



Conference Call Minutes

Aquatic Settlement Work Group

To: Aquatic SWG Parties

Date: August 9, 2018

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

Re: Final Minutes of the July 11, 2018 Aquatic SWG Conference Call

The Aquatic Settlement Work Group (SWG) met by conference call on Wednesday, July 11, 2018, from 10:00 a.m. to 12:00 p.m. Attendees are listed in Attachment A of these conference call minutes.

I. Summary of Action Items

1. Aquatic SWG members will review the revised draft report, *Adult Lamprey Approach and Passage Study, Wells Dam, 2016-17*, and be prepared for Douglas PUD to request approval of this revised report during the Aquatic SWG meeting on August 8, 2018 (Item VI-1).
2. Douglas PUD will communicate to Grant PUD the Aquatic SWG request to obtain a portion of Pacific Lamprey from the earlier portion of the 2018 migration being collected by Grant PUD at Priest Rapids Dam for translocation by Douglas PUD to locations upstream of Wells Dam (Item VI-2). *(Note: As reported by Chas Kyger via email on July 12, 2018, Douglas PUD contacted Grant PUD as discussed during the Aquatic SWG meeting on July 11, 2018, and Grant PUD agreed to allocate a portion of the fish Grant PUD collects to be translocated upstream of Wells Dam if the Priest Rapids Fish Forum [PRFF] approves of this request and if the run size is large enough for Grant PUD to meet their translocation program needs.)*
3. A Wells White Sturgeon Collection Update will be discussed during the Aquatic SWG meeting on August 8, 2018 (Item VI-3).
4. Ralph Lampman will provide John Ferguson and Kristi Geris with the contact information for Sang-Seon Yun (Big River Scientific, LLC) to schedule a brief presentation on bioassay sampling to monitor Pacific Lamprey pheromone levels during the Aquatic SWG meeting on September 12, 2018 (Item VI-5). *(Note: Lampman provided contact information for Yun, who is scheduled to present during the Aquatic SWG meeting on September 12, 2018.)*
5. The Aquatic SWG will continue discussing bioassay sampling, to monitor Pacific Lamprey pheromone levels over time as translocation efforts are implemented, during the Aquatic SWG meeting on August 8, 2018 (Item VI-5).

6. Ralph Lampman will contact Kellie Carim (U.S. Forest Service [USFS]) to request a brief presentation and discussion of environmental DNA (eDNA) sampling to monitor Pacific Lamprey presence during the Aquatic SWG meeting on August 8, 2018 (Item VI-5). (*Note: Lampman contacted Carim, who is scheduled to present during the Aquatic SWG meeting on August 8, 2018.*)
7. The Aquatic SWG meeting on August 8, 2018, will be held by **conference call** (Item VII-1).

II. Summary of Decisions

1. There were no decisions approved during today's conference call.

III. Agreements

1. There were no agreements discussed during today's conference call.

IV. Review Items

1. The revised draft report, *Adult Lamprey Approach and Passage Study, Wells Dam, 2016-17*, was distributed to the Aquatic SWG by Kristi Geris on June 14, 2018 (Item VI-1).

V. Documents Finalized

1. There are no documents that have been recently finalized.

VI. Summary of Discussions

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 changes to the agenda. No additions or changes were requested; however, Kristi Geris requested clarification about the comment deadline for the revised draft report, *Adult Lamprey Approach and Passage Study, Wells Dam, 2016-17*, which was distributed to the Aquatic SWG by Geris on June 14, 2018. Chas Kyger said all comments received on the draft report were incorporated into this revised report and he does not anticipate much further review is needed. He said, however, if Aquatic SWG members would like an additional 30-day review, this can be provided; otherwise, Douglas PUD is prepared to request approval of the revised report during the Aquatic SWG meeting on August 8, 2018. There were no requests for additional review. Ferguson suggested Aquatic SWG members review the revised draft report and be prepared to vote next month.

