifically as related to cultural practices that can be adapted to prevent fish health problems. Professional fish health specialists supplied by WDFW will monitor fish

health.

a. Fish health monitoring will be conducted by a fish health specialist. Significant fish mortality to unknown causes will be sampled for histopathological study.
b. The incidence of viral pathogens in broodstock will be determined by sampling fish at spawning in accordance with procedures set forth in WDFW/Co-Mgr. Fish Health Guidelines and Policies. Recommendations on fish cultural practices will be provided on a monthly basis, based upon the health of juveniles.
c. Fish health monitoring results will be summarized as part of an annual report.

Indicators: *3.7.1, 3.7.2, 3.7.3, 3.7.4, 3.7.5.*

4. Monitor and document facility operation to ensure compliance with applicable standards and to ensure that operation does not adversely affect natural populations.

***Collect and evaluate information on adult returns***.

This element will be addressed through consideration of the results of previous elements, and through the collection of information required under adaptive criteria. All will be used as the basis for determining the progress toward program goals and whether the program should continue.

Spawners returned back to stream or lethally spawned will be scale sampled to determine freshwater and marine residency. DNA sampling will be proposed for each wild steelhead used for broodstock and handled through-out the program duration. DNA data will be used to detect repeat spawner success and any kelt re-conditioning success in future years.

Indicators: *3.1.2, 3.2.1, 3.2.2, 3.3.1, 3.4.3, 3.5.1, 3.5.2, 3.6.1, 3.6.2*

1. Monitor harvest of hatchery endemic stock Lewis River steelhead in harvest strategies in the upper basin *if they materialize.*
2. Collect age, sex, length, average egg size, and fecundity data from a representative sample of broodstock used in the endemic stock program for use as baseline data to document any phenotypic changes in the populations.
3. Compare future DNA data reporting allele frequency variation of returning hatchery and natural fish with baseline genetic data. Determine if there is evidence of a loss in genetic variation (not expected from random drift) that may have resulted from the endemic stock program.

Use the above information to determine whether the population has declined, remained stable, or has been recovered to sustainable levels. The ability to estimate hatchery and natural proportions will be determined by implementation plans, budgets, and assessment priorities.

### 11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

By the second anniversary of the Issuance of the first of the New Licenses, the Licensees (PacifiCorp) shall complete a master monitoring and evaluation plan (the "M&E Plan") in Consultation with the ACC to implement the terms of this Section 9 to monitor and evaluate the effectiveness of aquatic PM&E Measures and to assess achievement of the Reintroduction Outcome Goals. The M&E Plan shall address the tasks, and the methods, frequency, and duration of those tasks, necessary to accomplish the monitoring and evaluation items described below. The Licensees shall provide a draft M&E Plan to the ACC by the first anniversary of the Issuance of the first New License. The Licensees shall allow the ACC a period of 90 days to provide comments on the draft M&E Plan as part of such Consultation. The Services shall have final approval authority over elements of the M&E Plan relating to fish passage or species listed under the ESA, subject to Section 15.14 below. The Licensees shall finalize the M&E Plan and submit it to the Commission for approval within 90 days after the close of the ACC comment period. The Licensees shall implement the M&E Plan upon approval by the Commission. For the purposes of this Section 9, Cowlitz PUD shall prepare elements of the M&E Plan to be performed within the boundaries of Swift No. 2 and shall implement such elements. PacifiCorp shall prepare and implement all other elements of the M&E Plan. PacifiCorp and Cowlitz PUD shall cooperate to prepare a single M&E Plan and a single annual report to the Commission, but if that is not successful, each shall submit its own plan and annual report as required under this Section 9.

The Licensees shall provide to the ACC the results of the monitoring and evaluations under the M&E Plan as part of the Licensees' annual report required in Section 14.2.6. The Licensees shall also include in such annual report a description of the monitoring and evaluation tasks to be completed during the following year. The Licensees shall Consult with the ACC as necessary, but no less often than every five years, to determine if modifications to the M&E Plan are warranted. As a result of such Consultation, the Licensees shall propose changes to the M&E Plan to improve the effectiveness of monitoring and evaluation. The Services shall have final approval of changes to the M&E Plan with respect to fish passage or species listed under the ESA. The Licensees shall implement any changes to the M&E Plan as soon as they have been approved by the Commission.

The Licensees shall amend the M&E Plan in Consultation with the ACC, to incorporate newly constructed facilities and other aquatic PM&E Measures to be implemented during the terms of the New Licenses. The Licensees shall provide a draft revised M&E Plan relating to facilities to be constructed in the future, and other aquatic PM&E Measures to be implemented in the future, to the ACC not less than two years before completing construction of such facilities or implementation of such measures. The Licensees shall allow the ACC a period of 90 days to provide comments on the draft revised M&E Plan as part of such Consultation. The Services shall have final approval authority over elements of the revised M&E Plan relating to fish passage or species listed under the ESA, subject to Section 15.14 below. Licensees shall finalize the revised M&E Plan and submit it to the Commission for approval within 90 days after the close of the ACC comment period. The Licensees shall implement any amendments to the M&E Plan as soon as they have been approved by the Commission.

### 11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

(*e.g. "The Wenatchee River smolt trap will be continuously monitored, and checked every eight hours, to minimize the duration of holding and risk of harm to listed spring chinook and steelhead that may be incidentally captured during the sockeye smolt emigration period.)"*

1. Juvenile sampling at hatchery facilities will be conducted with accepted procedures to minimize stress and mortality from sampling. Sample sizes will be the minimum necessary to achieve statistically valid results for growth, tag retention and fish health.
2. Smolt trapping operations will ensure that holding time, stress and potential for injury of captured migrants is minimized. Marked groups for assessing trap efficiency will be the minimum necessary to achieve statistically valid results.

3. Adult trapping facilities will be monitored daily, or more often as necessary to prevent injury and unnecessary delay.
4. Alternative broodstock collection protocols will be developed by WDFW in conjunction with NOAA Fisheries in such a manner to avoid scaring spawning fish off redds. Also, care will taken when walking in areas with redds so eggs won't be accidentally crushed.
5. Protocols for handling juveniles or adult kelts at proposed fish collection facilities in the upper basins will be developed.

