Rocky Reach Fish Forum

Wednesday, 5 November 2014
1:00 – 4:00 p.m.
Chelan PUD Second Floor Conference Room
Wenatchee, WA

Meeting called by Steve Hemstrom — Chairperson, Tracy Hillman
Notes taken by Heidi Kunz

Attending Representatives:

Hemstrom, Steve	Chelan PUD	(509) 661-4281	steven.hemstrom@chelanpud.org
Irle, Pat (phone)	Ecology	(509) 454-7864	pirl461@ecy.wa.gov
Kerec, Matt	Alcoa	(412) 553-4361	matthew.kerec@alcoa.com
Lewis, Steve (phone)	USFWS	(509) 665-3508 x14	stephen_lewis@fws.gov
Rose, Bob	YN	(509) 865-5121	rosb@yakamafish-nsn.gov
Truscott, Kirk	CCT	(509) 978-8031	kirk.truscott@colvilletribes.com
Verhey, Patrick	WDFW	(509) 754-4624	patrick.verhey@dfw.wa.gov

Attending Participants:

Hillman, Tracy	BioAnalysts	(208) 321-0363	tracy.hillman@bioanalysts.net
Jackson, Chad	WDFW	(509) 754-4624 x250	chad.jackson@dfw.wa.gov
Keller, Lance	Chelan PUD	(509)661-4299	Lance.keller@chelanpud.org
Kunz, Heidi	Chelan PUD	(509) 661-4758	heidi.kunz@chelanpud.org
Nelle, RD	USFWS	(509) 548-7573	RD_Nelle@fws.gov
Rainey, Steve (phone)	Consultant	(503) 260-6990	wsteverainey@aol.com
Steinmetz, Marcie	Chelan PUD	(509) 661-4186	Marcie.steinmetz@chelanpud.org

Meeting Minutes

I. Welcome and Introductions

Tracy Hillman welcomed everyone to the Rocky Reach Fish Forum (RRFF) meeting. Attendees introduced themselves.

II. Review of Agenda

The agenda was reviewed and approved.

III. Review and Approval of Meeting Minutes

Meeting minutes from the 3 September 2014 meeting, with edits that Tracy Hillman e-mailed to the RRFF earlier, were reviewed and approved. During the review, Tracy Hillman asked the group to help him clarify whether or not the juvenile white sturgeon release number of 6,500 fish was arbitrary or based on some level of modeling. Tracy noted that he has heard some members' state that the number was arbitrary and others state that the number was based in part on a modeling exercise conducted for the Priest Rapids Project Area. Bob Rose stated that there was some modeling work that informed the number and that it was not entirely arbitrary. Pat Irle indicated that in the Grant PUD White Sturgeon Management Plan, which was developed post 401 Certification, the 6,500 number was developed using modeling. However, the 6,500 number was included in the Certification before the modeling was completed. Marcie Steinmetz noted that during the settlement process, Grant PUD used a computer model to inform the 6,500 number. Pat Irle, Bob Rose, and Steve Hemstrom suggested the addition of a footnote to the September meeting notes indicating that "During the November meeting, some members recalled that the 6,500 number was informed by modeling efforts conducted for the Priest Rapids Project Area and therefore was not entirely arbitrary." Pat also noted that she did not attend the development of all the plans, but that she attended the development of two of the plans, and wrote the 401 Certifications for all three Projects.

Members then reviewed and approved the minutes from the 1 October 2014 meeting.

Action Items:

- **Tracy Hillman will add a footnote to the September Meeting Minutes stating that "During the November meeting, some members recalled that the 6,500 number was informed by modeling efforts conducted for the Priest Rapids Project Area and therefore was not entirely arbitrary."**

IV. Review of October Action Items

Tracy reviewed the Action Items from the 1 October 2014 meeting.

- Tracy Hillman will add the affiliations of the sturgeon experts to the document "Responses from Sturgeon Experts" and send it to the RRFF. **Complete.**
- Tracy Hillman will add edits he receives on the 3 September 2014 meeting minutes and then send the minutes out for review and approval before the 5 November 2014 meeting. **Complete.**
- Chad Jackson will provide the "Summary of Findings" on how WDFW will deal with the infestation of New Zealand Mudsnails at the Ringold Hatchery. **Complete.**
- Steve Hemstrom will send out the time and place of the lamprey subgroup meeting along with the purpose of the meeting and the objectives. **Complete.**
- Steve Hemstrom will provide a link to the report, "Natural Propagation and Habitat Improvement – Washington Volume IIA – Tumwater Falls and Dryden Dam Fish Passage Final Report, 1983." Tracy Hillman will send the link to the RRFF. **Complete.**
- Steve Hemstrom will provide a paper titled, "Trapping Effects and Fisheries Research, A Case Study of Sockeye Salmon in the Wenatchee River, USA." Tracy Hillman will send the paper to the RRFF. **Complete.**
- Steve Hemstrom will try to arrange a visit of Tumwater Dam when the fishway is dewatered. **Ongoing. The tour will occur in January or February.**
- Tracy Hillman will contact Lance Keller to identify a good time to tour the denils at Rock Island Dam. **Complete. Members available toured the denils on 4 November.**
- Jason McLellan will send Tracy Hillman articles on sturgeon energetics and lavage techniques. Tracy will forward them to the RRFF. **Complete.**
- The RRFF will review the draft primer on bioenergetics models and discuss next steps during the November meeting. **Complete. There were no comments from the RRFF.**
- Steve Hemstrom will work with Lance Keller on the EcoPath/EcoSim model and discuss their findings with the group at the next meeting. **Ongoing. Steve and Lance will work with Grant PUD on the model.**

V. Water Quality

Review of the Total Dissolved Gas Year Five Compliance Report

Marcie Steinmetz provided an update on the recently completed document titled, "Total Dissolved Gas: Year Five Compliance Report." She explained that this compliance report is a requirement through the 401 Certification. The report covers the period 2009-2013. The compliance standard was achieved 100% of the time in 2009. After that year, the percentage dropped, primarily because of the higher flows in 2011 and 2012. The overall compliance rate for the Rocky Reach tailrace for the five-year period was 92.7%. These numbers are for the fish-spill period of 1 April through 31 August. The Rocky Island

Forebay was at 94.6% for the five-year period. Rock Island Tailrace numbers are not usually as good as Rocky Reach, because Chelan PUD is limited in what they can do with the Forebay and Tailrace at Rock Island.

Marcie reported that another requirement of the 401 Certification is to look at the flattened spill configuration and running that through the consultation process with the RRFF and the HCP Coordinating Committee. Chelan PUD analyzed the data from 2011 and 2012. The data from 2011 were more complete than 2012, which had higher flows. The data showed that total dissolved gas (TDG) did not appear to affect fish passage.

