FINAL

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ANCHOR QEA

Memorandum

To: Wells, Rocky Reach, and Rock Island HCP Hatchery Committees

Date: April 19, 2018

From: Tracy Hillman, HCP Hatchery Committees Chairman

cc: Sarah Montgomery, Anchor QEA, LLC

Re: Final Minutes of the March 12, 2018 HCP Hatchery Committees Meeting

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plan (HCP) Hatchery Committees meeting was held at the Grant PUD office in Wenatchee, Washington, on Monday, March 12, 2018, from 9:00 to 12:30 p.m. Attendees are listed in Attachment A to these meeting minutes.

Action Item Summary

- Andrew Murdoch (Washington Department of Fish and Wildlife [WDFW]) will write an overview of proposed expanded sampling at the off-ladder adult fish trap (OLAFT) at Priest Rapids Dam (Item I-A). *(Note: this item is ongoing.)*
- Mike Tonseth will coordinate with Todd Seamons (WDFW) to produce an outline or recommended approach for genetic monitoring (Item I-A). *(Note: this item is ongoing.)*
- Mike Tonseth will coordinate with Todd Seamons (WDFW) regarding reviewing the memorandum, "Alternatives for Methow Basin conservation steelhead programs" (Item I-A). *(Note: this item is ongoing.)*
- Brett Farman will coordinate with Craig Busack (National Marine Fisheries Service [NMFS]) regarding reviewing the memorandum, "Alternatives for Methow Basin conservation steelhead programs" (Item I-A). *(Note: this item is ongoing.)*
- Sarah Montgomery will reconfigure the Extranet site to sort permits and Biological Opinions (BiOps) by species and date and upload the related documents (Item I-A). *(Note: this item is ongoing.)*
- Kirk Truscott will work with Casey Baldwin (Colville Confederated Tribes [CCT]) to summarize the CCT's current protocols for genetic sampling (Item I-A). *(Note: this item is ongoing.)*
- Tom Kahler and Greg Mackey will provide historical information to Tracy Hillman for incorporation in the Draft Hatchery Program Timelines (Item I-A). *(Note: this item is ongoing.)*
- Tracy Hillman will review aspects of the Independent Scientific Advisory Board's (ISAB's) *Review of Spring Chinook Salmon in the Upper Columbia River* under Hatchery Committees' purview (Item I-A). *(Note: this item is ongoing.)*

- Hatchery Committees representatives and alternates will review the draft *Methodology for Establishing Residualism Baseline Conditions of the Wenatchee River Summer Steelhead Hatchery Program* and consider options for discussion at the April 18, 2018 Hatchery Committees meeting (Item II-B).
- Greg Mackey will revise the Wells and Methow Hatchery 2018 Program Projected Releases document (Item III-C). *(Note: Mackey revised the document and Sarah Montgomery distributed it to the Hatchery Committees on March 13, 2018.)*
- Sarah Montgomery and Mike Tonseth will coordinate as needed to potentially schedule a conference call to discuss comments and questions on the draft 2018 Broodstock Collection Protocols (Item V-B).
- The Hatchery Committees will hold their April 18, 2018 meeting at Wells Fish Hatchery (Item VI-A).

Decision Summary

- The Rocky Reach and Rock Island HCP Hatchery Committees approved the Wenatchee Steelhead Release Plan (Brood Years 2017 to 2019) as follows: Chelan PUD, WDFW, U.S. Fish and Wildlife Service (USFWS), NMFS, Yakama Nation (YN) and CCT approved on March 12, 2018 (Item II-A).

Agreements

- There were no agreements besides the decision listed above.

Review Items

- Sarah Montgomery sent an email to the Hatchery Committees on April 17, 2018, notifying them that the draft 2018 Broodstock Collection Protocols (version 4) are available for review, with comments to be discussed at the April 18, 2018 Hatchery Committees meeting (Item V-C).

Finalized Documents

- Sarah Montgomery sent an email to the Rocky Reach and Rock Island HCP Hatchery Committees on March 13, 2018, notifying them that the Final Wenatchee Steelhead Release Plan (Brood Years 2017 to 2019) is now available for download from the Hatchery Committees Extranet site (Item II-A).
- Sarah Montgomery sent an email to the Wells HCP Hatchery Committee on March 13, 2018, notifying them that the Final 2018 Wells HCP Action Plan was approved by the Wells HCP

Coordinating Committee on February 27, 2018, and is available for download from the Hatchery Committees Extranet site.

I. Welcome

A. Review Agenda, Review Last Meeting Action Items, and Approve the February 21, 2018 Meeting Minutes (Tracy Hillman)

Tracy Hillman welcomed the Hatchery Committees and asked for any additions or changes to the agenda. The following items were added:

- Greg Mackey added two items: spring release targets and a sinkhole at Wells Fish Hatchery.
- Keely Murdoch added an item for steelhead acclimation.