## SECTION 12. RESEARCH

*Provide the following information for any research programs conducted in* ***direct association with the hatchery program described in this HGMP. Provide sufficient detail to allow for the independent assessment of the effects of the research program on listed fish****. If applicable, correlate with research indicated as needed in any ESU hatchery plan approved by the co-managers and NMFS. Attach a copy of any formal research proposal addressing activities covered in this section. Include estimated take levels for the research program with take levels provided for the associated hatchery program in* ***Table 1****.*

**12.1) Objective or purpose.**

*Indicate why the research is needed, its benefit or effect on listed natural fish populations, and broad significance of the proposed project.*

**12.2) Cooperating and funding agencies**.

**12.3) Principle investigator or project supervisor and staff.**

**12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.**

**12.5) Techniques: include capture methods, drugs, samples collected, tags applied**.

**12.6) Dates or time period in which research activity occurs.**

**12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.**

**12.8) Expected type and effects of take and potential for injury or mortality.**

**12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).**

**12.10) Alternative methods to achieve project objectives.**

**12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.**

**12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the**

**proposed research activities.**
(*e.g. "Listed coastal cutthroat trout sampled for the predation study will be collected in compliance with NMFS Electrofishing Guidelines to minimize the risk of injury or immediate mortality.")*.

## SECTION 13. ATTACHMENTS AND CITATIONS

*Include all references cited in the HGMP. In particular, indicate hatchery databases used to provide data for each section. Include electronic links to the hatchery databases used (if feasible), or to the staff person responsible for maintaining the hatchery database referenced (indicate email address). Attach or cite (where commonly available) relevant reports that describe the hatchery operation and impacts on the listed species or its critical habitat. Include any EISs, EAs, Biological Assessments, benefit/risk assessments, or other analysis or plans that provide pertinent background information to facilitate evaluation of the HGMP.*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## SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the information provided is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by_____________________________ Date:_____________

**Take Table 1.** Estimated listed salmonid take levels of by hatchery activity.

| **Listed species affected: Lower Columbia steelhead ESU ESU/Population: N.F. Lewis Late Winter Steelhead Activity: Juvenile Supplementation Program to generate adults for Adult Supplementation program for the Upper Lewis River System** | | | | |
|---|---|---|---|---|
| **Location of hatchery activity: Merwin hatchery Dates of activity: 2007 – 2022 Hatchery program operator:WDFW** | | | | |
| **Type of Take** | **Annual Take of Listed Fish By Life Stage *(Number of Fish)*** | | | |
| | Egg/Fry | Juvenile/Smolt | Adult | Carcass |
| **Observe or harass a)** | | | | |
| **Collect for transport b)** | | | | |
| **Capture, handle, and release c)** | | | | |
| **Capture, handle, tag/mark/tissue sample, and release d)** | | | | |
| **Removal (e.g. broodstock) e)** | | | 50[2] | |
| **Intentional lethal take f)** | | | 25[3] | |
| **Unintentional lethal take g)** | | 29,750 | 1* | |
| **Other Take (specify) h)** | Up to 250[1] | | | |

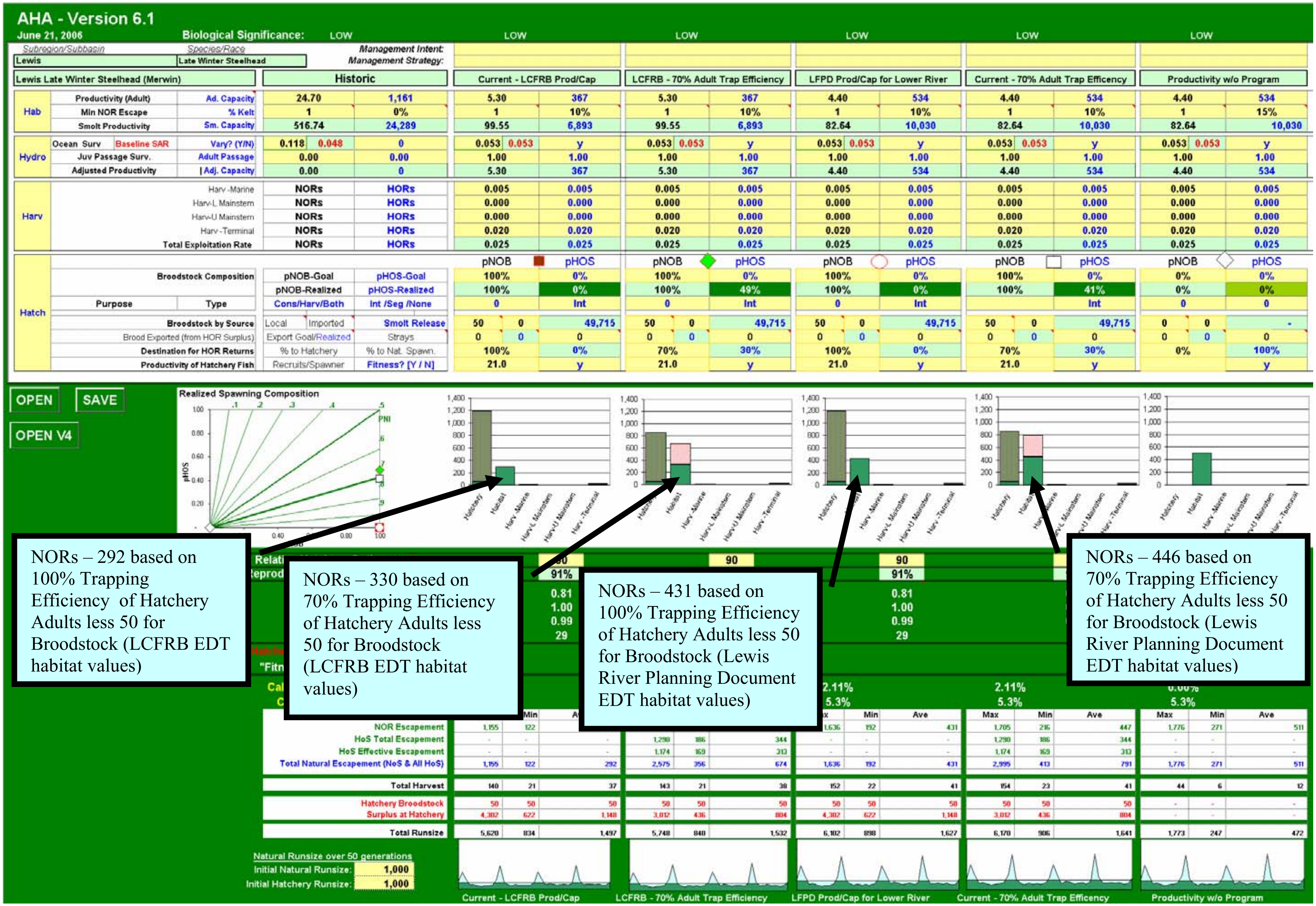
[1]Emergent fry from eggs resulting from the broodstock take. ~10 per female is proposed to be viral sampled.
[2]Total collected, females are live spawned and returned back to stream.
[3]Up to 50% could be used for kidney/spleen viral sampling per WDFW/ Co-Mgr Fish Health Guidelines.
* If a pilot kelt re-conditioning project is approved, up to 5 females out of the 25 live spawned could be used. Projected mortality is 1.

