FINAL

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ANCHOR QEA

Memorandum

To: Wells, Rocky Reach, and Rock Island HCPs Hatchery Committees and Priest Rapids Coordinating Committee Hatchery Subcommittee

Date: September 23, 2019

From: Tracy Hillman, HCP Hatchery Committees Chairman and PRCC Hatchery Subcommittee Facilitator

cc: Larissa Rohrbach, Anchor QEA, LLC

Re: Final Minutes of the August 21, 2019 HCP Hatchery Committees and PRCC Hatchery Subcommittee Meetings

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees (HCs) and Priest Rapids Coordinating Committee Hatchery Subcommittee (PRCC HSC) meetings were held in Wenatchee, Washington, on Wednesday, August 21, 2019, from 9:00 a.m. to 1:15 p.m. Attendees are listed in Attachment A to these meeting minutes.

Action Item Summary

Joint HCP-HCs and PRCC HSC

- Mike Tonseth will coordinate with Andrew Murdoch (Washington Department of Fish and Wildlife [WDFW]) to present pre-spawn mortality modeling results for spring Chinook salmon at an upcoming HCP-HC meeting (Item I-A). *(Note: this item is ongoing.)*
- Kirk Truscott will discuss with Colville Confederated Tribes (CCT) biologists whether elemental signature analysis could differentiate natural-origin Okanogan spring Chinook salmon from other natural-origin Chinook salmon during broodstock collection at Wells Dam for Methow Fish Hatchery programs (Item I-A). *(Note: this item is ongoing.)*
- Brett Farman will discuss with Charlene Hurst and Mike Tonseth the potential use of a multi-population model for estimating proportionate natural influence (PNI) for the Nason and Chiwawa spring Chinook salmon programs (Item I-A). *(Note: this item is ongoing.)*
- Tracy Hillman and Larissa Rohrbach will add review of the Broodstock Collection Protocols (BCPs) to the September meeting agenda to help the HCP-HCs and PRCC HSC identify co-authors and opportunities to discuss major revisions in advance of 2020 deadlines (Item II-F). *(Note: this item is ongoing.)*
- Greg Mackey will distribute a white paper reviewing broodstock composition and mating strategies for conservation programs, focusing on spring Chinook salmon at the Methow Hatchery (Item I-A). *(Note: this item is ongoing.)*

- Larissa Rohrbach will add HCP Policy Committee guidance on policy-level issues to the HCP-HC Meeting Protocols (version dated May 15, 2019; Item I-A).
- Catherine Willard will update the genetics section of the *Monitoring and Evaluation Plan for PUD Hatchery Programs (Update to the 2017 Plan)* to reflect revisions that were suggested in the August 21, 2019 meeting (Item II-D).

PRCC Hatchery Subcommittee

- HSC representatives will submit a list of minimum data or information needs for making a decision on the White River spring Chinook salmon hatchery program to Tracy Hillman (Item I-A). (*Note: This item is ongoing.*)
- Brett Farman will ask Craig Busack (National Marine Fisheries Service [NMFS]) to participate in the Wenatchee Basin life-cycle modeling discussion at the PRCC meeting on September 25, 2019, at Wanapum Dam, Washington (Item V-B).

Decision Summary

- Larissa Rohrbach sent an email to the Wells HC on September 11, 2019, noting that all parties voted by email in concurrence that there is sufficient capacity at Wells Fish Hatchery for WDFW's additional production of subyearling Chinook salmon for southern resident orca prey, without compromising the existing, on-station HCP programs (Item III-A).

Agreements

- There were no agreements made in today's meeting.

Review Items

- Larissa Rohrbach sent an email to the Rock Island and Rocky Reach HCP-HCs on August 21, 2019, notifying them that WDFW's revised *Relative Reproductive Success Study Extension Memorandum* (RRS memorandum) is available for review and approval in the September 18, 2019 meeting (Item II-A).
- Larissa Rohrbach sent an email to the HCP-HCs and PRCC HSC on August 19, 2019, notifying them that Douglas PUD's *2019 Egg Treatment Study Plan* is available for review and approval in the September 18, 2019 meeting (Item II-B).
- Larissa Rohrbach sent an email to the HCP-HCs and PRCC HSC on August 21, 2019, notifying them that the revised *Broodstock Collection Protocols Development Timeline Statement of Agreement* (SOA) is available for review, with edits due to Mike Tonseth by September 6, 2019 (Item II-F).

- Larissa Rohrbach sent an email to the Rock Island and Rocky Reach HCP-HCs on August 21, 2019, notifying them that *Chelan PUD's 2020 Draft Monitoring and Evaluation Implementation Plan* is available for review, with edits due to Catherine Willard by Friday August 30, 2019 (Item IV-A).

Finalized Documents

- There were no documents finalized in today's meeting.

I. Welcome

A. Review Agenda, Review Last Meeting Action Items, and Approve the July 17, 2019 Meeting Minutes (Tracy Hillman)

Tracy Hillman welcomed the HCP-HCs and PRCC HSC and asked for any additions or changes to the agenda. Greg Mackey asked to remove Item II-D, "Alternative broodstock composition and mating strategies," to prepare for more discussion in a future meeting. Bill Gale asked to add a fish health update for Leavenworth National Fish Hatchery (LNFH) to the Joint HCP-HCs and PRCC HSC topics (new Item II-C). The HCP-HCs and PRCC HSC members approved the agenda as revised.

The HCP-HCs and PRCC HSC representatives reviewed the revised July 17, 2019 meeting minutes. Larissa Rohrbach said there were some revisions that the representatives then reviewed. Additional revisions were made in the meeting. The HCP-HCs and PRCC HSC members approved the July 17, 2019 meeting minutes as revised.

Action items from the HCP-HCs and PRCC HSC meeting on July 17, 2019, and follow-up discussions were addressed *(note: italicized text below corresponds to agenda items from the meetings on July 17, 2019)*:

Joint HCP-HCs and PRCC HSC

- *Tracy Hillman will review aspects of the Independent Scientific Advisory Board's Review of Spring Chinook Salmon in the Upper Columbia River under HCP-HCs' purview (Item I-A).*
  Hillman said this item is ongoing. Hillman said his contract is set up to prepare the 10-year Comprehensive Reports and then move on to updating the PUDs' Monitoring and Evaluation Plan (M&E Plan; Update to the 2017 Plan) per the Independent Scientific Advisory Board's guidance. Hillman requested that this action item be set aside until he re-initiates work to update the M&E Plan. Greg Mackey said the M&E Plan must be updated every 5 years and updates should be brought to the HCP-HCs for consideration at that time. This item will be removed from the action items list.

