FINAL

Pacific Lamprey Regional Passage Workshop Notes

Aquatic Settlement Work Group

To: Aquatic SWG Parties

Date: May 10, 2017

From: John Ferguson, Chair (Anchor QEA, LLC)

Re: Final Notes of the April 13, 2017, Pacific Lamprey Regional Passage Workshop

A Pacific Lamprey Regional Passage Workshop convened at Douglas PUD Headquarters in East Wenatchee, Washington, on Thursday, April 13, 2017, from 10:00 a.m. to 3:30 p.m. Attendees are listed in Attachment A of these meeting minutes.

I. Summary of Discussions

1. Introductions, Review Agenda, Objectives, and Goals (John Ferguson):

John Ferguson welcomed the Aquatic Settlement Work Group (SWG), Rocky Reach Fish Forum (RRFF), Priest Rapids Fish Forum (PRFF) and others to the meeting (attendees are listed in Attachment A). Ferguson said no official meeting minutes are required for the workshop; rather, an informal documentation of key discussion points and decisions will be provided. He then reviewed the agenda and invited the workshop attendees to introduce themselves.

2. 2016 Pacific Lamprey Studies and Results and 2017 Pacific Lamprey Study Plans (Mike Clement, Steve Hemstrom, and Chas Kyger):

John Ferguson invited the representatives from Grant PUD, Chelan PUD, and Douglas PUD to provide updates on their respective Pacific lamprey studies and 2017 plans.

<u>Grant PUD</u>

Mike Clement (Grant PUD) reported to the workshop attendees that Grant PUD trapped more than 500 adult Pacific lamprey at Priest Rapids in 2016. Two hundred and fifty of those fish were allocated for Grant PUD studies; 211 were collected for Chelan PUD; and 51 were collected for Douglas PUD. Of the 250 Grant PUD fish, 150 were tagged with half-duplex passive integrated transponder (HDX PIT) tags to evaluate passage rates at the Priest Rapids and Wanapum dams fish ladders. The remaining 100 fish were tagged with Vemco acoustic active tags paired with full-duplex (FDX) PIT tags. Seventy of these dual-tagged fish were released in the Wanapum Dam forebay and 30 were released in the Priest Rapids Dam forebay. Clement said, collectively, between 2015, 2016, and 2017, 200 active-tagged fish were recorded in the reservoirs. The tag batteries for the fish tagged in 2016 are set to expire in late summer 2017, so Grant PUD will have 3 years of data in addition to the upriver data already collected. He said this study was

intended to inform the fate of Pacific lamprey in the reservoirs and potential upstream escapement into the tributaries. He said the Vemco tags were programmed with a sleep mode to disable them during the winter months and turn back on in March of the following year. He said Grant PUD also provided 200 PIT tags to the Warm Springs Tribe at Bonneville Dam to increase the overall number of tagged fish downstream of Priest Rapids and increase the amount of data on actively migrating Pacific lamprey. He said a few fish have been detected migrating in a downstream direction (from Priest Rapids Dam downstream to McNary Dam). He said Grant PUD is not planning to tag additional Pacific lamprey in 2017; however, will continue to monitor the 2016 study fish until the batteries expire. He added that Grant PUD has internally discussed collecting 200 additional Pacific lamprey for Chelan PUD in 2017. Cumulatively, Grant PUD has 5 to 6 years of Pacific lamprey passage data.

Bob Rose (Yakama Nation [YN]) asked if the Vemco tags programmed with sleep mode will have 100% battery life in the spring. Clement replied that once the Vemco tags expire at the end of the summer, the FDX PIT tags will continue to track the Pacific lamprey when the fish passes a FDX detection system. Rose asked if there is evidence for the longevity of the battery life, and Clement replied that Grant PUD has not conducted battery life testing.

