



Meeting Minutes

Aquatic Settlement Work Group

To: Aquatic SWG Parties

Date: April 8, 2020

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

Re: Final Minutes of the March 11, 2020 Aquatic SWG Meeting

The Aquatic Settlement Work Group (SWG) met in-person at Wells Fish Hatchery (FH) in Azwell, Washington, on Wednesday, March 11, 2020, from 10:30 a.m. to 1:00 p.m. Attendees are listed in Attachment A of these meeting minutes. The regular monthly meeting was held in the morning and a tour of the Wells FH and White Sturgeon Rearing Facility was held in the afternoon.

I. Summary of Action Items

1. Douglas PUD will update the 2020 Aquatic Settlement Agreement and Workgroup Action Plan to include continued discussion of adult Pacific Lamprey upstream passage study designs and juvenile Pacific Lamprey downstream passage study designs throughout 2020 (Item VI-1). (*Note: the final action plan was distributed to the Aquatic SWG by Kristi Geris on March 13, 2020.*)
2. Douglas PUD will distribute photographs, if there are any, of the Pacific Lamprey passage improvements installed in the Wells Dam west fish ladder during the 2019/2020 winter maintenance outage (Item VI-2).
3. Aquatic SWG members will review the requirements for an adult reproductive assessment, as outlined in the *White Sturgeon Management Plan*, for discussion during the Aquatic SWG meeting on April 8, 2020 (Item VI-4).
4. The Aquatic SWG meeting on April 8, 2020, will be held by conference call (Item VIII-1).

II. Summary of Decisions

1. There were no decision items approved during today's meeting.

III. Agreements

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

IV. Review Items

1. The draft *White Sturgeon Supplementation and Management Plan Implementation in the Wells Reservoir, 2019* (2019 White Sturgeon Monitoring and Evaluation [M&E] Report) was distributed to the Aquatic SWG by Kristi Geris on February 26, 2020, and is available for review with edits and comments due to Andrew Gingerich by Tuesday, March 31, 2020; Douglas PUD will request approval of the report during the Aquatic SWG conference call on April 8, 2020 (Item VI-4).
2. The draft *2019 Aquatic Settlement Agreement Annual Report* and appended *2019 White Sturgeon Management Plan Annual Report, 2019 Bull Trout Management Plan and Incidental Take Annual Report, 2019 Water Quality Management Plan Annual Report* (and appended *2019 Water Temperature Annual Report, 2019 Pacific Lamprey Management Plan Annual Report, 2019 Aquatic Nuisance Species Management Plan Annual Report, and 2019 Resident Fish Management Plan Annual Report*) were distributed to the Aquatic SWG by Kristi Geris on March 12, 2020, and are available for a 45-day review with edits and comments due to Geris by April 27, 2020; Douglas PUD will request approval of the report during the Aquatic SWG meeting on May 13, 2020.

V. Documents Finalized

1. The final 2020 Aquatic Settlement Agreement and Workgroup Action Plan was distributed to the Aquatic SWG by Kristi Geris on March 13, 2020 (Item VI-1).

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). Ferguson asked for any additions or changes to the agenda. No additions or changes were requested.

The revised draft February 12, 2020 conference call minutes were reviewed. Kristi Geris said all edits and comments that were received from members of the Aquatic SWG were incorporated into the revised minutes. Aquatic SWG members present approved the February 12, 2020 conference call minutes, as revised.

Action items from the Aquatic SWG conference call on February 12, 2020, are as follows (note: the following italicized item numbers correspond to agenda items from the February 12, 2020 conference call):

- *Douglas PUD will update the 2020 Aquatic Settlement Agreement and Workgroup Action Plan to include continued discussion of adult Pacific Lamprey upstream passage study designs and juvenile Pacific Lamprey downstream passage study designs throughout 2020 (Item VI-4).*

This action item will be carried forward. (Note: the final action plan was distributed to the Aquatic SWG by Kristi Geris on March 13, 2020.)

- *U.S. Fish and Wildlife Service (USFWS) will submit a vote via email on the 2020 Aquatic Settlement Agreement and Workgroup Action Plan to Douglas PUD by Friday, February 21, 2020 (Item VI-4).*

Steve Lewis approved the action plan via email on February 21, 2020, contingent that the edits discussed during the conference call on February 12, 2020, were incorporated into the final plan.

- *Douglas PUD will verify the fish rescue numbers reported in the Wells Dam west fish ladder fish salvage memorandum and redistribute a revised memorandum (Item VI-5).*

A corrected memorandum was distributed to the Aquatic SWG by Kristi Geris on February 25, 2020.

- *Douglas PUD will inquire internally about a possible tour of the Wells Dam west fish ladder during the 2019/2020 winter maintenance outage (Item VI-5).*

Andrew Gingerich contacted Steve Lewis on February 18, 2020, with possible dates to tour the west fish ladder and Lewis responded on February 21, 2020, thanking Gingerich for the effort; however, ultimately declining a tour due to scheduling conflicts.

- *Douglas PUD and Anchor QEA, LLC (Anchor QEA) will distribute logistics information for the Aquatic SWG in-person meeting on March 11, 2020 (Item VI-7).*

This information was included in the Aquatic SWG March 11, 2020 meeting agenda, which was distributed to the Aquatic SWG by Kristi Geris on March 2, 2020.