- *Mike Tonseth will coordinate with Andrew Murdoch (Washington Department of Fish and Wildlife [WDFW]) to present pre-spawn mortality modeling results for spring Chinook salmon at an upcoming HCP-HC meeting (Item I-A).*
  Tonseth said this item is ongoing, pending additional information from Jeff Jorgensen (NMFS).
- *Catherine Willard will update the genetics section of the Monitoring and Evaluation (M&E) Plan for PUD Hatchery Programs (Update to the 2017 Plan) based on the genetics panel recommendations and will append the recommendations from the panel to the plan (Item I-A).*
  The 2017 PUDs' M&E Plan was updated by Willard and distributed by Sarah Montgomery via email on August 9, 2019. This item will be discussed in today's meeting. This item is complete.
- *Kirk Truscott will discuss with Colville Confederated Tribes (CCT) biologists whether elemental signature analysis could differentiate natural-origin Okanogan spring Chinook salmon from other natural-origin Chinook salmon during broodstock collection at Wells Dam for Methow Fish Hatchery programs (Item I-A).*
  Truscott said this item is ongoing.
- *Brett Farman will discuss with Charlene Hurst and Mike Tonseth the potential use of a multi-population model for estimating proportionate natural influence (PNI) for the Nason and Chiwawa spring Chinook salmon programs (Item I-A).*
  Farman said this item is ongoing. In the July HCP-HCs meeting Farman noted NMFS's approval for use of the iterative approach of estimating PNI for annual M&E reporting; however, the use of the multi-population model has not been discussed with his NMFS colleagues.
- *Mike Tonseth will revise the* Relative Reproductive Success (RRS) Study extension agreement memorandum *for clarity (Item II-A).*
  Tonseth said this item will be discussed in today's meeting. This item is complete. *(Note: the revised memorandum was distributed immediately following the meeting for review.)*
- *Larissa Rohrbach will add sizing of upper Columbia River conservation programs as a periodic agenda item (Item I-A).*
  Rohrbach said this item is complete. Rohrbach said a schedule for the next discussion of this topic will be determined in today's meeting (Item I-F).
- *Tracy Hillman and Larissa Rohrbach will maintain a list of outstanding topics, as follows, for consideration in HCP-HCs and PRCC HSC meetings prior to development of the 2020 Broodstock Collection Protocols (Item II-F). (Note: this item is ongoing.)*
  - *Use of age-3 males in broodstock*
  - *Use of alternative mating strategies*
  - *Establishing ranges around broodstock collection targets*
  - *Source for Chiwawa spring Chinook salmon broodstock*

Rohrbach said this item is complete. Rohrbach said a schedule for the next discussion of this topic will be determined in today's meeting.

- *Tracy Hillman and Larissa Rohrbach will add review of the Broodstock Collection Protocols to the September meeting agenda to help the HCP-HCs and PRCC HSC identify co-authors and opportunities to discuss major revisions in advance of 2020 deadlines (Item I-A).*
  Rohrbach said this item is ongoing.
- *Mike Tonseth will revise and redistribute the HCP-HCs Annual Broodstock Collection Protocols development timeline Statement of Agreement (SOA; Item II-F).*
  Tonseth said this item will be discussed in today's meeting. *(Note: the revised SOA was distributed immediately following the meeting for review.)*
- *Mike Tonseth will ask Michael Humling (U.S. Fish and Wildlife Service [USFWS]) and Charlie Snow (WDFW) to estimate the number of Methow returns that are likely to return to Winthrop National Fish Hatchery to inform a translocation discussion in a future HCP-HCs meeting (Item I-A).*
  Tonseth said this item is ongoing. Larissa Rohrbach said a schedule for the next discussion of this topic will be determined in today's meeting (Item II-F). This item will be removed from the action item list.
- *Mike Tonseth will revise and redistribute the 2017 Out-planting Surplus Methow Composite Spring Chinook Salmon Adults memorandum (Item I-A).*
  Tonseth said this item is ongoing. Larissa Rohrbach said a schedule for the next discussion of this topic will be determined in today's meeting (Item II-F). This item will be removed from the action item list.
- *Larissa Rohrbach will add HCP Policy Committee guidance on policy-level issues to the HCP-HC Meeting Protocols (version dated May 15, 2019; Item I-A).*
  Tracy Hillman said this item is ongoing, pending finalization of the July 23, 2019 HCP-Coordinating Committee meeting minutes.
- *Betsy Bamberger and Greg Mackey will distribute a draft 2020 study plan for The Control of Saprolegnia Sp. Growth on Summer Chinook (Oncorhynchus tshawytscha) Eggs (Item II-B).*
  Bamberger and Mackey distributed the draft 2020 study plan, as distributed by Larissa Rohrbach via email on August 19, 2019. This item is complete.
- *Greg Mackey will distribute a white paper reviewing broodstock composition and mating strategies for conservation programs, focusing on spring Chinook salmon at the Methow Hatchery (Item I-A).*
  Mackey said he prepared a draft white paper that he recently edited and sent to a few HC members for review. He will prepare a presentation and distribute a revised version of the white paper for a future HCP-HCs meeting.