The revised draft June 13, 2018 conference call minutes were reviewed. Geris said no comments or revisions were received from members of the Aquatic SWG and there are no outstanding edits or questions to discuss. Aquatic SWG members present approved the June 13, 2018 conference call minutes, as revised.

Action items from the Aquatic SWG conference call on June 13, 2018, are as follows (note: the following italicized item numbers correspond to agenda items from the June 13, 2018 conference call):

- *Douglas PUD will provide the revised draft report, Adult Lamprey Approach and Passage Study, Wells Dam, 2016-17, to Kristi Geris for distribution to the Aquatic SWG (Item VI-1).* Chas Kyger provided the revised draft report to Geris on June 14, 2018, which Geris distributed to the Aquatic SWG that same day.
- *Douglas PUD will incorporate revisions discussed and provide the final approved Pacific Lamprey Translocation Statement of Agreement (SOA) titled, To translocate adult Pacific Lamprey from Priest Rapids Dam to areas within or upstream of the Wells Project and postpone passage evaluations, to Kristi Geris for distribution to the Aquatic SWG (Item VI-2).* Chas Kyger provided the final SOA, as discussed, to Geris on June 14, 2018, which Geris distributed to the Aquatic SWG that same day.
- *Douglas PUD will keep the Aquatic SWG updated on the logistics of implementing the Pacific Lamprey Translocation SOA (Item VI-2).* This will be discussed during today's conference call.
- *The Yakama Nation (YN) will discuss the need for bioassay sampling to monitor Pacific Lamprey pheromone levels over time as translocation efforts are implemented at a future Aquatic SWG meeting (Item VI-2).* This will be discussed during today's conference call.
- *Douglas PUD will provide a summary of 2018 gas bubble trauma (GBT) monitoring results conducted by Douglas PUD to date (Item VI-4).* Andrew Gingerich provided these data, which were distributed to the Aquatic SWG by Kristi Geris on June 25, 2018.
- *The U.S. Fish and Wildlife Service (USFWS) will keep the Aquatic SWG informed on a possible presentation by Damon Goodman (USFWS; Arcata, California) on the Van Arsdale Dam Pacific Lamprey Passage Structure during an in-person gathering of the regional fish forums; and Kristi Geris will coordinate logistics as needed (Item VI-6).* John Ferguson said this presentation is scheduled for the PRCC meeting on August 1, 2018. Steve Lewis said the logistics are still under discussion, but the presentation may take place at Chelan PUD Headquarters in Wenatchee, Washington. Ferguson said there was also discussion via email regarding an informal tour of Tumwater Dam. Lewis

confirmed and said the purpose of the tour is to remind folks about the structure and operation of the dam.

2. Pacific Lamprey Logistics Update (Chas Kyger):

Chas Kyger said Douglas PUD has been discussing Pacific Lamprey translocation logistics for the 2018 migration with Mike Clement (Grant PUD). Kyger said an agreement is near approval for the duration of the 2018 translocation program and should be ready to go in the next 2 weeks. He said the agreement addresses basic logistics such as trapping, holding, transportation, and tagging, among other things. He said everything is on track; the PUDs are just waiting for fish to arrive. He said fish will be collected at Priest Rapids Dam and transported to Wells Fish Hatchery for tagging. He said one concern is if high numbers of fish are collected at once. He said Douglas PUD is investigating ways to hold these fish at Wells Fish Hatchery. He said ideally, Douglas PUD would like to tag and release fish on the same day; however, if hundreds of fish are being trapped at once, this may require multiple transports, holding fish at Wells Fish Hatchery, and tagging the next day.

Patrick Verhey said Clement also noted the limited space to hold fish at Priest Rapids Dam. Verhey asked if the trap gets clogged with fish, have there been discussions about a place for these fish to go other than back to the river? Kyger said this was discussed yesterday. He said Douglas PUD plans to visit Priest Rapids Dam to look at the fish collection system and determine whether something can be built to hold extra fish. He said additionally, Douglas PUD is considering staging a hatchery transport truck at the flow-through system to hold extra fish before transport.