2. Wells Dam Fish Ladder Maintenance Update (Andrew Gingerich):

Andrew Gingerich said Douglas PUD Mechanical Foreman, Steve Nieuwenhuis, indicated that the Wells Dam west fish ladder is now watered up but is not yet open for fish passage. Gingerich said maintenance included grouting and crews are conducting monitoring to be sure the seals hold before removing the head gates, which is tentatively scheduled for next week. He said maintenance on the east fish ladder is complete and that ladder is open for fish passage. He said the same plating to aid Pacific Lamprey passage (by eliminating gaps in diffuser gratings) that was installed in the east fish ladder was installed in the west fish ladder. He said installation of the plating in the west ladder is not yet complete and will continue during the next scheduled outage during winter 2020/2021. He said he will distribute photographs, if there are any, of the Pacific Lamprey passage improvements installed in the Wells Dam west fish ladder during the 2019/2020 winter maintenance outage (Item VI-2).

3. Wells FH Brood Year 2019 White Sturgeon Rearing Update (Andrew Gingerich):

Andrew Gingerich said a Wells FH brood year (BY) 2019 White Sturgeon rearing update (Attachment B) was distributed to the Aquatic SWG by Kristi Geris on March 10, 2020. Gingerich said tagging of Wells FH BY2019 White Sturgeon went well. He said all fish received the same scute marking that Wells FH larval-origin fish have received in the past, which is the first three lateral white scutes anterior to the dorsal fin on the right side. He said all fish also received a passive integrated transponder (PIT) tag. He said tagging was conducted earlier than usual due to logistical reasons (i.e., as the range in fish sizes increases, multiple totes are needed to conduct the tagging). He said there were no post-handling mortalities and average fish size at tagging was 225 grams (median was 227 grams). He said the fish currently on station at Wells FH are the largest on average of any BY stocked in the first 4 years of the Douglas PUD White Sturgeon Supplementation Program. He noted that the upper 75th percentile is already close to the 200-gram threshold at 192.3 grams. He said adding 30% weight gain to the upper 90th percentile will increase the 156.12-gram average to above the 200-gram threshold by release. He said Wells FH staff were very proactive with this BY, including visiting the White Sturgeon Conservation Hatchery near Cranbrook, BC. He said this hatchery only collects about 200 fish with a target of 100% survival. He said at Wells FH, staff formerly implemented a "hands off" rearing strategy to help reduce stress. He said, however, there is a tradeoff in that there may be more stress associated with handling the fish, but more visual grading separates the larger from the smaller fish and reduces competition. He said Wells FH staff also switched back to Otohime for feed and started fish on warmer water temperatures in the rearing cycle. He said all these factors contributed to a better rearing year. Jason McLellan said another change that benefited this BY is applying feed immediately once fish were on station rather than waiting.

John Ferguson said it seems the stocking target of 551 fish at 200 grams each will be met. Gingerich said yes, and he added that there is one tank with about 13 to 16 fish with a wide standard deviation in fish size, where a few of those fish are having a hard time growing and may not reach the 200-gram threshold. He said these fish will be surplus to the 551-fish stocking target. He recalled that the Aquatic SWG already agreed to stock any surplus fish, and Ferguson clarified this applies only if fish are taggable. Gingerich confirmed that all fish were tagged. Ferguson asked about the tag location. Gingerich said fish were tagged close to the head and he recalled having this conversation with Laura Heironimus last year. Gingerich said historically, tags were inserted in the meat of the fish in the back, but now it is recommended to insert tags near the head. He said as fish grow, the tag can move deeper into the body, but if the tag is inserted toward the head area it will likely stay closer to the surface of the body. Heironimus said this change was also in the interest of future fisheries where people might encounter the tags (upon consumption of the fish). McLellan said Lake

Roosevelt fish are tagged as close to the head as possible. He said he also knows of reports of people biting into PIT tags. He said the Colville Confederated Tribes (CCT) have reviewed food grade tags but there is concern about the longevity of the tags. Heironimus agreed there is concern that food grade tags may biodegrade. She added that some known issues with the old tags are that they were made from glass and either break or have migrated to deeper in the sturgeon bodies and the old readers were not able to detect as far down into tissue compared to newer PIT tags/readers. She said most sturgeon literature suggests tagging in two locations: 1) in the Columbia River system, fish have been tagged under the head plate at least as far back as the mid-1990's; or 2) the National Oceanic and Atmospheric Administration's (NOAA's) guidance document recommends for Atlantic and Green Sturgeon that PIT tags should be placed muscle tissue by the dorsal fin or under the first dorsal scute anterior to the dorsal fin. *(Note: Heironimus later noted that this was her understanding and she believes the guidance was updated slightly since the Kahn and Mohead 2010 report¹ was published. What the report actually states is, "the National Marine Fisheries Service [NMFS] strongly recommends PIT tag placement in all four sturgeon species to be located to the left of the spine, immediately anterior to the dorsal fin, and posterior to the dorsal scutes." This is in reference to Atlantic, Shortnose, Gulf, and Green Sturgeon.)*

Heironimus said this standardized placement was created to hold the PIT tag in place longer and make it easier for the sampler to locate the tag, when compared to tags placed somewhat arbitrarily in the middle of the body. McLellan said in Canada, fish are also tagged in the peduncle. He said when scanning fish for tags, the CCT scan the entire body. Heironimus said the Washington Department of Fish and Wildlife protocols were also updated to scan the entire fish. Ferguson asked about possible tag extrusion. Gingerich said on average there has been about 1.88% non-working tags or tag extrusion observed in fish tagged. He said fish are handled twice to inspect for tag retention. He said if tags are expelled, this typically happens soon after tagging. McLellan said this is sometimes true. He said there is a rate of about 1% to 2% in recaptures in the reservoirs that have missing tags or tag failure, where loss occurs post-release.