Chelan PUD

Steve Hemstrom (Chelan PUD) said Chelan PUD has been studying adult passage at Rocky Reach Dam. In 2016, Chelan PUD switched from HDX to FDX PIT tags and tagged 211 adult Pacific lamprey with help from Blue Leaf Environmental. He said study fish were released in the Rock Island reservoir at Kirby Billingsley Hydro Park to assess passage efficiency at Rocky Reach Dam and estimate tributary escapement. Currently, there are FDX arrays in the Rocky Reach Dam fishway and in the Entiat, Methow, and Wenatchee rivers. Among the 211 fish tagged in 2016, 169 (80%) fish have been detected, including 5 fish in the Wenatchee River, 1 in the Methow River, and 2 or 3 in the Entiat River. Hemstrom said movement is minimal between March and May and typically peaks in July and August. He said 164 of the study's PIT-tagged fish were detected at Rocky Reach Dam and 162 passed the dam and were not detected again downstream. He said during a 2004 radio telemetry study, only 43% of the radio-tagged Pacific lamprey passed Rocky Reach Dam. He said, however, there is no entrance PIT antenna at Rocky Reach Dam so these could be conservative estimates. He said during a 2013 study, 70 to 80% of fish tagged with HDX PIT tags passed the dam. Chelan PUD has also been evaluating fishway window-count passage conversion between Rock Island and Rocky Reach dams since 2000. This evaluation indicates that escapement potential to the Wenatchee River is less than 10% based on the number of Pacific lamprey counted passing Rock Island and Rocky Reach dams each year. Hemstrom said for 2017, the RRFF is hoping to conduct a second confirmation study using 200 PIT-tagged Pacific lamprey, similar to the 2016 study. The release point will again be Kirby

Billingsley Hydro Park, with 90% of the 200 fish released near the right bank and 10% on left bank, based on historical count trends on Rock Island Dam's right and left fishways. Hemstrom said Chelan PUD has no Pacific lamprey study plans for 2018 because a bull trout study is planned.

Kirk Truscott (Colville Confederated Tribes) asked if Pacific lamprey movement through the Rock Island reservoir is rapid. Hemstrom replied that movement is very fast with a passage rate of around 2 days on average from release at Kirby Billingsley Hydro Park to the top of the Rocky Reach fish ladder. He said the big question is where fish go and what they do after they pass Rocky Reach Dam.

Douglas PUD

Chas Kyger (Douglas PUD) said Douglas PUD shifted study activities in 2016. Prior to 2016, the focus was on evaluating dam passage with PIT tags, which demonstrated that very few Pacific lamprey were reaching Wells Dam from downstream release locations. Douglas PUD decided to switch to an acoustic tag study to validate the assumption that fish below Wells Dam were actively seeking to pass the dam. In 2016, Douglas PUD acoustic tagged 51 Pacific lamprey in addition to the 100 Pacific lamprey that were acoustic tagged by Grant PUD. Grant PUD also released 211 PIT-tagged fish. Douglas PUD released the 51 acoustic-tagged fish at a location 1 mile upstream of Rocky Reach Dam on the Chelan County side of the river. Kyger said Chelan PUD's white sturgeon acoustic receiver arrays, as well as new receivers installed by Douglas PUD in the Wells Dam tailrace, were used to detect study fish. He said approximately 10% of the total sample of acoustically-tagged study fish (84 total; 33 Grant PUD fish and 51 Douglas PUD fish) known to have entered the Rocky Reach reservoir were detected at receivers in the Wells Dam tailrace. He said two fish were detected in the Entiat River; however, he does not believe this river is a significant escapement point. He said the telemetry data suggest the fish move upstream through the reservoir in a directed manner until they stop. Douglas PUD recently conducted mobile tracking in the Rocky Reach Reservoir. Although in general few tags were detected, clusters of Pacific lamprey were detected in deep, rocky pools, which could either be an overwintering site or just where dead tags settle out. Rose recommended conducting the same mobile surveys in a couple weeks to determine if the clusters are still present in the same locations. Kyger said Douglas PUD is still considering options for 2017 and plans to complete the 2016 study by monitoring the movement of tagged fish during spring 2017. He said there are currently no plans for additional fish releases or another tagging effort in 2017.

