



Meeting Minutes

Aquatic Settlement Work Group

To: Aquatic SWG Parties

Date: February 12, 2017

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

Re: Final Minutes of the January 11, 2017 Aquatic SWG Meeting

The Aquatic Settlement Work Group (SWG) met in-person at Wells Dam in Azwell, Washington, on Wednesday, January 11, 2017, from 9:45 a.m. to 12:45 p.m. Attendees are listed in Attachment A of these meeting minutes.

I. Summary of Action Items

1. John Ferguson will contact Tracy Hillman (Rocky Reach Fish Forum [RRFF] Facilitator) to notify Hillman the Aquatic SWG began discussing how to improve coordination between the Aquatic SWG and the RRFF with regard to Pacific lamprey behavior and survival in the Rocky Reach Reservoir (Item VI-4). *(Note: Ferguson notified Hillman, as discussed, on January 16, 2017.)*
2. Douglas PUD, in coordination with Dave Robichaud (LGL Limited), will synthesize Douglas PUD and Grant PUD 2016 Pacific Lamprey Study data collected to date (to demonstrate the behavior of each tagged individual) for discussion during the Aquatic SWG meeting on February 8, 2017 (Item VI-4). *(Note: Chas Kyger provided these data to Kristi Geris on January 13, 2017, which Geris distributed to the Aquatic SWG that same day.)*
3. The Aquatic SWG will further discuss Pacific lamprey passage hypotheses and study plans for 2017 during the Aquatic SWG meeting on February 8, 2017 (Item VI-4).
4. Aquatic SWG members will contact Andrew Gingerich if there is interest in touring the west fish ladder at Wells Dam while the ladder is dewatered. The ladder will be dewatered for 2 to 3 weeks starting on January 19, 2017 (Item VI-4).
5. **The Aquatic SWG meeting on February 8, 2017, will be held by conference call (Item VII-1).**

II. Summary of Decisions

1. Aquatic SWG members present approved the White Sturgeon Stocking Statement of Agreement (SOA), Wells Reservoir White Sturgeon Supplementation 2018-2022, as revised, with the Yakama Nation (YN) abstaining (Item VI-2).
2. Aquatic SWG members present reviewed and approved the Aquatic SWG request to consolidate annual reporting, and pursuant to the letter, be filed with the Federal Energy Regulatory Commission (FERC); Consolidation of Aquatic Settlement and Water Quality Certification Reporting Deadlines (Item VI-3).

III. Agreements

1. There were no agreements discussed during today's meeting.

IV. Review Items

1. Kristi Geris sent an email to the Aquatic SWG on January 5, 2017, notifying them the Draft 2016 Total Dissolved Gas Abatement Plan Annual Report and Draft 2017 Total Dissolved Gas Abatement Plan and Juvenile Fish Bypass Operating Plan are available for a 30-day review period, with edits and comments due to Andrew Gingerich by Monday, February 6, 2017. Douglas PUD will request approval of both documents during the Aquatic SWG meeting on February 8, 2017 (Item VI-5).

V. Documents Finalized

1. The Final White Sturgeon Stocking SOA, Wells Reservoir White Sturgeon Supplementation 2018-2022, was distributed to the Aquatic SWG by Kristi Geris on January 12, 2017 (Item VI-2).
2. The final letter to FERC; Consolidation of Aquatic Settlement and Water Quality Certification Reporting Deadlines, was distributed to the Aquatic SWG by Kristi Geris on February 12, 2017 (Item VI-3).

VI. Summary of Discussion

1. Welcome, Review Agenda, Meeting Minutes Approval, and Review of Action Items (John Ferguson):

John Ferguson welcomed the Aquatic SWG members (attendees are listed in Attachment A) and reviewed the agenda. Ferguson asked for any additions or other changes to the agenda. Andrew Gingerich added a reminder about the current documents available for review.

The revised draft December 14, 2016, conference call minutes were reviewed. Kristi Geris said she added three items under the Review Items section of the minutes, including: 1) the draft letter to FERC requesting consolidation of Aquatic Settlement Agreement (ASA) and Water Quality Certification reporting deadlines, which will be discussed during today's meeting; and 2) the Draft 2015 Total Dissolved Gas Abatement Plan Annual Report and Draft 2016 Total Dissolved Gas Abatement Plan and Juvenile Fish Bypass Operating Plan, which are available for a 30-day review with comments due to Gingerich by February 6, 2017. Geris said all other comments and revisions received from members of the Aquatic SWG were incorporated into the revised minutes, and there are no outstanding edits or questions to discuss. Aquatic SWG members present approved the December 14, 2016, conference call minutes, as revised. The YN and Washington State Department of Ecology (Ecology) abstained, because YN and Ecology representatives were not present during the December 14, 2016, conference call.

Action items from the last Aquatic SWG conference call on December 14, 2016, are as follows (note: the following italicized item numbers correspond to agenda items from the December 14, 2016, conference call):

- *Douglas PUD will provide a summary of Pacific lamprey monitoring and evaluation (M&E) acoustic data collected to date as soon as those data are downloaded (Item VI-1).*

This will be discussed during today's meeting.