Gingerich said fish will be inspected for tag retention just before release and fish size data at release will also be recorded. He said BY2019 fish will be released in the last week of May 2020 and will involve the Bridgeport High School Advanced Placement Biology Class. Gingerich recalled this coordination did not occur in 2019 with BY2018 fish because of a timing conflict with the release date and high school graduation.

¹ Kahn, Jason and M. Mohead, 2010. A Protocol Use of Shortnose, Atlantic, Gulf, and Green Sturgeons. U.S. Department of Commerce. NOAA. NMFS. NOAA Technical Memorandum NMFS-OPR-45. March 2010.

Gingerich said all PIT-tag files will be uploaded to PTAGIS after release.

4. PRESENTATION: White Sturgeon M&E and White Sturgeon Adult Reproductive Assessment (Andrew Gingerich):

Andrew Gingerich said a White Sturgeon M&E presentation (Attachment C) was distributed to the Aquatic SWG by Kristi Geris prior to the Aquatic SWG meeting on March 11, 2020. Gingerich said this presentation follows the draft 2019 White Sturgeon M&E Report, which was distributed to the Aquatic SWG by Geris on February 26, 2020, and is available for review with edits and comments due to Gingerich by Tuesday, March 31, 2020.

Slide 1 of Attachment C

Gingerich thanked Dave Robichaud (LGL Limited), who helped develop the tables and figures in this report and presentation. Gingerich said this presentation does not review the methodology; rather, it focuses on the results from the draft report. He said he hopes this contributes to a discussion of what is next for this program as it becomes very adaptive.

Slide 2 of Attachment C

Gingerich said this slide shows how many fish have been released to date. He said in the first year of release in 2014, Douglas PUD released BY2013 fish, which included two programs: 1) wild-caught larvae; and 2) direct gamete-origin fish sired from lower Columbia River adults in a conventional program at Marion Drain. He said at this time, all releases were at Washburn Island. He said the planting of the direct gamete program fish stopped after 2014, which was connected to reducing the risk of autopolyploidy.² He said if autopolyploidy is present in the Wells Project, the direct gamete program is the source of exposure. He noted, however, he heard from Donella Miller (Yakama Nation) that surplus fish from this BY were screened and the samples came back negative for autopolyploidy. Jason McLellan said the CCT purchased a culture counter this week, so now if Douglas PUD wants fish screened for autopolyploidy the CCT has the equipment to do this.

Gingerich said as shown in the center column of slide 2, in 2017, the release location moved to Bridgeport, Washington. He said the former release location was close to a double-crested cormorant (*Phalacrocorax auritus*) colony. He said in 2018, the number of fish released decreased, per the Statement of Agreement (SOA; *Wells Reservoir White Sturgeon Supplementation 2018-2022*, approved January 11, 2017). He said in 2019, the number of fish released decreased even more due to poor survival. He noted that each year, a small number of fish were released at Bridgeport, Washington, with the Bridgeport High School Advanced Placement Biology Class as part of Douglas PUD's outreach program.

² To clarify, this is referring to 12N fish (i.e., 12 copies of each chromosome, or irregular fish, or 10N fish). White Sturgeon are normally evolutionary octoploids having 8 copies of each chromosome (8N).

Gingerich said the right column of slide 2 shows the grand totals. He said including BY2018 fish, a total of approximately 21,000 fish have been released in the Wells Project. He said after this year (BY2019 fish), about 21,400 fish will have been released. He said the last column shows that in the first 4 years of the program there was a 5,000-fish stocking target, after which the stocking rates were reduced starting in 2018.

Slide 3 of Attachment C

Gingerich said this slide shows fish size at release and he noted the variability in weights. He also noted that for many of the BYs, average weight at release was well under 225 grams per fish, which is the average weight of BY2019 fish on station today. He recalled that in 2019 only 99 BY2018 fish were released; however, those fish were quite large on average and well over the 200-gram target. He guessed that BY2019 fish released this year will be close to, or will be, the largest fish sizes at release to date. He said this is good news if survival is influenced by size at release.

John Ferguson agreed weight may influence survival and suggested that length might also be a covariate. Gingerich said the regression analysis does include length, which the CCT also commented on in the draft report. McLellan said his comment was regarding the proportion of fish consumed by cormorants in relation to both length and weight. Ferguson agreed this affects the visibility of the fish to birds.