Wells HC

- *Mike Tonseth will prepare a proposal for the Wells HCP-HC on the use of surplus summer Chinook collected from the Wells Volunteer Trap for the production of subyearling smolts to support the Southern Resident Killer Whale population (Item III-A).*
  Tracy Hillman said Tonseth sent this updated proposal and a request for the Wells HC to vote in concurrence that sufficient capacity exists at Wells Fish Hatchery via email to Larissa Rohrbach and Hillman on August 20, 2019. This topic will be discussed in today's meeting. *(Note: the proposal and request for vote via email was distributed by Rohrbach immediately following the meeting.)*

PRCC Hatchery Subcommittee

- *HSC representatives will submit a list of minimum data or information needs for making a decision on the White River spring Chinook salmon hatchery program to Tracy Hillman (Item V-A).*
  Hillman said he has not received any responses from PRCC HSC members yet.
- *Keely Murdoch and Peter Graf will ask the PRCC whether members of the HSC can participate in the PRCC meeting when Jeff Jorgensen (National Marine Fisheries Service [NMFS]) discusses the Wenatchee life-cycle model and data needs (Item V-A).*
  Graf said the PRCC agrees the HSC members can attend the discussion with Jorgensen during the next PRCC meeting on September 25, 2019, at Wanapum Dam. This item is complete.
- *Tracy Hillman will compile questions from the PRCC HSC for Jeff Jorgensen during the August 21, 2019 PRCC HSC meeting (Item V-B).*
  Hillman said this item will be addressed in today's meeting. Hillman asked if Craig Busack is still interested in engaging with the HSC regarding the White River program. Brett Farman said he will ask Busack. Hillman suggested inviting Busack to participate in the conversation with Jorgensen in the September 25, 2019 PRCC meeting at Wanapum Dam.

II. Joint HCP-HCs and PRCC HSC

A. *Relative Reproductive Success Study Extension Memorandum* Update

Mike Tonseth provided the revised RRS memorandum via email and Tracy Hillman projected it for review during the meeting. Tonseth said the revisions included updating dates and updating language about the need for approval. The most important update is to note the last year of juvenile sampling is 2020 and the last year of adult sampling is 2023. Hillman asked if revisions to this memorandum need to be approved today. Tonseth said the memorandum states that WDFW requests approval from the Rock Island HCP HC for the clarifications in scope. Larissa Rohrbach will distribute the revised memorandum following the meeting for review. Bill Gale asked if discussion

and the vote whether to approve the revisions could be delayed to the September HCP-HCs meeting. Tonseth said yes, the activities were already implemented in 2019, so approval of revisions would pertain to activities in 2020 and beyond. Tonseth said the memorandum was directed at the Rock Island committee because the Rock Island HCP utilizes Tumwater Dam's fishway and trapping facilities. Catherine Willard said both the Rock Island and Rocky Reach HCPs utilize Tumwater Dam's fishway and trapping facilities.

B. *2019 Egg Treatment Study Plan*

Betsy Bamberger said in last month's meeting the 2018 Egg Treatment Study results were reviewed. The proposed 2019 study at Wells Hatchery is very similar to what was done at Methow Fish Hatchery last year with minor changes. One new treatment group was added: placing copper-covered pot scrubbers in the egg trays. The proposed list of treatment groups are as follows:

- Elemental copper
- Formalin
- Hydrogen peroxide
- 2% salt
- Ambient water (control)

The same dosages as were used last year at Methow Fish Hatchery would be used in 2019. There would be 5 egg stacks (1 stack per treatment) holding eggs from 7 females per stack. The eggs from a total of 35 females would be required and likely to require milt from 35 males with a 1:1 mating.

Bamberger said copper pot scrubbers are laid in the topmost egg tray of the treated stack. Over time the elemental copper leaches out of the pot scrubber and has an antimicrobial effect similar to other copper-based treatments like copper sulfate.

Bill Gale asked if the leaching of the copper depends on water quality. Bamberger said it is very dependent on water quality and she theorizes the effect may depend on the location of the hatchery relative to its water supply or that the effect will change over time.

Gale asked, at the production scale, what the effluent quality or National Pollutant Discharge Elimination regulation concerns are related to discharging copper into the Columbia River. Bamberger said they have discussed concerns with the Washington State Department of Ecology (Ecology) and they did not know of any restrictions on copper in effluent. Bamberger said in Idaho where Idaho Fish and Game hatcheries are implementing production-scale use of the copper pads, the discharge of copper in effluent was well below limits. Bamberger said Ecology does not necessarily have a method for categorizing this type of effluent.

Greg Mackey said this approach cannot be used to treat alevins due to its toxicity to fish after they have hatched.

Kirk Truscott said one concern is whether the copper may be toxic to the eggs as well, and if this treatment is scaled up, toxicity to eggs should be considered. Truscott said another concern is the potential effect of copper on homing. He said some heavy metals can interfere with homing fidelity. Bamberger agreed these are valid concerns. She said in Idaho the copper pads were used on resident trout [not on anadromous species that home to a natal stream]. She said the first step would be to test the method to find out if it even works. She said Idaho Fish and Game did some work to look at whether the copper is absorbed by the egg [embryo] and found it is only absorbed into the chorion. Gale asked if anyone has tested the copper mats with anadromous species. Bamberger said she is only familiar with its use with resident trout.

Gale asked how many eggs would be used. Bamberger said all the eggs from 35 females would be used regardless of the exact number. Truscott asked if all eggs would be destroyed except for those treated with formalin. Mackey said the hatchery-production fish would be used as the formalin-treated group because formalin treatment is the typical treatment at this time and the other groups would be housed separately and destroyed at the end of the experiment. Bamberger said the eggs treated with copper should be destroyed because of FDA regulations.

Tracy Hillman asked if Douglas PUD would like approval of the study plan from the Wells HCP-HC. Mackey said it would be acceptable to ask for approval in the September meeting.

C. Leavenworth National Fish Hatchery Fish Health Update

Bill Gale asked to provide a fish health update about Leavenworth National Fish Hatchery. Gale said the hatchery is experiencing a columnaris disease outbreak in its spring Chinook salmon broodstock. He is not sure of exact numbers of fish affected but 27 adults died yesterday; fewer died today. He said these were fish that were not actively spawning yet. He said many fish have been spawned that would have died [if they were not taken for spawning]. Gale said USFWS is asking if any HCP-HC and PRCC HSC members have experience treating columnaris. Kirk Truscott asked how USFWS is currently treating the fish. Gale said the disease is affecting predominantly the males. He said the water temperatures can only be brought as low as 54°F. Catherine Willard said one fish that was collected for the Chelan Falls summer Chinook program exhibited signs of columnaris. She said it was returned to the river and was not brought to Eastbank Hatchery. However, Eastbank Hatchery is treating the fish prophylactically with Diquat as a preventative measure. Gale said USFWS was surprised because they haven't seen it in a long time and haven't had to treat it at LNFH. Betsy Bamberger said the well-water at Wells Fish Hatchery is also 54°F and she was also surprised to see the disease at this low temperature.