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

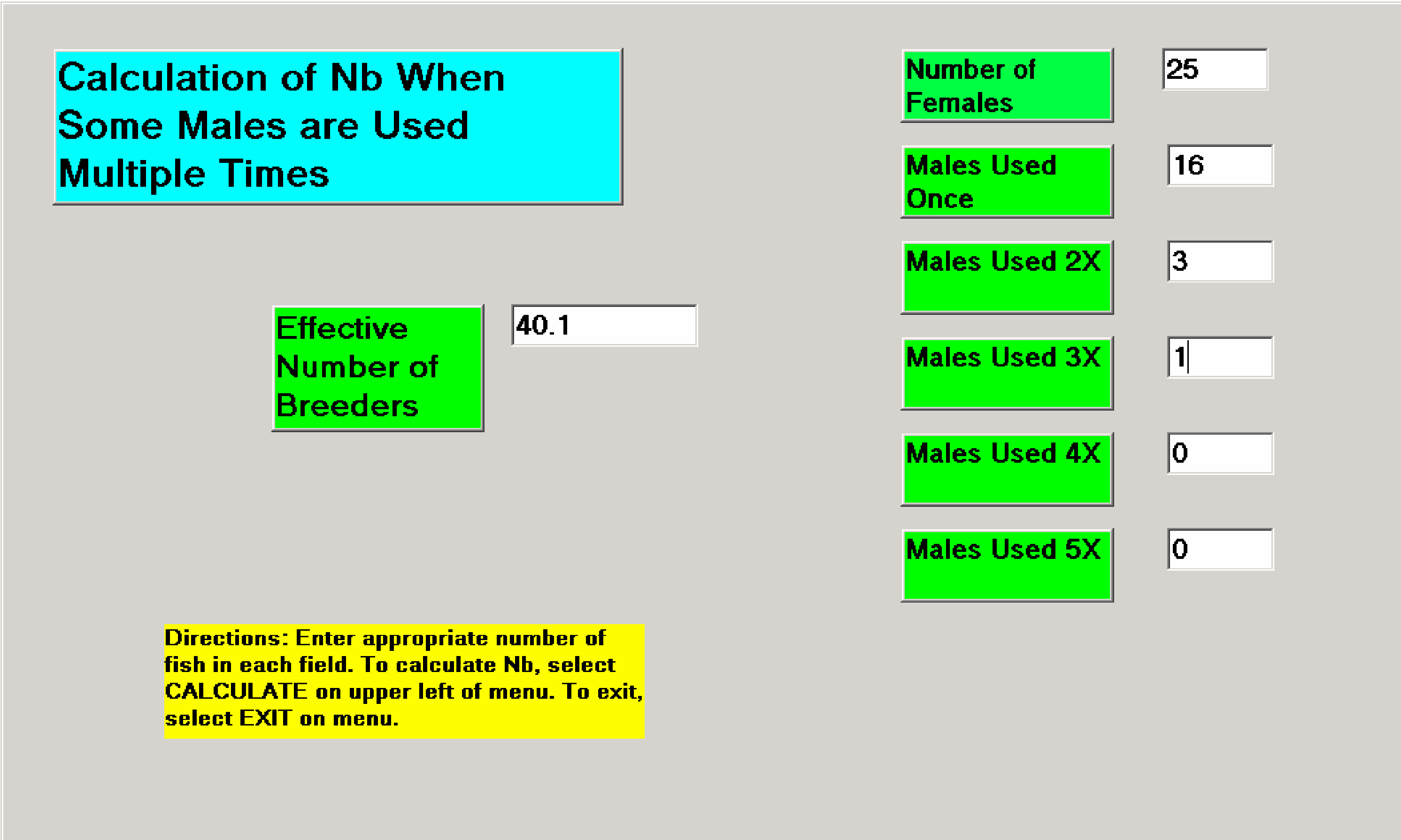
***Instructions:***

1. *An entry for a fish to be taken should be in the take category that describes the greatest impact.*
2. *Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).*
3. *If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.*

**Appendix I.** AHA Model Run for Lower Lewis River winter steelhead. Two habitat productivities were modeled – current values taken from the Lower Columbia River Fish Recovery Board Plans, and current EDT values from the Lewis River Planning Document (April 2004). Returning hatchery fish not captured for upriver adult supplementation were modeled at 70% (100% if assuming all will be trapped at Merwin Dan FCF.