Clement asked if Douglas PUD detected white sturgeon in the tailrace at Wells Dam, because Grant PUD detected some at the Priest Rapids Dam tailrace. He said in the past, when Pacific lamprey passage at Priest Rapids Dam has been lower it coincided with white sturgeon presence

in the tailrace during peak shad and sockeye salmon passage. He said in years when Pacific lamprey passage has been more successful, Grant PUD has not observed white sturgeon near the dam. Andrew Gingerich (Douglas PUD) said white sturgeon have been detected in the tailrace and in the collection gallery at Wells Dam during peak Pacific lamprey passage periods. Patrick Verhey (Washington Department of Fish and Wildlife [WDFW]) suggested that Pacific lamprey may be deterred by the effluent from the white sturgeon being reared at Wells Fish Hatchery. Ferguson said it is unlikely this would have a large impact because the white sturgeon are so small while in the hatchery.

The workshop attendees then discussed whether other predators, such as burbot and walleye, could be preying on Pacific lamprey in the Rocky Reach reservoir. Hemstrom said he is not concerned about burbot because burbot are not often detected in the reservoir, even during pikeminnow surveys. Ralph Lampman (YN) said the YN have detected Pacific lamprey in the stomach contents of walleye in the Yakima River.

3. Pacific Lamprey Tag Development (Daniel Deng):

Daniel Deng (Pacific Northwest National Laboratory [PNNL]) presented "An Acoustic Transmitter for Studying Juvenile Pacific Lamprey and Eel" (Attachment B).

Andrew Gingerich asked how 20 days was determined for the battery life. Deng replied that studies indicate juvenile Pacific lamprey take 20 to 30 days to outmigrate to saltwater, which is how the required battery life was determined. Bob Rose and Ralph Lampman agreed that 20 days is a good amount of time to determine patterns when released a certain distance from a project site.

Mike Clement asked if PNNL has plans to study three-dimensional (3D) passage around dams. Deng said it depends on the outcome of the planned pilot study in the Umatilla River. He said a 5-second ping rate at a 3D array could provide useful information.

John Ferguson asked why the respective fish forums wanted to present the tag development technology at the workshop. Rose said discussions about juvenile Pacific lamprey migration occur in the fish forums and he wanted to demonstrate to the larger group that the development of this technology is imminent and could be used shortly. He also said the tag is small enough to use on small white sturgeon and may even be extended to salmon.

Based on swimming success data presented by Deng, Rose asked about the physiological change that Pacific lamprey undergo around the 140-millimeter size range and how this is represented in the test results for the tags. Rose suggested continuing this discussion at a future meeting.

4. Conducting Adaptive Management within Licenses (Bob Rose):

Bob Rose shared his thoughts on an adaptive management approach for addressing the issue of Pacific lamprey passage through the Rocky Reach reservoir. Rose suggested it would be useful to review each PUD Pacific lamprey management plan side-by-side. Each management plan has, in only slightly different words, an allowance for adaptive management. He explained that the reason each plan contains an adaptive management approach is because at the time the plans were developed, there was no way to know what the critical uncertainties would be. He interprets the management plans and adaptive management language within them as requiring an iterative and rigorous process, employed effectively and as efficiently as possible. He suggested the regional group consider the temporal component required by the "effective and efficient" wording in the adaptive management sections of the management plans. He reminded the workshop attendees that the scope of this discussion is Pacific lamprey passage through the Rocky Reach reservoir. The respective Federal Energy Regulatory Commission requirements and Clean Water Act Section 401 Water Quality Certifications bind each PUD to these adaptive management processes. Rose asked the group to keep this in mind during the next presentation.

5. Pacific Lamprey Passage Hypotheses Developed by the Aquatic SWG for Wells Dam (Andrew Gingerich and John Ferguson):

John Ferguson and Andrew Gingerich presented "Pacific Lamprey Passage Hypotheses" (Attachment C), which summarizes hypotheses for the Pacific lamprey passage problem at Wells Dam that were developed by the Aquatic SWG Pacific Lamprey Subgroup.