Slides 4 and 5 of Attachment C

Gingerich said the next slides cover the indexing effort, including recapture and survival to date. He said in the diagram on slide 5, the blue line represents the surface of the water, the float lines connect to the anchors, which connect to another line in the water. He said the line in the water is set with hooks that are baited with pickled squid. Ferguson asked if the line is set lengthwise in the reservoir parallel to the shoreline or perpendicular to the shoreline, or does it vary, and is there a target depth? Gingerich said the lines are set based on randomized GPS points and run toward the channel or main thalweg. He said the assumption is this keeps the line deeper in the water column. McLellan said lines need to be set with the current in areas with high velocity. Gingerich said, aside from the Chief Joseph Dam tailrace, the current in the Wells Reservoir is more subtle compared to the upper portion of Lake Roosevelt.

Gingerich said this effort started in 2015 and includes almost 3,000 setlines or about 120,000 hooks through 2019. He said the table on slide 5 breaks out the setlines by timeframe. He noted there was no juvenile indexing conducted in 2018, per the *White Sturgeon Management Plan*.

Slide 6 of Attachment C

Gingerich said slide 6 shows the number of unique individuals recaptured by BY and index year. He said the indexing year is shown on the top row, and the release year and number of fish released is along the left column. He said the yellow highlighted rows flag the years when less fish were planted. He noted the 5,044 fish released in 2014 (BY2013 fish), and in 2015, during the first year of M&E, 317 fish were captured. He said, however, after 5,009 fish were released in 2015 (BY2014 fish), in 2016 only 57 fish were captured when he expected close to the same results as the previous year. McLellan said BY2014 fish were much smaller at release compared to BY2013 fish. Gingerich said yes, and the model suggests BY2014 fish likely survived at a much lower rate. He said the good news is, even though BY2014 survival is not as high as BY2013, M&E efforts are starting to catch more BY2014 fish each year.

Gingerich noted that Douglas PUD M&E efforts have captured a few Chelan PUD fish, which are assumed to have passed via Wells Dam because these fish were not detected in the fish ladders (PIT tag readers). Laura Heironimus asked what the route is through the dam. Gingerich explained that during turbine unit dewatering, the upstream bulkhead is set first and then the downstream bulkhead is set next. He said it takes 24 hours to set both bulkheads and a fish can access the draft tube from the tailrace before the downstream bulkhead is installed. During maintenance there is plenty of water in the bottom of the draft tube for fish to hold in. After the unit is watered up again, fish can exit the unit in an upstream direction when the upstream bulkhead is removed. Heironimus said this seems like a needle in a haystack, and McLellan said not if a lot of fish are moving. Robichaud asked why fish would want to move into the draft tube. McLellan said it could be the change in velocity. He said for some reason White Sturgeon move into those locations.

Gingerich noted Table 8 in the draft 2019 White Sturgeon M&E Report, which is a similar table to slide 6, only for the adult indexing session.

Ferguson asked if a White Sturgeon can pass a dam via a fish ladder. Gingerich said White Sturgeon have been photographed in the Priest Rapids Dam fish ladders infrequently. He said at Wells Dam, a small White Sturgeon was detected in Pool 19, but never made it to the count window so it must have dropped back down. He said White Sturgeon have also been detected on acoustic arrays in the collection gallery. Heironimus said she assumes there is a relationship between passage and how large the openings are in a fish ladder. Gingerich agreed and said the openings at Wells Dam are large enough for fish at release to pass through. McLellan asked if passage through the Wells Dam fish ladders is always monitored. Gingerich said 24-hour fish counts have been conducted at Wells Dam for at least a decade.

Slide 7 of Attachment C

Gingerich said the larger fish sizes at release are the fish being recaptured. He said this might be because larger fish are more susceptible to the gear and smaller fish take longer to recruit to the same gear, or maybe larger fish have a higher survival rate. He said the figures on slide 7 show the number of fish released by year (red) and in specific weight bins. He said, for example, among fish released in 2014 (BY2013 fish), 153 fish released were 300 grams or more in size and about 40% of these fish have been handled during M&E sampling. He said among the smallest fish (2,277 fish), only about 17% of these fish have been handled.

Robichaud said this analysis does not include fish that have been in the reservoir for 1 and 2 years; rather, it only includes fish that have been in the reservoir for at least 3 years to not include fish too small to be captured in the analysis.

Gingerich noted that BY2014 fish were very small, which is why the largest fish size bin is blank. He also noted the smaller numbers of BY2017 and BY2018 fish stocked; however, he said a few have still been captured. Robichaud said this is likely because these fish were large in size.

Slide 8 of Attachment C

Gingerich said, as Robichaud noted, there are minimum criteria for including data in this survival model. Gingerich said another criterion is that some fish in a given BY need to be captured at least twice for the model to create an estimation of survival. He said because BY2017 and BY2018 fish have not yet been captured twice, those BYs are not included in this analysis. He noted that of BY2013 fish, about 4,100 fish have never been recaptured, while about 950 fish have been recaptured.

Heironimus asked how well the gear captures different sized fish. Robichaud said this was analyzed in the 2018 White Sturgeon M&E Report (distributed to the Aquatic SWG by Geris on June 13, 2019), and he recalls very minor differences in the average fish sizes between two gear sizes.