- *Douglas PUD will: 1) provide a draft letter to FERC to the Aquatic SWG for review, requesting permission from FERC to combine ASA Annual Reports and deadlines into one submittal; and 2) coordinate obtaining agency support letters, as necessary (Item VI-1).*

Andrew Gingerich provided a draft letter to Kristi Geris on December 16, 2016, which Geris distributed to the Aquatic SWG on December 19, 2016. This will be further discussed during today's meeting.

- *Chad Jackson (Washington Department of Fish and Wildlife [WDFW]) will inquire with WDFW Wells Hatchery Staff about the flexibility (± 5 or 10%) associated with the proposed white sturgeon release number stipulated in the Draft White Sturgeon Stocking SOA (Item VI-2).*

This will be discussed during today's meeting.

- *Aquatic SWG members will submit edits and comments on the draft White Sturgeon Stocking SOA to Andrew Gingerich by Friday, December 23, 2016. Gingerich will distribute a revised draft SOA for approval at least 10 days prior to the Aquatic SWG in-person meeting on January 11, 2017 (Item VI-2).*

- Gingerich provided a revised draft SOA to Kristi Geris on December 30, 2016, which Geris distributed to the Aquatic SWG that same day. This will be discussed during today's meeting.
- *Andrew Gingerich and Kristi Geris will coordinate to distribute meeting logistic details for the Aquatic SWG in-person meeting on January 11, 2017 (Item VI-6).*
Gingerich and Geris coordinated, as discussed, and details were distributed to the Aquatic SWG by Geris on December 19, 2016.

2. DECISION: White Sturgeon SOA on Supplementation Beginning in 2018 (Andrew Gingerich):

Andrew Gingerich said a revised draft White Sturgeon Stocking SOA was distributed to the Aquatic SWG by Kristi Geris on December 30, 2016. Gingerich recalled that comments received and addressed in the revised draft SOA were discussed during the Aquatic SWG meeting on December 14, 2016. He said comments were also received after distribution of the revised draft SOA from U.S. Fish and Wildlife Service (USFWS), and Douglas PUD provided responses to those comments, as distributed to the Aquatic SWG by Geris on January 6, 2017. Gingerich said Douglas PUD suggested no additional revisions and USFWS agreed after receiving Douglas PUD's explanations.

Gingerich said Douglas PUD also located two errors in the revised draft SOA. He said first, supplementation will be from 2018 to 2022, and collection will be from 2017 to 2021; therefore, the dates in the revised draft SOA will be revised to reflect supplementation (i.e., 2018 to 2022). He said, secondly, in the second-to-last sentence in the Agreement statement, the word 'were' will be revised to 'are.' He said Douglas PUD is requesting approval of the revised draft SOA, including the modifications just discussed.

John Ferguson asked Chad Jackson about the flexibility (± 5 or 10%) associated with the proposed white sturgeon release number stipulated in the revised draft SOA. Chad Jackson said he discussed this with WDFW Wells Hatchery Staff and they indicated support for either one.

The Aquatic SWG members present approved the White Sturgeon Stocking SOA, *Wells Reservoir White Sturgeon Supplementation 2018-2022*, as revised, with the YN abstaining.

Bob Rose said he appreciates the effort put forth; however, wants to note for the record that the YN acknowledge the stocking rate stipulated in the White Sturgeon Stocking SOA, but it does not set precedent for what the YN intend to do in other reservoirs. He added that the numbers in this SOA are much different than numbers in downstream reservoirs. He said it

will be interesting to observe how this lower density of stocking pans out, and it may be useful for adaptive management scenarios at different densities.

The Final White Sturgeon Stocking SOA, *Wells Reservoir White Sturgeon Supplementation 2018-2022*, was distributed to the Aquatic SWG by Geris on January 12, 2017 (Attachment B).

3. DECISION: Douglas PUD's Consolidation of ASA and Water Quality Certification Reporting Deadlines Letter to FERC (Andrew Gingerich):

Andrew Gingerich said a draft letter to FERC requesting permission from FERC to combine ASA and Water Quality Certification reporting deadlines into one submittal was distributed to the Aquatic SWG by Kristi Geris on December 19, 2016. Gingerich recalled that the Aquatic SWG has been discussing this topic for several months, and the impetus was because review and approval of the numerous required annual reports has become somewhat complex during the first two quarters of each year. He said when FERC License No. 2149 was issued in 2012, this initiated new requirements to submit several reports around the same time of year, which made review of all FERC-, ASA-, and Ecology-required reports challenging for reviewers. He said to remedy this, the Aquatic SWG requested that Douglas PUD investigate modifying report scheduling.

Gingerich said the draft letter to FERC describes the history of documents and deadlines, and points out that two documents seem to be most out of line with the other reporting schedules. He said Douglas PUD is requesting to move the deadlines for these two documents, the Aquatic Nuisance Species Management Plan Annual Report (typically filed April 1) and Water Temperature Annual Report (typically filed April 30), to May 31, similar to the other resource management plan annual reports.