<u>Hypotheses</u>

Gingerich reviewed Pacific lamprey passage data obtained from dam counts in the context of the changes in the watershed (Tripod Fire 2006) and Wells Dam fishways (weir modifications in 2007 and 2008). Next, Ferguson reviewed the six hypotheses developed by the Aquatic SWG to reach a general consensus regarding the potential causes of the sharp decline in Pacific lamprey counts observed at Wells Dam starting in 2006. The uncertain fate of the Pacific lamprey in the reservoir, the reservoir acting as a potential population (productivity) sink, and the potential lack of upriver pheromones all led the Subgroup to the conclusion that translocation is a viable option. Ferguson said the Subgroup convened on April 12, 2017, and two bookends in terms of next steps were established: 1) conduct translocation and complete the Douglas PUD 2016 Pacific Lamprey Study; and 2) address all hypotheses simultaneously (Bob Rose's adaptive management plan), which includes additional studies in 2017 and 2018 (e.g., translocation, bathymetry of drop-off points in the Rocky Reach Reservoir, install additional receiver arrays). Ferguson said the Aquatic SWG Pacific Lamprey Subgroup expressed support for translocation, which will require a regional effort. He explained that the Subgroup also recognizes translocation is not the only

plausible hypothesis and the group will be discussing further whether to study additional hypotheses.

Mike Clement clarified that slide four of Attachment C should indicate stocked white sturgeon were released in the Rock Island reservoir in 2002 and not in the Rocky Reach reservoir in 2003 as indicated.

Approaches for Addressing Key Hypotheses (or Mechanisms) that Link the Apparent Loss of Adult Pacific Lamprey in Reservoirs to Dam Operations

Ferguson said translocation is not an effort Douglas PUD should accomplish on their own, but instead requires regional cooperation and input. He said the Aquatic SWG Pacific Lamprey Subgroup unanimously agreed translocation should begin in 2017; however, details and logistics still need to be discussed during future meetings.

Ferguson said from a resource standpoint, the Rocky Reach reservoir is potentially a biological sink. Translocation activities would serve to seed the olfactory cues upstream of Wells Dam. He said one outstanding question is where to get the fish, which suggests the need for regional participation.

Gingerich said Douglas PUD is supportive of translocation because the absence of Pacific lamprey upstream of Wells Dam is an issue if fish are attracted to pheromones and Douglas PUD needs to conduct passage studies at Wells Dam in accordance with their license. Specifically, based on multiple years of data, it is apparent there are not a lot of fish approaching Wells Dam, which makes it difficult to explore and address adult passage problems at Wells Dam. He said currently, Douglas PUD is hesitant to accept conclusions about Pacific lamprey passage at Wells Dam due to the small sample sizes and the apparent random behavior of Pacific lamprey (i.e., Pacific lamprey in the Rocky Reach reservoir could proceed upstream or not, making it nearly impossible to interpret behaviors of fish approaching and passing Wells Dam). He said other potential explanations for the lack of Pacific lamprey reaching Wells Dam are the white sturgeon pheromones above and near Wells Dam or actual predation by white sturgeon in the Rocky Reach reservoir. He said there is also the possibility that hydraulic conditions in the tailrace of Wells Dam prevent Pacific lamprey from wanting to approach, or being able to approach, the dam. He said there is currently concern about extirpation of Pacific lamprey in the Methow River and other tributaries located upstream of Wells Dam, which is a primary need for reestablishing or maintaining Pacific lamprey upstream of Wells Dam, regardless of why fish are not reaching there on their own. For this reason, Douglas PUD is supportive of translocation. He said translocating fish enables Douglas PUD to evaluate the number one hypothesis identified by the Aquatic SWG (lack of pheromones) while also providing time to address the other hypotheses.

Translocation accomplishes the task of moving Pacific lamprey upstream of Wells Dam and bypasses potential problems which can be tested in the future in an iterative manner.

Ryan Fortier (WDFW) asked what data are available that supports the statement that Pacific lamprey above Wells Dam are nearing the extirpation level. Rose said this has been concluded based on years of survey data indicating the Yakima and Okanogan river populations are barely functional or sustainable. RD Nelle (U.S. Fish and Wildlife Service [USFWS]) confirmed Pacific lamprey are no longer present in the Okanogan River.

Ferguson asked attendees' thoughts regarding regional assistance with fish collection if Douglas PUD decides to fund translocation. He said Douglas PUD would like to avoid confrontation or conflict with other PUDs on the matter and is only seeking cooperation and support.

