

Rocky Reach Fish Forum

Wednesday, 5 June 2013

1:00 – 4:00 p.m.

Chelan PUD Second Floor Conference Room

Wenatchee, WA



Meeting called by Steve Hemstrom

Notes taken by Suzanne Hodgson

Chairperson, Tracy Hillman

Attending Representatives:

Hemstrom, Steve	Chelan PUD	(509) 661-4281	steven.hemstrom@chelanpud.org
Irle, Pat (phone)	Ecology	(509) 454-7864	pir461@ecy.wa.gov
Lewis, Steve (phone)	USFWS	(509) 665-3508 x14	stephen_lewis@fws.gov
Rose, Bob (phone)	YN	(509) 865-5121	rosb@yakamafish-nsn.gov
Verhey, Patrick (phone)	WDFW	(509) 754-4624	patrick.verhey@dfw.wa.gov

Attending Participants:

Clement, Mike (phone)	Grant PUD	(509) 754-5088 x2633	mclemen@gcpud.org
Hillman, Tracy	BioAnalysts	(208) 321-0363	tracy.hillman@bioanalysts.net
Hodgson, Suzanne	Chelan PUD	(509) 661-4758	suzanne.hodgson@chelanpud.org
Jackson, Aaron (phone)	CTUIR	(541) 969-6254	aaronjackson@ctuir.org
Jackson, Chad (phone)	WDFW	(509)754-4624 x250	chad.jackson@dfw.wa.gov
Keller, Lance	Chelan PUD	(509) 661-4299	lance.keller@chelanpud.org
McLellan, Jason (phone)	CCT	(509) 263-1082	Jason.McLellan@colvilletribes.com
Skiles, Tom (phone)	CRITFC	(503) 238-0667	skit@critfc.org

Meeting Minutes

I. Welcome and Introductions

Tracy Hillman welcomed everyone to the Rocky Reach Fish Forum (RRFF) meeting and made known that voice recording of the meeting was initiated for note-taking purposes.

II. Review of Agenda

Before the agenda was reviewed, Keith Truscott, Chelan County PUD Director of Natural Resources, spoke briefly to thank the representatives and participants of the RRFF for their work. He added that the

Chelan PUD Fisheries Department is understaffed at the moment because of the resignations of Joe Miller and Josh Murauskas, but that he is working to get those positions filled as quickly as possible. He invited anyone on the RRFF who may have questions to contact him directly.

The agenda was approved as written with the following additions: Bob Rose requested an hour to discuss the No Net Impact (NNI) proposal regarding Pacific Lamprey, Steve Lewis requested time for a discussion of Bull trout at Tumwater Dam, and Steve Hemstrom requested time to discuss a Chelan PUD comment letter to the Chelan County Noxious Weed Board.

III. Review and Approval of Meeting Minutes

Minutes from the 1 May 2013 meeting were approved as written. Bob Rose stated that he had not received the meeting invitation. A discussion took place regarding the use of Outlook vs. e-mail invitations for future meetings, and the group expressed a preference for e-mail invitations. Tracy Hillman agreed to use e-mail invitations in the future except for those members who request Outlook.

IV. Water Quality

Update on Water Quality Reports

Tracy Hillman reported that there were no updates at this time and reminded the group that reports on water quality will be provided on an as-needed basis. Pat Irle stated that a macrophyte bed report from Steve Hays is due soon. Tracy indicated that the draft macrophyte bed report is due to the Department of Ecology (Ecology) and the RRFF on 17 June 2013, comments will be due back to Chelan PUD on 26 July 2013, and the final report will be sent to Ecology, the RRFF, and FERC on 30 August 2013.

V. Pacific Lamprey

Rocky Reach Project Effects

Tracy Hillman stated that Bob Rose e-mailed a draft proposal for addressing Pacific lamprey NNI to the group this morning (see Attachment 1). Tracy asked Bob to walk the group through it during the meeting. Bob said that he, Steve Lewis, RD Nelle, and Patrick Verhey developed the draft proposal with an eye on taking a general comprehensive view of lamprey in the upper Columbia region. He added that the group did not focus on NNI in this draft, but instead looked at more comprehensive objectives that could span several years, and could fit within the Conservation Agreement. He discussed the idea of using different kinds of tags, including radio telemetry (RT), Half-Duplex Passive Integrated Transponder (HD PIT) tags, acoustic tags, and full-duplex PIT tags in an effort to gain increased knowledge about where adult lamprey are going, what's happening in the reservoirs and tributaries, and what is happening to unaccounted-for fish (see Tables at the end of the attachment). He noted that this would

require additional HD antennas located at the mouths of the Okanogan, Methow, Entiat, and Wenatchee rivers, as well as within those tributaries. He stated that several of the objectives could be addressed by collecting and tagging about 400 adult lamprey for a two to three year evaluation. The thought is to radio tag about 35 fish and detect them at Tumwater and Dryden dams and also track them using plane surveys. Acoustic tags would be inserted into about 25 adult fish within each reservoir. Finally, all fish captured would receive a full-duplex PIT tag.