McLellan said in Lake Roosevelt, survival estimates increase after fish started recruiting to the adult gear. He said the juvenile gear is not as efficient, so the precision is not good. He said a big issue with the juvenile gear is the ganion lines getting tangled. He said there would be less tangling with smaller hooks if the same gangion material is used as in the mid-Columbia River Basin White Sturgeon monitoring programs, but the material does not fit through the eye of smaller hooks used in the upper Columbia.

Ferguson asked about bait, and McLellan said squid is also used in Lake Roosevelt. McLellan said there has been talk in the upper Columbia River about putting smaller fish in a tank at a

hatchery and testing which bait works best. Heironimus said in Nebraska, nightcrawlers are used as bait and this works well. She said squid may not be the only option for upstream reservoirs. McLellan said squid stays on the hooks well and there is low bycatch. He said nightcrawlers would likely result in a lot of bycatch.

Slide 9 of Attachment C

Gingerich said this slide shows apparent survival before correcting for live fish leaving the reservoir. He noted the two programs for BY2013 and said once fish acclimate and age in the reservoir there is better survival. He said this slide also shows estimated detection probability and the standard errors around these estimates. He said for the other BYs, it is difficult to conduct these same analyses, as explained in the first two bullets on the slide. He explained further that if new fish are captured in a subsequent year that the model assumed were not there, this affects the detection probability and survival estimate.

Gingerich noted Table 12 in the draft 2019 White Sturgeon M&E Report. He said about 11% of fish leave the reservoir and if these fish were accounted for in this model actual survival would be higher.

Slide 10 of Attachment C

Gingerich said this slide shows an alarming decline in wild fish survival; however, the standard errors are very large making these data useless for identifying differences. He said further, acoustic telemetry data for 18 wild fish indicate these fish are alive and well. He said the acoustic data coupled with the model and standard error bars suggest survival is likely approaching, if not, 100%.

Heironimus asked if these are adult-size fish. Gingerich said most fish were classified as subadults when handled and most fish weighed less than 30 pounds. He said recruitment was in 2011 and 2012 and he noted that these were both high water years, which may have helped the recruitment events. He said fin ray samples were collected on some, but not all, fish. McLellan added that most fish were between 70 to 110 centimeters. Heironimus said at that size, fish should recruit to gear. McLellan agreed and said there was a similar trend in a 5-year consecutive stock assessment in Lake Roosevelt. He said this effort did not estimate survival; however, there were the same declines in catch rates for wild adults. He said in the highest catch year, a lot of captures had never been handled before and have not been recaptured since. He said he believes there was some heterogeneity in the catch rates, as well as a possible behavioral effect. Heironimus agreed with Gingerich that the water year might also affect the catch rate. Gingerich said fish might also become gear shy. He said Douglas PUD acoustically tagged six wild fish in 2017 and two more wild fish in 2018, but in 2019 no wild adult fish were recaptured. Heironimus referred to the White Sturgeon research by

Idaho Power where fish were observed around the gear but did not take the bait at high rates. McLellan said the CCT do not have an estimate of how efficient the gear is. Heironimus said there is a high-resolution, side-scan sonar that is towable behind a boat. She said the Dual-Frequency Identification Sonar (DIDSON) is not as good of an option in this scenario because it has a narrow beam. She said the side-scan sonar has a wide beam and has great resolution. She said Jake Hughes with Idaho Power would be a great resource if interested in using this technology. McLellan said this side-scan sonar can also tie into Real-time kinematic GPS, so it is super accurate. Gingerich said Douglas PUD conducted side-scan work at the mouth of the Okanogan River a couple of years ago, and those images were included in the final report.

Slides 11 and 12 of Attachment C

Gingerich said slide 12 shows what happens to fish in the reservoir in terms of growth. He said the data are organized by BY release groups and mean change in weight by how long each BY has been in the reservoir (time at large). He said in 1.5 years, there are similar changes in weight from release. He noted that sample size is missing from this dataset. He said the number of fish handled across BYs is different. He said these data only include fish captured (or fish susceptible to the gear). He said these data indicate there is variability, but the data are generally consistent across BYs. He noted that the smaller BY2014 fish had higher weight gain. McLellan said he has observed a similar trend with smaller fish, as well as larger fish at release growing slower. He suggested adding variance around the mean changes in weight similar to how the weight at release is reported. Gingerich said this can be added.

Slides 13 and 14 of Attachment C

Gingerich said slides 13 and 14 show different sized fish that are all BY2013. He said these photographs show how this BY is starting to spread out more in terms of size and growth.

Slide 15 of Attachment C

Gingerich said this slide shows fish growth by year for BY2014 fish. He said there are similar figures developed for each BY, but only BY2014 is shown for this presentation. He noted that the y-axis is variable across years. He said as expected, fish growth spreads out farther in each subsequent year. Ferguson noted that BY2014 in 2018 is not included, which contributes to the increased spread in weight at recapture from 2017 to 2019.

Slides 16 and 17 of Attachment C

Gingerich reviewed a map showing the locations of acoustic telemetry arrays throughout the Wells Reservoir. He said some arrays are seasonal, some have moved, and some have been consistent over the years. He said most arrays are positioned to setup gates to improve

confidence in detection efficiency. He said last summer additional receivers were installed in the reservoir, including one receiver in the Okanogan River (not shown on map). He said Douglas PUD is tracking 18 fish, including 17 wild fish and one larger 6-year-old hatchery fish. He said all fish have a 10-year acoustic tag.