The Hatchery Committees representatives reviewed the revised draft February 21, 2018 meeting minutes. Sarah Montgomery said there are some outstanding comments, which the Hatchery Committees reviewed and addressed. Hatchery Committees representatives present approved the draft February 21, 2018 meeting minutes as revised.

Action items from the Hatchery Committees meeting on February 21, 2018, and follow-up discussions were addressed *(note: italicized text below corresponds to agenda items from the meeting on February 21, 2018)*:

- Andrew Murdoch (Washington Department of Fish and Wildlife [WDFW]) will write an overview of proposed expanded sampling at the off-ladder adult fish trap (OLAFT) at Priest Rapids Dam (Item I-A). *Mike Tonseth said today's discussion about advancements in estimating steelhead escapement methodology is a precursor to the discussion in April or May about expanded sampling at the OLAFT.*
- Mike Tonseth will coordinate with Todd Seamons (WDFW) to produce an outline or recommended approach for genetic monitoring (Item I-A). *Tonseth said this item is ongoing.*
- Mike Tonseth will coordinate with Todd Seamons regarding reviewing the memo, "Alternatives for Methow Basin conservation steelhead programs" (Item I-A). *Tonseth said he sent the memorandum to Seamons and this item is ongoing.*
- Mike Tonseth will send his revised version of the memo, "Alternatives for Methow Basin conservation steelhead programs" to Brett Farman (Item I-A). *Tonseth said this item is complete.*
- Brett Farman will coordinate with Craig Busack (National Marine Fisheries Service [NMFS]) regarding reviewing the memo, "Alternatives for Methow Basin conservation steelhead programs" (Item I-A). *This item is ongoing.*
- Mike Tonseth will invite Andrew Murdoch to the March 12, 2018 Hatchery Committees meeting to discuss steelhead escapement methodology (Item I-A). *This item will be discussed today.*

- Sarah Montgomery will reconfigure the Extranet site to sort permits and Biological Opinions (BiOps) by species and date and upload the related documents (Item I-A). *This item is ongoing.*
- Todd Pearsons will ascertain fish salvage activities at Priest Rapids and Wanapum dams, and report back to the Hatchery Committees for coordination purposes regarding lethal removal of 12- to 18-inch hatchery-origin *Oncorhynchus mykiss* (Item IV-A). *Pearsons said there are not enough of these fish encountered during fish salvage activities to warrant coordinating a collection effort.*
- Kirk Truscott will work with Casey Baldwin (Colville Confederated Tripes [CCT]) to summarize the CCT's current protocols for genetic sampling (Item IV-D). *This item is ongoing.*
- Tracy Hillman will distribute the Draft Hatchery Program Timelines for Hatchery Committees review (Item IV-E). *Hillman sent these to Sarah Montgomery who distributed them to the Hatchery Committees on February 21, 2018.*
- Tom Kahler and Greg Mackey will provide historical program information to Tracy Hillman for incorporation in the Draft Hatchery Program Timelines (Item IV-E). *Kahler said there was a species sharing agreement in the Methow Basin that will inform the timelines, and he will send information about the agreement to Hillman.*
- Tracy Hillman will review aspects of the Independent Scientific Advisory Board's (ISAB)'s *Review of Spring Chinook Salmon in the Upper Columbia River* under Hatchery Committees' purview (Item IV-F). *This item is ongoing. Hillman said there were many comments about the Monitoring and Evaluation (M&E) program in the appendices to the report which will need to be reviewed for important information and recommendations. He said, for example, the ISAB recommends analyzing abundance data by brood year instead of by return year.*

II. Chelan PUD

A. Draft 2018-2020 Steelhead Release Plan (Catherine Willard)

Catherine Willard shared Chelan PUD's draft 2018-2020 Steelhead Release Plan, which Sarah Montgomery sent to the Hatchery Committees on February 21, 2018. Matt Cooper asked if the brood year 2017 steelhead have been passive integrated transponder (PIT) tagged. Willard responded yes. Tracy Hillman asked if the release location was decided. Willard said the Chiwawa River would be a good place to release the fish because they could be placed above the PIT-tag array and smolt trap, which would help evaluate migrants. Keely Murdoch said there is also a PIT-tag array in Nason Creek. Willard said releasing in two locations would introduce a release site variable to the study, and there are not large enough sample sizes to statistically evaluate release sites and size at release. Hillman asked if the details from this plan are included in the draft 2018 Broodstock Collection Protocols. Mike Tonseth said this information is not yet in the draft protocols but will be added.