Pat Irle asked about studies involving attraction at the base of the dams, entrance efficiency, and fall-back. Bob said that information on entrance efficiency is not great, but that acoustic tags might be useful in those efforts. He added that fishway efficiency is pretty good and that lamprey fall-back has not been observed. He stated that entrance efficiency is important and that he would like to know what percentage of fish go into the Entiat from Rocky Reach reservoir. Patrick Verhey added that although the draft involves a comprehensive look at lamprey, there are components that he hopes the PUDs can embrace. Bob noted that he would like to have some comments on the draft back by July, and then move into specific tasks and funding responsibilities in August and September.

Steve Hemstrom stated that while the draft makes scientific sense, the request to Bob and the RRF was to demonstrate how funds from Chelan County PUD can be used to meet the written requirements in the license. He added that there is no language in the Settlement Agreement for research. Bob stated that issues such as the number of unaccounted-for adult fish in the reservoir and the possibility of increased predation of juveniles in the Rocky Reach Dam tailrace involve Chelan PUD from a regional standpoint. Steve acknowledged the difficulty of demonstrating NNI, but repeated his concern that PUD funding must be tied to license requirements. Bob argued that the PUD must be actively involved in efforts to understand the lamprey-related problems in the reservoir. Steve stated that he had hoped to see more vision on how the work outlined in this draft would connect to Rocky Reach, the license and the Settlement Agreement, and suggested that a page addressing this needs to be included in the draft.

Tracy asked Bob to briefly describe the seven objectives identified in the draft proposal (see Attachment 1) and show how they link to the Settlement Agreement. Bob stated that the first objective is to gather more baseline status and trend data on lamprey and to identify five to ten suitable index sites for determining lamprey relative abundance and relative density. He added that primary data goals include counts, passage efficiency, and spawning locations. Bob stated that the second objective is to determine the fate of adult lamprey in the reservoirs, adding that this is very difficult information to obtain and suggested that acoustic tags might be useful. He stated that Objective 4 involves adult passage through tributary streams, using HD and radio tags. Bob noted that Objective 7 is adult lamprey translocation research, in which fish are moved into the mainstem and tributaries. He added that this objective will primarily be the responsibility of the Yakama Nation. Discussion then took place about Objective 3, which involves predation on juvenile lamprey in the tailrace. Bob suggested that increasing fishing effort within the tailrace may reduce juvenile lamprey predators there and that losses could be better absorbed if more lamprey were translocated. Bob stated that Objective 5 is to evaluate and correct juvenile entrainment into irrigation facilities. He asked if Dryden and Tumwater dams are part of the Rocky Reach license. Steve Hemstrom replied that only the trapping portions of those facilities are part

of the license. Bob said that the last objective (Objective 6) is juvenile lamprey propagation research. He indicated that over the course of the next few years, the managers would be putting together management plans in 2016 and 2017, and propagation may fit into those plans based on the research done in this objective. He added that he sees a direct connection between this work and the Rocky Reach Lamprey Management Plan.

Patrick Verhey commented that the work done on this draft proposal is collaborative and that he is disappointed that Chelan PUD has expressed dissatisfaction with the plan. Bob added that he agreed with Patrick. Steve Hemstrom restated Chelan PUD's earlier position that the framework of the plan needs to link directly to the Rocky Reach license and achievement of NNI. He added that he supports collaboration and the idea of combined funding from multiple agencies. Bob noted that he would be happy to meet with stakeholders to talk about what Chelan PUD needs to see in the plan. Pat Irle offered to help Bob and Steve Lewis rewrite the proposal. Lance Keller stated that he appreciated Bob's efforts to walk the group through the plan.

Because the NNI proposal was just shared with the RRF with little opportunity for review, Tracy suggested that the group spend some time reviewing the proposal and be prepared to discuss it at the next meeting. In the meantime, he asked if the authors of the proposal could convene a short meeting with Chelan PUD and discuss linkages between the proposed plan and the Settlement Agreement. Pat Irle asked if the meeting could be at Steve Lewis' office. Steve Lewis did not see a problem with that. Steve Lewis then asked if Steve Hemstrom would like to see a starter version of how the research/study objectives would fit into NNI for the next meeting. Steve Hemstrom replied that he would. Steve Hemstrom and Lance Keller agreed that they could participate in a meeting on this topic. Steve Lewis commented that the group should not get hung up on the Settlement Agreement, but instead they should consider the broader needs of the species. He suggested that Chelan PUD could contribute to efforts beyond the Settlement Agreement. Pat Irle noted that the PUD cannot support efforts that go beyond their FERC license.

Action Items:

- RRF representatives and participants will review the draft Pacific Lamprey NNI proposal and be prepared to discuss it at the next meeting.
- Bob Rose, Steve Lewis, Patrick Verhey, Pat Irle, RD Nelle, Steve Hemstrom, and Lance Keller will meet in an effort to link the plan's objectives to the Settlement Agreement.