John Ferguson said Ralph Lampman noted prior to this conference call beginning, that the peak of the 2018 Pacific Lamprey migration was early at Bonneville Dam (Lampman provided Pacific Lamprey counts to date [Attachment B] to the Aquatic SWG during the Aquatic SWG conference call on July 11, 2018). Ferguson asked if the Aquatic SWG is tracking this and if run timing needs to be discussed.

Lampman asked if collection for Douglas PUD will be conducted after collection for Grant PUD? Kyger said yes, this was Grant PUD's preference for logistical reasons. Kyger said Grant PUD prefers that Douglas PUD traps after Grant PUD's agreement is met. Kyger said Clement was tentatively thinking Grant PUD would complete collection in the second or third week of August 2018, and then collection can begin for Douglas PUD fish.

Lampman said his concern is that typically, July 10 is the peak at Bonneville Dam and about 30 days later the peak arrives at Priest Rapids Dam. He said if the peak is approximately 20 days early this year and trapping for Douglas PUD does not begin until early August 2018,

there may only be limited numbers left toward the tail end of the migration. He asked if Grant PUD is set in stone on this plan and if there is a way for Douglas PUD to obtain fish from earlier in the run? Kyger said in 2 weeks, Douglas PUD will be ready for collection and transportation at any time. Ferguson asked if Grant PUD is targeting a number of fish for collection, and Kyger said Grant PUD is targeting a certain number of days of trapping.

Andrew Gingerich said he understands that Grant PUD plans to trap for 3 weeks, translocate fish upstream of Rock Island Dam, and release fish near Kirby Billingsley Hydro Park in Wenatchee, Washington. Gingerich said it does not seem like there is anything which precludes those fish from being transported farther upstream. He said if the Aquatic SWG wants fish from earlier in the run, the Aquatic SWG or Douglas PUD can ask Grant PUD for access to those fish being released at Kirby Billingsley Hydro Park and move those fish farther upstream above Wells Dam. Gingerich noted that he is just thinking aloud and has not yet discussed these details with Kyger; however, it seems this option would meet both PUDs' actions and meet the Aquatic SWG request to obtain fish earlier in the run.

Lampman said Grant PUD's Pacific Lamprey Management Plan indicates these decisions are up to the PRFF. Lampman said it seems Grant PUD is mainly concerned with translocating fish upstream of Rock Island Dam, and what happens to those fish once upstream of Rock Island Dam depends on the PRFF. Ferguson asked when the next PRFF meeting will take place, and Lampman said August 1, 2018. Ferguson asked if the Aquatic SWG agrees to make this request from Grant PUD and the PRFF during today's conference call (i.e., may Douglas PUD translocate Grant PUD fish farther upstream?), can this be discussed within the PRFF prior to the next Aquatic SWG meeting on August 8, 2018? Ferguson asked further, does this schedule allow enough time to meet the needs of the translocation effort? Lewis said the PRFF meeting on August 1, 2018, will be largely devoted to the presentation by Damon Goodman, and Lewis is unsure about how much time will be left to discuss translocation.

Lampman said he provided a PUD translocation spreadsheet (Attachment C) to the Aquatic SWG during the conference call on July 11, 2018. He said the spreadsheet includes scenarios for different release sites and allocates proportions for each site. Gingerich said he reviewed Attachment C, which does not allocate any Grant PUD fish for translocation upstream of Wells Dam, and Gingerich said his question is, can there be fish allocated for translocation upstream? Lewis said based on previous discussions with Clement, he understands that Grant PUD is only concerned with moving fish upstream of Rock Island Dam and it is up to the individual agencies to figure out how to distribute each group. Verhey said this is his recollection, as well.

