

Pacific Lamprey Subgroup 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 12, 2017, Aquatic SWG Pacific Lamprey Subgroup Meeting

A Pacific Lamprey Subgroup (Subgroup) of the Aquatic Settlement Work Group (SWG) met at Douglas PUD Headquarters in East Wenatchee, Washington, on Wednesday, April 12, 2017, from 10:00 a.m. to 4:00 p.m. Attendees are listed in Attachment A of these meeting notes.

I. Summary of Action Items

1. There were no Action Items discussed during today's Subgroup meeting.

II. Summary of Decisions

1. There were no Decision Items approved during today's Subgroup meeting.

III. Agreements

1. There were no Agreements discussed during today's Subgroup meeting.

IV. Summary of Discussions

1. Welcome and Review Agenda (John Ferguson):

John Ferguson welcomed the Subgroup of the Aquatic SWG (attendees are listed in Attachment A) and reviewed the agenda. Ferguson asked for any additions or other changes to the agenda. No additions or changes were requested.

Ferguson stated the purpose of this meeting is to set up the message and ideas the Subgroup wants to bring to the Pacific Lamprey Regional Passage Workshop (held on April 13, 2017, at 10:00 a.m.). Ferguson confirmed with the Subgroup that formal meeting minutes are not required for this meeting; rather, an overall summary of discussion topics and ideas will be compiled.

2. Pacific Lamprey Study Alternative Actions Document (Andrew Gingerich and John Ferguson):

John Ferguson said a Pacific Lamprey Study Alternative Actions document was distributed to the Aquatic SWG by Kristi Geris on February 28, 2017.

Approaches and Priorities for Hypotheses

Ferguson presented the Pacific Lamprey Passage Hypotheses presentation (Attachment B) to the Subgroup. This presentation is based on discussions among Aquatic SWG members at the January 11, 2017, Aquatic SWG meeting and information contained in the Pacific Lamprey Study Alternative Actions document developed by Douglas PUD and distributed at the March 8, 2017, meeting of the Aquatic SWG. The six hypotheses for the lack of Pacific lamprey passage at Wells Dam developed by the Subgroup and presented in this presentation were:

1. Poor hydraulic conditions at the Wells Dam fishway entrance
2. Reservoir mortality, fate in reservoir, and mainstem spawning
3. Lack of juvenile and adult Pacific lamprey pheromones above Wells Dam
4. Pacific lamprey bioenergetics
5. Structural changes at Wells Dam
6. Changes to the Wells spill playbook

The top three hypotheses prioritized for study in 2017 by the Subgroup at the January 11, 2017 meeting of the Aquatic SWG included (in no order): 1) lack of juvenile and adult pheromones; 2) poor hydraulic conditions at fishway entrances; and 3) reservoir mortality, fate in reservoir, and mainstem spawning. All six hypotheses were discussed further at today's meeting.

Ralph Lampman (Yakama Nation [YN]) observed that the trends present in the Rocky Reach reservoir from 2000 to 2016 are similar to trends observed on the Yakima River. The number of fish traveling over the lower dam tends to determine the number of fish traveling to and passing over the upper dam; however, when the passage numbers at the lower dam are greatly diminished, the fish seem to not travel to the upper dam. He hypothesized this could be caused by a lack of pheromones upstream of the upper dam. Pheromone studies seem to work in the lab setting; however, in the wild, have not produced the desired results. He said pheromone influences should be considered as part of a combination of interacting variables. Alternatively, he said Pacific lamprey could be finding ample spawning habitat between the two dams (Rocky Reach and Wells) and thus are not motivated to travel past the upper dam.

Lampman said the YN released 250 Pacific lamprey in 2015 and 425 in 2017. He said he will formalize the data summary report from these studies and provide the information to the Subgroup. *(Note: Lampman provided these reports to Geris on April 12, 2017, which Geris distributed to the Aquatic SWG on April 13, 2017.)*

Andrew Gingerich further explained the bioenergetics hypothesis to the Subgroup. He said bigger fish are more likely to ascend more dam structures than their smaller counterparts. They might experience a trade-off between size and spawning accessibility. He said it is possible the average size of Pacific lamprey traveling from the ocean has decreased over the years and could be contributing to fish not traveling as far up the river system as they once did. Lampman said maturation level has a greater impact on Pacific lamprey's ability to pass large dams. He said in this context, maturation means how long it has been since the Pacific lamprey left the ocean. Lampman said Pacific lamprey in the Mid-Columbia system overwinter for 1 to 2 years in order to reach the Rocky Reach reservoir. This amount of time spent fasting may reduce their ability to pass the dams. He said Pacific lamprey spawning generally occurs between April and July, shifting later as the fish move upriver because of snowmelt and other physical factors. If they are unable or unwilling to spawn during this period, they will overwinter wherever they are. Trends suggest Pacific lamprey are less likely to pass over large dams during the spring because they do not have enough energy after overwintering. Gingerich added that spill at Wells Dam generally runs from April through August and is therefore most likely to affect any Pacific lamprey migration that occurs during spring immediately following overwintering if spill effects Pacific lamprey migration in any way. Based on this information, Pacific lamprey are more likely to pass the larger dams, including Wells Dam, in the fall.