**Appendix 2.** Nb Calculator for Effective Spawners Calculations (if males used more than once).



**Appendix 3.** Ne Effective Population Calculator (C. Busack 2006).

# Input:

Only numbers within this box can be changed; entries in all other cells are calculated from values in this box, and cannot be changed

| | | |
|---|---|---|
| **Natural Production Parameters** | | |
| **Beverton-Holt Productivity Parameter** | **5.3** | |
| **Beverton-Holt Capacity Parameter** | **356** | |
| **Hatchery Production Parameters** | | |
| **Broodstock Size** | **50** | |
| **Recruits/spawner** | **21** | |
| **Gene Flow** | | |
| **Proportion Natural-origin fish in broodstock** | **1** | |
| **Proportion Hatchery-origin fish on spawning grounds** | **0.45** | |
| **Harvest Rate on HORs** | **0.01** | **0.798691** |
| **Harvest Rate on NORs** | **0.01** | |
| **W&R Family Variance Multipliers** | | |
| **Family variance multiplier for HO fish** | **3** | |
| **Family variance multiplier for NO fish** | **3** | |

# Output

| | |
|---|---|
| PNI | 0.689655 |
| **Total NORs** | **311** |
| **Harvest** | **3** |
| **Spawners** | **308** |
| **Total HORs** | **1050** |
| **Harvest** | **11** |
| **Escapees** | **1040** |
| **Spawners** | **211** |
| **Surplus** | **828** |
| **Natural Spawners** | **470** |
| **NOS** | **258** |
| **HOS** | **211** |
| **Broodstock** | **50** |
| **NOB** | **50** |
| **HOB** | **0** |

| | |
|---|---|
| **Equilibrium. NORs** | |
| **hatchery+harv** | **311** |
| **harvest, no hatchery** | **285** |
| **no harvest, no hat.** | **289** |
| **HOR Removal** | |
| **Proportion escapees remov** | **0.80** |
| **Effective total harvest rate** | **0.80** |

| **Effective Size Stuff** | **Nb** | **Nc/Nb** |
|---|---|---|
| **L&O** | 246.5 | 2.11 |
| **Wang and Ryman** | **126.0** | **4.12** |
| **Without Hatchery** | **94.4** | **3.02** |
| **Without Hatchery or Harves** | **95.6** | **3.02** |

## Attachment 1. Definition of terms referenced in the HGMP template.

Augmentation - The use of artificial production to increase harvestable numbers of fish in areas where the natural freshwater production capacity is limited, but the capacity of other salmonid habitat areas will support increased production. Also referred to as "fishery enhancement".

Critical population threshold - An abundance level for an independent Pacific salmonid population below which: depensatory processes are likely to reduce it below replacement; short-term effects of inbreeding depression or loss of rare alleles cannot be avoided; and productivity variation due to demographic stochasticity becomes a substantial source of risk.

Direct take - The intentional take of a listed species. Direct takes may be authorized under the ESA for the purpose of propagation to enhance the species or research.

Evolutionarily Significant Unit (ESU) - NMFS definition of a distinct population segment (the smallest biological unit that will be considered to be a species under the Endangered Species Act). A population will be/is considered to be an ESU if 1) it is substantially reproductively isolated from other conspecific population units, and 2) it represents an important component in the evolutionary legacy of the species.

Harvest project - Projects designed for the production of fish that are primarily intended to be caught in fisheries.

Hatchery fish - A fish that has spent some part of its life-cycle in an artificial environment and whose parents were spawned in an artificial environment.

Hatchery population - A population that depends on spawning, incubation, hatching or rearing in a hatchery or other artificial propagation facility.

Hazard - Hazards are undesirable events that a hatchery program is attempting to avoid.

Incidental take - The unintentional take of a listed species as a result of the conduct of an otherwise lawful activity.

Integrated harvest program - Project in which artificially propagated fish produced primarily for harvest are intended to spawn in the wild and are fully reproductively integrated with a particular natural population.

Integrated recovery program - An artificial propagation project primarily designed to aid in the recovery, conservation or reintroduction of particular natural population(s), and fish produced are intended to spawn in the wild or be genetically integrated with the targeted natural population(s). Sometimes referred to as "supplementation".

Isolated harvest program - Project in which artificially propagated fish produced primarily for harvest are not intended to spawn in the wild or be genetically integrated with any specific natural population.

Isolated recovery program - An artificial propagation project primarily designed to aid in the recovery, conservation or reintroduction of particular natural population(s), but the fish produced are not intended to spawn in the wild or be genetically integrated with any specific natural population.

Mitigation - The use of artificial propagation to produce fish to replace or compensate for loss of fish or fish production capacity resulting from the permanent blockage or alteration of habitat by human activities.

Natural fish - A fish that has spent essentially all of its life-cycle in the wild and whose parents spawned in the wild. Synonymous with *natural origin recruit (NOR).*

Natural origin recruit (NOR) - See *natural fish* .

Natural population - A population that is sustained by natural spawning and rearing in the natural habitat.

Population - A group of historically interbreeding salmonids of the same species of hatchery, natural, or unknown parentage that have developed a unique gene pool, that breed in approximately the same place and time, and whose progeny tend to return and breed in approximately the same place and time. They often, but not always, can be separated from another population by genotypic or demographic characteristics. This term is synonymous with stock.

Preservation (Conservation) - The use of artificial propagation to conserve genetic resources of a fish population at extremely low population abundance, and potential for extinction, using methods such as captive propagation and cryopreservation.

Research - The study of critical uncertainties regarding the application and effectiveness of artificial propagation for augmentation, mitigation, conservation, and restoration purposes, and identification of how to effectively use artificial propagation to address those purposes.

Restoration - The use of artificial propagation to hasten rebuilding or reintroduction of a fish population to harvestable levels in areas where there is low, or no natural production, but potential for increase or reintroduction exists because sufficient habitat for sustainable natural production exists or is being restored.

Stock - (see "Population").