Clement said Grant PUD will abstain from providing input on Aquatic SWG priorities and noted that the Rocky Reach reservoir and Wells Dam are well past any Grant PUD project areas. He said internally Grant PUD has discussed translocation as it relates to their No Net Impact (NNI) obligations and if Grant PUD decides to move forward with this plan, the surplus fish could potentially be available for Douglas PUD use if they could obtain credit for this under their NNI requirement.

Steve Hemstrom said Chelan PUD would like to see a more developed scientific plan prior to offering support. He said there are Pacific lamprey in the Wenatchee River system near Dryden (in the 15,000's). He expressed concern that no one knows how many fish are required upstream of Wells Dam to generate an adequate olfactory signal. He said Chelan PUD is already committed to another year of study in 2017 to address passage at Rocky Reach Dam. He said Chelan PUD would at least need to see a plausible hypothesis before committing to helping. Ferguson responded that not enough is known about the problem or the biology of Pacific lamprey to provide the requested reassurance. He said if certainty is required prior to taking action, then action will never be taken. However, he agreed the details need to be figured out. Rose said most RRFF members are interested in making translocation work, so Chelan PUD will have a chance to participate and gain some scientific knowledge.

Chas Kyger said Douglas PUD has observed the same migration pattern and lack of Pacific lamprey interaction with Wells Dam for over 10 years. Gingerich hypothesized that the Rocky Reach reservoir could be experiencing a feedback loop, where available habitat results in spawning, which attracts fish year after year, and slowly pheromones upriver are diminishing.

Aaron Jackson (Confederated Tribes of the Umatilla Indian Reservation [CTUIR]) said the CTUIR did not have much data about Pacific lamprey in the Umatilla River prior to their translocation and

he sees translocation as the prime action needed for understanding Pacific lamprey migration patterns. Since translocating Pacific lamprey to the river, the CTUIR have observed recovery and adult returns. He also said he has observed a similar pattern of population loss between Bonneville and The Dalles dams. Hemstrom asked if Jackson thought the mechanism of loss at The Dalles Dam is the same as at Wells Dam. Jackson said it is a natural phenomenon with no solid explanation, but he thinks this should not stop the group from trying everything to understand it.

Kirk Truscott said he believes the next step is to develop an action plan because translocation could answer several questions in addition to addressing the pheromone issue. Ferguson reiterated Rose's suggestion made during the Aquatic SWG Subgroup meeting on April 12, 2017, that each hypothesis needs to be broken down to build an action plan.

Rose asked what kind of passage is needed through the entire Mid-Columbia Basin to adequately seed each of the reservoirs? He suggested the group will not accomplish this without a successful translocation program that allows the mechanisms of survival to be evaluated and understood. He said obtaining an understanding about this should not only be the responsibility of the PUDs. Once a translocation program is in place, regional fisheries managers should get involved to promote it. He said the YN is ahead of the curve, releasing fish in the Methow and Yakima rivers. He suggested part of the NNI activities could be used to assess the success of this program.

Tracy Hillman (RRFF and PRFF Chairman) said the idea of translocation is gaining momentum in each fish forum. Nelle said the USFWS has discussed translocation as being a viable option for preventing extirpation and reseeding pheromones. Steve Lewis (USFWS) agreed that while there is the possibility of hybridization, translocation is an option and it is better than extirpation.

Gingerich asked how long it would take to see measurable results from translocation. Jackson said adult Pacific lamprey translocated to the Umatilla River began spawning immediately and juvenile Pacific lamprey were found within the first couple years after translocation. He said changes in adult returns took about a decade.

Ferguson summarized the discussion as follows: there is generalized support for translocating fish above Wells Dam from the PUDs and fish forums. The Aquatic SWG will start the process of developing a translocation plan and share the plan with the regional group.