Bamberger suggested using chloramine-T and oxytetracycline as early treatments. Bamberger said once the disease is expressed, the disease may be beyond the phase when these treatments are effective. Bamberger said she prefers using Diquat to treat columnaris to minimize handling. Bamberger said that Douglas PUD has treated their summer Chinook salmon with Diquat.

D. Genetics Updates to the Monitoring and Evaluation Plan for PUD Hatchery Programs

Tracy Hillman reminded the committees that Catherine Willard took on the task of incorporating feedback from the invited panel of geneticists (provided in a memorandum dated December 13, 2018) into the genetic monitoring objective in the PUDs' M&E Plan (Update to the 2017 Plan).

Willard said the three PUDs are planning to conduct the genetic analyses for the 10-year Comprehensive Report. She said not all of the objectives in the genetics section of the M&E Plan were relevant to the current conservation programs and the objectives did not address the potential for changes in genetic diversity in natural populations as a result of a hatchery program. Willard worked with Todd Seamons (WDFW geneticist) to ensure her revisions were accurate.

Willard said the major changes were as follows:

1. An evaluation of linkage disequilibrium was added.
2. Beginning with brood years 2017 and 2018, testing of statistical hypotheses associated with genetic components (Hypotheses 3.1, 3.2, and 3.3) will be conducted with natural-origin baseline samples (the earliest genetic samples available for each program) and natural-origin contemporary samples. Testing will be repeated every ten years (approximately two generations). If significant differences between baseline samples and contemporary samples are found, contemporary hatchery-origin samples will be analyzed to evaluate if the difference can be attributed to the hatchery programs.

Seamons proposed the stepwise approach for analyzing hatchery-origin samples only if there is a deviation observed between the contemporary natural-origin fish and baseline natural-origin fish.

Kirk Truscott asked if DNA samples would be archived for every brood year. He said a concern might be that if this analysis is carried out only every 10 years, a major change could be observed that could have been headed-off earlier with a change in operations. He suggested there may be incremental changes in allele frequencies that could be observed with more frequent analysis. Willard said the original question was whether hatchery programs are affecting the natural population. She said Truscott's question may be an additional question. Truscott said this may be a different question of minimizing risk of hatchery operations to the natural populations. Truscott said perhaps over several decades a deviation from the natural population could be prevented. Willard asked what the contemporary hatchery samples would be compared against. Truscott suggested

comparing the contemporary hatchery-origin fish against the contemporary natural-origin fish and to the natural-origin baseline.

Peter Graf said in most cases the natural-origin fish would be tested anyway for the conservation programs. Truscott said any hatchery-origin fish should be tested because hatchery-origin fish are on the spawning grounds and some gene flow would occur every year. Bill Gale agreed, if hatchery-origin fish are being used for brood. Gale asked if it would be necessary to test the hatchery-origin fish in the conservation programs and safety net programs to identify divergence. Gale said the additional effort may be reasonable with newer genetic analysis techniques. Graf said that may triple the number of samples if we test natural-origin conservation program fish, hatchery-origin conservation program fish, and hatchery-origin safety-net program fish.

Hillman said the revisions could be made in the hypotheses in Section 7.1.1. of the M&E Plan. Hillman also suggested rephrasing the hypotheses in terms of bioequivalence testing. This requires the Committees to identify a biologically meaningful effect size.

Greg Mackey said Douglas PUD also talked with Seamons. Mackey said that neutral markers are used to look for genetic drift; these genes should not be related to selective traits. Mackey said that Seamons said geneticists really want to understand what the markers of selective traits are. Mackey said that especially for small hatchery programs such as the Twisp component of the Methow spring Chinook salmon population that uses a broodstock of 30 fish, the reproductive success is variable and the returns from that small population are likely to be different from the larger population, making genetic monitoring results hard to interpret. In this case, Seamons suggested monitoring only the wild population to ensure its genetic baseline is stable in time. The point is that a lot of samples could be analyzed, and the results may still not provide information that can be used to inform management decisions.

Graf said if the hatchery fish are not a separate population, there should not be divergence from the wild population because of genetic mixing within the broodstock and on the spawning grounds. He said the difference year-over-year depends on which part (e.g., subsample) of the population is taken for broodstock. Truscott said yes, that may be true if the proportion of natural-origin brood is 1 every year. Gale agreed but said the degree that the populations are mixed is different every year.

Gale asked if it would help if the hypotheses were rephrased to look for a genetic difference, then ask the geneticists to review the hypotheses again to determine what difference is meaningful. Willard suggested asking the geneticists to provide an effect size. Gale and Mackey said they interpreted that the genetics panel would indicate that it depends upon things like population size. Truscott said he would expect more deviation to occur with a small population.

Hillman said in terms of bioequivalence testing, the hypotheses statements would be reversed from the current version and refined with an effect size. Willard said it is not likely that the committees could agree to a level of biological significance in genetic divergence for making management decisions. Gale suggested establishing a threshold for re-evaluating whether there is a biologically relevant difference. Hillman said a similar situation occurred in observed differences between adult hatchery-origin and natural-origin sizes and the Committees determined the observed difference was not biologically significant.

Willard said she would ask Seamons, and Gale said he would ask Christian Smith (USFWS geneticist) for their opinions on an effect size.

Mackey said the intent of the report is to provide information that can be used by managers for making decisions. Mackey said the results need to be put into context with the significance of the results.

Hillman asked Truscott if the change [to compare genetics of contemporary hatchery-origin fish to contemporary natural-origin fish and the natural-origin fish baseline] should be made to several of the genetic analysis approaches in the M&E Plan. Truscott said yes, this would be a recommended revision.

Hillman revised a hypothesis to compare contemporary hatchery-origin fish to the natural-origin contemporary broodstock and baseline. Willard said she would take this hypothesis and discussion regarding bioequivalence back to Todd Seamons and would provide an update at the next meeting.

E. 2019 Broodstock Collection Updates

Bill Gale said Entiat National Fish Hatchery has a few summer Chinook salmon coming in and expects a bigger pulse.