Lampman suggested further discussing Attachment C, specifically regarding translocation locations upstream of Wells Dam. He also suggested if Douglas PUD "borrows" Grant PUD fish, those fish can be replaced if adequate fish are collected during the end of the migration (i.e., the adults can be released at the Grant PUD release site during the later collection period).

Verhey said it seems there are three immediate questions to be addressed: 1) does the Aquatic SWG agree to request fish from Grant PUD that are collected during their 3-week collection period to translocate upstream of Wells Dam; 2) is Grant PUD willing to allow fish from their program to be translocated farther upstream; and 3) who will be transporting these fish farther upstream; and if Douglas PUD, is this an option? Verhey said regarding the first question, the Washington Department of Fish and Wildlife (WDFW) is not opposed to this request. Gingerich said regarding the third question, Douglas PUD is more than willing to transport the fish upstream of Wells Dam.

Lampman asked if Douglas PUD would tag fish at Kirby Billingsley Hydro Park. Gingerich said fish would be tagged at Wells Fish Hatchery. He said logistically, it seems to make most sense versus setting up a tagging station in the field. Lampman agreed.

Ferguson asked if the Aquatic SWG agrees to ask Grant PUD for a portion of their fish to meet the Douglas PUD Pacific Lamprey translocation SOA? No Aquatic SWG member expressed disagreement.

Ferguson asked how to coordinate with Grant PUD to obtain approval of this request. He asked if this needs to be vetted via the PRFF. Gingerich suggested that Douglas PUD contact Grant PUD directly with this request. He further suggested, for example, an every-other-day schedule to obtain fish. Lewis said this makes sense to him. Gingerich said he is unsure why Grant PUD would disagree. Ferguson said his initial thoughts were that Grant PUD would disagree because they will want to be sure to meet their requirements; however, he said the request is worth asking. *(Note: Lampman clarified after the conference call that translocating adult Pacific Lamprey to the Kirby Billingsley Park satisfies Grant PUD's requirement and anyone translocating those adults farther upstream does not negate Grant PUD's accomplishment.)*

Lampman asked, per the agreement between Douglas and Grant PUDs, is Douglas PUD picking up fish from Priest Rapids Dam? Gingerich said yes. Lampman asked if Grant PUD is transporting fish during their collection or will transport be conducted by contractors? Gingerich said he is unsure whether Grant PUD is transporting in-house or by contract. Lampman said if Grant PUD is using a contractor, this (the Aquatic SWG request) may require

a contract extension (if the contractor is required to transport the adults to the release site past the 3-week period). Gingerich said hydro staff at Priest Rapids Dam are responsible for collection and perhaps a contractor handles fish once captured; in previous years, trapping has been conducted by Grant PUD and fish handling on subsequent days was conducted by Blue Leaf Environmental.

Lampman suggested that Douglas PUD trap 1 week before Grant PUD starts trapping in early August 2018, and then trap 2 additional weeks after Grant PUD collection. Verhey said the every-other-day schedule seems to make sense (i.e., Douglas PUD obtains fish from Kirby Billingsley Hydro Park every other day of the Grant PUD trapping effort). Gingerich said one concern with this schedule is it increases the Douglas PUD effort two-fold. He said with the other ongoing field efforts (e.g., white sturgeon), this schedule may be difficult to meet. Ferguson said at this point Douglas PUD understands the Aquatic SWG request and the next step is for Douglas PUD to contact Grant PUD directly to discuss flexibility in contracts, program requirements, and logistical constraints. He said further coordination among Douglas PUD, Grant PUD, the Aquatic SWG, and PRFF will be conducted via email, as needed.