Take - To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

Viable population threshold - An abundance level above which an independent Pacific salmonid population has a negligible risk of extinction due to threats from demographic variation (random or directional), local environmental variation, and genetic diversity changes (random or directional) over a 100-year time frame.

## Attachment 2. Age class designations by fish size and species for salmonids released from hatchery facilities.

**(generally from Washington Department of Fish and Wildlife, November, 1999).**

| | | SIZE CRITERIA | |
|---|---|---|---|
| | SPECIES/AGE CLASS | Number of fish/pound | Grams/fish |
| X | Chinook Yearling | <=20 | >=23 |
| X | Chinook (Zero) Fingerling | >20 to 150 | 3 to <23 |
| X | Chinook Fry | >150 to 900 | 0.5 to <3 |
| X | Chinook Unfed Fry | >900 | <0.5 |
| X | Coho Yearling 1/ | <20 | >=23 |
| X | Coho Fingerling | >20 to 200 | 2.3 to <23 |
| X | Coho Fry | >200 to 900 | 0.5 to <2.3 |
| X | Coho Unfed Fry | >900 | <0.5 |
| X | Chum Fed Fry | <=1000 | >=0.45 |
| X | Chum Unfed Fry | >1000 | <0.45 |
| X | Sockeye Yearling 2/ | <=20 | >=23 |
| X | Sockeye Fingerling | >20 to 800 | 0.6 to <23 |
| X | Sockeye Fall Releases | <150 | >2.9 |
| X | Sockeye Fry | > 800 to 1500 | 0.3 to <0.6 |
| X | Sockeye Unfed Fry | >1500 | <0.3 |
| X | Pink Fed Fry | <=1000 | >=0.45 |
| X | Pink Unfed Fry | >1000 | <0.45 |
| X | Steelhead Smolt | <=10 | >=45 |
| X | Steelhead Yearling | <=20 | >=23 |
| X | Steelhead Fingerling | >20 to 150 | 3 to <23 |
| X | Steelhead Fry | >150 | <3 |
| X | Cutthroat Trout Yearling | <=20 | >=23 |
| X | Cutthroat Trout Fingerling | >20 to 150 | 3 to <23 |
| X | Cutthroat Trout Fry | >150 | <3 |
| X | Trout Legals | <=10 | >=45 |
| X | Trout Fry | >10 | <45 |

**1/ Coho yearlings defined as meeting size criteria and 1 year old at release, and released prior to June 1st.**
**2/ Sockeye yearlings defined as meeting size criteria and 1 year old.**

**Lewis River Acclimation Pond Site Recommendation**

Attachment F

The Lewis River Settlement Agreement (SA) calls for PacifiCorp to establish fish acclimation sites in the upper Lewis River to aid in the reintroduction of anadromous fish in the upper Lewis River watershed. The language in the SA states:

*8.8 Juvenile Acclimation Sites.*

*8.8.1 Above Swift No. 1 Dam. Beginning upon completion of the Swift Downstream Facility, the Licensees shall place juvenile salmonid acclimation sites in areas reasonably accessible to fish hauling trucks and in practical areas in the upper watershed above Swift No. 1 Dam, as determined by the Licensees in Consultation with the Yakama Nation and the ACC. The acclimation sites shall consist of fish containment areas that allow juvenile fish to acclimate in natural or semi-natural waterways and allow necessary pre-release juvenile fish management; such sites will not consist of or include concrete-lined ponds or waterways, but may include other concrete structures necessary for facility functionality and structural integrity during the supplementation program.*

Section 8.8.2 addresses acclimation sites for Yale Lake and Lake Merwin which will be addressed prior to the Yale Lake reintroduction in license year 13.

In the course of the past year discussions have occurred during the monthly ACC meetings regarding location of the acclimation sites and whether or not all 3 introduced species should be placed in the acclimation ponds. During the June 8th ACC meeting at the WDFW office in Vancouver, the parties present agreed to use a target of 100,000 spring Chinook juveniles for the supplementation program and that it was not necessary to supplement juvenile coho and steelhead. The general agreement was that coho and steelhead adults will be able to seed the watershed without additional juveniles. For the ensuing discussion, then, it is assumed that the acclimation ponds will be sited, designed and managed solely for the juvenile spring Chinook supplementation program.

For the Swift Creek Reservoir fish four sites have been under consideration (Figure 1). Table 1 provides a brief comparison of the four sites. Extensive search for other possible sites has not yielded any additional candidate sites. We expect that each pond structure will be designed to hold one-third of the 100,000 juveniles in approximately 2,100 cubic feet of water with a 1.3 cfs water supply. Pond designs will vary to accommodate the terrain and access at each site.

The Muddy River site is located on USFS land approximately 4 miles upstream of the confluence with Lewis River and just upstream of the Forest Road 25 crossing. There is a day-use park at this location which will provide for paved access to the site. In this particular section of the Muddy River, a natural side-channel exists. The channel is barely visible through the trees in the aerial photograph (Figure 2). It is lined with trees and has boulder, gravel and large woody debris (LWD) components already in place. We intend to modify that channel on the upper and lower end to provide some pass-through water from the main river and to allow for containment of the juvenile spring Chinook for the late-February to mid-April timeframe. Otherwise the channel will remain as natural as possible. PacifiCorp recommends selection of this site.

The Clear Creek site is located on USFS land approximately 1.5 miles upstream of the confluence with Muddy River. This site is also located near a day-use/dispersed camping site on Forest Road 9303. Note that just above the point where FR 9303 turns off of FR 25, FR 25 is closed and gated during the winter so there is no further upstream access available. Discussions have centered around constructing a pond on either side of the creek on the downstream side of the bridge. Currently USFS staff is recommending the site just upstream of the bridge on the river bend. There is an abandoned road leading to this site. USFS staff is looking into this possibility. Any of the locations would be suitable. We anticipate the site will be excavated to provide side-channel type habitat much like the Muddy River site with concrete structures on the upstream and downstream ends. PacifiCorp recommends selection of this site.