Greg Mackey said Wells Fish Hatchery had collected most of the summer Chinook salmon broodstock to support production for the orca program and surplused a lot of fish for tribal consumption. Mackey said some fish were also held for transport above Grand Coulee Dam. Gale asked about the Yakima Basin summer Chinook salmon program. Mackey said the Yakama Nation (YN) has taken fish for food but have not taken adults for broodstock. Gale said he thought adults could not be transferred from the Columbia River to the Yakima Basin for fish health reasons; this is the reason the YN has historically taken eggs.

F. Broodstock Collection Topics: Discussion Plan

Tracy Hillman asked Mike Tonseth to identify the draft timeline for BCP production described in the existing SOA. Tonseth said that unlike the previous SOA that was specific to HCP programs, this

version would include the PRCC HSC programs as well. Tonseth said parts of the SOA were brought into the bulleted timeline and it reflects when discussions of major topics should occur and when deliverables should be available for review to ensure that work on any major issues starts in September, well in advance of the draft BCP review. This would also be the time that individuals would be tasked with leading discussions. That is, assignments would be made in November. Discussions and agreements would be finalized in December. The draft document would be finished by January 10 for internal permit holder review. By February, the draft would be available for all committee members. The March and April dates are the standard schedule used in past years for delivery to NMFS and USFWS. Tonseth said the previous SOA only identified NMFS as the recipient; he included USFWS because of their role in permit review.

Peter Graf noted that the issues for early discussion would be related to programmatic changes that are not dependent upon run-size projections, which are rarely available until spring. Graf suggested adding placeholders to the BCPs for content that depends on run-size projections. Tonseth said it is correct that the *US v. Oregon* Technical Advisory Committee (TAC) forecast is typically available in December for fall Chinook salmon, sockeye salmon, and steelhead, and a more localized approach is being used for spring Chinook salmon because the TAC projection is not very accurate for spring Chinook salmon at the local level. Topics like marking plans and trapping locations, operations, and methods can be resolved earlier. Tonseth said this should not preclude having some discussions later in the timeline as opinions can change.

Bill Gale asked when Tonseth would like information submitted from HCP parties. Tonseth requested that information be received by mid-November and noted it could be brought forth sooner but receiving it by mid-November allows for the document to be developed in a timely manner.

Gale suggested adding language to re-valuate the timeline after the first year of implementation.

Deanne Pavlik-Kunkel said that a separate SOA may be required for the different committees. Tonseth said that's acceptable but suggested starting with one document and replicating them later for the separate PUDs, and Pavlik-Kunkel agreed.

Graf said one consideration is that broodstock collection for fall Chinook salmon programs occurs much later in the year than other species, so discussions could occur later than for other programs. Tonseth agreed and said the content is mostly consistent from one year to the next, but the BSPs are a living document that can be modified within the year as an adaptive management tool.

Hillman projected and read through the list of topics that would require early discussions to support BCP revisions (Attachment B). Committee members were identified to lead discussions of individual topics. Gale suggested identifying items that require deliberation and decision in the Committees but are not necessary for development of the BSPs, such as conservation program sizing, source for

Chiwawa spring Chinook salmon broodstock, and out-planting Methow spring Chinook salmon spawners. Graf asked if it is possible to identify the timing for the discussions that may affect program sizing. Tonseth said for some topics, dates must remain flexible because the programs are waiting for information (e.g., to resolve program sizing based on the results of Wenatchee Basin life-cycle modeling or spring Chinook salmon pre-spawn mortality estimates) and some of that information will become available with development of the 10-year Comprehensive Report in 2020.

Hillman assigned meeting dates to topics that could be addressed for the next annual BCP and noted topics where decisions are pending additional information.

Tonseth said per the conversations on conservation program resizing that have been ongoing in the HCP-HC meetings, the first program for consideration is Nason Creek. Methow programs may be discussed later.

Kirk Truscott said for identification of natural-origin Okanogan spring Chinook salmon to distinguish them from natural-origin Methow spring Chinook during trapping at Wells Dam, the method would need to be determined for 2021. Truscott said there may be a desire to carry out some work to start establishing the baseline this year.

Greg Mackey suggested adding a line for identifying requests for adults for research or non-routine use of fish. Tonseth said needs can be identified in the BCP for programs that want to lock in their requirements, but these non-routine requests could also be considered later in the year. Requests may require a Joint Fisheries Parties (JFP) discussion first to determine whether there is an effect on HCP programs, then incorporation into the BCPs, if possible. Gale asked if the need for JFP discussion would pertain to additional requests for adults that are surplus to production. Tonseth said the JFP discussion is to determine the use of adults that are surplus to the production to meet requests prior to distribution for consumption. Tonseth said one consideration which may involve HC discussion is whether a surplus request (once surplus is identified) for a study or evaluation that benefits an HCP program would have priority before other considerations. Mackey said the intent of his suggestion was simply to make sure these requests are considered ahead of time.

Tonseth suggested sending the SOA to the HCP-HCs and PRCC HSC for review and final approval in the October 16, 2019 meeting. *(Note: Rohrbach distributed the* Broodstock Collection Protocols Development Timeline Statement of Agreement *following the meeting, requesting that edits be returned to Mike Tonseth by September 6, 2019.)*

G. National Marine Fisheries Service Consultation Update

Brett Farman said Emi (Kondo) Melton has sent the Chinook salmon and steelhead permit bundle for internal signature, and then it will be sent out for countersignature by the program managers.

Greg Mackey said he received a note that there could be a request for signatures from NMFS within two weeks.

III. Wells HC

A. Wells Hatchery Subyearling Production Expansion

Mike Tonseth said last month a discussion was initiated in which WDFW asked for concurrence from the Wells HC that the existence of a 500,000 subyearling summer Chinook salmon program reared at Wells Fish Hatchery for orca prey would not compromise the existing, on-station HCP programs. He said the discussion was initiated to demonstrate what capacity exists at Wells Fish Hatchery and what additional capacity would be needed. Tonseth sent an email on August 20, 2019, to Tracy Hillman and Larissa Rohrbach that breaks those requests out. *(Note: Tonseth's email was distributed by Rohrbach to the Wells HC following the meeting.)* The original proposal was for 1 million smolts per year to be reared at a cost of $350,000. The Washington State legislature responded to the proposal with funding for $350,000 for the biennium, allowing for only half the number of smolts, but ultimately WDFW would like to achieve the production of 1 million smolts from the Upper Columbia River. Tonseth calculated the needs for both the 500,000 and 1 million-smolt production size. His conclusion was that even with an addition of 1 million subyearlings, only about 85% of the capacity of Wells Fish Hatchery would be in use. He said the limitations pertained to the adult holding capacity rather than juvenile rearing capacity.