Questions or Key Information Gaps to Raise at the Pacific Lamprey Regional Passage Workshop

Ferguson proposed the first step toward filling in the information gaps is to finish the mobile tracking studies which were started by Douglas PUD in 2016. He then proposed each member of the Subgroup express their thoughts.

Gingerich said, given the hypotheses and information the Subgroup has right now, the priority for Douglas PUD would be translocation; however, this action is not a requirement of the FERC license and might seem outside the bounds of the ASA Pacific Lamprey Management Plan. Gingerich also said Douglas PUD would look to the U.S. Fish and Wildlife Service (USFWS) for their position on this effort. He said the Subgroup would need to come up with additional details, i.e., stocking numbers, tagging methods, frequency of checking for

the presence of tagged fish, tagging methods, and release locations if translocation were to occur.

Ferguson reminded the Subgroup that during the last Aquatic SWG meeting on March 8, 2017, Steve Lewis proposed placing Pacific lamprey in a cage within the Wells Dam fish ladder to provide pheromones to fish attempting to enter the fishway from the tailrace.

Patrick Verhey said, on behalf of WDFW, he is not seeing a clear path forward given all the factors to consider. However, he recognizes olfactory cues are very sensitive, so he anticipates WDFW would be supportive of translocation efforts. He said he would like to see Pacific lamprey seeding in the upper watershed to promote reproduction. He is not in support of placing caged Pacific lamprey in the fish ladder. He also said it is unknown whether the pheromone cues are from juveniles or adults, so the key with translocation is to jumpstart the population upstream of Wells Dam. He suggested the Aquatic SWG also consider improving the fishway at Wells Dam for fish that reach that dam, potentially addressing the predator (white sturgeon) situation in the tailrace. Verhey then called Steve Lewis, who said when asked, that USFWS would support translocation efforts upstream of Wells Dam as an experimental and cautious process.

Kirk Truscott said, on behalf of the Colville Confederated Tribes (CCT), the Subgroup should look at each of the top three priority hypothesis and determine what is required to address each one. He suggested exploring multiple hypothesis with the same fish since the determining factors are likely not mutually exclusive. He said if it is determined there are not enough Pacific lamprey available to test all three hypotheses, then his top priority is translocation. He said the Subgroup should not wait 5 or 6 years to start monitoring the other factors, when they can do this simultaneously as the resources and issues arise. Given the dramatic decline in Pacific lamprey passage through Rocky Reach reservoir, there probably is not just one bottleneck. He suggested that Douglas PUD consider seeding Pacific lamprey in multiple varied habitats in multiple subbasins upriver of Wells Dam. Gingerich said most Pacific lamprey who make it past Wells Dam wind up in the Chewuch River.

Lampman said he thinks the lack of pheromone cues is the big issue. The YN have started translocation efforts in the Methow. He said the YN do not have enough fish for all of the locations they want to seed, so getting local fish from the respective PUDs would help increase their number and would promote collaboration. He suggested that Douglas PUD conduct larval surveys along with translocation. He said translocating fish above the dam seems more effective than placing caged Pacific lamprey in the fish ladder. He said he is interested in seeing acoustic tagged fish released into the reservoir above Wells Dam as a potential next step to see if the pattern is the same as has been observed in Rocky Reach

reservoir. He also suggested putting fish directly in front of the Wells Dam tailrace to identify problem areas where the fish fall out. Chas Kyger said Douglas PUD tried to assess this in 2013 with radio-tagged Pacific lamprey. Douglas PUD released fish 1 mile below Wells Dam and 60% of the tagged fish retreated downriver.

Bob Rose said the Subgroup should consider adding Pacific lamprey physiology as a fourth top priority hypothesis. He said the Subgroup should consider shifting their mindset from thinking Pacific lamprey are not "driven/motivated" to pass the dam to Pacific lamprey may not be "able" to pass the dam. Truscott asked for clarification. He said if fish are being eaten or are not wanting to pass the dam, the Subgroup can likely address those issues, but if the problem is bioenergetics, then the Subgroup cannot fix the problem. Rose confirmed he is not seeing a physiological problem with the fish (bioenergetics), but would like to eliminate it as a hypothesis.