Juvenile Effects Spreadsheet

Steve Hemstrom stated that he is almost done revising the spreadsheet. He added that the spreadsheet could serve as a portion of the report to FERC that is due on 14 February 2014.

Action Item:

- Steve Hemstrom will finish the Juvenile Effects Spreadsheet.

Future Planning: Potential Juvenile Lamprey Measures, Timeframe, and Budgeting

No report.

Adult HD PIT Monitoring

No adults have yet been detected in 2013.

VI. Resident Fish

Resident Fish Report – WDFW Revision

Tracy Hillman noted that WDFW is conducting an internal review and revision of the resident fish report. Steve Hemstrom added that this is only a revision of the written portion of the report and that he has not seen the revised report. Tracy indicated that based on results of the report, the next step was to identify when the next three sampling events would occur. Steve Hemstrom provided a handout showing that the three surveys would be completed in 2023, 2033, and 2043 (see Attachment 2). Steve added that the group could agree to modify the schedule if a significant change in species diversity or an invasive species is observed. Chad Jackson concurred with building flexibility into the schedule to accommodate any unforeseen changes in species composition. He also added that it would be helpful to have a WDFW statistician conduct a power analysis to determine the sample size needed to detect a change in species composition. The group agreed that this was a good idea.

Action Item:

- Chad Jackson will ask a WDFW statistician to conduct power analyses on the resident fish data within the next few months.

Bull Trout and the Operation of Tumwater Dam

Steve Lewis stated that after consulting on the effects of upstream passage of bull trout at Tumwater and Dryden dams, he questioned Steve Hemstrom's earlier statement that the fishway traps are the only parts of the facilities that are included in the Rocky Reach license. He added that he is concerned that the PUD, as owner of the facilities, is deferring the respective take issues to the entities that operate the project and that USFWS's legal department says that this is incorrect. Tracy Hillman questioned whether the RRF was the correct venue for this discussion. Steve Lewis indicated that he wanted the issue on the record.

Steve Hemstrom stated that the traps are the only part of these facilities that are connected to the Rocky Reach license because they provide brood stock trapping locations. Steve Lewis questioned why the USFWS had issued take if that is the case. Steve Hemstrom replied that take was issued for trapping only for PUD activities. Steve Hemstrom then provided background details on the spring Chinook relative reproductive success study conducted by WDFW at Tumwater with BPA funding, noting that Chelan PUD is not involved in the study. He added that Chelan PUD has been assured by WDFW that the

State's ESA Section 6 Take Permit covers WDFW's take for its relative reproductive success study. More discussion ensued, with Steve Hemstrom suggesting that the involved parties should discuss the issue. Tracy asked Steve Lewis if a take permit is needed for that project, and Steve replied that the permit is outdated and that discussions on this topic had taken place with PUD staff in the past. Tracy suggested that the affected parties need to meet to discuss this issue, due to the fact that it would be problematic if Chelan PUD needed to end WDFW's BPA-funded study because of potential liability for take problems at Tumwater. Steve Lewis replied that he wanted to clarify that take has been issued for activities at Tumwater, but that he got the impression that Chelan PUD was unwilling to accept responsibility for any potential negative take events. He added that he would like this topic to remain on the agenda for future discussion. Steve Hemstrom stated that other interested parties such as WDFW and the USFWS Leavenworth Hatchery, who also operate at Tumwater, should be included in future discussions on this subject.

Action Item:

- Tracy Hillman will keep this issue on the agenda for future discussion.

VII. White Sturgeon

Broodstock Collection and Coordination

Lance Keller reported that adult brood stock collection work took place between 16 and 25 May with Blue Leaf Environmental and Rivers West Sport Fishing. He added that broodstock collection was successful with the collection and transport of four females and nine males to Marion Drain, and that three of the females spawned last Wednesday with three of the flowing males. He added that eggs from a 3x3 cross are now at Columbia Basin and Chelan Hatchery; some are at Marion Drain for Grant PUD and others are at Wells Hatchery for Grant and Douglas PUDs. He stated that on 30 and 31 May, additional fishing took place below McNary Dam resulting in three more flowing males, which were transported to Marion Drain. He noted that of the twenty-three viable fish collected, four were females. He also commented that nine viable males were taken to Marion Drain. Lance thanked Steve Lewis, Chad Jackson, and Patrick Verhey, who assisted with fishing. Mike Clement asked why a larger cross was not attempted. Discussion took place regarding breeding strategies and possible reasons for the 3x3 cross.