6. Synthesis (John Ferguson and Tracy Hillman):

John Ferguson said the Wells Dam jurisdiction extends 1,000 feet downstream of the dam, so the Aquatic SWG is not yet ruling out the dam as the root cause of low passage counts and poor conversion rates between Rocky Reach and Wells dams; however, the Rocky Reach reservoir also

raises questions. He said the regional group needs to discuss the Rocky Reach pool downstream of the 1,000-foot mark and how to share the responsibility of any actions taken there. Steve Hemstrom said Chelan PUD is concerned with setting a precedent for blaming the reservoir instead of the dam and shifting the responsibility to the downriver jurisdiction. Chas Kyger said it is unknown what is different about the Rocky Reach reservoir; however, he believes the main difference is there are not large numbers of Pacific lamprey upstream of the reservoir, which is why translocation has become a priority. Ferguson clarified that the group is not identifying the Rocky Reach reservoir as the problem; rather, it has been noted that Pacific lamprey stop migrating in the reservoir for some reason and that is an uncertainty. If the fish are stopping and spawning, they are contributing to population productivity. Knowing this is important because it shapes how the Aquatic SWG views that lack of passage at Wells Dam. However, if they are being preyed upon and not contributing to population productivity, that is a different situation. In that case, additional measures that address predation might need to be taken.

Actions Needed in 2017 to Address Key Hypotheses

Bob Rose suggested the next step be taking discussion topics back to the respective fish forums and reconvening in May or June 2017 for another regional workshop to lay out the specifics for the initial translocation this year while leaving room for adaptation in future years. Ferguson said the Aquatic SWG still has work to do to discuss and agree on potential actions between the "bookends" outlined earlier and to reconcile actions for all of the hypotheses. Therefore, the timeline for reaching agreement within the Aquatic SWG is undetermined at this time. He also said a monitoring and evaluation component to any translocation effort still needs to be developed.

Steve Lewis asked if RD Nelle if the USFWS has intentions to evaluate Pacific lamprey populations and migration into the Entiat River. Nelle said the USFWS has observed Pacific lamprey spawning at the end of the steelhead spawning season, between the steelhead season and the Chinook salmon spawning season.

Lewis asked about the second phase of the current Methow River translocation effort.
Ralph Lampman said the YN have released 425 fish into the Methow River since 2015. Lewis proposed that the PUDs build on the Methow program.

II. Closing Remarks

1. **Thank You (John Ferguson):**
   John Ferguson and Tracy Hillman thanked everyone for attending and contributing to a productive meeting.

List of Attachments

Attachment A – Attendees

Name	Role	Organization
John Ferguson*	Aquatic SWG Chairman	Anchor QEA, LLC
Emily Pizzichemi*	Administration/Technical Support	Anchor QEA, LLC
Tracy Hillman[PR, RR]	Priest Rapids Fish Forum and Rocky Reach Fish Forum Chairman	BioAnalysts
Andrew Gingerich*	Aquatic SWG Technical Representative	Douglas PUD
Chas Kyger*	Technical Support	Douglas PUD
Mike Clement[PR]	Priest Rapids Fish Forum Technical Representative	Grant PUD
Steve Hemstrom[RR]	Rocky Reach Fish Technical Representative	Chelan PUD
Dave Robichaud	Observer	LGL Limited
Steve Lewis*	Aquatic SWG Technical Representative	U.S. Fish and Wildlife Service
RD Nelle	Technical Support	U.S. Fish and Wildlife Service
Breean Zimmerman*	Aquatic SWG Technical Representative	Washington State Department of Ecology
Patrick Verhey*	Aquatic SWG Technical Representative	Washington Department of Fish and Wildlife
Chad Jackson	Aquatic SWG Technical Representative	Washington Department of Fish and Wildlife
Ryan Fortier	Technical Support	Washington Department of Fish and Wildlife
Eric Pentico	Technical Support	Washington Department of Fish and Wildlife
Bob Rose*	Aquatic SWG Technical Representative	Yakama Nation
Ralph Lampman†	Technical Support	Yakama Nation
Tom Skiles†	Technical Support	Columbia River Inter-Tribal Fish Commission
Daniel Deng	Observer/Presenter	Pacific Northwest National Laboratory
Julie Maenhout	Observer	Blue Leaf Environmental
Aaron Jackson†	Technical Support	Confederated Tribes of the Umatilla Indian Reservation
Kirk Truscott*	Technical Support	Colville Confederated Tribes

* Denotes Aquatic SWG member or alternate

† Joined by phone

[PR] Denotes PRFF member or alternate

[RR] Denotes RRFF member or alternate