Hillman asked Tonseth if the conclusion was that this production would not adversely affect the Wells Fish Hatchery production. Tonseth said yes, even if this program were held in common rearing vessels, densities would be well below the management protocols of 0.06 lbs/ft^3/inch. Hillman asked if these fish would be reared separately. Tonseth said no, these would be reared in common in the same dirt ponds, allowing the program to use the coded wire tag data associated with the Wells production fish to track success of the 500,000-smolt orca prey program.

Tonseth said the additional production may result in an increase of surplus adult returns of up to 1,500 fish. Tonseth said funding will be requested for additional years but at this time there is only funding for 2 years.

Kirk Truscott asked if there is any concern about chilled water availability. Greg Mackey said there is plenty of chilled water incubation space available, beyond what is commonly used.

Tonseth requested that the Wells HC vote on the additional subyearling production via email within 10 days from today, by September 4, 2019. Truscott said CCT is prepared to vote now in the affirmative.

(Note: Bill Gale responded to the Wells HC via email on September 3, 2019, stating USFWS's vote in concurrence is based on the following understanding,

> *"Our understanding is that [brood year] BY 19 production can move forward because surplus adults are available and that there was consensus among the fishery co-managers about distribution of surplus for this portion (i.e. this productions (sic) is sourced through WDFW's share of surplus). However, production in [brood year] BY 20 will depend on 1) the designation of surplus brood being available, and 2) the distribution of that surplus in a manner that has the approval and consensus of the fishery co-managers.")*

(Note: Additional information on Wells Hatchery rearing capacity was provided by Greg Mackey, and distributed by Larissa Rohrbach, to the Wells HCP-HC on September 9, 2019, included as Attachment C to these minutes.)

IV. Rock Island/Rocky Reach HC

A. 2020 Draft Monitoring and Evaluation Implementation Plan

Catherine Willard said there were no major changes regarding activities to be implemented in 2020 compared to 2019. Willard said changes including improving wording, permit number updates, and updates to Table 1 to show who is doing what activities.

Willard said methods used to estimate brood year 2020 steelhead spawner abundance by tagging at the Off-Ladder Adult Fish Trap that had been historically done by WDFW would be carried out by Chelan PUD. Greg Mackey asked whether there would be any spawner surveys at all. Willard said they will still do spawner surveys in the lower Wenatchee River. She said Chelan PUD is looking at are other methods that could be used to estimate spawner abundance without spawning surveys in future years.

Kirk Truscott said Objective 7 for collecting genetic samples does not appear in the summary tables. Willard said she would revise the tables to add that objective. Truscott said there was a reference to methods consistent with the 2018 steelhead release plan and said that release plan should be appended to the document. Willard agreed to append the steelhead release plan.

The draft 2020 Chelan PUD M&E Implementation Plan was revised by Willard and distributed by Larissa Rohrbach on August 21, 2019, to the HCP-HCs via email for review through August 30, 2019.

V. PRCC HSC

A. Approve the July 17, 2019 Meeting Minutes, Committee Updates, and Meeting Summary Review (Todd Pearsons)

The PRCC HSC representatives approved the July 17, 2019 meeting minutes as revised.

Bill Gale asked if there were any updates to the ongoing broodstock collection activities. Deanne Pavlik-Kunkel said no, everything is following the typical routine and plans. Pavlik-Kunkel said there is a new plan for surplusing fish. Gale asked if the surplussing plan has been shared with other parties. Mike Tonseth said it has not been shared outside of the requestors for surplus. Pavlik-Kunkel said it had not been shared more broadly because it was about logistics, schedule, and where and when surplus fish would be distributed.

B. Wenatchee Spring Chinook Salmon Life-Cycle Model: Data and Questions

Tracy Hillman projected a draft list of questions for Jeff Jorgensen in preparation for Jorgensen's presentation in the September 25, 2019 PRCC meeting. Hillman added to and revised the questions during the discussion.

Bill Gale asked if the focus would be on modeling the effect of re-implementation rather than the effect of the previous program implementation. Peter Graf responded that the intent was to identify questions that would prepare Jorgensen for the discussion in the next PRCC meeting such as how well the model reflects reality based on modeling of the Nason and Chiwawa rivers and how the model could be applied to the question of restarting a hatchery program.

Gale asked what Jorgensen has been asked to talk about specifically. Hillman said the model was designed to evaluate the effects of different factors, including hatchery programs, on the survival of the Wenatchee spring Chinook salmon population.

Kirk Truscott reiterated the question of what data would be required to develop a model for a White River component of the spring Chinook salmon population in general; for instance, what level of predation occurs in the lake, where in the lake does it occur, what are the major predators, etc. Truscott said there is a decision pending in 2026 whether to implement the program or not. Truscott said he does not believe it is acceptable to walk away from implementing a White River hatchery program if NMFS advocates that the program is important for recovery of the Wenatchee population. Truscott said there could be other management actions, such as predator reduction, as an alternative to hatchery production.

Graf said the difficulty in moving the issue forward in the PRCC and the PRCC HSC has been determining what the targets for mitigation should be. Graf said, of course, any information on

factors like predation would benefit the model but pursuing that information may not help lead to a decision related to hatchery mitigation.

Gale said he supports implementing the model, but to answer the question of whether to start a hatchery, as a collective group, the PRCC HSC would want to be in the position of determining what Grant PUD's mitigation obligations are. A perfect model of the life cycle is not the only solution to answering those hard questions. Graf agreed and said the model will inform all the programs, but it won't answer the main questions of whether to construct a hatchery in the White River, what the broodstock would be, whether to composite the broodstock, etc.

Truscott said if you could quantify predation by bull trout, for example, the likelihood of reducing or eliminating bull trout predation is low, and the model will inform you that no matter how many fish are produced in a hatchery, survival would be low. Graf said that a model of the White River may not necessarily be needed to inform the outcome of a potential hatchery program because information on Nason and Chiwawa survival exists, and Lake Wenatchee survival estimates exist.