Rose proposed that the Subgroup evaluate several factors simultaneously, an approach he referred to as the "full court press." At some point, the purpose of any passage study needs to prove the problem is not endemic to Wells Dam and the Rocky Reach reservoir. If fish were stocked in various location throughout the reservoir, as well as above and below the dam, the results may help determine if Pacific lamprey are simply running out of steam (bioenergetics hypothesis) or if there is something in the reservoir which is preventing fish from passing Wells Dam. Rose said the other alternative is to assess the different hypotheses one at a time over a matter of years. While the step-by-step approach might be more practicable from a budget stand point, he cautioned against choosing this approach because a full court press approach would have the largest impact on Pacific lamprey population in the short term and the species is declining very rapidly.

Rose stated, the ASA allows for adaptation of management plans. He said this provides Douglas PUD full access to the translocation activities. He said he is hearing general support from the Subgroup and believes this action is essential to the adaptive management process. Gingerich said he interprets the management plan as allowing for a more step-by-step process. He said if Douglas PUD moves forward with translocation, this would also allow time to assess other concerns while working on the hypothesis of low pheromone cues. He said translocation also solves the problem of white sturgeon in the Rocky Reach Reservoir eating Pacific lamprey and the problem of extirpation in the Methow River, since fish would be moved and bypass predation and should spawn in the Methow. Gingerich said he is concerned about approaching the Regional Workshop with the issue of white sturgeon predation because Chelan PUD recently stocked white sturgeon in Rocky Reach reservoir and Douglas PUD does not want to place any blame when the cause of fish stopping is largely

unknown. Rose said Douglas PUD does not need to depend on approval from Chelan PUD and Grant PUD. If the Subgroup decides to move forward with translocation, Douglas PUD would have to provide the fish and the funding.

Rose said he still interprets the management plan as requiring any and all study options. Since the Subgroup has determined each of the six hypotheses may contribute to the overall problem, they have the responsibility to address them in a timely and effective manner. Rose said the pheromone hypothesis would require longer term study with re-evaluation in 10 years to assess the impact over the full lifespan of the Pacific lamprey. He said he is disappointed Douglas PUD is more interested in a step-wise approach to the problem. He said the Rocky Reach reservoir is a small area resulting in a giant sink in population numbers. This clearly speaks to an urgency to address the problems.

Rose proposed five additional points to consider in developing the study objectives.

1. Rocky Reach reservoir studies: conduct studies on Pacific lamprey and white sturgeon interactions, bathymetric survey for Pacific lamprey habitat, repeat the 2016 mobile tracking study and expand it by installing additional acoustic receiver arrays throughout the basin.
2. Tailrace studies: conduct a telemetry study in 2017, evaluate entrance efficiency near Wells Dam fishway.
3. Fishway passage studies: place fish in a fishway and allow to acclimate to improve stability for upriver movement and potentially retrieve fish from Priest Rapids Dam and relocate them below Wells Dam to see if they migrate back downriver.
4. Place additional receivers in the Entiat River and other upriver tributaries.
5. Translocation.

Ferguson reminded the Subgroup that during the Aquatic SWG meeting on March 8, 2017, the Aquatic SWG considered whether the Rocky Reach reservoir was indeed a population sink for Pacific lamprey. Gingerich acknowledged translocation is a risk. He said these activities could change the biology of a species that has persisted for millions of year, but Pacific lamprey getting 'stuck' in the Rocky Reach pool and not making it to the quality habitat in the Methow and the Entiat may be worth taking on risk provided the Aquatic SWG recognizes these risks and believes the Rocky Reach reservoir is a sink for the population. Truscott thinks the Subgroup should assess the risks of translocation before making a final decision. Kyger asked if the ultimate goal is get to Pacific lamprey into the Methow and the Entiat, why not just plant them there. Truscott said this action would be a short-term fix, but translocation is not sustainable for hundreds of years.

Ferguson said if the Subgroup decides translocation is the best option, the group can develop details, including a risk analysis, at future meeting dates.

3. Acoustic Tag Data (Dave Robichaud, Chas Kyger, Andrew Gingerich, and John Ferguson):

John Ferguson recounted at the Aquatic SWG meeting on February 8, 2017, the Aquatic SWG decided that Douglas PUD should conduct more mobile tracking of Pacific lamprey in the Rocky Reach reservoir. He said the Aquatic SWG is trying to get as much migration pattern information out of the currently tagged fish as possible, because no hypothesis has jumped out as the main study factor at this point. He said the Aquatic SWG has come with up three essential options at this point: 1) spend several years conducting biological studies on Pacific lamprey; 2) test all hypotheses for the loss observed in Rocky Reach reservoir; and 3) translocate fish upstream of Wells Dam to jumpstart the pheromone signal.