Per this Aquatic SWG discussion and request, Gingerich said Douglas PUD is requesting Aquatic SWG approval of this letter. If approved by FERC, this will enable Douglas PUD to provide a more comprehensive annual report package to the Aquatic SWG for review (as opposed to individual reports with several different deadlines for comment submittals). Gingerich noted that some annual document deadlines will remain the same, e.g., the Total Dissolved Gas Abatement Plan Annual Report and Total Dissolved Gas Abatement Plan and Juvenile Fish Bypass Operating Plan, and therefore will have different deadlines than May 31. He said those document deadlines cannot be changed due to environmental timing such as bypass season. He added that approving this letter now will hopefully allow time for FERC to process the request before the April 2017 deadlines.

Aquatic SWG members present approved the Aquatic SWG request and letter to FERC; Consolidation of Aquatic Settlement and Water Quality Certification Reporting Deadlines.

The final letter (Attachment C) was distributed to the Aquatic SWG by Kristi Geris on February 12, 2017.

4. 2017 Pacific Lamprey Passage Workshop:

John Ferguson said today's workshop is a follow-up to the 2016 Pacific Lamprey Passage Workshop held on June 8, 2016. He said today's agenda continues discussions about Pacific lamprey, including review of results of research conducted to date, notably the ongoing 2016 Pacific Lamprey Study data, review of governing documents, and discussing next steps, including plans for Pacific lamprey studies in 2017 and beyond. He said another goal of today's workshop is to identify working hypotheses to focus on within the Aquatic SWG. Ferguson added that today's discussions will likely continue throughout the year.

2016 Pacific Lamprey Passage Workshop – Recap (John Ferguson):

Ferguson said the workshop held on June 8, 2016, began with review of Douglas PUD FERC license and ASA requirements, as a refresher about what governing processes require for Pacific lamprey in terms of Douglas PUD and Aquatic SWG responsibilities. Ferguson recalled that this discussion was fundamental to discussing planning for the Douglas PUD 2016 Pacific Lamprey Study. He said the workshop also focused on critical uncertainties about Pacific lamprey passage, and there was also a summary on Chelan PUD and Grant PUD Pacific lamprey topics.

Douglas PUD 2016 Pacific Lamprey Study – Results to Date (Chas Kyger):

Chas Kyger said a Douglas PUD 2016 Pacific Lamprey Study Update (Attachment D) was distributed to the Aquatic SWG by Kristi Geris on January 10, 2017. Kyger recalled that study rationale from previous years was based on the assumption that translocated Pacific lamprey would approach and actively pass Wells Dam, and past studies also relied on translocated fish in an attempt to increase sample size. He said the 2016 Pacific Lamprey Study shifted to a more approach-based focus to determine what fish are doing between Rocky Reach and Wells dams. He said Douglas PUD believes that a critical first step in determining how fish pass Wells Dam is understanding whether the assumption is met that study fish want to pass Wells Dam. He said Douglas PUD acoustically tagged 51 Pacific lamprey collected at Priest Rapids Dam, and released the fish 1 mile upstream of Rocky Reach Dam. He said Grant PUD also acoustically tagged 100 Pacific lamprey collected at Priest Rapids Dam and released the fish at various locations between Priest Rapids and Wanapum dams. He said all these fish are available for analysis.

Kyger said Attachment D includes data for Douglas PUD acoustically tagged fish (51 fish) and Grant PUD acoustically tagged fish that have passed Rocky Reach Dam (33 fish), totaling 84 study fish. He noted very few fish have been detected in the tailrace of Wells Dam; there are four to ten fish, depending on the boundary of the tailrace. He recalled the null hypothesis assumed that 50% of the tagged fish will approach the dam and enter the tailrace, based on the option for a tagged fish to move either upstream or downstream after release. He said, at this point, it seems that approach is something to focus on because not enough fish are approaching Wells Dam to draw conclusions on possible issues with passage at the dam.

Bob Rose asked about detections at other upstream or downstream receivers, and Kyger said those data have not yet been analyzed. Kyger said analyses to date have only focused on the Wells Dam tailrace, and he added that other data will be analyzed eventually. Rose expressed interest in the fate of those fish, noting that this should be available in the receiver data. He asked about detection efficiency in the receivers, particularly at Gateway (see Attachment D). Kyger said Douglas PUD is confident detection efficiency is at or near 100% for Douglas PUD receivers, based on tag testing. He said Gateway is a Chelan PUD receiver and, for white sturgeon, Chelan PUD indicated detection efficiency was 100%. Andrew Gingerich noted that Table 2 in Attachment D shows 100% detection efficiency when Gateway and GW-TR transition were combined. He said all fish subsequently detected at upstream locations were detected at either Gateway or GW-TR transition. Jason McLellan said he is not disputing detection efficiency is probably high; however, it may not be 100%. He said for example, fish may pass Gateway but not get detected. He also noted Tag 44867 in Table 2 of Attachment D was not detected at Gateway, but was detected at GW-TR transition. He said there could also be code collision issues, or detection differences between the types of tags used between the two PUDs or other equipment differences. Gingerich agreed, and noted he was referring only to fish detected at Gateway and GW-TR transition and subsequently detected at an upstream location.