Hillman said Jorgensen's life-cycle model isn't built to estimate predation in the lake. To do so, it would need estimates of predator abundance, prey abundance, consumption rates, digestion rates, temperatures, etc. Graf said the model downstream of Lake Wenatchee is the same for the Nason and Chiwawa populations. Truscott said that further work to characterize predation was proposed but not approved by consensus in the PRCC. Truscott said if the predator is pikeminnow, for instance, the problem could be managed and a hatchery program may be viable. Gale said it is more complex than that. For example, bull trout may increase predation on smolts if the number of competing pikeminnow is reduced. Gale said his view is that the White River population may be unique because it has co-evolved with other species in Lake Wenatchee. Gale said he would hesitate to recommend knocking down predator abundance in this ecosystem. Graf said identifying the source of predation in the lake is a food-web study, which would be a different study than a survival study to support Jorgensen's model. Truscott said his concern is arriving at 2026 without data supporting a decision on how to recover the White River spawning aggregate.

Gale said he would like to hear more about why the White River spawning aggregate is so important to the recovery of the species. Graf said a status review will occur soon that may inform that question. Truscott said diversity is one reason. Hillman said the importance of White River spring Chinook salmon goes back to the Quantitative Analysis Report and the development of the HCPs. At that time, the National Oceanic and Atmospheric Administration (NOAA) and others struggled with determining the importance of the White River group. Because of its genetic divergence from the Wenatchee population, some thought it should be identified as an independent population (separate from the Wenatchee population). It was decided, however, that White River spring Chinook salmon should be designated as an important aggregate of the Wenatchee population. In the recovery plan,

White River spring Chinook salmon were designated as a separate spawning aggregate, which is needed to maintain diversity and allow local adaptation. Recently, Craig Busack has said they (NOAA) need to evaluate the importance of White River spring Chinook salmon for recovery. Truscott said White River natural-origin spawners are still the most divergent of all the spawning aggregates in the basin. If there was no survival benefit of having White River genes, wouldn't they have the same genetic profile as the Chiwawa fish? Chiwawa fish have been spawning in the White River as long as the program has existed and for some reason they are not as successful as the White River fish. There's still enough genetic differentiation that they can be identified during broodstock collection to differentiate from Chiwawa and Nason fish. Gale said he'd like to know if the genetic differentiation has already been lost due to over-escapement of Chiwawa fish into the Nason and White rivers and he would like to see a comparison using modern genetic analyses to past analyses. Graf said genetics work to be completed in 2019 and 2020 will answer some of those questions. Gale asked if White River fish will be sampled on the spawning grounds. Graf said yes, carcasses in the White River will be sampled. Hillman said there have been about 25 years of genetic influence of the Chiwawa program on the White River aggregate.

Hillman said Jorgensen's model evaluates the effects of hatchery production on survival using proportion of hatchery origin spawners (pHOS) in the Wenatchee Basin. Graf said the model worked by discounting the spawning success of that natural population based on the influence of hatchery fish. Truscott recalled that Jorgensen was adamant that food-web information in the lake would be necessary to model the population survival. Graf agreed if you want that level of information. However, if you want a simple survival number, it's not necessary.

Gale said the best thing managers could do would be to prevent Chiwawa fish from over-escaping into the White River. Truscott said changes have been made in that direction by carrying out adult management at Tumwater Dam and reducing jack rates because jacks stray more than older fish.

Hillman asked Brett Farman if he had any questions for Jorgensen. Farman said that he did not. Tom Scribner said he would like to ask NOAA (Busack) how important the White River is to recovery, if in fact modeling shows that the impacts in Lake Wenatchee are insurmountable for sustaining a hatchery population. Hillman suggested Busack participate in the September PRCC meeting so he can address some of those questions. Farman said he will invite Busack.

Graf said Grant PUD would send more questions to Hillman for Jorgensen before the end of the month. Hillman requested that members provide any additional questions for Jorgensen by August 30, 2019. Hillman will then forward questions to Jorgensen.

VI. Administration

A. Next Meetings

The next HCP-HCs and PRCC HSC meetings are September 18, 2019, October 16, 2019, and November 20, 2019, at Grant PUD in Wenatchee, Washington.

VII. List of Attachments

Attachment A List of Attendees
Attachment B Broodstock Collection Protocols Discussion Topics for 2020
Attachment C Information for the Wells Orca Production Discussion and Vote Request

Attachment A
List of Attendees

Name	Organization
Tracy Hillman	BioAnalysts, Inc.
Larissa Rohrbach	Anchor QEA, LLC
Ian Adams	Chelan PUD
Catherine Willard*	Chelan PUD
Kirk Truscott*‡	Colville Confederated Tribes
Betsy Bamberger	Douglas PUD
Greg Mackey*	Douglas PUD
Tom Kahler*	Douglas PUD
Peter Graf‡	Grant PUD
Deanne Pavlik-Kunkel	Grant PUD
Brett Farman*‡º	National Marine Fisheries Service
Bill Gale*‡	U.S. Fish and Wildlife Service
Mike Tonseth*‡º	Washington Department of Fish and Wildlife
Tom Scribner*‡º	Yakama Nation

Notes:
* Denotes HCP-HC member or alternate
‡ Denotes PRCC HSC member or alternate
º Joined by phone

Attachment B
Broodstock Collection Protocols Discussion Topics for 2020

Topic	Discussion Lead	Meeting Date for Discussion
Review of the Broodstock Collection Protocols to identify major revisions needed and assign co-authors	Tracy Hillman	September
Elemental signature analysis could differentiate natural-origin Okanogan spring Chinook salmon from other natural-origin Chinook salmon during broodstock collection at Wells Dam for Methow Fish Hatchery programs	Kirk Truscott	
Sizing of upper Columbia River conservation programs**	All	TBD—Based on prespawn survival (currently working on Nason Spring Ch)
Use of age-3 males in broodstock Use of alternative mating strategies	Greg Mackey	Sept
Establishing ranges around broodstock collection targets	Greg	Sept-Oct
Source for Chiwawa spring Chinook salmon broodstock	Catherine	Oct
Outplanting surplus Methow Composite Spring Chinook Salmon Adults**	Mike	Sept-Oct
Request for HCP surplus adults for research or other requests	All	Sept-Feb
Revised Broodstock Collection Protocols Development Timeline SOA	Mike Tonseth	