Juvenile Rearing and Release

Lance Keller reported that Chelan PUD staff assisted Grant PUD with their out-planting of juvenile sturgeon and that they also received assistance from Eastbank Hatchery staff. He added that on 20 and 21 May, juvenile sturgeon from the Columbia Basin Hatchery were released into the Rocky Reach reservoir and that two new stocking locations at the Entiat boat launch and Daroga Park were used in addition to the usual locations. He stated that on 22 and 23 May, juveniles from the Chelan Hatchery

were released and that fish with acoustic tags had been spread evenly throughout the reservoir. Lance stated that a total of about 7,600 fish were released. Lastly, he added that some eggs from the Marion Drain 3x3 cross were starting to hatch.

Update on Juvenile Monitoring

Lance Keller reported that Blue Leaf downloaded receivers in the Rocky Reach reservoir before the adult broodstock collection work. No results from the download are yet available.

VIII. Weed Control

Steve Hemstrom stated that the Chelan County Noxious Weed Board sent a draft plan to Chelan PUD and others asking for comments on their proposed plan to apply Triclopyr TEA to about thirty-six acres on a two-mile shoreline area around Entiat Park in 2014. He added that the PUD has started putting together a response and that RRFF representatives and participants can add their comments to this letter if they wish. He added that this information has also been sent to the HCP Coordinating Committee for the same purpose, and that comments are due back to Steve on 14 June. Discussion took place around whether agencies should add their comments to the PUD letter or provide their own agency response. Steve Hemstrom stated that any comments from the RRFF included in the PUD letter would be noted as comments from individuals. Steve Lewis asked about the nature of the PUD's response and Steve Hemstrom replied that the PUD wants to see assurances against unexpected negative aquatic effects.

Action Item:

- If desired, comments should be forwarded to Steve Hemstrom at Chelan PUD before 14 June for inclusion in the PUD's comment letter to the Chelan County Noxious Weed Board.

IX. Next Steps

The next regular meeting of the RRFF is scheduled for 3 July 2013 at 1:00 p.m. in the Chelan PUD Second Floor Conference Room. Because of the 4th of July holiday, Tracy Hillman asked if the meeting should be moved or cancelled. It was decided that in late June Tracy will ask members and participants if they want to meet on the 3rd, move the date of the meeting, or cancel the meeting.

Attachment 1

**No Net Impact, Regional Cooperation
and Recovery of Pacific Lamprey
in the Mid-Upper Columbia River**

**DRAFT Proposal and Recommendations
to the
*Wells Aquatic Settlement Work Group
Rock Reach Fish Forum
Priest Rapids Fish Forum***

by the Joint Fisheries Parties

*Confederated Bands and Tribes of the Yakama Nation
Confederated Tribes of the Umatilla Indian Reservation
Colville Confederated Tribes
US Fish and Wildlife Service
Washington Department of Fish and Wildlife*

August, 2012

Purpose: The purpose of this discussion is to provide the need and rationale for employing the "No Net Impact" (NNI) concept to Pacific lamprey as a result of the operations of the Mid-Columbia public utility projects (PUDs). Specifically, the Joint Fishery Parties (JFP, including the YN, CCT, CTUIR, USFWS and WDFW) agree that the preponderance of evidence throughout the Columbia River Basin clearly indicates that mainstem hydroelectric projects do in fact impede or prevent adult passage past these dams with a direct or indirect negative effect. This is evident in the fact that the Federal Action Agencies (Bonneville Power Administration, US Army Corps of Engineers, and Bureau of Reclamation) agreed to allocate \$50,000,000 dollars primarily for adult passage improvements in the 2008 Fish Accords, and is farther evident in the fact the Mid-Columbia PUDs are themselves beginning to implement passage improvements in these Projects, therefore recognizing the impact to the migrating adult lamprey populations.

Need: It is clearly evident at both local and regional scales that Pacific lamprey populations have plummeted over the past decades, and that recovery actions are imminent and urgent. Above the Mid-Columbia Projects, local populations are essentially extirpated. From an ecologically and from a tribal harvest perspective, they are extirpated. The JFP recognizes that the Projects are not solely responsible for this cumulative effect, but they are a primary contributor to the situation and a key player in future Pacific lamprey recovery actions. The JFP advocates there is a clear connection between passage issues, Project Effects and the need for the PUDs to mitigate for these impacts to the population.

Background: Each of the PUDs contain language within their perspective Lamprey Management Plans that recognize the need to contribute to Pacific lamprey recovery. The essence of this language is captured below.

Chelan PUD Lamprey Management Plan: Section 4:

Protection, Mitigation, and Enhancement Measures.

*The goal of the PLMP is to achieve No Net Impact (NNI) on Pacific lamprey by measuring ongoing Project-related impacts, if any, on Pacific lamprey; implementing appropriate and reasonable measures to reduce or eliminate such impacts; and **implementing on-site or off-site measures to address unavoidable impacts.***

Grant County PUD Lamprey Management Plan: Section 4

Protection, Mitigation, and Enhancement Measures.