Bob Rose asked what kinds of analyses were done to come to that conclusion. Marcie replied that they looked at the scenario of running the flattened spill and correlated it to fish passage over the same period, and then looked at passage over the year. She indicated that it will be easier to run tests once the gates are automated. Steve Hemstrom commented that the gates are automated, but what is not automated is a program that would change from the normal fish-spill-gate pattern to a flattened spill program. He stated that there are several scenarios to consider when creating an automated program.

Steve Rainey commented that about 20 years ago, Chelan PUD used to open one spill gate at a time. Once one gate was fully open, they would open another one. The result was that there was significant flow through a spill gate that plunged into pools instead of on bedrock. He added that this was when discussions about automated spill gates were initiated. At other projects with deeper tailraces and spilling basins (not the shallow bedrock outcrop found at Rock Island), flat spill is the best for controlling TDG levels in the tailrace. Marcie explained that Chelan PUD had noticed that at 50 kcfs it would be a benefit, and at lower spills there is not a large difference.

Steve Hemstrom stated that Rocky Reach uses a full set of gates to distribute spill. Spill is added via different gates opening and closing incrementally across the spillway. The secondary function of the fish-spill-gate pattern is to try to help adult passage through the fishway. The gate sequence is set up to aid juvenile and adult passage.

In response to a question from Steve Rainey, Marcie stated that no three-dimensional physical hydraulic model was used to develop spill schedules. Steve Hemstrom explained that if the operators know what they need to spill, they can enter that number and the gate program will open the gates to make that happen. However, the flattened spill configuration is not programmed. Steve Hemstrom indicated that adult conversion rates at Rocky Reach are very good.

Steve Rainey asked how Rock Island TDG levels compare to Rocky Reach. Marcie replied that 2014 was not a typical year at Rock Island because of the Wanapum drawdown. She stated that both Projects typically do well. Steve Hemstrom explained that there are nine modified spill gates at Rock Island that can handle moderate spill discharge (about 21.5 kcfs). Above the spill flow of 21.5 kcfs, additional full gates open in addition to the nine that are modified to help TDG. This gate configuration and spill method was tested in the HCP's. The gates are opened through a sequence of various adjustment

points. This was found to be the best way to reduce TDG and it is the best way to distribute spill across the forebay.

Tracy Hillman directed Marcie to the last paragraph in the executive summary, which reads, "The total number of Rocky Reach Dam TDG exeedances during the first five years of the License range from zero in 2009 to 21 in 2013, with a five year total of 210." Tracy stated that the math does not support the total number of 210. Marcie checked the numbers in the reported and noted that the numbers are correct, but that the sentence was not correctly written. She indicated that she would reword the sentence.

Steve Lewis asked for an update on the Chelan County milfoil project near the town of Entiat. Marcie said that she received an e-mail from John Jennings informing her that their application through Aquatechnics is still on hold. Marcie will forward the e-mail from John Jennings to Steve Lewis.

Action Items:

- **The RRFF will review the report "Total Dissolved Gas: Year Five Compliance Report" and send comments to Marcie Steinmetz by 4 December 2014.**
- **Marcie Steinmetz will forward the e-mail from John Jennings to Steve Lewis.**

VI. Pacific Lamprey

Rocky Reach Project Effects (No Net Impact)

Tracy Hillman stated that in an attempt to track and fully understand the Pacific lamprey No Net Impact (NNI) discussion, he reviewed the past several months of RRFF meeting notes and found that NNI was not defined by the Forum. Tracy said that he then went through all the Settlement Agreement and management plans looking for a definition of NNI for lamprey. He reported that he did not find a clear definition of NNI for lamprey. However, within the Pacific Lamprey Management Plan (PLMP), he found the following statement: "*The goal of the Pacific Lamprey Management Plan is to provide safe, timely and effective passage for adult and juvenile Pacific lamprey and where unavoidable Project impacts are measured, then provide appropriate and reasonable Protection, Mitigation and Enhancement Measures that achieve an overall No Net Impact on this population*." In addition, on page 514, the PLMP states, "*The Pacific Lamprey Management Plan is to achieve No Net Impact on Pacific lamprey by measuring ongoing Project related impacts, if any, on Pacific lamprey. Implementing appropriate reasonable measures to reduce or eliminate such impacts and eliminating onsite or offsite measures to address unavoidable impacts*." Tracy said that from his perspective, this was not an entirely satisfying definition of NNI. Therefore, Tracy asked each member how they define or interpret NNI for lamprey.

- Matt Kerec, Alcoa, said that being new to the Forum he had no definition at this time.
- Patrick Verhey, WDFW, responded that he thinks it means that the Project is invisible to Pacific

lamprey. He acknowledged that there remains the element of measuring the impact, but he thinks it speaks to eliminating all the impacts to Pacific lamprey at the Project.

- Kirk Truscott, CCT, responded that his thoughts are similar to what Patrick Verhey conveyed. If you identify negative impacts to Pacific lamprey, you need to address those, but also acknowledge that there will be impacts that you cannot address. NNI includes activities to account for the unavoidable impacts so the net impact is as close to zero as you can get it. Kirk suggested looking at NNI in the Habitat Conservation Plans (HCPs) for examples of habitat and hatchery compensation. He thinks the correct direction is to address impacts that we can do something about. For those that we can't, we need to determine how to compensate for them.
- Steve Lewis, USFWS, stated that at this point it is hard to measure the impact because the technology to do so is not yet available. He thinks NNI is hard to define because it is still in its infancy and its definition may change as our understanding of lamprey biology changes.
- Pat Irle, Ecology, responded that she does not have a definition at this time, but would like to add her input when we get close to wording a definition.
- Steve Hemstrom, Chelan PUD, stated that he goes back to the PLMP and reads what was intended to happen and then determines how to achieve it through onsite and offsite measures. He stated that it is difficult to determine if you have achieved NNI, because there are no percentages in place to measure it or to determine if it has been achieved. The question is do you mitigate unavoidable effects to the point where there is definitely no loss as if the Project is invisible, or just that the Parties agree that the mitigation actions taken are doing the proper mitigation job. Steve said that he would be asking not only for a definition of NNI, but also what it means when NNI is achieved. He said that he is trying to interpret NNI in the plan as it is written and not add anything to it.
- RD Nelle, USFWS, stated that his definition of NNI would include a historic look at the impact as opposed to looking at the physical impact of the Project.
- Tracy Hillman stated that he sees how NNI may equate with Portfolio theory, which is a theory developed originally in economics and finance but has recently been used in the ecological sciences. In the ecological context, Portfolio theory provides a framework and analytical tools for characterizing the relative performance of populations. It links the liabilities (risks or impacts) and assets (benefits) such that they achieve a desired balance between gains and risks to the population. In the case of lamprey, one would identify the possible risks (e.g., mortality at the project, increased predation, etc.) and possible benefits (e.g., increased rearing habitat within the reservoir, etc.), and link them to see if the gains and risks balance. If not, and the risks are greater than gains, one would need to mitigate to provide balance. Thus, NNI would be achieved when gains equal risks (impacts).