Willard asked that the Rocky Reach and Rock Island Hatchery Committees vote on the plan with a planned release 11.4 river kilometers upstream of the confluence of the Chiwawa River with the Wenatchee River. Kirk Truscott said the plan does not address all questions related to origin, release strategy, and location. Willard agreed and said those data are available for past releases but confounded by different variables. This plan aims to narrow the variables and increase statistical power by releasing all fish in the same location. Bill Gale asked if this plan increases the number of fish released in the Chiwawa River compared to previous years. Tonseth said it does not change the total number of fish released in the Chiwawa River, and the significant deviation from prior years is not acclimating fish at Blackbird Pond. Willard noted that the plan is a 3-year study beginning with the 2018 release year (brood year 2017).

The Rocky Reach and Rock Island HCP Hatchery Committees approved the Wenatchee Steelhead Release Plan (Brood Years 2017 to 2019) as follows: Chelan PUD, WDFW, USFWS, NMFS, YN and CCT approved on March 12, 2018. The final approved plan was distributed to the Hatchery Committees after the meeting on March 13, 2018 (Attachment B).

B. Proposed Methodology for Establishing Baseline Conditions in the Wenatchee Steelhead Program (Catherine Willard)

Catherine Willard shared the draft *Methodology for Establishing Baseline Conditions in the Wenatchee Steelhead Program* document (Attachment C), which Sarah Montgomery distributed following the meeting on March 13, 2018. Willard said a special condition in the new Wenatchee steelhead permit is to minimize residualism rates and maximize downstream migration of steelhead. Willard said the Hatchery Committees are responsible as a group for developing the methodology for establishing baseline conditions, and she drafted this document as a starting point. Willard summarized the options she drafted: a PIT-tag evaluation; post-release sampling; and an electrofishing and angling study (see Attachment C).

Bill Gale said for an electrofishing and angling study, one issue is how to expand collection to develop an estimate of residualism. He asked would multiple passes and index reaches be used? Willard said she has not developed a sampling design, but one idea is to use index reaches around the release site and perform a mark-recapture estimate of residuals. Keely Murdoch said mark-recapture might work for this evaluation, but there may be a bias with angling. She said surveys for residualized coho salmon have been conducted using snorkeling, where residual coho salmon were observed in Nason Creek. She said snorkel surveys allow for systematically sampling reaches, especially during low water in the summer, and some of the hatchery fish were distinguishable by physical characteristics.

Mike Tonseth said these discussions have two facets. First, the Hatchery Committees should develop a methodology to evaluate what the rate of residualism is. Then, the Hatchery Committees should discuss whether that rate is reasonable and if changes need to be made.

Bill Gale said in order to estimate a rate, one will need to know the total number of steelhead that residualize and this is very difficult to estimate. Hillman agreed and said this is a complex problem for a couple of reasons. First, we need a reliable technique to estimate the number of residuals within sampling sites, such as removal/depletion or mark-recapture, and second, sites need to be selected in such a way that allow us to extrapolate to the entire population. He said residuals are likely not uniformly distributed throughout the rivers, noting that there is likely a higher concentration of residualized fish near the release site and in high quality habitat such as Tumwater Canyon. Gale agreed and said he thinks an estimate of residualism may be made without intensive sampling. He said while electrofishing and angling might not be the most accurate way to estimate residualism for the entire release group, it might still be informative to sample one index site near the release location for year-to-year tracking.

Gale suggested studying apparent survival to the first, downstream Columbia River hydroelectric facility, which would provide a year-to-year indicator of survival. Keely Murdoch asked if residualized steelhead are observed during snorkel surveys in the Chiwawa River. Hillman said yes, but some are difficult to distinguish from wild steelhead. Hillman asked how NMFS defines residuals for the purposes of the steelhead permit. Willard said the BiOp states that a fish is considered a residual if it is found in the system 21 days after release, or July 1, whichever is later. Tonseth suggested sampling sites periodically to examine rate of decay for residualism. Keely Murdoch said it may be helpful to do initial surveys (an exploratory year) to identify where residual steelhead are holding. Gale said a PIT-tag evaluation could similarly determine how quickly the fish migrate. Andrew Murdoch suggested that one way to locate hatchery-reared steelhead is to sample in areas where the water profile is similar to a hatchery (i.e., laminar flow and uniform depth). Keely Murdoch said it may be helpful to examine data from past WDFW angling efforts in the Chiwawa River to put these ideas for sampling into context. Andrew Murdoch said rearing and release conditions have changed so much over the years that it might be difficult to query those data in a meaningful way.