*The goal of the PLMP is to identify ongoing Project-related impacts on Pacific lamprey; implementing reasonable and feasible measures to reduce or eliminate such impacts; and **implementing on-site or off-site measures to address unavoidable impacts.***

*4.1 Objective 1: No Net Impact (NNI). Identify, address, and **fully mitigate Project effects to the extent reasonable and feasible.***

Douglas PUD: Lamprey Management Plan

Section 3.0: Goals and Objectives

*The goal of the PLMP is to implement measures to monitor and **address impacts**, if any, on Pacific lamprey resulting from the Project during the term of the new license. Douglas, in collaboration with the Aquatic SWG, has agreed to implement several Pacific lamprey PME's in support of the PLMP. The PME's presented within the PLMP are designed to meet the following objectives:*

Objective 1: Identify and address any adverse Project-related impacts on passage of adult Pacific lamprey;

Objective 3: Participate in the development of regional Pacific lamprey conservation activities.

*The PLMP is intended to be **compatible with other Pacific lamprey management plans in the Columbia River mainstem.** Furthermore, the PLMP is intended to be supportive of the HCP, the critical research needs identified by the Columbia River Basin Technical Working Group, the Resident Fish Management Plan, Bull Trout Management Plan, and White Sturgeon Management Plan by continuing to monitor and address ongoing impacts, if any, on Pacific lamprey resulting from Project operations. **The PLMP is intended to be not inconsistent with other management strategies of federal, state and tribal natural resource management agencies and supportive of designated uses for aquatic life under Washington state water quality standards found at WAC 173-201A.***

Section 1: Introduction. Paragraph 3:

*The PLMP will direct implementation of measures to protect against **and mitigate for potential Project impacts** on Pacific lamprey (*Lampetra tridentata*). To ensure active stakeholder involvement and support, Douglas developed this plan, along with the other aquatic management plans, in close coordination with the members of the Aquatic SWG.*

In sum, the JFP agrees there is sufficient language embedded within the Pacific Lamprey Management Plans to justify that additional (and potentially off-site) actions are not only warranted, but required within these Plans. We make the argument that even if the Projects could achieve 80-90 percent passage with little or no passage delay (which would likely be a substantial improvement over what we currently believe exists today) there would still be an impact to the migrating population and that the NNI concept was built on the foundation that all impacts would be mitigated for.

Recommendation: The JFP recommends that within each of the three Forums (ASWG, RRFF, PRFF) we establish this topic as a regular agenda item, in anticipation this discussion will require several months of considerations. We recognize the uniqueness of each of the PUDs and the need for each institution to maintain boundaries within their own FERC license, but we also recognize that each of the Plans call for regional cooperation. As a result, the JFP would ultimately like to develop and begin initiation of a "regional strategy" towards lamprey recovery in the Mid- Columbia region (Priest Rapids Dam to Okanogan River) and agree that the Mid-Columbia PUD Projects should play a role towards this end.

The JFP offers to this discussion several examples of activities that should be considered as a part of these future discussions. We do not advocate that the PUDs are solely responsible for any or all of these actions, rather, we hope to build inter-agency cooperation in a similar manner as has evolved within salmonid recovery actions. Over time, we will identify various responsibilities, and from this point we will discuss and identify the "appropriateness" of the actions as a component of overall NNI mitigation. The following actions (not intended to be comprehensive, but examples for this time) are recommended for discussion:

- contributions towards juvenile and adult supplementation / trans-location in the Upper Columbia tributaries,
- passage at Tumwater Dam - and irrigation facilities that may need enhancements,
- fixing juvenile entrainment at Dryden Dam - and other irrigation facilities,
- financial support to better establish baseline information / monitoring in preparation for restoration activities and long-term monitoring of status and trends within the tributary habitats,
- support in regional planning documents that identify specific survival standards, tagging technologies and recovery actions in which each of the PUDs can participate,
- enhanced understanding of in-reservoir adult mortality (predation? - sturgeon?),

Next Steps: The JFP will announce to the three Forums our interests and intentions at the September forum meetings. We will advocate that this be an agenda item which will require at least one hour during the October meeting. We anticipate developing an initial list of activities that could be implemented in each of the Upper Columbia Subbasins (Okanogan, Methow, Entiat, and Wenatchee) during the winter and spring months of 2013. From this short planning process, in which we will use existing salmonid subbasin restoration committees, we will discuss potential partnerships for implementation and appropriate timeframes, which will include involvement from each of the PUDs.

Collaborative Implementation and Research Strategy *in the* Upper Columbia Region *for the* Recovery of Pacific Lamprey

Purpose

- The purpose of this document is to establish a coordinated and collaborative approach towards Pacific lamprey recovery in the Upper Columbia region Priest Rapids to Chief Joseph Dam).
- To describe in sufficient detail a regional strategy for which each of the three Mid-Columbia Public Utility Districts (Douglas, Chelan and Grant counties) can efficiently and effectively join local fishery managers in implementing key activities benefiting the recovery of Pacific lamprey.
- Identify priority objectives, tasks and data needs to be addressed by actions implemented by multiple agencies.