Tracy noted that yesterday Bob Rose provided the Forum with a Concept Paper titled "No Net Impact and Mid-Columbia Regional Coordination, 5-Year Action Plan for Pacific Lamprey," which included a definition for lamprey NNI (see Attachment 1). Tracy noted that the RRFF agenda was prepared before he received the Concept Paper from Bob and therefore the agenda item "What does NNI mean for

lamprey" predates the paper distributed yesterday. Nevertheless, the Concept Paper provides the first attempt at defining NNI for lamprey. Noting that the Forum probably did not have time to review the paper, Tracy asked Bob to walk the Forum through the document and to define NNI for Pacific lamprey.

Bob Rose stated that he thought the group had a good working knowledge of both the Grant and Chelan PUD Pacific Lamprey Management Plans. He stated that both plans are equally vague in their definition of NNI, but that the objectives basically say the same thing in both plans. The definition in the Concept Paper is basically the same as in the Chelan PUD Pacific Lamprey Management Plan, but includes a bit more detail (see page 3 in Attachment 1). Bob stated that he is defining the effect on a population as opposed to effects on individuals. He stated that the definitions given earlier by the RRFF members are not distinctly different from the language in either one of the Management Plans or in the Concept Paper. If a new definition is proposed, Bob would still like the ideas in the paper to be considered. He would also like to focus on a definition that is functional. Bob believes that the function of the Forum should be to interpret the Management Plans according to the present time and the growing knowledge that has been gained, and use that information to determine how to move forward.

Steve Hemstrom noted that although he has not yet studied the Concept Paper, it is important to point out that the dam has positive and negative effects on both Pacific lamprey and humans, and those need to be considered. He also noted that this is the second license and filling the reservoir and original inundation effects were paid for in the first license. He does not think NNI means that Chelan PUD needs to go back to a time before there were any dams on the river to show effects of the Project.

Bob Rose summarized the information contained in the Concept Paper. He started by pointing out that the paper was prepared by the Yakama Nation, Umatillas, Colville Tribes, WDFW, and the USFWS. He said the Concept Paper proposes a five-year passage standard of 80%. This number is based on the 2011 Tribal Lamprey Management Plan, which was supported by the Northwest Power and Conservation Council. Kirk Truscott pointed out that even though 80% seems like a high number, when you look at the cumulative effect of all five Projects, the impact on Pacific lamprey is high. Steve Hemstrom voiced concern about setting a specific standard and what it would mean if that standard was not achieved. Bob indicated that 80% is just a goal to aim for. Bob stated that the 80% goal includes entrance efficiency, passage efficiency, and fallback.

Bob Rose stated that he would like to establish an agreed upon timeline for the implementation of the NNI proposal. Bob would like the Forum to agree to the proposal by March or April 2015. Steve Lewis agreed and asked if Bob would like to propose a vote in April. Bob said that he would like to see different components of the proposal voted on each month in order to be able to move forward in April. Pat Irle commented that it would be helpful to have actual dollar amounts included in the Concept Paper in order to begin discussions.

Kirk Truscott pointed out the importance of identifying specific timelines and deadlines in order to move forward on this issue. Steve Hemstrom, referring to the Settlement Agreement, said that the Agreement says to measure effects and where unavoidable effects are measured, take action, but it does not

provide a time frame. He stated that for juvenile Pacific lamprey there is presently no tagging system and therefore there is no way to measure effects. In addition, he does not feel that Chelan PUD has done nothing to reduce impacts to lamprey. He pointed out that Chelan PUD has fixed the Rocky Reach fishways and they are currently evaluating the passage of 280 PIT-tagged adult lamprey in the Rocky Reach fishways. Chelan PUD continues to evaluate what needs to be fixed. He then referred to the HCP's definition of infeasible juvenile studies, which says that "*infeasibility to measure does not constitute failure*." He stated that it is not possible at this time to measure unbiased juvenile survival using existing mark-recapture techniques. Steve Hemstrom stated that the RRFF is moving towards an NNI idea without conducting all of the effects studies that were envisioned in the License. Pat Irle stated that it was her understanding that Chelan PUD was committed to providing funding for NNI and that the Concept Paper looks at identifying the specific actions to be paid for under NNI. She believes at this point it should be as simple as agreeing on a few of the projects listed in the concept paper that fall under NNI.

Steve Hemstrom agreed that Chelan PUD is looking at the NNI concept and trying to figure out a way to move forward positively, which includes funding some of the projects. The concept of moving forward with NNI funding before Project effects are evaluated is still being discussed by Chelan PUD and money has not been committed. Steve Hemstrom reported that a meeting took place with the Chelan PUD Senior Management Team on 13 October regarding this issue, but they are not yet at a point to pick projects to fund under NNI. He urged patience and stated that it will continue to take time to discuss the issue internally and to review the results of studies that are still ongoing.

Kirk Truscott commented that if Chelan PUD decides that they will follow the letter of the Settlement Agreement, which states that if you can't measure the effects, you don't mitigate for them, then spending too much time on the Concept Paper could be a waste of time. Steve Hemstrom responded that he expects that the PUD could have an answer on whether or not to move forward with NNI within the next two months. Steve Hemstrom stated that the Concept Paper included helpful information and he again asked for patience from the RRFF while Chelan PUD works on the NNI issue internally.

Steve Hemstrom pointed out that the Senior Team and the Commissioners are different groups. Approval would be needed from the Senior Team before presenting to the Commissioners. He explained that the Senior Team would need to approve the concept of an alternate pathway for the plan and what that would mean in future years. Steve Hemstrom is not currently in a position to talk about approving specific projects or spending certain dollar amounts. Bob Rose suggested that it would beneficial for the two of them to meet before Steve Hemstrom speaks to the Senior Team. Steve Hemstrom stated that Chelan PUD needs a little more time to work on NNI internally. Bob Rose and Steve Hemstrom disagreed on how much time is needed.

Bob Rose reported that the Table at the end of the Concept Paper has not been updated and is not correct. Bob would like to get together with Steve Hemstrom within the next few weeks to make connections between the interpretations of the 401 Certification and the intent of the FERC License, and

the relationship to the PLMP.