Slide 18 of Attachment C

Gingerich said by summer/fall 2017, there were nine wild subadults carrying V16 acoustic tags in the Wells Reservoir. He said it appears these fish exhibit repeatable movements. He said Foster Creek is in the upper reservoir, and the color purple represents access and use in the Okanogan River. He said interestingly, wild subadults compared to wild adult movements are quite repeatable. He said in the June to August timeframe fish move upstream. Ferguson asked if this is because the upper reservoir is cooler around this time of year. Gingerich said the area is cooler compared to the Okanogan River in mid-summer. He noted the block of orange is due to a lost receiver (Erlandsen, light blue), so the Upper Reservoir receiver (orange) is the closest in this area.

Ferguson asked if similar movement patterns are present in Lake Roosevelt. McLellan said there is no tributary use in the upper Columbia River. He said there is more movement in the summer and associated with spawning. He said fish move downstream as far as the confluence of the Spokane River, about 100 river kilometers (rkms) from where the main core of White Sturgeon are located. He said these movements occur only in the summer and fish move back upstream in the winter. He said these movements are consistent. Ferguson asked if these movements upstream are because of Chief Joseph Dam, or because there is cooler, deeper water or food there? He said it seems for subadults, fish move from low to high within every year in the Wells Reservoir and he asked if this is the same in Lake Roosevelt. McLellan said some fish exhibit similar movements, and some do not. He said the sample size is larger in Lake Roosevelt, there is a larger stretch of river, and the array covers 300 rkms. He said fish are almost always present in the riverine stretch, some holding in the same eddy for months or years and then moving downstream or upstream. He said he would be speculating as to what these movements are for other than for spawning.

Gingerich said Douglas PUD guessed the repeated purple use on slide 18 is because the Okanogan River is warmer this time of year, it can be quite turbid, and it is likely much more productive. He said fish might be moving there for early season feeding.

McLellan said the overwintering in a major tributary confluence is similar behavior observed in the upper Columbia River.

Heironimus asked if the lower reservoir is stratified. Gingerich said the temperature data indicate no stratification. McLellan said there are major changes at the mouth of the Okanogan River.

Slide 19 of Attachment C

Gingerich said this slide shows wild adult movements. He said a total of 8 adults are now being tracked. He said similar to subadults, adults are also using the Okanogan River during the early spring pre-spawn period, then start moving towards the Chief Joseph Dam tailrace during the assumed spawning period. He said the block of orange is, again, due to the lost receiver. Heironimus said over the past 2 years, acoustic telemetry surveys conducted in the John Day Pool in Oregon have documented females present in the assumed spawning area at the tailrace of McNary Dam during May to June then moving downstream to the John Day arm and upstream to the tailrace again in August, but it is unclear why. Gingerich said fish are observed moving all over in the Wells Reservoir, as well.

Slide 20 of Attachment C

Gingerich said this slide focuses on the spawning periods. He noted that in April 2018 there were a lot of adults in the Okanogan River and by June 10, 2018, all fish left. He noted the pulses of fish into the Foster Creek Delta. He said in 2019, there is almost a complete repeat of behaviors. He added that 2019 was a low flow year in the Okanogan River but the same movements still occurred.

Slide 21 of Attachment C

Gingerich said this slide shows the behaviors of each adult. He noted that the bottom example is what Heironimus just commented about in the John Day Pool. Gingerich said this fish moved to mid-reservoir, then down, and then back up. Ferguson asked if there seems to be pattern of downstream movement to overwinter. Gingerich said there is movement to about mid-reservoir and lower, and then not much movement during the winter. He said there is a lot of movement during the summer.

Slide 22 of Attachment C

Gingerich said this slide shows the Chief Joseph Dam tailrace. He noted that the Foster Creek confluence is located at the array. He said the next downstream array is located on a rocky outcrop. He said there is another receiver at the hatchery outfall across the river from the Foster Creek array and then another array at Bridgeport. He said these arrays were added to try and estimate where spawning takes place. McLellan said this is a start to a Vemco Positioning System (VPS) grid. He said if more receivers are installed, this will provide a good idea of where spawning might occur by showing clusters at certain times. He added, however, this might not be important depending on what the question is. Heironimus