Ferguson asked about the disposition of study fish not included in Table 2 of Attachment D. He asked how long the tags are operable, what is the frequency of Chelan PUD downloads, and what is the spatial resolution. Kyger said Grant PUD tags are programmed differently than Douglas PUD tags. He said Grant PUD tags are programmed to switch to sleep mode this time of year, and Douglas PUD tags are operable year-round. He acknowledged that operating the tags year-round limits the tag life; however, he said Douglas PUD adjusted the ping rate to help the tags last longer (at least through spring 2017). He said the receivers are installed at about 10- to 15-mile intervals throughout the Rocky Reach Reservoir. He said this provides information on the last detection location; however, it does not provide the type of

resolution needed to inform disposition, mortality, holding, or spawning in the mainstem. Ferguson asked about mobile tracking, and Kyger said the study plan does not include specifics on mobile tracking; however, if fish are observed holding in a particular zone, mobile tracking could be a tool to obtain more data. Kyger said there is one such area, Sun Cove (previously referred to as Duck Tail Rock), located about 18 to 20 miles downstream of Wells Dam. He said last year, fish seemed to be holding in that area, which seems to be the pattern this year, too. He said there is no known tributary in that area, but there is a deep trench with a rocky floor, which might serve as good cover from predators. He said it is unknown why fish seem to hold there. Gingerich noted that the deep trench may also be the location of expelled tags from Pacific lamprey that were predated upon by white sturgeon. McLellan suggested setting up four VR2W (Vemco) receivers around the hole for 1 to 2 hours and running a Vemco Positioning System to confirm whether fish are aggregating in a hole. He said this is a way to evaluate this question, if there are available funds.

Rose agreed with McLellan, and further supported conducting mobile tracking, as needed, to provide insight. He said the whole point of this workshop is to better understand what is happening. He suggested more tags and more cooperation, in less time than in the past. He said about 100% detection efficiency is needed, otherwise there will only be speculation. Ferguson noted that the 2016 Pacific Lamprey Passage Workshop focused more on regional coordination; however, this workshop is more focused on the Wells Project. Gingerich said, from Douglas PUD's perspective, the 2016 Pacific Lamprey Study is already stepping out of the purview of FERC License No. 2149 and the ASA since tracking in the Rocky Reach Reservoir is outside the Wells Project boundary. He said Douglas PUD wants to conduct studies to address Wells Project effects if and where they exist; however, this is based on the assumption that fish want to interact with Wells Dam. He said the 2016 Pacific Lamprey Study is in the Rocky Reach Reservoir, which is not in the Wells Project. He said he hopes the Aquatic SWG can acknowledge this. Rose said, as he and others have stated for years, some of these questions are common for all PUDs, but then each PUD retreats to its own confines and time goes by. He said the PUD boundary model is no longer useful, and he hopes the PUDs can embrace this. He said if this is not obvious to all PUDs, agencies need to start writing letters. Gingerich said he appreciates the frustration; however, he argued that Douglas PUD has not retreated, and the 2016 Pacific Lamprey Study is an example of this. He said Douglas PUD released tagged study fish in the Rocky Reach Dam forebay, outside of the Douglas PUD boundary, and he believes that FERC would support the notion that tracking fish outside of project boundary falls outside of the Pacific Lamprey Management Plan and ASA actions, or protection, mitigation, and enhancement measures. He added that some

criticism is appropriate, but not all. Rose said he appreciates the comments, and assured the Aquatic SWG that Chelan PUD will be a part of this, as well.

Ferguson asked the Aquatic SWG for suggestions on how to start discussions with the RRF. Rose suggested drafting SOAs that show interest in a regional effort. He said, for example, he believes there is reasonable likelihood that translocating adult Pacific lamprey upstream of Wells Dam will encourage a certain percent of other Pacific lamprey to pass Wells Dam. He said this may require a lot of fish (juveniles and adults), and all PUDs need to embrace this and help fund it. He said a systematic, cohesive, larger-scale study is needed, which includes getting adults and juveniles in upstream habitats. He said the Aquatic SWG can keep discussing these data to date; however, he interprets the data as confirming the effort is just tip-toeing along, and the resource is suffering all the while. Ferguson noted that these data do suggest the Rocky Reach Reservoir is likely an area of focus, which is why he asked about coordination between forums.

Ferguson asked about timing for the next data download with regard to what data will be available for discussing the 2017 study design. Kyger said Douglas PUD will have downloads from at least the Douglas PUD receivers in the Wells Dam tailrace by early spring. He said he cannot speak with certainty as to when Chelan and Grant PUDs will download their receivers; however, he believes they plan to download their receivers shortly after the tags wake up in the spring. He said Douglas PUD will distribute a report summarizing the results as soon as possible, and then the study hypotheses will be reviewed to determine the next logical step. He noted that Douglas PUD is not debating if fish want to pass upstream of Wells Dam; rather, the current focus is evaluating this assumption for passage at Wells Dam. He said, at this point in time, it seems that adequate data are not available to at this time to inform discussions of modifications at Wells Dam. He said the objectives of the 2016 Pacific Lamprey Study are not Douglas PUD's only goals; however, Douglas PUD's FERC license stipulates figuring out passage issues at the concrete. He said Douglas PUD is also interested in this regional, larger-scale study.