Given that the Forum had not fully studied the information in the Concept Paper, Tracy Hillman proposed a 30-day comment period, which would give the RRFF time to review and study the paper. Tracy asked the RRFF to focus their comments on definitions, timelines, and funding aspects of the report. In addition, members should state why they agree or disagree with the linkages made in the report. To that end, Steve Lewis stated that it would be helpful to link each task in the report to NNI, FERC requirements, Adaptive Management, or any combination of those three. Members agreed to study the Concept Paper and provide comments to Bob Rose by Monday, 1 December. Bob will then compile the comments, edit the report, and send it to the Forum by no later than Tuesday, 2 December. The Forum will meet on 3 December to discuss the revised Concept Paper.

Action Items:

- **The RRFF will review the paper, "No Net Impact and Mid-Columbia Regional Coordination, 5-Year Action Plan for Pacific Lamprey" and send their comments to Bob Rose by 1 December.**
- **Bob Rose will compile comments, edit the report, and send the revised report to the RRFF by 2 December.**
- **Steve Hemstrom and Bob Rose will set up a small group meeting to discuss the Concept Paper and its objectives.**
- **Tracy Hillman will send a reminder to Bob Rose regarding the 1 December deadline.**

Pacific Lamprey at Tumwater Dam

Steve Lewis reported that there was a good discussion onsite at Tumwater Dam about the pitfalls of upstream lamprey passage through the ladder and trap at Tumwater Dam. Steve Lewis would like to have a group discussion on next steps and whether addressing lamprey passage at Tumwater falls under NNI. Patrick Verhey asked Steve Lewis to clarify what he meant by passage at Tumwater being an NNI issue. Steve Lewis said that he believes it is a Section 18 Fishway issue versus an NNI issue. Steve Lewis stated that he would like to release lamprey below the facility and see where they go; this could be done in 2015. Steve Rainey noted that he believes there are two primary objectives at Tumwater Dam. The first would be to determine if Tumwater Dam blocks upstream lamprey passage, particularly when the fish trap is operating. If it does, then determine where in the fishway the blockage exists. He thinks this could help us better understand the biology of the fish at the site and then we can start talking about what could be done. RD Nelle reminded the Forum that Task 9 in the Concept Paper addresses passage at Tumwater Dam.

Kirk Truscott commented that Chelan PUD had agreed to the NNI concept before studies indicated that there was an issue at Tumwater Dam. He asked if the FERC license considers passage issues only at Rocky Reach, or does it consider passage issues at Rocky Reach and its associated structures. Steve Lewis stated that the License views only the fish trapping facilities at Tumwater Dam, not the entire structure. He stated that originally Tumwater Dam was not included in the Section 18 Prescription. Steve

Lewis asked if it is considered under the guise of the FERC Section 18 Fishway Prescription, or is it captured under the guise of NNI. Patrick Verhey stated that the Section 18 Fishway Prescription is a USFWS authority. He said that he is still unclear about whether the entire Tumwater Dam is part of the Rocky Reach Project or just the fish trapping facility. He wanted to clarify if Steve Lewis is asking the RRFF to give their opinion on whether it falls under the Section 18 Fishway Prescription, or if the RRFF prefers to address Tumwater through NNI. Steve Lewis stated that he would like to provide lamprey passage at Tumwater and would like to vet the exact process for doing that.

Pat Irle asked if Section 18 can be applied to lamprey, or is it limited to listed species. Steve Lewis responded that it applies to all fish that use the facilities. Steve Rainey commented that Section 18 is under the Federal Power Act, not the Endangered Species Act. Pat Irle thought that passage of lamprey through the fishway should be covered under Section 18, but there's a possibility that it could be the actual dam itself that is also causing passage problems. She suggested that under the license, Chelan PUD would address lamprey passage through the trapping facility. Steve Rainey commented that until recently, Pacific lamprey have not been a priority for research at Tumwater. The population has declined and it is not known if it is because of the new fish ladder installed in the 1980's, because of ongoing trapping operations at Tumwater, or both.

Steve Lewis stated that a Fishway Prescription was filed for Rocky Reach itself and there is the capability to file an amended Fishway Prescription for Tumwater just for the fishway and its associated trapping facilities. Steve Lewis noted that a Fishway Prescription has not been done for the type of structure or modification that would facilitate further upstream passage for lamprey at Tumwater. The focus was only on fish passage at Rocky Reach. Steve Lewis stated that an amended Fishway Prescription can be filed at any time if there is new information or if circumstances change. Steve Lewis verified that the USFWS could ask Chelan PUD to conduct studies on the fishway, trapping operations, or the dam through an amended Fishway Prescription.

Recalling RD's earlier comment, Tracy Hillman asked if this issue should be addressed under Task 9 in the No Net Impact and Mid-Columbia Regional Coordination, 5-Year Action Plan for Pacific Lamprey report, or if it needed to be discussed separately. Steve Lewis said it is appropriate to discuss it under Task 9. Others agreed.

Regional Implementation Planning Process

RD Nelle explained that local experts met to fill out templates for the Pacific Lamprey Regional Implementation Planning process. Templates for all Upper Columbia areas have been completed. RD said that the next task is to write the reports.

Wanapum Response: Rock Island Lamprey Passage Structures

Tracy Hillman reported that Lance Keller sent out the "Interim Fish Passage Plan, Monthly Report, November 1, 2014" to the RRFF last week. Tracy asked Lance to provide a brief update on the passage

plan.

Lance Keller indicated that daily fish counts dating back to March are in the document. The report contains window counts of adult lamprey that have ascended the fishway and passed the counting window. Lance pointed out that Grant PUD was doing their trap-and-haul work during this time period. The total number of adult lamprey being reported is 2,449, but there is some discrepancy with this number, because the fish that Grant PUD transported around Rock Island and up to Kirby Billingsley Hydro Park were not included in the total. Lance indicated that 2,463 adult lamprey were transported around the dam, bringing the total for the year to 4,912. Since the operation with denils began, 980 adult lamprey have passed Rock Island Dam. In order to pass Rock Island, the lamprey would have had to interact with the denils. Chelan PUD is continuing to log lamprey passage. For example, on 1 November, five adult lamprey passed the count window.

Steve Rainey asked if the lamprey are passing through the denils or through the lamprey ramps attached to the denils. Lance said that the denils were designed for salmon and steelhead passage and the lamprey would be more likely to use the lamprey passage systems, which are attached to the denils. However, they do not know for sure if the lamprey used the ramps or the denils.

Tracy Hillman noted that Grant PUD plans to start raising the elevation of Wanapum pool later this year. Lance Keller stated that Chelan PUD would like to see the start of a pool raise before 2015. Chelan PUD is discussing the appropriate time to remove the denil structures. There are many issues to consider when determining the ideal time to remove the denils, including if they may need to be put back in place.

Tracy Hillman asked if there was any harm in leaving the denils in place. Lance noted that Chelan PUD is considering that option, but it has not been presented to FERC and the HCP Coordinating Committee. Chelan PUD is evaluating all of their options.