suggested using a side-scan sonar and Gingerich said this was done but no fish were observed. He said the scan may have been conducted too early. Heironimus asked if any staging has been observed in the area and Gingerich said yes, in early June, across from Bridgeport. Heironimus suggested monitoring and deploying egg mats if fish are detected present in the area and you want to try and verify spawning. Gingerich said the *White Sturgeon Management Plan* includes language about using egg mats, for example, for the adult reproductive assessment. He said Douglas PUD was going to try deploying egg mats a few years ago but was not sure about a location. Heironimus said White Sturgeon broadcast spawn over 18 to 20 hours so if mats are deployed throughout a general spawning area, you may collect eggs. McLellan noted that the eggs are not adhesive during the first 5 to 10 minutes and will roll downstream until they become adhesive. He said, however, this is how spawning areas are located; just deploy mats and see what is where. Heironimus said during her former work with USFWS, she had deployed rectangular hog-hair furnace material mats and setlines with attached buffer pads. She said the lines were set to grid an entire area and eggs adhered to the buffer pads pretty well without catching much debris. Gingerich asked how often the mats were checked. Heironimus replied that the rectangular mats were checked either daily or as little as twice per week, depending on flow conditions and the detection of active spawning. *(Note: Heironimus later clarified that specifically, if White Sturgeon were detected forming spawning aggregations, eggs had already been detected, or if flow conditions increased the risk of not retrieving a deployed mat, then gear was checked with greater frequency. If no spawning was detected and if flow conditions allowed, egg mats were checked twice weekly, on Mondays and Thursdays. The buffer pad setlines were checked daily as this was only done as part of a pilot project during a period of time when White Sturgeon were known to be spawning in the area.)*

Slide 23 of Attachment C

Gingerich said this slide shows the general location of the floating PIT-tag reader in front of Zosel Dam. He said Wells FH White Sturgeon have been detected at this location. McLellan noted that during a high flow year, fish can swim over this dam. Gingerich said Wells FH White Sturgeon have also been detected on OKL (Lower Okanogan Instream Array), which is located up the Okanogan River. He said technically, it is unknown how many Wells FH White Sturgeon have left the Wells Reservoir.

Slide 24 of Attachment C

Gingerich said this slide shows Okanogan River discharge and water temperature over the last several years and the gray shading shows when some fish, at a minimum, may use the Okanogan River. He noted that 2019 was a drought year and tributary use was low. Heironimus noted that White Sturgeon are known to make spawning migrations around

14°C, and that aligned with the figure displayed for the Okanogan River. She asked about the substrate there and Gingerich said the mouth of the Okanogan River is sand and silt. McLellan agreed and said it is similar to the Kootenai River. He said the substrate is not suitable for spawning, but fish seem to try to spawn in the area each year. Heironimus said in other rivers she has observed a relationship between flow and temperature as a cue for spawning migration and that the increasing flow may cue sturgeon to move towards this area. McLellan said he is not sure discharge is what draws fish there because he has observed spawning occurring on both ascending and descending river flows. Ferguson said river temperature might be factor.

Slides 25 and 26 of Attachment C

Gingerich said this slide shows PIT tags recovered on the cormorant rookery that belonged to White Sturgeon. He said these data show a low percentage of fish recovered relative to release; however, it is unclear what the data indicate about fish eaten by birds. He said there is uncertainty about whether all tags were collected and if the tags were deposited there. He said regarding what size of fish are being targeted, the p-values are showing insignificant differences among weight-at-release categories. He said he believes this means birds are feeding up and down the size distribution without bias.

McLellan said he wonders if there is a better way to analyze cumulative distribution functions. He suggested, for example, pooling all the size data instead of binning by BY. Heironimus said agreed but noted that it is also unclear how many years the fish was in the reservoir before being consumed. McLellan agreed and said the fish may not be the size at release when preyed upon. Gingerich said this could be teased out using seasonal scans. Heironimus suggested applying growth rates to get at fish size up to the year the tag was recovered. McLellan said the highest recovery appears to be on smaller fish sizes. He said bird densities are unknown—there are a lot of confounding factors. Gingerich agreed and said, for example, 4.29% detected—what does this mean? He said there might be 10 tags and only two collected. He said perhaps using detection probabilities and efficiencies that have been used and determined to be reasonable by researchers in the lower Columbia River looking at fish eating water birds i.e. Real-Time Research could help Douglas PUD's data interpretation. Ferguson said estimating mortality by avian predation and avian behavior is difficult. Gingerich agreed and said Douglas PUD is not obligated to do this under the *White Sturgeon Management Plan*; however, the reason behind this is to test the hypothesis that releasing fish at a larger fish size will result in higher survival. He recalled that changing the release size to 200 grams, as stipulated in the current SOA, was based on this hypothesis. He said he hoped to see clear data showing that birds select smaller fish; however, based on these data this is not the case. Ferguson suggested plotting all fish released, all fish detected, and all fish

detected with a growth factor. He said if these three plots do not line up there is size selection. McLellan said the shift in release locations might also be a factor. Ferguson said water conditions might also be a factor. McLellan said there may be higher survival with larger fish and birds are not a driving factor. Heironimus suggested focusing just on release year, remove any PIT tags less than 1 year old, and then study the size class there are data for. She said this would eliminate the need for a growth rate plot and eliminate the bias of not knowing how long a tag had been on the rookery undetected (*i.e., what year the fish was consumed*).

McLellan asked about fish behavior at release. Gingerich said at the Washburn Island location, fish were released from the shore, which drops down into the thalweg. He said at the Bridgeport location, fish are released at the boat launch. He said crews release the fish and fish head directly into deeper water. He noted at Bridgeport, just a couple of river miles downstream is a 100-foot deep pool where avian predators, including cormorants and mergansers, have been observed. Heironimus said Lance Keller (Chelan PUD) has evidence that cormorants can swim down deep for prey (maybe as much as 60 feet or more, but suggested Gingerich should ask Keller for specific data). Gingerich said he has also seen evidence of cormorants preying on larger fish.