ASA Adaptive Management (Andrew Gingerich):

Gingerich presented slides on adaptive management (Attachment E), which Geris distributed to the Aquatic SWG following the meeting on January 11, 2017. Gingerich read slide 1 of Attachment E, which he said is adaptive management language copied directly from the ASA. He reviewed slide 2 of Attachment E, which demonstrates how Douglas PUD has executed adaptive management steps A and B, as outlined in the ASA, through implementation of the 2016 Pacific Lamprey Study.

YN Translocation Policies (Draft Bonneville Power Administration Report) and Anticipated Implementation Actions (Bob Rose):

Rose said the YN does not have translocation policies, per se; rather, YN translocation efforts are all very technical. He said the YN are still internally discussing the best approach to these efforts. He said ongoing discussions are often about numbers, what is available, where to capture, and where to distribute. He said all of this is starting to take shape; however, nothing is final. He said, with regard to the Wells Project, whether or not 200 or 400 fish are translocated upstream of Wells Dam is still quite subjective. He welcomed this discussion with the Aquatic SWG, including what the forum can do to bring the Methow and Okanogan rivers into the fold and have the necessary resources to conduct M&E. He said the YN are very interested in getting fish upstream of Wells Dam, noting he believes this is a very germane thing. He said Ralph Lampman (YN) wonders if there are enough pheromones upstream of Wells Dam. He suggested that perhaps a lot more adult pheromone is needed upstream of Wells Dam, along with pheromones produced by juvenile lamprey. Rose said he believes this is a reasonable hypothesis. He said the YN are only able to extract x-number of fish from the lower Columbia River, which is defined by the Columbia River Inter-Tribal Fish Commission. He said this number ends up being about 1,000 fish per year, split among tribes. He said more fish are needed, and care needs to be taken not to mix those fish with fish predestined to the Snake River. He said useful information on the success of translocating Pacific lamprey has been obtained by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and Nez Perce, and the YN are also starting to obtain useful information. He suggested something similar is needed in the Upper Columbia River. He said, when the PUDs begin working together and have a strong collection effort, the YN believe there will be more pheromones from juveniles and adults, and better Pacific lamprey numbers overall in the Methow and Okanogan rivers. He said the YN do not believe this is a Bonneville Power Administration (BPA)-funded Columbia Basin Fish Accords projects; rather, he suggested this is a PUD project. He added that, over time, it has become more evident this needs to happen in a more coordinated way.

Steve Lewis asked, with regard to adaptive management, has the threshold been passed to explore translocation for the Wells Reservoir and should the Aquatic SWG begin defining what this will look like. Rose said he believes so. He said translocation is not included in the adaptive management language; however, he believes the Aquatic SWG should do what makes sense, and translocation seems to make sense. He said he does not believe the current studies are very accurate, noting that if there is no solid trail for adults to follow from pheromones, then it seems the overall lifecycle is incomplete. Lewis asked if the Aquatic SWG were to pursue pheromones, how this would take shape. He recalled, for example, discussing the possibility of conducting tests directly in the fishway to ground truth this hypothesis

before translocating fish. The Aquatic SWG agreed to postpone this discussion until after hypotheses and prioritization are further discussed.

Ferguson asked why the Wenatchee River is not included in the Draft BPA Report and Draft YN Pacific Lamprey Supplementation and Monitoring Frameworks. Rose said this is one topic the YN are still debating. He said he believes if fish are translocated into the Wenatchee River basin and are reared at the Dryden Acclimation Facility, for example, this will solve the pheromone issue. He also noted, however, the YN is discussing adopting the approach where Pacific lamprey are allowed to pass Tumwater Dam and distribute and colonize habitats naturally. He said there is disagreement within the YN, and this is still under discussion.

CCT Translocation Policies and Implementation Plans (Jason McLellan):

McLellan said these discussions are still under development.

Hypotheses for Poor Approach Behavior or Passage at Wells Dam (All):

Ferguson reviewed hypotheses discussed to date as to why approach behavior or passage at Wells Dam is poor, including lack of pheromones; poor hydraulic conditions at fishway entrances; upper-dam bioenergetics; and project operations having changed tailrace hydraulic patterns. Ferguson said this is an open discussion about these and other possible hypotheses, with the goal of prioritizing a select few for study in 2017.