2014 Rocky Reach Lamprey Tagging and Initial Detections Update

Steve Hemstrom reported that Chelan PUD has nearly 40,000 individual detections from the 223 fish that have arrived at Rocky Reach Dam. Fish have been detected at five different sources including Priest Rapids, Ice Harbor, Bonneville, McMary, and Rocky Reach dams. Steve Hemstrom said that he is just beginning to look at the data. When all of the data have been analyzed, he hopes to have a full history for each fish. Steve Hemstrom would like to use GIS as a tool to help present the data. He would like to be able to use the data to learn about the efficiency of the modifications made to the Rocky Reach ladder system. He said that successful passage includes fish that have been detected at the top of the fishway and not detected again lower in the fishway. Preliminary passage numbers are looking good. There are still some fish making their way through the system, including some that may winter in the fishway. Steve Hemstrom brought up the issue of moving forward with an NNI proposal before completing the upstream passage assessment that is still going on at Rocky Reach.

Action Item:

- **The RRFF will consider if it is necessary to continue the same level of fishway passage assessment studies in the future.**

Modeling lamprey/sturgeon interactions

Tracy Hillman reported that last month he sent to the RRFF a primer on bioenergetics modeling. He did not received any comments or edits on the primer. He reported that he recently received information from the Fisheries Information and Technology Section of the American Fisheries Society that the bioenergetics model has been upgraded to version 4.0 and includes a database that contains parameter estimates for 108 models, an increase from the 33 models included in version 3.0. Tracy will check to see if the new version includes parameter estimates for white sturgeon. Another new feature is that the model includes links to all of the studies that the model draws upon for information and uses an R-based application. Tracy will give an update next month on the upgraded version of the model.

Action Item:

- **Tracy Hillman will review Fish Bioenergetics 4.0 to determine if it includes parameter estimates for white sturgeon.**

VII. Bull Trout

Bull Trout and Tumwater Dam

Steve Lewis reported that there was nothing new to report other than the fact that they had a meeting with the HCP Hatchery Committees in which they tried to develop annual operating plans for facilities like Tumwater. The purpose is to minimize effects and exposure of effects to bull trout. He would like to see these operating plans vetted through the RRFF.

Kirk Truscott indicated that he did not believe there had been any discussion at the HCP Coordinating Committee or Hatchery Committee meetings about routing those plans through the RRFF. Tracy Hillman suggested that if any issues come up that could affect bull trout or Pacific lamprey, one of the committee members could bring that to the attention of the RRFF.

VIII. White Sturgeon

Rearing Update

Lance Keller reported that he spoke with Mike Lewis (WDFW), who informed him that things are going well at Columbia Basin Hatchery. Lance noted that part of Chelan PUD's production is at Columbia Basin Hatchery and the rest are at Chelan Hatchery. Fish are doing well at both locations. They have about

8,000 juveniles on station and WDFW will begin their second culling soon. Pacific Northwest National Laboratory has requested 1,000 healthy juvenile sturgeon (from the culls) to conduct tagging and growth relationship studies. Chelan PUD approved this request. Chad Jackson reported that histological studies are still on hold as they wait for contract approval.

Monitoring Update

Lance Keller reported that Blue Leaf Environmental completed their 2014 fieldwork associated with monitoring and indexing the juvenile white sturgeon population within the Rocky Reach Project Area. They captured a total of 763 fish on set lines. Of those 763 fish captured, 101 were from the 2011 release, nine were from the 2012 release (note that only 147 fish were released in 2012), 545 from the 2013 release, and 89 from the 2014 release. The remaining 19 fish captured in 2014 were of unknown release year. Two of the nine fish captured from the 2012 release had been captured previously. Because initial captures from the 2014 release group were low, Blue Leave Environmental and Columbia Basin conducted an additional five days of long-line fishing. This additional effort resulted in 215 recaptures. Lance reported that over the last two years, three release locations have been used.

Lance Keller indicated that the annual monitoring report should be available by the end of the year. Lance also said that he and Corey Wright (Blue Leaf Environmental) have discussed using different scute marks for different years. Lance noted that they continue to track fish with acoustic tags. He did not have information on PIT-tag detections in the tributaries, but will look into getting that information.

Phase 2 Sturgeon Conservation Program – Sturgeon Model

Tracy Hillman reported that the RRFF has been waiting for Lance Keller to complete his review of the EcoPath/EcoSim model. Tracy noted that because of Lance's workload, Grant PUD and their consultant, Golder, will assist Lance with a review of the model. Lance was pleased to hear that Grant PUD and Golder will help him with the review. Lance noted that the EcoPath/EcoSim model incorporates a lot of the same information as the bioenergetics model and that will be helpful when looking at the Pacific lamprey/white sturgeon interactions. Both Steve Hemstrom and Lance Keller will be attending the Upper Columbia White Sturgeon Recovery Initiative meeting in mid-November. This will provide an opportunity to get more information on the issue from sturgeon experts. Chad Jackson suggested that Chelan, Grant, and possibly Douglas PUD could share the cost of having a consultant develop a stocking strategy for the Project Areas.

Chad Jackson informed the group that because of changes in personnel at WDFW, it would be a good idea to submit Transport Permits for 2015 broodstock transport as soon as possible. He also advised the PUD to download the form from the WDFW website in order to get the most current version of the form.

Action Items:

- **Lance Keller will work with Grant PUD and Larry Hildebrand (Golder) on the EcoPath/EcoSim model.**
- **Lance Keller will get Transport Permits to Chad Jackson as soon as possible.**

IX. Next Steps

The next regular meeting of the RRFF will be on Wednesday, 3 December 2014 from 1:00 to 4:00 p.m. in the Chelan PUD Second Floor Conference Room.

Attachment 1

No Net Impact and
Mid-Columbia Regional Coordination

5-Year Action Plan for Pacific Lamprey

Proposed by

Yakama Nation
Confederated Tribes of the Umatilla Indian Reservation
Confederated Tribes of the Colville Reservation
Washington Department of Fish and Wildlife
U. S. Fish and Wildlife Service

Concept Paper

For Evaluations to Determine Project Effects

and

Implementation of No Net Impact

Presented to the

Rocky Reach Fish Forum

Nov 5, 2014

Introduction

The Rocky Reach Fish Forum (Forum) functions to support the implementation of the Rocky Reach Settlement Agreement in general, and the Pacific Lamprey Management Plan (PLMP) specifically in addition to implementation of the 401 Water Quality Certification. Given that so little is understood about many aspects of the biology and behaviors of Pacific lamprey, the PLMP was written with a full expectation by the Forum that the notion of Adaptive Management would be central in our progress towards determining and eliminating Project effects on the species. Additionally, it was understood during the development of the PLMP that there would likely be Project effects that cannot be completely eliminated (either in the near term or longer term) and that mitigation would be required such as to render the Project operations as having No Net Impact (NNI) on the species.