Greg Mackey suggested using a repeated sightings population estimate approach. He said if enough PIT-tagged fish remain in the system and are able to be detected, a raft with a PIT-tag array could be floated down the river multiple times to determine the proportion of the release group that did not migrate. Gale asked about detection efficiency. Mackey said this method involves detecting the same individuals and new individuals with each pass, allowing for the population to be estimated. Mackey said he is not certain of all the statistical properties of this type of study, but it would not rely on capture efficiency. Such methods are used to estimate relatively small populations of animals that are

difficult to capture. Andrew Murdoch said repeated surveys with a PIT-tag detection boat could be completed at different flows to potentially detect more fish. Truscott asked how this type of study would account for dead fish whose PIT tags are detected. Hillman said a snorkeler could follow the boat and note any carcasses. He said repeated surveys in the same sites could provide information needed to calculate detection efficiencies, but fish movement could complicate the estimate. Mackey agreed and said the study reaches would need defined boundaries. Andrew Murdoch said WDFW developed similar equipment for studying overwinter distribution and used ghost PIT tags to calibrate the equipment, with two boats used for detecting tags. He said this methodology can be further refined. The basic strategy is that each boat has a PIT tag antenna, or a larger boat has two antennas (one on the front and one on the back), but maneuvering boats is difficult.

Willard summarized that the draft plan contains three components: 1) PIT Tag evaluation, 2) Post release GSI and maturation lethal sampling, and 3) electrofishing/angling. She said doing a PIT-tag evaluation certainly seems like an easy and logical method. She asked if anyone had thoughts about a post-release sampling study. She said it would involve pre-release non-lethal sampling and post-release lethal sampling and would be coordinated with the USFWS. She also asked the Hatchery Committees if an electrofishing and angling study should be pursued. Keely Murdoch said representatives should review the options presented today and discuss further at the April 18, 2018 Hatchery Committees meeting.

III. Douglas PUD

A. Fish Health and Production at Wells and Methow Hatcheries (Betsy Bamberger)

Greg Mackey introduced Betsy Bamberger, the fish health and evaluation specialist at Douglas PUD. Bamberger shared a presentation, *Columnaris at Wells Fish Hatchery—A Case Review* (Attachment D). (Sarah Montgomery distributed the presentation to the Hatchery Committees following the meeting on March 13, 2018.) Bamberger said Columnaris affected summer Chinook salmon and summer steelhead programs at Wells Fish Hatchery the past year, and this presentation describes the management strategies undertaken and insight about fish health.

A summary of the presentation and the questions and comments that followed are included in the following sections.

<u>Introduction to Columnaris (Slides 1-3)</u>

Bamberger said columnaris is a disease affecting freshwater finfish that is caused by a bacteria, *Flavobacterium columnare*. Outbreaks are more frequent in warm water and when fish are stressed. It presents as white-gray spots, usually below the dorsal fin, and can progress to tail rot and ulcerations, as well as gill necrosis. In the gills, it can disrupt filament functionality. It can also present

as a yellow-brown film, such as in the oral cavity. Columnaris is transmitted horizontally between fish, and generally becomes more virulent under the following circumstances: crowding, low dissolved oxygen, handling, physical injury, and poor water quality.

Wells Fish Hatchery Summer Chinook Salmon (Slides 4-5)

Bamberger said the Wells summer Chinook salmon 2017 brood were collected from late July to early September. While there were few pre-spawn mortalities observed by mid-October, losses quickly escalated in late October and the brood was diagnosed with columnaris disease on October 24, 2017. The management strategy for this outbreak was to spawn the fish as soon as possible and interfere as little as possible. The no-interference strategy was chosen because spawning goals had nearly been met, stress from treatments would have likely been fatal, and physical injuries were beyond benefit from therapeutic intervention. There were relatively low water temperatures and no known history of columnaris disease for this brood. Bamberger noted that columnaris disease was a regional issue for spring and summer Chinook salmon in fall 2017.

Wells Fish Hatchery Steelhead (Slides 6-10)

Bamberger said Wells Fish Hatchery summer steelhead were observed exhibiting odd behavior in the water column at the beginning of spawning efforts in late November, and were diagnosed with columnaris disease on November 27, 2017. She said spawning was expected to continue for weeks, so treating the columnaris disease was important to minimize losses. The first management strategy implemented was treatments of potassium permanganate and solar salt. This treatment prevented mortality events from worsening, but losses still occurred. Chloramine-T was considered as an option but decided against it due to National Pollutant Discharge Elimination System (NPDES) regulations. A second management strategy using an aquatic herbicide, Diquat (Reward®), was implemented beginning in late January. Diquat is more expensive than most other chemotherapeutics used in aquaculture but has a better safety margin and higher potential benefit. Diquat is an experimental drug made available by an investigational new animal drug (INAD) exemption granted by the Aquatic Animal Drug Approval Paternship Program (AADAP). At Wells Fish Hatchery it was used at a lower dose for a prolonged exposure. Bamberger said 0.72 gallons were used per daily treatment (three successive treatments were administered weekly for three weeks), and it was helpful to be able to shut water flow off to use less herbicide. After Diquat treatment began, mortalities declined and there were no further losses after February 7.