**Programs in part independent of BSP.

Wells Hatchery Capacity
September 9, 2019

The following provides information on incubation and rearing space allocation and chilled water supply. This demonstrates that Wells Hatchery has sufficient capacity to incubate and rear the Orca summer chinook program in addition to programs already in production. The Dirt Pond 3 "sink hole" that developed in 2017 was likely caused by a leak in the old liner at a location where an old buried (previously unknown) concrete structure existed. We believe, after excavating this area, that the concrete structure exacerbated the erosion. Dirt Pond 1 has been relined and is currently in service. By September 26, 2019 Dirt Ponds 3 and 4 will be lined with a new heavy duty Coletanche liner. Dirt Pond 2 is not currently in active use but is still operational if needed. All other incubation and rearing facilities are 100% operational.

1. Trout:
    a. Incubation in old building September – March. Shallow Troughs. No chilling required.
    b. Early Rearing in old building.
    c. Grow Out: Bureau Ponds, Above Ground Ponds, Dirt Pond 3B. Final Grow Out in Dirt Pond 3B.
2. Sturgeon:
    a. Early rearing in Sturgeon Room circulars. No chilling.
    b. Grow Out in Sturgeon Room circulars.
3. Summer Chinook Yearlings:
    a. Incubation in one large Incubation Room. Chilled for ~240 days to slow down growth (October – May).
    b. Early Rearing in Production Room spring.
    c. Transitional rearing in Above Ground Ponds or Bureau Ponds
    d. Grow Out in Dirt Pond 1 September – April.
4. Summer Chinook Subyearlings:
    a. Incubation in one large Incubation Room. Chilled briefly to synch up egg take dates (October-November).
    b. Early Rearing in Production Room late winter.
    c. Transitional rearing in Above Ground Ponds or Bureau Ponds
    d. Final Grow Out in Dirt Pond 1 April - May.
5. Steelhead Columbia Safety New and Methow Safety Net:
    a. Incubation in one small incubation room April-June. Chilling as needed to synch up egg take dates.
    b. Early Rearing in Production Room in summer.
    c. Transitional rearing in Circular Ponds
    d. Final Grow Out in Dirt Ponds 4A and 4B.
6. Okanogan Steelhead:
    a. Incubation in one small incubation room April-June. Chilling as needed to synch up egg take dates.
    b. Early Rearing in Production Room in summer.
    c. Transitional rearing in Circular Ponds
    d. Final Grow Out in Circular Ponds.

7. Twisp/Methow Conservation Steelhead:
    a. Early incubation at WNFH – eyed eggs to Wells Hatchery in summer – one small room.
    b. Early Rearing in Production Room in summer.
    c. Rearing in Circular Ponds
    d. Final Grow Out in Circular Ponds.
8. Coho:
    a. Early incubation at WNFH – eyed eggs to Wells Hatchery in December – one small room. Chilling December – April.
    b. Early Rearing in Production Room in summer.
    c. Transitional rearing in Circular Ponds
    d. Final Grow Out in Dirt Pond 3A.
9. Summer Chinook Subyearlings Orca Program:
    a. Incubation in one large Incubation Room with HCP Subyearlings. Chilled briefly to synch up egg take dates (October-November).
    b. Early Rearing in Production Room late winter.
    c. Transitional rearing in Above Ground Ponds or Bureau Ponds
    d. Final Grow Out in Dirt Pond 1 April - May.

Incubation: Wells Hatchery has 7 new incubation rooms. Chilling capacity is 250 gpm to 38 F from a pair of new Daiken chillers. Wells Hatchery also has an additional incubation facility in the old building with 672 trays and a separate chiller that supplies 40 gpm of 38 F water (This is the chiller that was sufficient to produce the entire Wells Hatchery Summer Chinook production prior to the modernization project. We service and operate this chiller annually to keep it in full operational condition). The maximum incubation chiller demand is 190 gpm when Subyearling Chinook (HCP and Orca), Yearling Chinook, and Coho all use chilled water (Subyearlings and Coho may not overlap), resulting in at least 60 gpm of surplus chilled water capacity in the new building and 40 gpm in the old building summing to 100 gpm total. Regarding the 7 incubation rooms in the new building: During the October – May incubation period all summer Chinook production may use up to the 2 large rooms, Coho 1 small room, steelhead 2 small rooms (in spring). There will be at least 2, and normally 4 empty rooms at any one time. Thus, there is plenty of capacity to meet incubation needs.

Rearing : Dirt Ponds 3, and 4 are in the process of being re-lined and will be complete by September 26, 2019. Dirt Pond 1 is already complete and is in use. Dirt Ponds 3 and 4 have each been split into two sections (3A, 3B, 4A, 4B) with separate release structures for each. The ponds are being re-lined with a heavy duty Coletanche liner. Dirt Pond 2 is not required for production but is available and supplies a massive amount of rearing space. Rearing in all of the Dirt Ponds is at very low fish densities.

All other rearing vessels (Bureau Ponds, Above Ground Ponds, Adult Ponds, Circular Tanks, Production Room, old Production Room, Sturgeon Room) are in 100% operational capacity.

Contingency Plan: As illustrated above, Wells Hatchery has sufficient and redundant capacity to meet the fish rearing needs. Should a portion of the facility become unusable, the unused capacity of the facility will be used to compensate. The new Hatchery Building has extra incubation space if needed. Production Room space typically is open expect for fairly short periods when Chinook are present, and we added 4 new large start tanks in 2019 to increase capacity and flexibility. Another 4

will be installed in 2020. The old Hatchery Building has enough incubation and early production space to compensate for an event in the new building. The facility has multiple rearing options, and fish can be moved around as needed. For large groups fish can be moved to Dirt Pond 2. Dirt pond 2 has been surveyed using geologic electro-resistivity techniques and no voids were detected. In the case of a loss of water supply due to an electrical or pump outage, we have a detailed Emergency Action Plan for hatchery staff to follow to quickly restore the water supply, and contingency actions to take with aerators and oxygen, as needed.