To date, the majority of the ongoing effort has been associated with improving and measuring adult passage in the Project fishways. Many members of the Forum believe there are Project effects beyond adult passage issues but are stymied by the lack of technology and proven methods to quantify these potential effects. These members also recognize it is a responsibility of the Forum to implement reasonable and feasible actions to advance our understanding of these potential impacts in the face of uncertainty and to advance our goals and objectives as effectively and efficiently as possible, as discussed in more detail below. Therefore, the Forum concludes it is reasonable and useful to employ the NNI concept to mitigate ***and*** to advance our knowledge of lamprey biology and behaviors relevant to Project operations and Project effects.

Recognizing this need a regional holistic proposal incorporating 10 Objectives has been introduced to the Forum by the Yakama Nation (YN), Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Washington Department of Fish and Wildlife (WDFW) and the United States Fish and Wildlife Service (USFWS). This same proposal has been introduced and discussed in the Douglas County PUD and the Grant County PUD Fish Forum and its core components are embedded in the USFWS Pacific Lamprey Conservation Agreement. This holistic approach goes beyond addressing potential direct effects within the Project Area with the objective of substantially increasing lamprey productivity and spatial structure within the tributary streams of the Upper Columbia River (from Priest Rapids Dam to Chief Joseph Dam). By necessity, this approach recognizes the severely reduced lamprey population is a regional problem, which necessitates a regional response.

As stated above, many of the Forum members believe there are Project impacts related to the operation of the Rocky Reach Dam and that it is appropriate to apply the NNI concept. Furthermore many Forum members agree that it is warranted to define and incorporate mitigation measures into the existing PLMP, as provided by the State of Washington 401 Certification fish use section 5.3. As such, the Forum concludes and recommends that the proposal provided in this document, with an intended effective time frame of 5-years, is the appropriate manner in which to sufficiently address mitigation during this time and advance our understanding of Pacific lamprey in relation to the Rocky Reach hydroelectric Project. The following outlines the general concept and identifies specific actions to be applied under the FERC License requirement and actions implemented under the NNI concept.

Purpose
The purpose of this document is to provide to the Forum a conceptual context and meaning of No Net Impact (NNI) and clarity in its application over the next five years (2015 – 2019).

Goal
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 implement on-site or off-site measures to address unavoidable impacts.

The intent of the PLMP is to measure any impacts of ongoing Project operations on upstream and downstream passage of Pacific lamprey. To fulfill this intent, Chelan PUD shall, in consultation with the Forum, develop and implement measures to eliminate those impacts, to the extent appropriate and reasonable. The PLMP also states that the intent of the PMEs contained in this PLMP is to: 1) protect, mitigate, and enhance lamprey resources; 2) ensure that the ongoing operation of the Project will not adversely impact lamprey; 3) minimize the effect of any incidental injury or mortality to lamprey that may occur as a result of ongoing Project operations on lamprey habitat; and 4) ensure adequate monitoring and reporting of results. The PLMP outlines the following objectives to achieve NNI.

Objective 1: Measure Any Ongoing Project-related Impacts on Upstream and Downstream Passage of Adult Pacific Lamprey, and Eliminate Those Impacts to the Extent Appropriate and Reasonable

Objective 2: Measure any ongoing Project impacts on downstream passage of juvenile Pacific lamprey, and eliminate those impacts to the extent appropriate and reasonable.

Objective 3: Measure any ongoing Project impacts on the existing reservoir habitat used currently by juvenile Pacific lamprey, and eliminate those impacts to the extent appropriate and reasonable.

Objective 4: Identify and implement measures to address unavoidable impacts to achieve NNI.

No Net Impact – The Concept

Definition: The Forum defines No Net Impact as actions provided by Chelan County PUD that mitigate Project effects on Pacific lamprey such that the presence and operation of the Rocky Reach Hydroelectric Dam, including the reservoir up to the tailwater of Wells Dam, is essentially "invisible" to impacts towards abundance, productivity, spatial distribution and genetic diversity of the species.

More specifically, during the term of this 5-year Action Plan, CCPUD will substantially support trap and haul (translocation) actions, as directed in the PLMP (but not included as an NNI contribution) and guided by the fisheries co-managers and will contribute $X dollars to an account managed by the PUD for the purpose of (1) measuring the benefits of this translocation program, (2) to assist resource managers in identifying and correcting passage problems in the tributary streams and to (3) support identification of potential juvenile entrainment issues in the tributary streams and correction of these issues. Actions associated with this account are discussed in more detail below.

Application: Ideally, this definition requires perfect knowledge of both lamprey biology and Project effects. The Forum acknowledges problems associated with enumerating adult or juvenile mortality due to Project operations (either direct or indirect effects) and the incomplete understanding of lamprey

biology. However, neither of these limitations precludes the Forum from using existing information and, through consensus, define reasonable mitigation actions that are appropriate over a defined timeframe. The definition of Adaptive Management within the Settlement Agreement recognizes this notion. In addition, it is appropriate and reasonable to define NNI actions in a way that not only benefits the species but also implements actions that increases our knowledge of lamprey behavior and biology useful in measuring Project effects at some future time. It is intended that this information will be useful in determining reasonable and feasible actions to reduce, eliminate or as necessary mitigate for Project effects. These actions are described in more detail below.

Rational for Employing NNI: The Forum recognizes three specific facts that are the basis for the use of NNI at this time, including – but not necessarily limited to adult passage, uncertainties related to the reservoir and predation of juveniles in the turbine boils:

First, adult passage in the Rocky Reach fish ladders, as currently being measured, is likely below 80%. This does not include any unmeasured effects from ladder entrance efficiency or potential issues associated with the reservoir. Although it might be argued that this passage rate is *similar to other passage measurements on the Columbia River*, a passage rate of 80% contributes substantially to cumulative effects. For example, if three dams had 80% passage efficiency in the upper Columbia, less than half of the adults "destined" to migrate above these dams would make it (33% for 5 dams). Currently passage rate of 80% has not been achieved by any of the dams on the Columbia River. Applying NNI is consistent with Objective 4 of the PLMP as stated above.

Second, nearly 100% of the fish that pass Rocky Reach Dam are not accounted for at the Wells Dam count window. It is not likely that all of these fish are moving into the Entiat River. This situation is also attributed partly to Wells passage issues. The Forum is well aware of this situation and it is appropriate for Chelan PUD to work closely with Douglas PUD in providing an appropriate evaluation, consistent with Objective 1 of the PLMP, above. It is also consistent with the principles of Adaptive Management, outlined below.