Bamberger summarized that the incidence of columnaris disease can be cyclical from year to year, and she emphasized the importance of diagnosing it as soon as possible. It is also important to implement more stringent biosecurity and disinfection measures and keep treatment materials (like Diquat) stocked. Another step Douglas PUD might take is to become an accredited lab through the

Washington State Department of Ecology, which would allow for use of alternative chemicals such as Chloramine-T.

Questions and Comments

Todd Pearsons asked how Diquat treats columnaris disease. Bamberger said it is an experimental chemical for treating columnaris disease, and she is not certain of the theory behind its use. She clarified that it kills the bacteria which causes columnaris disease, but sometimes the disease has progessed so far that full recovery is not possible. Mike Tonseth asked if Diquat has any effects on copepods. Bamberger said she is not aware of any effects to copepods. She said some people advise using peroxide to treat copepods, but techniques vary between saltwater and freshwater species and success is tenuous.

Pearsons asked why Columnaris was such a problem in the 2017 brood year. Bamberger said it was abundant in the river system whereby most or all hatcheries in the region experienced significant outbreaks, and the hatcheries cannot control exposure to river water. There are different strains with varying virulence. Keely Murdoch said copepods have been an issue in the kelt reconditioning program and are treated with emamectin benzoate (Slice®). Bamberger said emamectin might be one idea for future copepod treatments, but that copepods are not too concerning as long as gill tissue is still viable. Willard asked if other facilities also did not use Chloramine-T due to NPDES regulations and perhaps this is why Columnaris disease seemed more prevalent in other hatchery stocks in Washington state. Bamberger said some facilities used Chloramine-T, but she is not sure how many are aware of the regulations. She said it is best used as a prophylactic treatment but that there are some anecdotal toxicity concerns with repeated, long-term use. Hatchery Committees representatives thanked Bamberger for her presentation.

B. Sinkhole at Wells Fish Hatchery (Greg Mackey)

Greg Mackey said a sinkhole recently developed in the downstream corner of Dirt Pond 3 at Wells Fish Hatchery. Low water was observed in the pond, and upon investigation, a sinkhole was discovered with approximately 1,000 gallons of water per minute going into the ground. Mackey said the old pond liner may be gone or disintegrated, allowing for the hole to develop. He said roads at the hatchery were recently re-graveled, and the vibratory compactor used for that work could have triggered the hole. Less than an hour after the sinkhole was discovered, a contractor was able to pack boulders and material into the hole and slow or stop the leak. Mackey said it appears the pond has stabilized, and fish were likely not going down the sinkhole because they were at the head of the pond. The pond currently holds Columbia safety-net program steelhead, and they will be released soon. Mackey said the pond will be repaired or rebuilt after fish are released. Keely Murdoch asked if the number of fish released from the pond will be known. Mackey said it may be possible to estimate

the number of fish released. He said the fish are usually brought into a release raceway and pumped into a truck, and a PIT-tag reader is used to estimate the number of fish. Mike Tonseth said given the uncertainty about fish going into the sinkhole, it is important to develop an estimate of loss according to terms and conditions in permits. Kirk Truscott added that the number could be roughly estimated based on how fish are feeding. Mackey said the surrounding area was inspected for plumes of water related to the leak and none were discovered.

C. Release Targets (Greg Mackey)

Greg Mackey shared a document, Wells and Methow Hatchery 2018 Program Projected Release (revised version distributed following the meeting on March 13, 2018; Attachment E). Mackey described which Wells and Methow programs have projected releases over and under their respective targets.