2016 Pacific Lamprey Study Update

Chas Kyger said 2016 Pacific Lamprey Study Update was distributed to the Aquatic SWG by Kristi Geris on February 28, 2017.

Kyger said Douglas PUD and Grant PUD both released acoustic-tagged Pacific lamprey into Rocky Reach reservoir in 2016 (84 total; 33 Grant PUD fish and 51 Douglas PUD fish). Chelan PUD also released 211 PIT-tagged Pacific lamprey. Acoustic receiver arrays were installed throughout the reservoir and in the Wells Dam tailrace and fishway.

Kyger said results show clear attrition throughout the Rocky Reach reservoir. At each receiver array there was a loss of 40-50% of the tagged Pacific lamprey. At this rate, roughly 10% make it to the Wells Dam tailrace. Overall patterns and tracking of individual fish show the Pacific lamprey move upstream through the reservoir at a fast rate until they get to a certain point and just stop. At this point, Douglas PUD has not been able to do a spring download of the tracking data because conditions in the reservoir are adverse due to high spring runoff. Grant PUD did a pilot study in 2016 with 100 tagged Pacific lamprey and a similar pattern emerged. The biggest drop-off in upriver migration is seen between Sun Cove and Goosetail Rock areas. There is a large, deep hole in this reach which could either provide a place for the Pacific lamprey to hold or be predated upon by white sturgeon.

Gingerich pointed out that both the Douglas and Grant PUD fish display the same pattern of decay in the Rocky Reach pool as they moved upstream, which suggests to Douglas PUD they should have confidence in the data and methods used. Gingerich said what he gleans from this pattern is a flip of a coin. At each checkpoint, there is a 50/50 chance the individual Pacific lamprey continue upriver or remain where they are. He expressed concern over

interpreting the data when evaluating passage success at Wells Dam using Pacific lamprey that reach the tailrace, when the data are showing such unpredictability.

Mobile Tracking in the Rocky Reach Reservoir

Kyger said Douglas PUD conducted 4 days of mobile tracking from Rocky Reach Dam to Wells Dam. During this study, not many fish were detected (approximately 16 total). A big cluster of fish was detected at Goosetail Rock and a few other deep hole areas in the reservoir.

Ralph Lampman asked Douglas PUD how much spawning habitat is available in the Rocky Reservoir mainstem. Gingerich replied, there are several known summer and fall Chinook salmon spawning sites in the reservoir, but the specific amount is unknown.

Kirk Truscott asked for confirmation from Douglas PUD and the Subgroup that Wells Dam is not the major blockage for Pacific lamprey moving upstream. The Subgroup confirmed the fish are having a hard time making it through the Rocky Reach reservoir, not necessarily over Wells Dam.

Lampman inquired about the migration pattern near the mouth of the Entiat River. Gingerich confirmed that Douglas PUD released Pacific lamprey below the Entiat to give them the opportunity to turn off into the river, but few did. Lampman said he would be interested to see tag data near the Entiat at the end of the summer. Gingerich said the tags Douglas PUD used have a shorter lifespan and data may not be available through the end of the summer.

4. Synthesis (John Ferguson):

Actions Needed in 2017 – Draft Plan for Discussion with Policy Representatives

John Ferguson summarized the Subgroup's actions needed for 2017 and a path forward. He said if translocation of Pacific lamprey is the agreed-upon path, the Subgroup must work to iron out the details of the study plan. Ferguson also summarized comments expressed by Bob Rose, which identified a need for a bathymetry study of the reservoir as well as an additional acoustic study similar to the 2016 study.

Rose said mobile tracking of white sturgeon is a necessary study and 2017 is a good year to conduct a pilot study. He proposed that Douglas PUD tag white sturgeon to assess the predation impact. Rose also said he would be insistent that Chelan PUD be actively engaged in this predation study effort. Kirk Truscott confirmed Chelan PUD has been tagging white sturgeon in the reservoir and maybe the first step for the Subgroup should be to review existing data from Chelan PUD instead of spending resources and time planning a pilot study. Andrew Gingerich reviewed the following Chelan PUD study data: 116 tags remained

active in August/September 2016, 34% of which were in the Gateway-to-Wells area for an average of 24 days.