Slide 27 of Attachment C

Gingerich read the conclusions bulleted on this slide.

Slide 28 of Attachment C

Gingerich read next steps bulleted on this slide. He said there are no plans to conduct indexing in 2020. He said Douglas PUD still has questions before attempting to collect eggs or larvae and hopes to defer such an effort until there are more adults in the reservoir. He asked if Douglas PUD does not defer, how will obligations be met? McLellan said the CCT collected close to 100 larvae downstream of Rock Island Dam. Gingerich asked if not many larvae were collected downstream of Rock Island Dam, what are the chances any will be collected in the Wells Reservoir? McLellan said this is the assessment. He said there is no guarantee of catching anything. He said below Rock Island Dam, the CCT fished two stations, each with one frame and two nets. He said there was not much effort because it was split between the Wanapum Pool and Lake Roosevelt. He said with the CCT's current system, he believes upwards of thousands of larvae can be collected at that same location. He said, however, this does not mean there are thousands of larvae in the Wells Reservoir to be collected.

McLellan asked what reproductive potential means. Heironimus asked if wild fish are spawning, is the requirement to improve this or to carry on with hatchery supplementation.

Gingerich recommended that Aquatic SWG members review the language in the *White Sturgeon Management Plan*. He said the supplementation plan becomes highly adaptive. He asked if Douglas PUD conducts a reproductive assessment in 2020, what does this look like and what is needed to do this?

Gingerich said regarding the draft 2019 White Sturgeon M&E Report, Douglas PUD hopes to receive and address comments and request approval of the report next month. Ferguson said with the Douglas PUD 2020 Survival Verification Study closely approaching and potentially the reproductive assessment to follow right after, he suggested focusing on comments and reworking analyses where possible, and then identifying items that can be addressed in next year's report. Gingerich agreed and said if the Aquatic SWG wants to conduct a reproductive assessment this year, Douglas PUD might advocate for a pilot effort. McLellan agreed it will be difficult to gear up for a study with such little time. Aquatic SWG members will review the requirements for an adult reproductive assessment, as outlined in the *White Sturgeon Management Plan*, for discussion during the Aquatic SWG meeting on April 8, 2020.

Ralph Lampman asked about the reasoning behind the large decrease in White Sturgeon release numbers between 2017 and 2018. Gingerich recalled that the *White Sturgeon Management Plan* required releasing 5,000 fish during the first 4 years of implementation, which Douglas PUD completed. He said then the obligation was to release no more than 15,000 fish in years 5 to 10. He said Douglas PUD and the Aquatic SWG went through a modeling exercise that indicated that based on other healthy reservoirs, the Wells Reservoir could likely hold 1,100 adults, which could be achieved by releasing 325 fish each year that are 200 grams and larger. He said this was the basis for the reduction in numbers. Patrick Verhey agreed and added that due to the increase in fish size, there was a decrease in numbers.

Lampman asked if Rocky Reach, Rock Island, and Priest Rapids dams also have 24-hour fish counting. Gingerich said he is unsure and suggested asking Chelan and Grant PUDs.

Lampman asked if fish can be too large to capture. Gingerich said the hooks can get straightened; for example, juvenile gear is not efficient for capturing large fish. Heironimus agreed and added that depending on fish size, some smaller hooks will not fit over a fish's lip.

VII. Wells FH Tour

1. Wells FH and White Sturgeon Rearing Facility (All):

Aquatic SWG members and others in attendance toured the Wells FH. This included touring the recently modernized circular tank facility and adult handling facility, a walk through the

incubation and production wings in the new hatchery building, and viewing the existing concrete raceways and newly installed bird netting over Dirt Ponds 1, 3, and 4.

The Aquatic SWG then toured the White Sturgeon Rearing Facility, including a look at the size and condition of the recently scute-marked and PIT-tagged BY2019 White Sturgeon on station. Members also were shown the feed, Otihime, including a comparison of the different size types.

VIII. Administration

1. Upcoming Meetings (John Ferguson):

The Aquatic SWG meeting on April 8, 2020, will be held by conference call.

Other upcoming meetings include May 13 and June 10, 2020 (conference call).

List of Attachments

Attachment A List of Attendees

Attachment B Wells FH brood year 2019 White Sturgeon rearing update

Attachment C White Sturgeon M&E presentation

Attachment A – Attendees

Name	Role	Organization
John Ferguson	Aquatic SWG Chairman	Anchor QEA, LLC
Kristi Geris	Administration/Technical Support	Anchor QEA, LLC
Larissa Rohrbach*	Administration/Technical Support	Anchor QEA, LLC
Andrew Gingerich	Aquatic SWG Technical Representative	Douglas PUD
Chas Kyger	Technical Support	Douglas PUD
Dave Robichaud†	Technical Support	LGL Unlimited
Patrick Verhey	Aquatic SWG Technical Representative	Washington Department of Fish and Wildlife
Laura Heironimus	Aquatic SWG Alternate Representative	Washington Department of Fish and Wildlife
Jason McLellan	Aquatic SWG Technical Representative	Colville Confederated Tribes
Ralph Lampman†	Aquatic SWG Technical Representative	Yakama Nation

Notes:

- * Joined for the Wells FH tour
- † Joined by phone