Mackey shared a second document, which showed steelhead broodstock collection targets for the Methow safety-net, Columbia safety-net, and Okanogan programs. Mackey said broodstock collection targets have nearly been met for the Methow safety-net and Columbia safety-net programs. Spring collection via angling is still occurring. Matt Cooper said steelhead will also be collected in the Winthrop National Fish Hatchery (NFH) outfall, which can be used as backup broodstock for Douglas PUD's programs. Mackey said additional broodstock can also be collected from the Twisp Weir. He said Methow safety-net eggs could be transferred to the Columbia safety-net program, and a proportion of Columbia safety-net eggs spawned from the fall broodstock collection could be discarded. He said eggs are hatching each day, so decisions should be made as soon as possible to optimize the programs and allow for disposal of surplus eggs. Mike Tonseth asked if the Methow safety-net program is supposed to be comprised of conservation program brood from the Twisp River and Winthrop NFH programs. Mackey said yes, some of the brood is sourced from the Twisp River and the Winthrop NFH, but the majority of the brood has come from collections at Wells Dam since the new program began. Tonseth said backup fish are collected in the fall for broodstock in case not enough fish can be collected in the spring, but broodstock collected in the spring are higher priority for using in the programs. Bill Gale asked if a fall collection period even needs to occur in future years. Tonseth said that will be discussed as part of the broodstock collection protocols discussion. He said the Methow safety-net program should be made up of adult returns from the Winthrop and Twisp programs, and if eggs currently on station are not from those programs, the eggs should be moved into a different program or discarded. If the eggs have hatched, however, decisions are more complicated, as the fish need to be reared until they are large enough to be released to resident waters. Mackey summarized that eggs that are a result of crosses between Methow safety-net or Twisp River steelhead should be kept and transferred to the Columbia safety-net program. Tonseth said it appears all Methow safety-net program brood can be

met through hook-and-line collection so the entire backup brood for Methow safety-net can be transferred to the Columbia safety-net program, and extra eggs in the Columbia program can be discarded. Tonseth also recommended decreasing spawn takes so that spawn timing is narrower, and fish are more similarly sized. Gale asked about the Okanogan program. Mackey said they need approximately 150,000 eggs, and Truscott said he is not sure if they have collected brood or started spawning fish yet.

Mackey said he would coordinate the outcome of this discussion with hatchery staff. He summarized that any Methow safety-net crosses that are Winthrop NFH- or Twisp-origin brood should be kept. Hatched fish in the Methow safety-net program should be moved to the Columbia safety-net program. Any fish in the Columbia safety-net program that have hatched should also be kept and reared. Of the eggs in the Methow safety-net program, move all that are advantageous to the Columbia safety-net program, and discard the rest. Any additional Columbia safety-net program or Methow safety-net program eggs that do not help optimize spawn takes should also be discarded. Tonseth said this involves moving a lot of fish, but the outcome is that the Methow safety-net program starts fresh with broodstock from spring collections.

Tonseth said the Joint Fishery Parties have also discussed this, as well as continuing the S1/S2 approach with the Twisp and Winthrop steelhead programs. Tonseth asked if the Twisp steelhead received 5,000 PIT tags as planned. Tom Kahler said yes. Tonseth said there is a higher number of juvenile releases in the Twisp River in 2018, but in future years, 48,000 fish will be released. Tonseth said one issue in transferring fish from Winthrop NFH to their release site in the Twisp River, is truck capacity for moving smolts, and asked if Douglas PUD could assist in moving those fish to Buttermilk Bridge for release. Mackey said yes.

Mackey asked if there are any issues with the proposed plan for moving eggs between program allocations. None were raised, and a vote was not needed for this item. Keely Murdoch asked for a summary of how many fish and eggs are being transferred or culled, and if any additional broodstock collection efforts will be needed. Mackey said he will provide a summary once numbers are more certain, and he does not anticipate any broodstock collection in addition to what is already planned. Mackey and Tonseth agreed that it will be helpful to have this plan described more thoroughly in the broodstock collection protocols, and for future permitting efforts.

IV. YN

A. Steelhead Acclimation (Keely Murdoch)

Keely Murdoch said coho salmon and steelhead were once comingled at the Rohlfings Pond site on Nason Creek. This practice was discontinued by the YN due to space constraints. She said the YN

now plans to construct a new pond near the old Rohlfings Pond site for the coho and steelhead acclimation programs. Construction is planned for summer 2018 with testing in 2019. In 2020, she said there will be space for steelhead acclimation. She said once that space is available, YN will be interested in using the pond for steelhead acclimation. .

V. Joint HCP-HC/PRCC HSC

A. Advancements in Estimating Steelhead Escapement Methodology (Andrew Murdoch)

Andrew Murdoch (WDFW) shared the presentation, Estimating Steelhead Escapement in the Upper Columbia Distinct Population Segment (DPS) (Attachment F), which Sarah Montgomery distributed to the Hatchery Committees following the meeting on March 13, 2018. Andrew Murdoch said this presentation is a culmination of methodologies to estimate run escapement and spawning escapement for the Upper Columbia DPS of steelhead. Andrew Murdoch presented the different methods for estimating escapement, and there were questions and comments as described below.

Todd Pearsons asked for clarification about spring-run fish in the Entiat River being equated to spawners (slide 21). Andrew Murdoch said radio-telemetry data suggest that spring-run steelhead do not die before spawning. Part of the study included looking at overwinter mortality, which was found to occur mainly in January and February, so if fish survive the winter, they generally spawn. He said it would be incorrect to use run escapement as a surrogate for spawn escapement in some cases. Run escapement cannot be assumed to equal spawning escapement because some fish that enter in the fall or winter experience pre-spawn mortality. Pearsons asked if fish move into the Entiat River in the fall and then leave again. Andrew Murdoch said some steelhead enter the Entiat River in the fall when the Columbia River is warm, but then leave when the Entiat River becomes cooler. For fish entering the Entiat River in the spring, run escapement can be equated to spawning escapement.