Douglas PUD will communicate to Grant PUD the Aquatic SWG request to obtain a portion of Pacific Lamprey from the earlier portion of the 2018 migration being collected by Grant PUD at Priest Rapids Dam for translocation by Douglas PUD to locations upstream of Wells Dam. *(Note: As reported by Kyger via email on July 12, 2018, Douglas PUD contacted Grant PUD as discussed during the Aquatic SWG meeting on July 11, 2018, and Grant PUD agreed to allocate a portion of the fish Grant PUD collects to be translocated upstream of Wells Dam if the PRFF approves of this request and if the run size is large enough for Grant PUD to meet their translocation program needs.)*

Lampman said he still would like to discuss the PUD translocation spreadsheet (Attachment C). Gingerich said Douglas PUD has a different opinion regarding translocation locations for Douglas PUD fish. He said the Douglas PUD Pacific Lamprey translocation SOA is operating under the hypothesis that pheromones need to be increased. He said in past years, among the passive integrated transponder (PIT)-tagged fish released above Wells Dam, the bulk of the detections end up in the Chewuch River. He said Douglas PUD does not see this SOA as an introduction program. He said additionally, due to logistics (i.e., manpower and time it takes to release fish multiple locations), Douglas PUD would advocate using a simplified plan: release at Starr Boat Launch and let fish distribute volitionally. He said if other agencies want to meet at the boat launch and take the fish to other release locations, Douglas PUD may be able to accommodate this request. He said even then, he questions whether this is the appropriate release strategy as it takes away from the purpose of the SOA. He said, for

example, he does not know if Pacific Lamprey have been detected in the Okanogan River. He said releasing at the mouth of the Methow River or at Starr Boat Launch seems to make sense. He said additionally, having all these release locations proposed in the translocation spreadsheet complicates future statistical analyses.

Lampman said conversely, when there are really low pheromones, increasing pheromones in spawning reaches will help fish find their own way to those reaches. He suggested in the first couple of years, translocating fish more broadly and near multiple spawning reaches helps to establish the fish in these reaches. He said, then in the following years, one could take a more passive approach. Ferguson said he understands Lampman's concerns; however, this also depends on logistical capabilities. Ferguson asked about flipping this approach, i.e., in the first 2 years release at the boat launch and work out logistics for the second 2 years.

Lampman said when the YN began translocation efforts in three tributaries to the Yakima River, in the first year, 50% of the fish moved downstream after release. He said in the second year only 25% moved downstream, and in the third year a very small percent (about 10%) moved downstream after release. He said, there may be movement downstream in the first year, but in later years, pheromones build up and fish stay in the release area.

Ferguson asked, considering the early run, how firm does the Aquatic SWG need to be on release locations before the next Aquatic SWG meeting on August 8, 2018? Lampman said logistically, it will be difficult for the YN to meet up in the Methow River Basin. He said this is slightly closer in proximity for the Colville Confederated Tribes (CCT), but he is unsure what the CCT's thoughts are on this idea. Gingerich suggested 75% released at the mouth of the Methow River and 25% released at the mouth of the Okanogan River. He said this still gives fish an opportunity to move up the Okanogan River. He said if the YN or the CCT want to move fish farther up the Okanogan River, perhaps staff can meet Douglas PUD at the mouth. He said logistically, he just does not think Douglas PUD has time to drive to Priest Rapids Dam or Kirby Billingsley Hydro Park to pick up fish, drive to Wells Fish Hatchery to PIT-tag fish, and then drive all the way up the Okanogan River to release fish. Lampman said this sounds like a good compromise. Verhey said WDFW is supportive of what works for the YN and Douglas PUD.

Ferguson said this is a reasonable start and seems logistically feasible. Gingerich said he will further coordinate with Wells Fish Hatchery and Grant PUD to move this forward. He said with two release groups, he thinks it will be beneficial to have systems to keep the groups separate.

3. Wells White Sturgeon Collection Update (Jason McLellan):

John Ferguson said since Jason McLellan is not in attendance today, this agenda item will be discussed during the Aquatic SWG meeting on August 8, 2018.

4. Water Quality and River Forecast Update (Andrew Gingerich):

Andrew Gingerich said a Water Quality Update (Attachment D) was distributed to the Aquatic SWG by Kristi Geris prior to the conference call on July 11, 2018. Gingerich said conditions have improved since the last update during the Aquatic SWG meeting on June 13, 2018.