Need

- Lamprey populations are very low and in many watersheds of the Upper Columbia Region have been extirpated, or nearly so. Lamprey are recognized to be an important species both ecologically and culturally. Tribal culture has lost an important component of their heritage.
- Population declines and reduced spatial distribution are a result of multiple threats to the species, affecting all life stages.
- Recovery of Pacific lamprey in the Upper Columbia can only be achieved by simultaneously implementing multiple actions, including research, to address priority threats for all life stages throughout the region.
- The Joint Fisheries Parties¹ recognizes that the Mid-C Projects are not solely responsible for this cumulative effect, but that hydro-electric Projects do negatively affect Pacific lamprey populations and are a key and necessary player in future recovery actions within and outside of the Project boundaries.

Scope

- This regional strategy encompasses the mainstem Columbia River and Project boundaries of the Wells, Chelan and Grant PUD Project Areas (excluding the Project boundary of the Rock Island Project). The timeframe will last through December, 2018.
- Relatively little is currently understood about many important aspects of lamprey biology and ecology. As such, there is a great necessity for "adaptive management".

¹ The Joint Fisheries Parties consist of the US Fish and Wildlife Service, NOAA Fisheries, Washington Department of Fish and Wildlife, Yakama Nation, Colville Confederated Tribes and the Confederated Tribes of the Umatilla Indian Reservation.

- Geographically, the scope is contained within the Columbia River from Priest Rapids Dam to Chief Joseph Dam and includes priority areas within the Okanogan, Methow, Entiat and Wenatchee subbasins. "Priority"² watersheds / stream reaches will be defined for various Objectives.
- Temporally, the scope of these objectives and activities is contained within a period of approximately five years (2013 - 2018).
- Activities contained within this Scope are consistent and will be coordinated by the tribes and the USFWS in coordination with the Conservation Agreement and other regional planning and implementation strategies (CRITFC Restoration Plan, PUD Mgt Plans, NPCC Fish and Wildlife Program, US ACE, etc).

Note:

The following 7 Primary Objectives are not intended to be in order of priority.

It is thought that a mixed use of radio telemetry, HD and FD PIT tags will be necessary. This is an important component of the discussion.

Genetics analysis is one of the analytical tools that will be required to discern translocated juveniles from the rest.

² *Fishery managers will define priority watersheds or stream reaches where lamprey populations are either known to exist or are likely to exist if lamprey were relatively abundant. These areas are generally considered to be priority sites to monitor status and trend and to establish "anchor points" for spatial structure, increased productivity and abundance.*

1. Regional Establishment Baseline / Status and Trend Information

Objective:

Establish baseline information by enumerating (relative abundance) local populations (watershed scale) of adults and juveniles in priority areas (stream reaches) .

- Track and understand changes of both juvenile and adult populations in priority monitoring locations (index sites) over time.
- Compare and evaluate these changes relative to other Columbia Basin regions.

Scope:

Primary sources of information will include, but not necessarily limited to:

- adult counts at mainstem PUD dams
- adult counts at Tumwater Dam (as they become available)
- adult spawning surveys in key index sites
- juvenile rearing and adult spawning locations based upon key "index sites" to be established
- juvenile counts at irrigation maintenance / sediment cleanout
- juvenile counts at screw traps
- juvenile counts at Rocky Reach Juvenile Fish Facility
- radio tag/tracking information - adults
- PIT tag counts at various stations - adults

Critical Questions:

- What is the actual adult escapement over each of the mainstem Columbia River dams and how does this change over time? (implies accurate dam counts)
- What is adult escapement and spawning success at priority spawning areas?
- Where are important adult spawning locations within the Upper Columbia (and do these need to be enhanced and / or protected)?
- Where are the important juvenile rearing locations within the region (and do these need to be enhanced and / or protected)?
- What is the relative (vrs absolute) production (or productivity) of key watersheds / stream reaches?

Primary Data Needs:

- Accurate daily dam counts, including fishway entrance efficiency and passage efficiency.
- Identification of important known / potential spawning locations and use.
 - radio telemetry
 - spawning surveys
- Identification of important known / potential juvenile rearing locations and use.
 - relative abundance / relative densities / likelihood of occurrence / age-length classes

Tasks, Responsibilities and Estimated Budgets

Task	Responsibility	Timeframe	Estimated Budget

2. Fate of Adults in Reservoirs

Objective:

Determine fate of adults that enter into PUD reservoirs with regards to:

- movement behavior through reservoir (passage success and timing, over-winter, etc),
- mortality / predation within reservoir,
- successful entry into tributary streams.
- success in reaching spawning locations. (See status and trend).

Scope:

- Study period three-years under "normal" flow / reservoir conditions.
- Wells, Rocky Reach, Wanapum, Priest Rapids reservoirs.
- Okanogan, Methow, Entiat, Wenatchee rivers and Crab Creek.