Regarding the spawning distribution of Entiat River steelhead (slide 23), Bill Gale commented that there are many hatchery steelhead in the Entiat River, but no hatchery releases occurring there.

Regarding overshoot at Priest Rapids Dam (slide 26), Gale asked if most of the Snake River steelhead that overshoot Rock Island move back downstream, or do they go to Wells Dam? Andrew Murdoch said many drop back down, but some are seen going into tributaries like the Wenatchee and Entiat rivers. Gale asked if any upper Columbia fish turn into the Snake River then turn around. Andrew Murdoch said no, mostly the mid-Columbia fish overshoot.

Regarding the "black box" of fish that cannot be assigned to a spawning location (slide 32), Pearsons asked how redd surveys are used to standardize the unknown group. Andrew Murdoch replied redd surveys are not used, and the method requires accurate estimates of overwinter mortality and

harvest, and that all other spawning tributaries be monitored for PIT tags. Peter Graf asked, for tributaries with PIT-tag arrays, is there a difference in detection ability between tributaries with one array and two arrays? Andrew Murdoch said most tributaries in this study have two arrays, but tributaries with single versus double arrays perform similarly for this work.

Regarding model selection for the Gaussian Area Under the Curve method (slide 45), Catherine Willard asked how level of effort is measured. Andrew Murdoch replied it is measured by minutes per river kilometer, so it is standardized by distance. Pearsons asked why when redd density is higher, accuracy is higher. Andrew Murdoch said he thinks redds are more difficult to see at lower densities. Pearsons asked if redds are clustered. Andrew Murdoch said yes, some imposition occurs, and redds are clustered but not to the same degree as with spring and summer Chinook salmon. Kirk Truscott asked if a model would have to be specifically developed for the Okanogan due to its turbidity issue. Andrew Murdoch said water clarity was positively related to efficiency in his study, and said it would be helpful to sit down with CCT staff to share knowledge.

Gale said the estimates of hatchery fish are aggregated, but in several cases, it would be helpful to understand the contributions of individual programs or components of programs. He asked if the accuracy in the model can work with that much variability. Andrew Murdoch said it works because adults are tagged at Priest Rapids Dam. He said, if the programs were tagged at the same rate, then it would be easier to derive the composition of juvenile tagged fish. Gale said it would also be useful to have a minimum tagging number or rate for each program. Mike Tonseth agreed that analyses would be much simpler if tagging was completed at a consistent rate, say, 10%. Andrew Murdoch said tagging at Priest Rapids Dam also provides a total estimate of hatchery fish.

Regarding the 2014 spawning escapement estimates (slide 67), Truscott asked if these estimates are generated by redd surveys. Andrew Murdoch said they are generated through tributary PIT-tag estimates, and redd surveys in the mainstem Wenatchee River. Truscott asked how the PIT-tag-based tributary spawning estimates compare to redd survey estimates. Andrew Murdoch said he has not compared those data yet, but it is possible to use models to do that. Gale said, looking at the 2014 estimates, the ratio of hatchery and wild spawners would result in a proportion of hatchery-origin spawners of approximately 0.3. He asked how that compares with other estimates. Andrew Murdoch said older methods such as those used in 2014 do not account for overshoot, and static values were used for fish turning into the Okanogan and Methow rivers. He said he hopes to pull all the data together for 2011 to 2017 and compare the existing method and the new method, but he has not found a consistent difference between the two yet. Over time, he said the models should be able to be applied back to 2004 to develop spawner abundance estimates using just the redd model.

Regarding the 2017 spawning escapement estimates (slide 68), Gale asked how much juvenile tagging helps to determine estimates. Andrew Murdoch said it does not help very much, as the statistics involved in determining what proportion of a program each fish represents are complicated. Truscott said if all programs tagged juvenile fish at the same rate, this would be easier. Andrew Murdoch agreed and said returning fish could be assigned by release location and adult estimates could be determined. Hillman said that is based on juvenile tagging at the hatcheries, whereas a fish's hatchery of origin is unknown if it is tagged as an adult at Priest Rapids Dam (unless genetic samples are taken or there is another way to determine the origin of hatchery fish tagged at the dam).

Andrew Murdoch said this is an ongoing effort and welcomed any feedback from the Hatchery Committees. He said this may help inform upcoming discussions about expanded sampling at the OLAFT at Priest Rapids Dam.