Gingerich reviewed page 1 of Attachment D. He said since most of the total dissolved gas (TDG) generated upstream of Wells Dam does not dissipate much by the time flow reaches Wells Dam, this complicates Douglas PUD's ability to achieve TDG compliance in the Wells Dam tailrace and Rocky Reach Dam forebay. He said if Wells Dam is spilling, this also contributes to gas in the tailrace and the Rocky Reach Dam forebay.

Gingerich reviewed page 2 of Attachment D. He noted that every value in the Wells Dam forebay prior to June 25, 2018, was above 114%, which makes meeting the standard in the tailrace challenging. He said as of July 10, 2018, every hourly value in the Wells Dam forebay was above 110%, which is above the state standard and again is challenging. He said as of July 1, 2018, there have been no values in the Wells Dam tailrace above 120%, and Douglas has been compliant in the Rocky Reach Dam forebay at 115% and as measured by the 12C-High standard (12 highest consecutive hourly readings in any one 24-hour period) since July 2, 2018.

Gingerich reviewed page 3 of Attachment D. He said during June and July 2018, river flow generally decreased. He said during the first 2 weeks in June 2018, there was more consistency in daily project flow; however, between July 4 to July 10, 2018, there was a widening of project flows within the day. He said this change in the flow pattern represents lower flow around midnight, higher flow in the morning, and increased flow in the afternoon, which is a function of water being released in the federal system above Wells Dam to meet peak loads.

Gingerich reviewed page 4 of Attachment D. He said the blue line represents the shape of hourly flow at Wells Dam. He noted that the red line (Wells Dam forebay) is largely unchanged across the period shown. He said Chief Joseph Dam releases water in the mornings, which arrives at Wells Dam in the afternoon. He said this is shown by river flow at Wells Dam (blue line) being around 60,000 cubic feet per second (60 kcfs) in the morning and then increasing to 155 kcfs in the afternoon.

Gingerich reviewed page 5 of Attachment D. He noted the high hourly spill values during the first 2 weeks in June 2018. He said generally, hourly spill values during the month of July

2018 were about 40 kcfs or lower. He noted that the zeros are errors that have not been removed from the dataset.

Gingerich said the peak freshet occurred in May 2018 and looking ahead he expects river flow to continue to be moderate into the summer and fall 2018.

Ralph Lampman asked if river flow at Wells Dam was lower than flow experienced in 2017? Gingerich said at this time of year, river flow is below average because the peak freshet typically occurs in late June; however, this year it occurred in May.

5. Water Monitoring for Pacific Lamprey Pheromone Bioassays (Ralph Lampman):

Ralph Lampman said he contacted several groups conducting Lamprey research, explained that Douglas PUD and the Aquatic SWG are beginning implementation of a Pacific Lamprey translocation program in 2018, and asked about a good way to monitor water over time. Lampman said he distributed a Water Monitoring for Pacific Lamprey summary document (Attachment E) to the Aquatic SWG prior to the Aquatic SWG conference call on July 11, 2018, which includes a summary of responses he received to his inquiry. He said in summary, it seems a lot of people recommended an integrated approach using bioassays and eDNA, because there are pros and cons for both methods. He said this approach would be experimental to some degree, but he believes this would be a great dataset to collect in year 1 of translocation to compare to year 4 to evaluate changes over time with regard to Pacific Lamprey pheromones or eDNA.

Lampman said the USFS is beginning a fairly large eDNA project, which uses an intrinsic model for Pacific Lamprey. He said the model is based on gradient, flow, and temperature data from USFWS and other agencies. He said based on what the YN have observed, this model is almost spot-on for Pacific Lamprey hot spots. He said adjustments are still being made to the model for improvements. John Ferguson asked who is leading this effort at USFS. Lampman said Kellie Carim is leading the eDNA portion and Dan Isaak is leading the modeling portion. Lampman said the YN will also be working in the Wenatchee and Methow river basins to collect eDNA data for the effort. He suggested conducting pilot monitoring at Wells Dam. He also suggested conducting monitoring at Bonneville Dam and McNary Dam (as a halfway point) because these areas have high densities of Pacific Lamprey and should produce some sort of a signal.