Ferguson suggested the Subgroup develop a plan to present to the Douglas PUD Commissioners demonstrating that Chelan PUD's effort to stock white sturgeon is not responsible for the attrition in the Rock Reach reservoir. He further suggested that the Subgroup develop an explanation for how a predation study fits in with the broader goal of getting Pacific lamprey over Wells Dam. Additionally, he asked the Subgroup to consider what messages need to be conveyed during the Regional Workshop being held the following day. He proposed the Subgroup present the bookends with an undefined middle to be determined at a later date. He also suggested the Subgroup figure out what each party's action would be as part of the overall plan to demonstrate to the Douglas PUD Commissioners this is a group effort.

Patrick Verhey emphasized this is about FERC relicensing for Wells Dam, which puts the responsibility on Douglas PUD to solve the problem. Truscott agreed Douglas PUD needs to figure out the problem with Wells Dam passage prior to conducting other studies with assistance from outside parties and input. Truscott said he believes translocation is the only option to be considered at this time. Gingerich said he believes translocation is a great start and he does not see a major risk. Ferguson clarified the big risk with relying solely on translocation efforts is if it does not produce a response, then ten years have gone by with no other studies occurring and Pacific lamprey will have likely been extirpated from the upper systems. Ferguson said the Subgroup cannot establish ahead of time which hypotheses are the right ones. Lampman expressed support for finding middle ground between gaining information and saving funds. He thinks the biggest benefit would be translocating fish above Wells Dam with a combination of acoustic and PIT-tags. He said this would be a good study plan for 2018 and the Subgroup can begin to lay the groundwork in 2017.

Rose said Douglas PUD is responsible for the main component of this discussion – Pacific lamprey passage at Wells Dam. Additionally, the Subgroup is discussing the study of other contributing factors which would involve other entities, for example studies on Chelan PUD's stocked white sturgeon. Truscott asked Douglas PUD if they would have the budget to perform a translocation study in 2017. Gingerich and Kyger confirmed Douglas PUD does have the funds for such a study.

The Subgroup discussed permit requirements for a translocation study. Kyger mentioned needing a scientific collection permit. Lampman said the YN have a permit for relocation of

1,500 Pacific lamprey for the upper Columbia River and could potentially contribute to the Douglas PUD effort.

Key Questions and Information to be Discussed at the Pacific Lamprey Regional Passage Workshop

Ferguson summarized, the Subgroup has generally agreed on the top three hypotheses and priorities. The Subgroup agrees something beyond translocation which incorporates entangled hypotheses is required but that translocation is a good first step. The other end of the spectrum is Rose's five-step, full-court press strategy (summarized above). Ferguson asked the Subgroup how to work within these two bookends to develop a viable and reasonable plan over the next couple of years. He asked if this is feasible in time for 2017 implementation and what should be presented during the Regional Workshop.

Ferguson suggested the Subgroup present the six hypotheses to spur a discussion about where to go as a regional group within the bookends decided upon by the Subgroup. Gingerich said he needs to discuss translocation internally within Douglas PUD before fully committing and did not know how Policy staff would respond to translocation and additional studies if the reasoning behind translocation is Douglas PUD cannot make or meet passage study assumptions.

Ferguson asked the members of the Subgroup what their desired outcome of tomorrow's workshop would be. Rose said he would like to see a consensus that some form of translocation will begin in 2017 and there will be cooperation between the respective PUDs. He also thinks some evaluation of Pacific lamprey and white sturgeon interactions need to be conducted in the Rocky Reach reservoir. He suggested scheduling at least two meetings to develop objectives for a 2017 pilot study and objectives for studies beyond 2017.

List of Attachments

Attachment A List of Attendees

Attachment B Pacific Lamprey Passage Hypotheses Presentation

Attachment A – Attendees

Name	Role	Organization
John Ferguson	Aquatic SWG Chairman	Anchor QEA, LLC
Emily Pizzichemi	Administration/Technical Support	Anchor QEA, LLC
Andrew Gingerich	Aquatic SWG Technical Representative	Douglas PUD
Chas Kyger	Technical Support	Douglas PUD
Dave Robichaud [†]	Observer	LGL Limited
Steve Lewis ^{†,1}	Aquatic SWG Technical Representative	U.S. Fish and Wildlife Service
Patrick Verhey	Aquatic SWG Technical Representative	Washington Department of Fish and Wildlife
Bob Rose [†]	Aquatic SWG Technical Representative	Yakama Nation
Ralph Lampman	Technical Support	Yakama Nation
Kirk Truscott	Technical Support	Colville Confederated Tribes

[†] Joined by phone

¹ Steve Lewis participated during a portion of the workshop and expressed USFWS's position on translocation.