B. NMFS Consultation Update (Brett Farman)

Brett Farman said he does not have an update on the National Environmental Policy Act process for consultations. He said the Environmental Assessment for Methow steelhead and the unlisted programs (summer/fall Chinook salmon for Wells, Methow, Chelan Falls, Dryden, and Priest Rapids) is undergoing more internal review, and he does not know of a revised timeline for its distribution.

C. 2018 Broodstock Collection Protocols (Mike Tonseth)

Mike Tonseth said the draft 2018 Broodstock Collection Protocols will be discussed during the PRCC HSC meeting following this meeting. He said he does not expect that much discussion about the protocols will be required this year. He said if the National Oceanic and Atmospheric Administration is amenable, the protocols could be submitted on April 20, 2018, which would allow for approval at the next Hatchery Committees meeting on April 18, 2018.

Notes from PRCC HSC March 12, 2018 Meeting – Joint HCP-HC/PRCC HSC Topic

The following notes were collected during the PRCC HSC meeting on March 12, 2018, by Andy Chinn and Elizabeth McManus (Ross Strategic), and are provided here as a joint item. The HCP Hatchery Committees revised and edited the minutes as follows:

- Notable Items in 2018 Protocols – Details on notable items in the 2018 broodstock collection protocols are listed on pages 1 through 3 of the draft document. Examples include:
  - Expansion of spring Chinook salmon trapping at the Wells Dam East and West ladders to provide flexibility to trap up to 7 days per week
  - Addition of Appendix H, which describes a draft preferred approach to integration of the Methow conservation steelhead programs
  - Further refinement to Upper Columbia River surplus steelhead management

  - Expansion of the Chiwawa weir operation to ensure sufficient natural origin fish for the Chiwawa program. This will require an expansion of the total number of trapping days and an increase in bull trout encounters. The proposed action is consistent with the sideboards for bull trout impacts as described in the BiOp.
  - Management plan for excess production from Wenatchee spring Chinook salmon programs
  - Contingency for changing operations at Tumwater Dam beginning September 1 to allow for lamprey passage
- Other notes:
  - WDFW suggests that all of the fish managers' data collection begin to include fish girth, as measured behind the pectoral fins. For various reasons, including climate change trends, fish may be reaching appropriate size at length, but not appropriate weight, which could be affecting fecundity. Girth may provide a better measure than POH to determine fecundity.
  - Last year and this year the steelhead returns were low but WDFW still had to manage for excess fish. WDFW recommends eliminating all contingency collections for above-Wells steelhead programs to mitigate the surplus fish issue.
- Next Steps
  - PRCC HSC and HC Hatchery Committee members will provide comments to WDFW on the draft 2018 broodstock collection protocols by March 30. If there are any comments that require further discussion with the Committees, WDFW will either request a conference call and/or request an extension of the submission deadline for the protocols.

VI. HCP Administration

A. Next Meetings

The next Hatchery Committees meetings are April 18, 2018 (Wells Fish Hatchery), May 16, 2018 (Grant PUD), and June 20, 2018 (Grant PUD).

VII. List of Attachments

Attachment A List of Attendees
Attachment B Final Wenatchee Steelhead Release Plan (Brood Years 2017 to 2019)
Attachment C Draft Methodology for Establishing Baseline Conditions in the Wenatchee Steelhead Program
Attachment D Columnaris at Wells Fish Hatchery—A Case Review
Attachment E Wells and Methow Hatchery 2018 Program Projected Release
Attachment F Estimating Steelhead Escapement in the Upper Columbia DPS

Attachment A
List of Attendees

Name	Organization
Tracy Hillman	BioAnalysts, Inc.
Sarah Montgomery	Anchor QEA, LLC
Catherine Willard*	Chelan PUD
Tom Kahler*	Douglas PUD
Greg Mackey*	Douglas PUD
Betsy Bamberger	Douglas PUD
Todd Pearsons‡	Grant PUD
Peter Graf‡	Grant PUD
Deanne Pavlik-Kunkel†‡	Grant PUD
Mike Tonseth*	Washington Department of Fish and Wildlife
Andrew Murdoch	Washington Department of Fish and Wildlife
Alf Haukenes†	Washington Department of Fish and Wildlife
Matt Cooper*	U.S. Fish and Wildlife Service
Bill Gale*	U.S. Fish and Wildlife Service
Brett Farman*†	National Marine Fisheries Service
Kirk Truscott*	Colville Confederated Tribes
Keely Murdoch*	Yakama Nation
Cory Kamphaus†	Yakama Nation

Notes:
* Denotes Hatchery Committees member or alternate
† Joined by phone
‡ Joined for the joint HCP-HC/PRCC HSC discussion