Third, although not confirmed, there is reasonable cause to believe that predation on juveniles by Northern pikeminnow may be pronounced in the turbine boils where these predators are generally known to exist in established feeding stations. Although the PUD has an active predator control program, it is not clear to what extent the current pikeminnow removal program benefits lamprey. It is reasonable to evaluate the potential for increased predator control in the turbine boil area, consistent with Objective 2 of the PLMP.

Adaptive Management

Adaptive Management is defined in the Settlement Agreement.

"Adaptive Management" means an iterative and rigorous process used to improve decision-making in the face of uncertainty. In the context of the Rocky Reach relicensing, it is intended to improve the management of natural resources affected by ongoing Project operations, in order to achieve desired goals and objectives as effectively and efficiently as possible, within the provisions of this Agreement. The process has seven steps:

a) Develop initial hypotheses regarding any ongoing Project impacts and potential remedial

measures;

b) Develop goals and objectives for addressing any such impacts;

c) Develop and implement appropriate and reasonable measures in accordance with an established schedule;

d) Develop or identify monitoring and evaluation methodologies for determining whether such goals and objectives have been achieved;

e) Monitor and evaluate the implementation of such measures and their effectiveness toward achieving such goals and objectives;

f) Review monitoring and evaluation efforts; and

g) Confirm that such goals and objectives have been achieved or, if not achieved, evaluate additional or revised measures, including those previously considered in the Comprehensive Plan, and implement any additional or revised appropriate and reasonable measures, or explain why such goals and objectives cannot be achieved. If such goals and objectives have not been achieved, the Rocky Reach Fish Forum (RRFF; see Section 15) may reevaluate and revise such goals and objectives.

The Forum recognizes the importance of several key concepts in this definition, including:

- iterative and rigorous process …in the face of uncertainty,
- intended to improve the management of natural resources…
- in order to achieve desired goals and objectives as effectively and efficient as possible…

With this understood, it is the intention (and the obligation) of the Forum to apply these Adaptive Management principles to actions directed under the FERC License and mitigation actions developed under the NNI. The importance of this cannot be understated because it is only through these principles that the Forum can measure and be assured that actions implemented by Chelan PUD are in fact, *achieving the desired goals and objectives in an effective and efficient manner*.

Implementation Plan

The following is a brief summary of the 10 Objectives which have been under consideration by the Forum and proposed to be fully developed for both FERC License Requirements and NNI. The first six Objectives are relevant to the FERC license and must be accomplished accordingly. The last four Objectives are appropriate for NNI considerations.

Appropriate Actions Implemented through the FERC License

1. Mainstem Fishway Entrance, Passage and Exit Efficiency

Determine the proportion of tagged adult lamprey that successfully (1) enter fishways entrances (Fishway Efficiency), (2) ascend and exit mainstem fishways (Passage Efficiency) and (3) leave the forebay area without falling back. Describe behavioral attributes associated with general lamprey movements and elapsed time at fishway entrance and within fishways.

Task	Continue to evaluate specific areas within the fishways (as identified by the Forum) for passage improvement and implement actions recommended by the Forum in a timely manner.
Rationale	Consistent with the Goal and Objective 1 of the PLMP and the 401 Certification.
Timing	Ongoing

2. Proportion of Adults Ascending Tributaries

Estimate the proportion of migrating adult lamprey that leave the Mid-Columbia reservoirs and permanently ascend the Wenatchee, Entiat, Methow and Okanogan tributaries. Describe behavioral attributes associated with general lamprey movements and elapsed time as lamprey leave the reservoir and enter lower mainstem tributary reaches ("affirming" establishment into that tributary).

Task	Establish radio telemetry and HD PIT receivers at the mouth of the Entiat River. Trap and tag sufficient adults (TBD by Forum) for evaluation. Employ USFWS to establish and maintain receivers, download and evaluate information and report on findings. Contribute $X into the NNI Account funding to support for radio telemetry in the upper Columbia.
Rationale	Consistent with the Goal and Objectives 1 and 4 of the PLMP and the intent of the 401 Certification. It is unknown what is happening with a substantial number of migrating adults within the Project Area after they exist the Rocky Reach fishway.
Timing	Equipment in place for the 2015 adult migration.

3. Fate of Adults in Reservoirs

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

- movement behavior through reservoir (passage success and timing, over-winter, etc),
- successful passage up to the next counting window,
- mortality / predation within reservoir, and
- successful entry into tributary streams.

Task	Implement Task 2. Evaluate efficacy of using active tags to track or locate adults in the reservoir especially during the winter months of inactivity.
Rationale	Consistent with the Goal and Objectives 1 and 4 of the PLMP and the intent of the 401 Certification. It is unknown what is happening with a substantial number of migrating adults in the Project Area after they exist the Rocky Reach fishway.
Timing	Initial evaluations in 2016-2017, utilizing tagged adults for other evaluations. Study period anticipated to be approximately 3-years.

4. Predation on Juveniles in Tailrace

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

Task	Tasks not yet identified. Evaluation of additional fishing effort from powerhouse deck.
Rationale	Consistent with the Goal and Objective 2 of the PLMP and the intent of the 401 Certification.
Timing	Section 4.2.3 indicates these evaluations are to be conducted within the first 5-years of the License period. Initial evaluations anticipated to begin in 2017.

5. Juvenile Occupancy and Use of Reservoir Habitat

Measure juvenile lamprey presence and relative abundance in habitat areas that may be affected by ongoing Project operations. Identify and measure Project effects on lamprey in these areas, if any.

Task	Continue to evaluate presence/absence and relative abundance in habitat areas that may be affected by ongoing Project operations.
Rationale	Consistent with the Goal and Objective 3 of the PLMP and the intent of the 401 Certification.
Timing	Planning for future actions completed in 2016. Begin implementation in 2017-2018.

6. Juvenile Propagation Research

Determine the efficacy of using artificially produced lamprey to develop the means to provide sufficient numbers of juvenile lamprey for evaluations intended to measure the type and magnitude of any on-going Project impacts on downstream passage of juvenile lamprey, specifically, mortalities associated with migration timing and passage survival through Project areas.

Task	Support Yakama Nation, Confederated Tribes of the Umatilla Indian Reservation and the USFWS (Abernathy Lab) in artificial propagation research to provide juveniles of sufficient size for future studies addressing potential Project effects on juveniles within the Project area, including but not limited to dam passage, reservoir fluctuations or predation. Estimated support $100,000 per year for three years, per Section 4.2.3 of the PLMP. In addition, Chelan PUD will provide $100,000 per year for three years to the PNNL to support ongoing tag development already in progress supported by the US ACE and the US DOE.
Rationale	Section 4.2.3 of the PLMP specifically identifies that Chelan PUD will investigate Project impacts on juvenile lamprey and develop the means to provide sufficient juvenile associated with these studies. This Section recognizes the potential for contributions "to other local or regional lamprey investigation programs in order to gain efficiencies in the development of methods for lamprey investigations at the Project. Recent development in artificial propagation indicate promise to obtaining juveniles in a timely manner to use for these studies, assuming methodologies are also available. Approximately $620,000 is currently available.
Timing	Annual funding for both propagation and tag development will be made available in the second quarter of 2015.