The third site is located on the mainstem Lewis River at the Crab Creek Bridge on USFS land which is approximately 10 miles upstream of the confluence with Swift Creek Reservoir and 1 mile downstream of Lower Falls. Current discussions have been focused on the area just upstream of the bridge on the same side as the road. However, a number of problems exist with that location including cultural and esthetic effects. An alternative is currently under consideration by USFS management and staff that involves utilizing the Lower Falls Campground site during the closure period (closed after Labor Day weekend to Memorial Day weekend). This would involve use of a portable pond similar to the holding ponds used for fire fighting. The pond would be assembled in the fall and a temporary water supply line would be installed to capture water from the Lewis River and gravity feed it to the pond. In the Spring, a crew would go to the site, clean up the holding pond and generally prepare the pond to receive fish. Access may need to occur using snowmobiles or a snow cat. After fish release occurs, the structure would be disassembled and stored for the next season. This option allows for little to no disturbance to the riparian area. It also allows for flexibility such that if this site does not seem to be effective, it could be moved to an alternative location. PacifiCorp recommends the alternative portable pond system at this site.

The Eagle Cliff site is located just upstream of the FR 90 Bridge on PacifiCorp property. This site is very accessible and contains quality habitat but it is at the lowermost point of the upper watershed and does not meet the ultimate need to acclimate fish as high in the watershed as possible. PacifiCorp is therefore dropping this site from further consideration.

Figure 2. Muddy River proposed acclimation pond site.

Figure 3. Clear Creek proposed acclimation pond site.

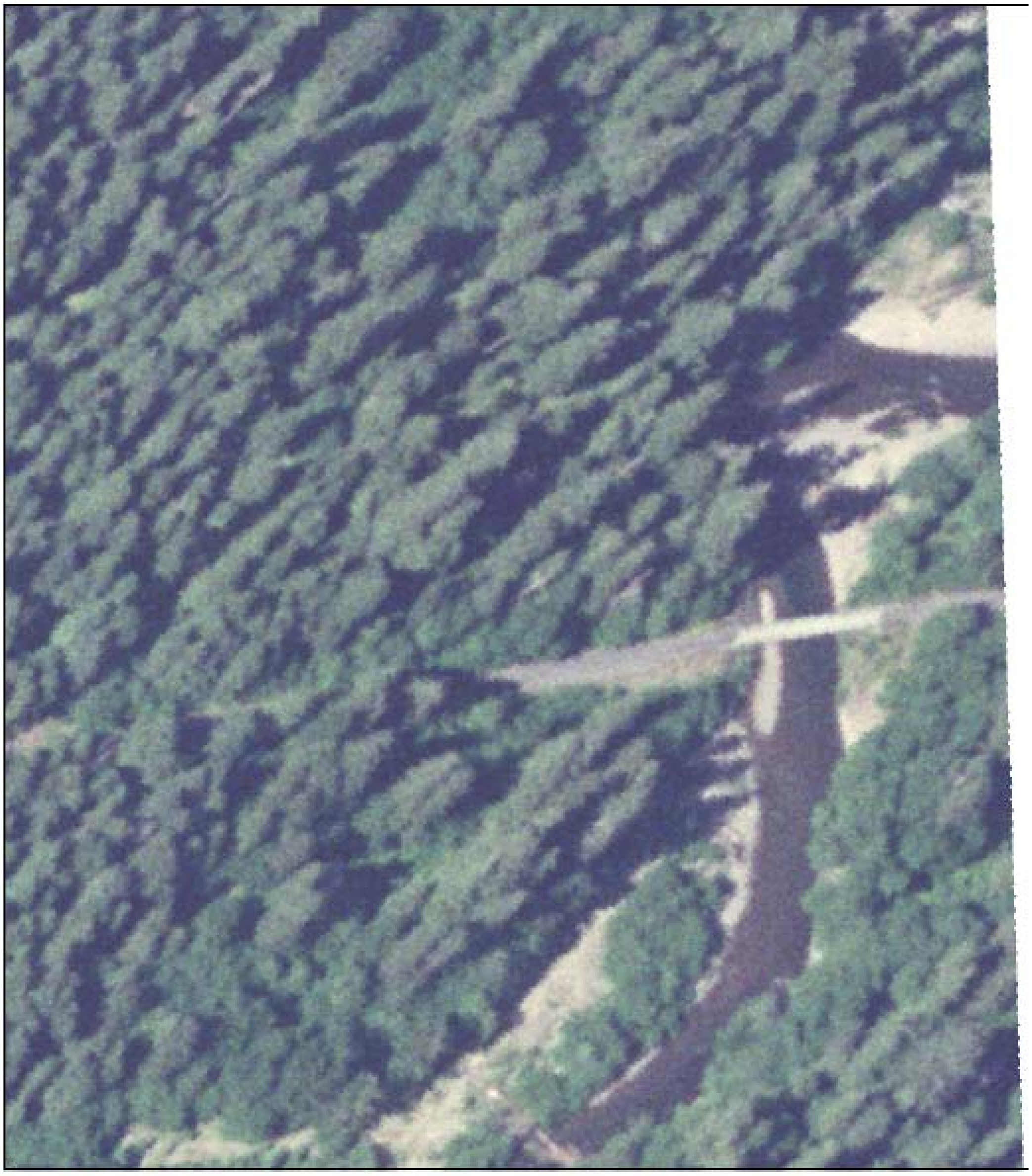


Figure 4. Mainstem Lewis River at Lower Falls proposed acclimation pond site.