Lampman introduced Sang-Seon Yun (Big River Scientific, LLC) and asked Yun to explain water monitoring using bioassays. Yun said he has completed work with Sea Lamprey. He said there are well-studied facts about how much pheromone compound Sea Lamprey release into the water and based on this it is possible to determine presence or absence of

fish in an area and possibly how many Sea Lamprey are present. He said, however, there is not much known about pheromones for Pacific Lamprey. He cautioned to be aware of this when considering this method of water monitoring. He said the method itself is not difficult to develop. He said liquid chromatography–mass spectrometry (LC-MS) is used to detect pheromone compounds. He said petromyzonol sulfate (PZS) is the most abundant compound of the three migratory pheromone compounds known; however, this compound exists in only trace amounts (as low as 1 nanogram per liter). He said he cannot guarantee the LC-MS approach can detect as low as 1 nanogram per liter of PZS, which is why an extraction step is needed to separate and detect a specific compound. He said this extraction step is sensitive to flow rate and mixing rate and should take place in a known stream or area with a large population of Pacific Lamprey. He said based on the extraction, the number of fish in this system can be extrapolated. He said after the extraction step (compounds are identified, weighted, and standards established), monitoring is conducted at the target stream or river to determine changes over time.

Yun said he has access to a LC-MS system. He said he cannot guarantee specific results, but he has the tools to explore this approach. Lampman asked about what timing and conditions would be best to conduct these analyses and guessed that would be periods of low river flow. Yun said lower river flow will increase the chance of detecting this compound. He said if the compound is released and mixes with a large amount of water, it dilutes quickly so the chance of detecting the compound is slimmer. He said detection also depends on how many Pacific Lamprey are present in the area.

Ferguson asked if this approach can be used on adults or juveniles, and Yun said this can be conducted for both. Yun added that in his experience with Sea Lamprey, juveniles and adults both release a common compound, like PZS; however, juveniles do not release the specific PZS compound.

Ferguson asked if samples would be collected at Bonneville and McNary dams first, or would samples be collected at Bonneville, McNary, and Wells dams at the same time? Yun said it would be ideal to explore the three locations first to determine if this approach is feasible. He said collecting and concentrating samples is not difficult and it does not matter in what order the samples are collected.

Lampman said he thinks it would be beneficial to collect samples at all three locations. He asked if samples would be collected from the tailrace or forebay and questioned whether there would be enough mixing in forebay? Yun said this depends on what kind of population is being monitored. He said, for example, in any given system monitoring should be conducted at the end of the system for juveniles because adults are likely upstream. He also suggested

picking a location where a downflow of the compound is expected. He said once this location is determined, the best spot to collect samples needs to be identified, which depends on system specifics. Lampman said if monitoring a larval hotspot, samples should be collected close to this location and not 40 to 50 kilometers away. Yun said this is correct; that there is a target area of interest and sampling should not be conducted too far from this spot.

Lampman asked about cost to conduct a preliminary study. Yun said he would first need to obtain a quote on how much it costs to extract the PZS compound and rent the LC-MS machine. He guessed \$20,000 to \$30,000 would be needed initially to identify and extract the compounds and establish the standards. Ferguson asked about the compounds needed to get setup. Yun said not much is needed at this stage. He said higher quantities of this chemical can be up to \$40,000 to \$50,000; however, smaller amounts are only \$20,000 to \$30,000 for early setup. Ferguson asked about the LC-MS machine, and Yun said he has access to it and pays an hourly rate to rent it. Ferguson asked where Yun is based out of, and Yun said Seattle, Washington.