Poor Hydraulic Conditions at Fishway Entrances

Rose asked what the fishway entrances look like under water, and suggested this as a good place for white sturgeon to hold and prey on Pacific lamprey. He asked if Pacific lamprey would also be exposed to reasonably higher velocities at the fishway entrances. Gingerich shared a figure of a cross section of the fishway entrance at Wells Dam (Attachment F), which Geris distributed to the Aquatic SWG following the meeting on January 11, 2017. McLellan said this may be a good location for white sturgeon to hold; however, Pacific lamprey ascended several dams downstream of Wells Dam with the same presence of white sturgeon. He added that it seems Pacific lamprey numbers at the Wells Dam fishway entrance were in the 100s until about 2006, and then dropped to the 20s; and this steep decline does not align with white sturgeon supplementation. He said he is not ruling out that white sturgeon may affect Pacific lamprey behavior to some degree; however, he is not sure it is the cause of the wholesale decline. Gingerich noted that Douglas PUD has a couple of VR2W receivers installed in the Wells Dam collection gallery and can review these data for detections of Chelan PUD-tagged white sturgeon at the fishway entrance. Lewis asked if white sturgeon

have ever been recovered during dewatering of the Wells Dam fishways. Kyger said a few years ago, one small juvenile white sturgeon was recovered in the collection gallery.

Rose said, with regard to velocities at the fishway entrances, it seems, based on past studies (notably the Dual Frequency Identification Sonar [DIDSON] camera studies), those fish were having a hard time entering and staying in the fishway. He said these studies suggest the fishway is not conducive for Pacific lamprey passage. Gingerich noted that those same hydraulic conditions were present when there were 30 to 40% conversion rates, indicating a number of fish were able to pass during those conditions years ago. Kyger added that studying hydraulic conditions at the fishway entrances may be an even lesser priority because not even 5% of study fish are reaching the fishway entrances. Ferguson asked Rose if he is suggesting, while evaluating reservoir issues, that the Aquatic SWG not lose sight of entrance conditions as well, and Rose said that is correct. He suggested considering not only biological, but physical constraints.

Rocky Reach Reservoir Mortality, Fate within the Rocky Reach Reservoir, and Mainstem Spawning

Rose suggested, in response to McLellan's comment about white sturgeon presence at the fishway entrances, that there may be some imbalance of Pacific lamprey pheromone coupled with white sturgeon presence that deters Pacific lamprey. He suggested conversely, if there was more Pacific lamprey pheromone, it may surpass the deterring effects of white sturgeon presence. McLellan agreed there is likely an ideal balance, and white sturgeon have some impact on that balance. He said, however, he would not make this judgment based on the information available. He added that he could probably make a stronger argument for stocking white sturgeon in the Rocky Reach Reservoir in 2003. He said those fish are probably quite large now, and could be the cause of declining Pacific lamprey numbers. He said he is not suggesting this, but just mentioned it for the sake of argument. Lewis also agreed that historically, there was balance between white sturgeon and Pacific lamprey in the reservoirs, and over time this balance has been disrupted.

Gingerich asked what proportion of acoustically tagged white sturgeon have been detected in the Wells Dam tailrace versus the Wells Reservoir. Dave Robichaud said random indexing shows there are two pockets of concentrations, and tracking data show white sturgeon prefer the upper reservoir. He said two lines of evidence indicate there are a lot of white sturgeon in the Wells Dam tailrace; however, this may not be the case. He said the issue with random indexing is it is one snapshot. Gingerich said he is interested in acoustic data during the months of June through September, because Pacific lamprey were released in the

Rocky Reach Dam forebay; if white sturgeon were stacked in the Wells Dam tailrace, this could explain why Pacific lamprey did not want to approach Wells Dam.

Ferguson said while discussing this topic of Pacific lamprey with Mary Moser (National Marine Fisheries Service), she asked about the disposition of the fish and suggested that mortality in the Rocky Reach Reservoir may be a factor. Ferguson said Moser also indicated that researchers in the Great Lakes are investigating using predator scent to deter sea lamprey from entering streams, and suggested this may have merit with Pacific lamprey, as well. Lewis asked if Moser had literature on this, and Ferguson said she did not. Moser indicated that a graduate student at Central Washington University conducted laboratory studies of the effects of white sturgeon scent on Pacific lamprey behavior. Ferguson also suggested considering the effects of white sturgeon hatchery rearing at Wells Fish Hatchery on Pacific lamprey. He said the effluent from the hatcheries may affect Pacific lamprey migration. He said he spoke with Tracy Hillman, who indicated a white sturgeon was detected in a fish ladder at a Grant PUD facility and Pacific lamprey vacated the area. Ferguson said Hillman agreed Pacific lamprey could be sensitive to olfactory cues. Lewis also agreed there is a link.

Gingerich asked about other evolutionary driving factors, such as mainstem spawning. He said considering Pacific lamprey use their own muscle reserves for energy, he questioned what the tradeoffs are for fish migrating farther, but at a potential cost of reproduction or gonadal development, especially for a panmictic fish that does not need to return to a natal spawning stream, like salmonids. He asked, if there is available habitat downstream of Wells Dam, would Pacific lamprey spawn lower downstream opposed to migrating farther and using energy for migration and not reproduction. Rose said it seems fish will go as far and wide as possible.

McLellan said it seems numbers coming over Rocky Reach Dam are relatively consistent and high. He said it is unknown how many fish are actually reaching Wells Dam; however, telemetry data suggest not many. He said there have been no major operational or structural changes to Wells Dam. He said, based on these factors, it seems that evaluating Rocky Reach Reservoir mortality or fate within the Rocky Reach Reservoir should be a priority. Rose asked if McLellan is indicating he believes it is reasonable that white sturgeon are accumulating and predated upon Pacific lamprey in the upper Rocky Reach Reservoir, particularly later in the summer and early fall when Pacific lamprey are present. McLellan said he believes there is the opportunity for white sturgeon to prey on Pacific lamprey between Rocky Reach and Wells dams. Rose added that it seems the river constricts in that area, providing less places to hide.