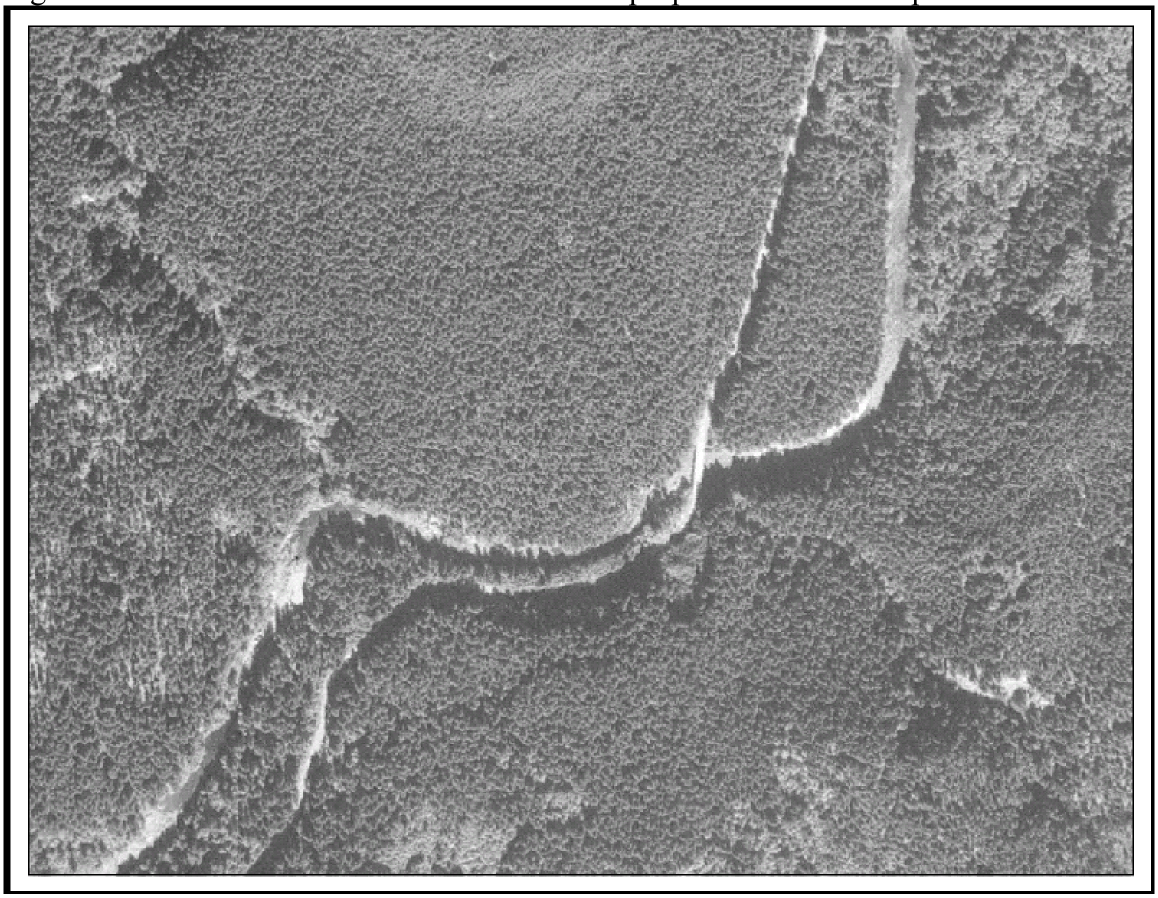
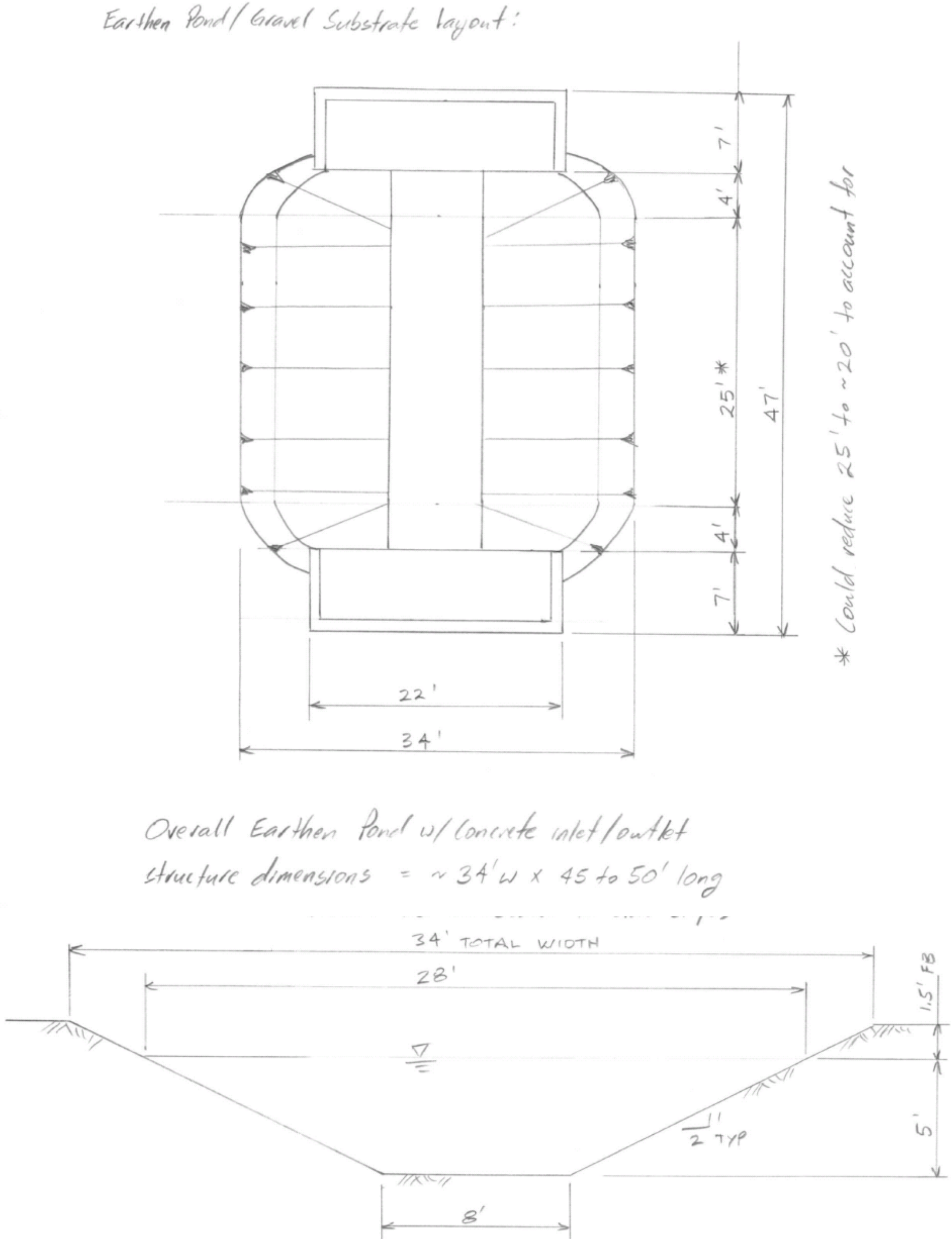


Figure 5. Mainstem Lewis River at Eagle Cliff proposed acclimation pond site.