Appropriate Actions Implemented through NNI

7. Adult Translocation Research

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

Task	Trap and Haul: Chelan PUD will provide sufficient effort and/or funding to trap X adults from Priest Rapids and/or Rock Island Dams and translocate into tributary streams. Adult Tagging – Radio: Chelan PUD will provide $X sufficient funding to radio tag 60 (TBD) adults per year for three years (2015 - 2017) to be released at locations specified by the Forum. (Funded by PUD) Telemetry Equipment Setup: Chelan PUD will provide $X sufficient funding into the NNI Account to support establishing radio receivers at the mouths of the W-E-M-O prior to 2015 adult migration and maintain equipment through 2017 migration. Air Radio Telemetry Surveys: Chelan PUD will provide $X sufficient funding into the NNI Account to support performance of air surveys twice per year for two years in the W-E-M-O preferably in October and May-June, or as determined by the Forum (2015 – 2017). Field Radio Telemetry Surveys: Chelan PUD will provide $X sufficient funding into the NNI Account to support USFWS survey capacity to provide mobile field telemetry tracking of adults to determine spawning locations (2015 – 2017). Field Juvenile Distribution and Abundance Surveys: Chelan PUD will provide $X sufficient funding into the NNI Account to support existing tribal survey capacity providing surveys in Index Sites to determine juvenile relative abundance and spatial distribution. Genetic Samples: Chelan PUD will provide sufficient funding into the NNI Account to support genetic analysis of translocated adults and subsample of juveniles found in the W-E-M-O during 2019 field surveys. Analyze genetic samples from W-E-M-O to estimate proportion of juveniles produced from translocation program. Numbers of adults and juveniles sampled to be determined by the Forum.
Rationale	Translocation is the primary means to mitigate for Project effects. Appropriate monitoring is obligated through the PLMP and 401 Certification to determine benefits to the species for this mitigation.
NNI Funding	$X to support field efforts for both adult surveys (2015-2017) and juvenile surveys (2017-2019) and genetic analysis.

8. Regional Establishment Baseline / Status and Trend Information

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

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

Task	Establish long term "Index Sites" in the Wenatchee, Entiat, Methow and Okanogan subbasins to monitor and track changes in juvenile abundance, spatial distribution and population age/size-class characteristics. Monitor juvenile presence, relative abundance and age/size class characteristics using screw traps, fyke-nets, electroshocking or other monitoring methods. Consolidate and evaluate data and report on findings.
Rationale	Baseline information is critical to establish to determine long-term benefits of lamprey NNI mitigation measures associated with supplementation and natural production of the local populations.
NNI Funding	Chelan PUD will provide $X sufficient funding into the NNI Account for two years (2015-2016) to support existing tribal juvenile survey capacity at Index Sites to determine juvenile relative abundance and spatial distribution.
Timing	Funding available in Yeas 1 and 2. Baseline juvenile information completed in 2017.

9. Adult Passage in Tributary Streams

Identify primary spawning areas of adult lamprey and establish, where feasible specific spawning locations and timing. Identify, evaluate and correct adult passage issues in priority areas within the Upper Columbia subbasin tributary streams.

Task	Establish radio telemetry receivers at various locations (Dryden Dam, Tumwater Dam, irrigation diversion dams) to identify potential adult migration passage issues. Provide sufficient funding and excess telemetry receivers to support identification of potential adult passage issues in the W-E-M-O and implementation of corrective actions.
Rationale	Consistent with the Goal and Objectives 1 and 3??. Mitigation for passage issues associated with Rocky Reach Dam.
NNI Funding	Chelan PUD will provide $X sufficient funding into the NNI Account to support USFWS for radio telemetry installation and maintenance of equipment and retrieval, evaluation and reporting of information.
Timing	Established prior to March 2016 and maintained through 2018 to insure full two year (minimal) analysis.

10. Juvenile Entrainment: Dryden Ditch / Other Irrigation Structures

Evaluate and correct juvenile entrainment into irrigation facilities within priority watersheds / stream reaches in the Upper Columbia subbasin tributary streams.

Task	Evaluate alternative strategies to prevent or minimize juvenile entrainment into the Dryden irrigation ditch and other irrigation ditches to increase effectiveness of juvenile salvage operations until such time that preventative strategies can be implemented, appropriately monitored and determined to be successful.
Rationale	Mitigation for Project effects to adult passage.
NNI Funding	Chelan PUD will provide $X funding into the NNI Account to support agency actions associated with this Objective.
Timing	Implement preventative strategy as appropriate. Implement improved salvage operations beginning October, 2016.

Summary of Actions to be Implemented through NNI and/or Regional Coordination			
Objective	**Grant**	**Chelan**	**Douglas**
FERC Required Actions			
1. Mainstem Fishway Entrance, Passage and Exit Efficiency	Passage improvements needed – continued evaluation		
2. Proportion of Adults Ascending Tributaries	Evaluation required. 2015 - 2016		
3. Fate of Adults in Reservoirs	Ongoing consideration, preliminary acoustic evaluations warranted.		
4. Predation on Juveniles in Tailrace	Ongoing consideration Evaluation warranted	Contribution to JLAT development (Section 4.2.3)	Ongoing consideration Evaluation warranted
5. Juvenile Occupancy and Use of Reservoir Habitat	Additional evaluations deferred until 2018-2019	Additional evaluations deferred until 2018-2019	Preliminary evaluation needed (2016)
6. Juvenile Propagation Research	No Requirement	Contribution to ongoing efforts. Section 4.2.3	No Requirement
NNI / Regional Coordination Actions			
7. Adult Translocation Research	Trap and Haul for passage studies. Trap and Haul into Tribs. Contribute Funds to NNI.	Trap and Haul for passage studies. Trap and Haul into Tribs. Contribute Funds to NNI	Trap and Haul for passage studies. Trap and Haul into Tribs. Contribute Funds to Reg. Coord
8. Regional Establishment Baseline / Status and Trend Information	Contribute Funds to NNI.	Contribute Funds to NNI.	Contribute Funds to Reg Coord.
9. Adult Passage in Tributary Streams	Contribute telemetry equipment. Contribute Funds to NNI.	Contribute telemetry equipment. Contribute Funds to NNI.	Contribute telemetry equipment. Contribute Funds to Reg Co.
10. Juvenile Entrainment: Dryden Ditch / Other Irrigation Structures	Contribute Funds to NNI.	Contribute Funds to NNI. Evaluate and correct Dryden.	Contribute Funds to Reg. Co.