Critical Questions:

- What are the basic movement patterns (time and space) of adults as they enter and pass through reservoirs?
- What proportion of adults reside and potentially spawn in reservoirs?
- What proportion of adults are lost to predation in reservoirs?
- What is the proportion of adults successfully moving into tributary streams and what are their basic movement patterns approaching tributary mouths.

Primary Data Needs:

- Time of exit from various PUD fishways.
- Time of entrance into various PUD fishways.
- Time of entrance into tributary streams.
- Location of last observation in reservoir.

Tasks, Responsibilities and Estimated Budgets

Task	Responsibility	Timeframe	Estimated Budget

3. Predation on Juveniles in Tailrace

Objective:

Determine the relative (or absolute) level of predation on juvenile lamprey in turbine boils and tailrace areas and implement measures to reduce excessive predation, as warranted.

Scope:

- Tailrace areas influenced by turbine outwash (boils) and approximately XXX yards downstream during times of juvenile out-migration.

Critical Questions:

- Are a significant (or disproportionally high) number of out-migrating juvenile lamprey being consumed by predators in the tailrace areas immediately below PUD dams? (*discuss relative abundance??*)
- What species are primarily responsible for *significant* predation on out-migrating lamprey.
- What management practices could be employed to significantly reduce predation in these areas?

Primary Data Needs:

- Presence, relative abundance and timing of potential predators in study area during juvenile lamprey out-migration timeframes.
- Presence (relative abundance??) of juvenile lamprey in study area.
- Stomach contents of predators in study area over time (compare relatively high and low presence of juvenile lamprey with stomach contents of predators).
- Inventory of cost-effective means to reduce predation in the study area.

Tasks, Responsibilities and Estimated Budgets

Task	Responsibility	Timeframe	Estimated Budget

4. Adult Passage - Tributary Streams

Objective:

Evaluate and correct adult passage issues in priority areas within the Upper Columbia subbasin tributary streams. (*note - five year scope - and priority areas*)

Scope:

- Initial focus at Dryden and Tumwater Dams (Wenatchee) and Foghorn Dam (Methow).
- Potential passage structures (i.e. culverts) in other-priority areas.

Critical Questions:

- To what extent are Dryden and Tumwater Dams limiting passage of adults attempting to spawn in the Upper Wenatchee River?
- To what extent is Foghorn Dam - or other irrigation or humanoid-made structures - limiting passage of adults attempting to spawn in priority Upper Columbia watersheds and stream reaches?
- What measures should be implemented to obtain cost-efficient and effective passage at dams or other structures for adult passage?

Primary Data Needs:

- Inventory of potential structures known or suspected to be barriers for adult passage.
- Assessment of site-specific potential passage issues that may lead to obstruction of passage.
- Information (radio telemetry or PIT Tag) suggesting passage obstruction.
- Specific recommendations detailing remedies for resolving passage issues.

Tasks, Responsibilities and Estimated Budgets

Task	Responsibility	Timeframe	Estimated Budget

5. Juvenile Entrainment (Dryden / other Irrigation structures)

Objective:

Evaluate and correct juvenile entrainment into irrigation facilities within priority watersheds / stream reaches in the Upper Columbia subbasin tributary streams. (*note - five year scope - and priority areas*)

Scope:

- Initial focus is on Dryden Dam (Wenatchee) and all major irrigation withdrawal structures within the Upper Columbia subbasins.
- Secondary focus includes minor irrigation pumping stations.

Critical Questions:

- To what extent does Dryden Irrigation Diversion entrain juvenile lamprey and what proportion of these are lost to the overall population?
- What are the priority irrigation ditches within the Upper Columbia subbasins that are known or likely to entrain juvenile lamprey such that these fish are lost to the local populations?
- What management actions can be taken to reduce or eliminate entrainment of juvenile lamprey into priority irrigation diversions?

Primary Data Needs:

- Inventory of potential structures known or suspected to entrain juvenile lamprey.
- Assessment of site-specific conditions that either will / may entrain juveniles.
- Surveys documenting entrainment.
- Technical recommendations outlining solutions for resolving entrainment issues.

Tasks, Responsibilities and Estimated Budgets

Task	Responsibility	Timeframe	Estimated Budget

6. Juvenile Propagation Research

Objective:

Determine / Estimate and Compare proportion of surviving larval lamprey and growth rates in laboratory environment using various feeding, light and other environmental controls) and in various stream locations to determine efficacy of using artificially propagated fish in critical research or future supplementation and recovery of upper Columbia populations.³

Scope:

Five year evaluations in both laboratory and natural environments (stream reaches to be determined) focusing on 0-4 year age classes in growth and survival measurements. Key stream reaches to be used / evaluated identified in Pacific Lamprey Artificial Propagation and Rearing Investigations: Rocky Reach Pacific Lamprey Management Plan.