Figure 6. Conceptual acclimation pond drawing.



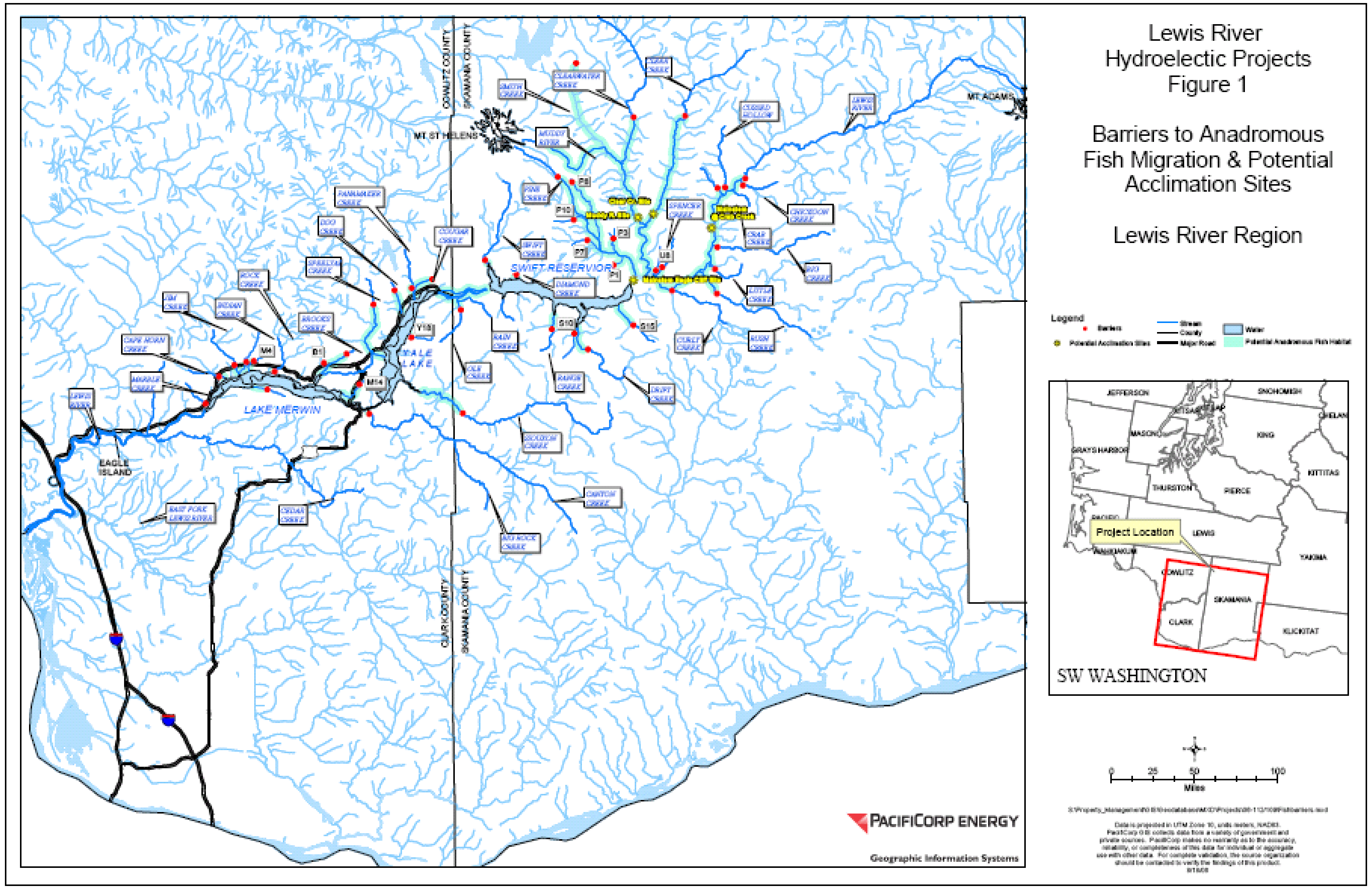



Figure 1. Map of the Lewis River basin showing all accessible habitat and the four possible acclimation site locations.

Table 1. Brief comparison of potential acclimation sites in the upper Lewis River watershed.

**Potential Lewis River Acclimation Pond Sites and decision Criteria**

| Site | Access to River? | High in the watershed? | Close proximity to quality habitat? | Water supply Quantity/Quality | Other Considerations |
|---|---|---|---|---|---|
| **Muddy River** | Y | Relatively | Marginal | Good/Good | Has side channel that could be modified |
| **Clear Creek** | Y | Relatively | Y | Good/Good | Can use either side of the Creek |
| **Mainstem Lewis at Lower falls** | Difficult | Relatively | Y | Good/Good | May have some esthetic/cultural concerns |
| **Mainstem Lewis at Eagle Cliff** | Y | N | Y | Good/Good | Very low in the Upper watershed |
| **Other** | | | | | |

| | |
|---|---|
| Time of year for Pond operation: | Late-Feb to mid-April |
| Number of fish anticipated: | 100,000 @ 8 fpp |
| Pond size needed (assume 1.2 cfs) | 34' W x 47' L x 5' D |
| Also assume 33,333 fish per pond | |