Ferguson asked about the influence of stocking white sturgeon in the Rocky Reach Reservoir, and McLellan suggested this falls under reservoir mortality. He added that he believes Chelan PUD plans to analyze stomach contents of white sturgeon this year, and Chad Jackson said he believes this was started last year.

Lack of Juvenile and Adult Pheromones

Rose said he agrees reservoir mortality is a high priority, and suggested another high priority is the lack of juvenile and adult pheromone cues to drive fish upriver. Gingerich agreed the Aquatic SWG has discussed lack of pheromones, and there is interest in a translocation effort, to some degree. He said this is part of the reason behind having Aaron Jackson (CTUIR) and Lampman participate in these discussions. Gingerich said, with regard to testing this hypothesis, it seems a number of fish will be needed at a certain location before there is a response. He added that he is unsure there will be a response after only 1 year, and suggested first translocating juvenile pheromones and then retesting. Rose agreed, and suggested 5 to 7 years may be needed to obtain sufficient numbers of fish upstream of Wells Dam to produce a sufficient signal without inserting artificial pheromones. Ferguson asked about the pheromone concentrations present in the Methow River, with regard to ensuring the signal upstream of Wells Dam is significant. Rose suggested researching the Entiat River where it seems juvenile Pacific lamprey and habitat already exist. Gingerich noted, however, data indicate very few Pacific lamprey entered the Entiat River in 2016. Kyger also cautioned investing a lot of effort in pheromones, noting that most available pheromone research has only been on sea lamprey where there has been a suite of bioassays to show cause and effect. He said he is uncertain significant research has been conducted with Pacific lamprey, which ultimately comes back to concentration, cause and effect, and what pheromones to measure. He said, in the end, it may be unknown whether pheromones made a difference at all.

Upper-Dam Bioenergetics

Ferguson recalled Patrick Verhey mentioning this hypothesis during a past meeting. Ferguson said it seems bioenergetics could be on the list of hypotheses to follow up on, because there are data to analyze it. Lewis asked if data are available on girth of tagged individuals when passage at Wells Dam was higher, and what other data might be available. Kyger said he is not sure datasets exist from when there were greater numbers of Pacific lamprey passing Wells Dam versus present day. He said there is strong evidence Pacific lamprey are getting smaller as they migrate upstream. Gingerich said there are data, which suggest larger fish are more successful in passing dams and migrating farther upstream. He said data from past Douglas PUD studies do not suggest fish size was a factor, but he is uncertain what the 2016 data indicate. Ferguson recalled Moser suggesting

bioenergetics would be lowest priority factor to study on the list from her perspective, based on laboratory work on Pacific lamprey that were held for 2 years and then successfully spawned. Ferguson said Moser believes these fish have evolved and adapted to long-term starvation periods while still preserving the ability to successfully reproduce. Ferguson said the graduate student work previously referenced also suggests a similar notion. Robichaud said fish size data are available from the 2016 Pacific Lamprey Study, but the analyses have not yet been run. Gingerich said mean size at each detection point can easily be reviewed.

Changes at Wells Dam

Ryan Fortier (WDFW) asked about any changes at Wells Dam. Gingerich said there has been some operational variability year to year, but very few structural changes in the recent past. He recalled concern about salmonids holding in the collection gallery, which prompted adding a baffle to increase velocity from the collection gallery into Weir 1, to encourage salmon to move through the area quicker. He said this is the only structural change and it does not align with the decline in Pacific lamprey numbers.

Changes to the Spill Playbook

Lewis asked if changes to the Spill Playbook might affect Pacific lamprey approaching Wells Dam. Gingerich said this might be worth looking into; however, the majority of these changes occurred after the large drop in fish counts. He also noted Pacific lamprey usually migrate through the area during the time of year when there is not a lot of spill. He suggested, based on these factors, this hypothesis be moved farther down the list to consider.

Prioritized Hypotheses and Next Steps (All):

Ferguson summarized (in no particular order) the following three hypotheses identified as priorities for study in 2017: 1) lack of juvenile and adult pheromones; 2) poor hydraulic conditions at fishway entrances; and 3) reservoir mortality, fate in reservoir, and mainstem spawning. The following next steps were also identified as described below.