Critical Questions:

- What is the temporal survival of propagated larval lamprey in both the laboratory and natural environments?
- What is the rate of growth of larval lamprey produced by artificial propagation under various conditions and how does this differ from larval lamprey produced in the natural environment?
- What are the key environmental and habitat characteristics (water temperature, flow, and discharge) associated with larval growth and survival?
- What are the important foods and feeding strategies that lead to favorable / optimal growth and survival?
- What is the range for optimal densities that can be expected for early year classes in the natural environment?

Primary Data Needs:

- Relative survival and average growth rates / length frequencies over time, in laboratory and in natural environment.
- Survival and average growth rates compared to key environmental factors (nutrition, temperature, substrate types, water quality, photoperiod).
- In-stream environmental (temp, flow, chemistry (P:K:N) and discharge) and habitat data (substrate).
- Mark/recapture data.

Tasks, Responsibilities and Estimated Budgets

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- ³ Based upon information obtained in the Art Prop and Rearing document developed by the RRFF, for key sub-objectives have been identified to guide progress towards this primary objectives, specifically: (1) Influence of rearing density, photoperiod, and water temperature on fish growth and health; (2) Identification and development of foods and rations for optimal growth and nutrition; (3) Evaluate release timing, size at release, and release of various life history stages to determine most successful time of and stage for fish stocking, and (4) Develop optimal artificial feeds to enhance growth rates at all life history stages.

Task	Responsibility	Timeframe	Estimated Budget

7. Adult Translocation Research

Objective:

Evaluate the success of translocated fish in producing viable redds, eggs, larvae and early age ammocoetes in key stream reaches identified in the Pacific Lamprey Artificial Propagation and Rearing Investigations: Rocky Reach Pacific Lamprey Management Plan.

Scope:

- Initial scope for translocation research includes mainstem Columbia River (to support PUD passage and reservoir studies), upper Wenatchee / Nason Creek, and in the mid-upper Methow River and Chewuch Creek. Re-introduction period to include 2013 - 2016 with monitoring to occur in 2013 - 2018).

Critical Questions:

- Do translocated fish spawn in areas determined to be of good habitat by fisheries managers?
- Are translocated adults able to produce viable redds, larvae and early-aged juveniles in areas identified by fishery managers as being of good quality for spawning and rearing?
- What is the relative success of larval production from eggs and ammocoete production from larvae?
- What were key environmental characteristics associated with this relative success?

Primary Data Needs:

- Genetic information from each adult translocated into the study area.
- Genetic information taken from "appropriate" number of offspring and tested for lineage to translocated adults.
- Location of tagged adult spawning.
- Estimate of total number of eggs and viable eggs within redds over time.
- Environmental characteristics (flow, substrate, temperature, gradient, stream size, for example)
- Locations and relative abundance of juvenile off spring from translocated adults.

Tasks, Responsibilities and Estimated Budgets

Task	Responsibility	Timeframe	Estimated Budget

Total Annual Adult Lamprey Counts for Each Mid-Columbia Project

	Priest Rapids	Rock Island	Rocky Reach	Wells
2008	5083	880	368	7
2009	2714	375	278	9
2010	1114	318	268	2
2011	3868	886	618	1
2012	4025	1048	805	3

Total and Percentage of migrating adult Pacific lamprey unaccounted in each of the Mid-Columbia Project Pools (no information available for Wells Project).

	Priest Rapids (PR)		Rock Island (RI)		Rocky Reach (RR)		Wells
	Total Unaccounted between PR and RI	% Unaccounted between PR and RI	Total Unaccounted between RI and RR	% Unaccounted between RI and RR	Total Unaccounted between RR and Wells	% Unaccounted between RR and Wells	
2008	4203	83%	512	58%	361	98%	NA
2009	2339	86%	97	26%	269	97%	NA
2010	796	71%	50	16%	266	99%	NA
2011	2982	77%	268	30%	617	100%	NA
2012	2977	74%	243	23%	802	100%	NA

	Ice	LoMo	Goose	Granite
2008	264	145	104	61
2009	57	58	34	12
2010	114	29	114	15
2011	269	99	80	48
2012	484	135	88	48

Attachment 2

Proposed times for future resident fish sampling within Rocky Reach Reservoir.

Rocky Reach Resident Fish Studies Timeline*								
Location	Researcher/ Contractor	Study Purpose	Funder	2012	2023	2033	2043	2052**
RR Reservoir	WDFW	rec fishing eval, rel abundance, species comp, predatory fish	CCPUD	Initial Completed				
RR Reservoir	CCPUD	ID changes in species comp, abundance	CCPUD		One-Year Monitoring Survey			
RR Reservoir	CCPUD	ID changes in species comp, abundance	CCPUD			One-Year Monitoring Survey		
RR Reservoir	CCPUD	ID changes in species comp, abundance	CCPUD				One-Year Monitoring Survey	

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1

* Study timeline may be modified by Chelan PUD in consultation with the RRF if invasive species or detectable changes are identified

* License expires February 1, 2052