Ferguson asked if Lampman is proposing an action. Lampman said he is trying to obtain a better understanding of how water monitoring may work, including costs. He said the eDNA approach would be cheaper; as the cost per sample is about \$40 to \$50. He said it would be great to integrate both the bioassay and eDNA monitoring approaches because eDNA cannot differentiate juveniles from adults nor live from dead fish.

Yun suggested providing a presentation to the Aquatic SWG on bioassay sampling to monitor Pacific Lamprey pheromone levels. Steve Lewis and Patrick Verhey expressed interest in a presentation. Verhey said, however, he will not be available to attend the Aquatic SWG meeting on August 8, 2018. Lampman said he will provide Ferguson and Kristi Geris with the contact information for Yun to schedule a brief presentation on bioassay sampling to monitor Pacific Lamprey pheromone levels during the Aquatic SWG meeting on September 12, 2018. *(Note: Lampman provided contact information for Yun, who is scheduled to present during the Aquatic SWG meeting on September 12, 2018.)*

The Aquatic SWG will continue discussing bioassay sampling to monitor Pacific Lamprey pheromone levels over time as translocation efforts are implemented during the Aquatic SWG meeting on August 8, 2018.

Lampman said Carim is looking for volunteers to help collect eDNA samples every 20 kilometers and at the mouths of tributaries. Lampman said this is for a partnership project where USFS conducts the analyses but needs help collecting samples on the ground. He said this is a great opportunity if agencies can help. He said the goal of the project is to collect

more information about eDNA signals in the Upper Columbia River. He said the collection effort will take place in August 2018 and was scheduled this way because most spawned-out fish will be gone by this time. He said he thinks it might also be good to sample in April with the start of the run for adults coming in, and in October/September during low river flow conditions and when most adults have moved through.

Ferguson asked if a proposal from Carim was distributed? Lampman said he distributed an eDNA presentation by Carim et al. (Attachment F) to the Aquatic SWG prior to the meeting on July 11, 2018. Lampman said the presentation explains the project and what the USFS is seeking from partners. He added that he would like to invite Carim to the next Aquatic SWG meeting on August 8, 2018, to provide a brief presentation on her project. Verhey and Lewis expressed interest in this presentation. Lampman said he will contact Carim to request a brief presentation and discussion of eDNA sampling to monitor Pacific Lamprey presence during the Aquatic SWG meeting on August 8, 2018. *(Note: Lampman contacted Carim, who is scheduled to present during the Aquatic SWG meeting on August 8, 2018.)*

VII. Administration

1. Upcoming meetings (John Ferguson):

The Aquatic SWG meeting on August 8, 2018, will be held by conference call.

Other upcoming meetings include: September 12, 2018 (TBD) and October 10, 2018 (TBD).

List of Attachments

- Attachment A List of Attendees
- Attachment B Pacific Lamprey counts to date
- Attachment C PUD translocation spreadsheet
- Attachment D Water Quality Update
- Attachment E Water Monitoring for Pacific Lamprey summary document
- Attachment F eDNA presentation by Carim et al. (USFS)

Attachment A – Attendees

Name	Role	Organization
John Ferguson	Aquatic SWG Chairman	Anchor QEA, LLC
Kristi Geris	Administration/Technical Support	Anchor QEA, LLC
Andrew Gingerich	Aquatic SWG Technical Representative	Douglas PUD
Chas Kyger	Technical Support	Douglas PUD
Breean Zimmerman	Aquatic SWG Technical Representative	Washington State Department of Ecology
Steve Lewis	Aquatic SWG Technical Representative	U.S. Fish and Wildlife Service
Patrick Verhey	Aquatic SWG Technical Representative	Washington Department of Fish and Wildlife
Ralph Lampman	Aquatic SWG Technical Representative	Yakama Nation
Sang-Seon Yun	Guest Speaker	Big River Scientific, LLC