Fish Forum Coordination

Ferguson asked how to initiate coordination between the Aquatic SWG and RRF. Rose suggested developing an SOA, either issued from the YN or jointly, recognizing Pacific lamprey passage at Wells Dam is an issue which transcends one PUD and there are specific management questions that need to be addressed in a more holistic manner rather than an individual approach. He suggested pushing such an SOA forward and getting the PUDs to respond. He also noted an SOA might help define roles of coordination, and suggested that Ferguson notify Hillman this effort is underway. Ferguson said he will contact

Hillman to notify Hillman the Aquatic SWG began discussing how to improve coordination between the Aquatic SWG and the RRF with regard to Pacific lamprey behavior and survival in the Rocky Reach Reservoir. *(Note: Ferguson notified Hillman, as discussed, on January 16, 2017.)*

Study Fish Fate in the Rocky Reach Reservoir

McLellan suggested gaining a better understanding about study fish fate in the reservoir (are fish still alive or not). He said it is not clear where these fish are moving or end up. He suggested summarizing detections of fish, and once there is a clearer idea about fate, causes of that fate can be assessed. Douglas PUD, in coordination with Robichaud, will synthesize Douglas PUD and Grant PUD 2016 Pacific lamprey Study data collected to date to demonstrate the behavior of each tagged individual, for discussion during the Aquatic SWG meeting on February 8, 2017. McLellan requested that sample size and total detections by tag code are included. *(Note: Kyger provided these data to Geris on January 13, 2017, which Geris distributed to the Aquatic SWG that same day.)*

Initial Discussion of 2017 Study Plan Development

Rose said he would like to begin discussing what might be possible in terms of a study in 2017. He said he has already been discussing this and a tour of the dewatered fishway at Wells Dam with Gingerich. Rose acknowledged the time constraints already present for a study this year; however, he indicated he would like to begin translocation efforts, if possible. He suggested further discussing these hypotheses soon. The Aquatic SWG will further discuss Pacific lamprey passage hypotheses and study plans for 2017 during the Aquatic SWG meeting on February 8, 2017.

Gingerich agreed discussing hypotheses soon is good, and extended the invitation to tour the dewatered fishway at Wells Dam to all Aquatic SWG members. Aquatic SWG members will contact Gingerich if there is interest in touring the west fish ladder at Wells Dam while the ladder is dewatered; the ladder will be dewatered for 2 to 3 weeks starting on January 19, 2017. *(Note: Rose, Fortier, Gingerich, and Kyger toured the entire dewatered west fishway on January 23, 2016.)*

5. Draft 2016 Total Dissolved Gas Abatement Plan Annual Report and Draft 2017 Total Dissolved Gas Abatement Plan and Juvenile Fish Bypass Operating Plan (Andrew Gingerich):

Andrew Gingerich reminded the Aquatic SWG that Kristi Geris sent an email on January 5, 2017, notifying the Aquatic SWG that the Draft 2016 Total Dissolved Gas Abatement Plan Annual Report and Draft 2017 Total Dissolved Gas Abatement Plan and

Juvenile Fish Bypass Operating Plan are available for a 30-day review period, with edits and comments due to Gingerich by Monday, February 6, 2017. Gingerich said Douglas PUD will request approval of both documents during the Aquatic SWG meeting on February 8, 2017.

VII. Next Meetings

1. Upcoming meetings (John Ferguson):

The Aquatic SWG meeting on February 8, 2017, will be held by conference call.

Upcoming meetings are as follows: February 8, 2017 (conference call); March 8, 2017 (TBD); and April 12, 2017 (TBD).

VIII. Wells Dam Fish Ladder Tour

1. Wells Dam Fish Ladder Tour (All):

Originally, the west fish ladder at Wells Dam was scheduled to be dewatered for annual winter maintenance, and a tour of the ladder in the dry was planned for interested Aquatic SWG members and Pacific Lamprey Passage Workshop attendees. Due to unexpected bad weather, the west fish ladder was not yet dewatered; however, Douglas PUD still provided a short tour of the upper end of the west fish ladder in the wet. Aquatic SWG members present also toured the Wells White Sturgeon Fish Hatchery. Douglas PUD is still offering tours of the west fish ladder, once dewatered, to those interested. (*Note: Bob Rose, Ryan Fortier, Andrew Gingerich, and Chas Kyger toured the entire dewatered west fishway on January 23, 2016.*)

List of Attachments

- Attachment A List of Attendees
- Attachment B Final White Sturgeon Stocking SOA, *Wells Reservoir White Sturgeon Supplementation 2018-2022*
- Attachment C Final Douglas PUD letter to FERC, *Consolidation of Aquatic Settlement and Water Quality Certification Reporting Deadlines*
- Attachment D Douglas PUD 2016 Pacific Lamprey Study Update
- Attachment E Adaptive Management Slides
- Attachment F Cross Section of the Fishway Entrance at Wells Dam

Attachment A – Attendees

Name	Role	Organization
John Ferguson	Aquatic SWG Chairman	Anchor QEA, LLC
Kristi Gerist [†]	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
Bao Le [†]	Observer	HDR, Inc.
Steve Lewis [†]	Aquatic SWG Technical Representative	U.S. Fish and Wildlife Service
Breean Zimmermant [†]	Aquatic SWG Technical Representative	Washington State Department of Ecology
Chad Jackson	Technical Support	Washington Department of Fish and Wildlife
Ryan Fortier	Technical Support	Washington Department of Fish and Wildlife
Bob Rose [†]	Aquatic SWG Technical Representative	Yakama Nation
Jason McLellan [†]	Aquatic SWG Technical Representative	Colville Confederated Tribes

Notes:

† Joined by phone