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: February 22, 2019

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

cc: Larissa Rohrbach, Anchor QEA, LLC

Re: Final Minutes of the January 16, 2019 HCP Hatchery Committees and PRCC Hatchery Subcommittee Meetings

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCP) Hatchery Committees (HC) and Priest Rapids Coordinating Committee Hatchery Subcommittee (PRCC HSC) meetings were held on Wednesday, January 16, 2019, from 9:00 a.m. to 1:00 p.m. Attendees are listed in Attachment A to these meeting minutes.

Action Item Summary

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). *(Note: this item is ongoing)*
- Greg Mackey will continue researching whether to include age-3 males in broodstock and discuss it with Craig Busack (National Marine Fisheries Service [NMFS]; Item I-A). *(Note: this item is ongoing.)*
- Keely Murdoch will attempt to provide coho salmon broodstock collection protocols to Mike Tonseth by early February for inclusion in the draft 2019 Broodstock Collection Protocols (Item I-A). *(Note: this item is ongoing.)*
- Mike Tonseth will coordinate with Andrew Murdoch (Washington Department of Fish and Wildlife [WDFW]) regarding presenting pre-spawn mortality modeling results for spring Chinook salmon at an upcoming HCP-HC meeting (Item I-A). *(Note: this item is ongoing.)*
- Keely Murdoch will research past co-mingling ratios of coho salmon to spring Chinook salmon at Winthrop National Fish Hatchery or other locations (Item I-A). *(Note: this item is ongoing.)*
- Larissa Rohrbach will obtain approval or abstention from NMFS to approve the December 2018 meeting minutes (Item I-A). *(Note: NMFS did not respond to a request for a vote within 5 business days and therefore abstained. Brett Farman [NMFS] approved via email on February 13, 2019)*

- Larissa Rohrbach will schedule a tentative conference call on March 11, 2019, at 2:30 pm for the HCP-HC and PRCC HSC to discuss the draft 2019 Broodstock Collection Protocols (Item I-A). *(Note: Rohrbach sent a calendar placeholder via email on January 28, 2019)*
- Catherine Willard will update the genetics section of the *Monitoring and Evaluation 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 II-A)
- Mike Tonseth will share draft 2019 Broodstock Collection Protocols with the HCP-HC and PRCC HSC by February 11 (Item II-B).
- Greg Mackey will confirm with Betsy Bamberger (Douglas PUD) whether Douglas PUD will use the Washington Animal Disease Diagnostic Laboratory (WADDL) for in-season bacterial kidney disease (BKD) testing during 2019 broodstock collection and confirm that WADDL methods will provide ELISA optical density test results (Item II-B).
- Kirk Truscott will discuss with Colville Confederated Tribe (CCT) biologists whether elemental signature analysis in fish scales, fin rays, or otoliths 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 II-B).
- Mike Tonseth will ask Andrew Murdoch for interim pre-spawn mortality data for spring Chinook salmon to incorporate into the 2019 Broodstock Collection Protocols (Item II-B).
- Larissa Rohrbach will add the size of upper Columbia River conservation programs as a periodic agenda item (Item II-C). *(Note: this item is ongoing)*
- Mike Tonseth will ask Andrew Murdoch to provide to the PUDs a list of passive integrated transponder (PIT)-tag arrays that will be shut down if not funded, the cost to operate and maintain these arrays, and the cost of PIT tagging steelhead at the Priest Rapids Dam Off-Ladder Adult Fish Trap (OLAFT; Item II-D)
- Larissa Rohrbach will draft email distribution lists merging HCP-HC and PRCC HSC recipients for review and approval by the HCP-HC and PRCC HSC and the HCP Coordinating Committees (Item II-E). (*Note these documents were emailed by Rohrbach to the HCP-HC and PRCC HSC on February 7, 2019)*
- Larissa Rohrbach and Tracy Hillman will revise and distribute meeting protocols for the HCP-HC and PRCC HSC for review and approval (Item II-E). (*Note these documents were emailed by Rohrbach to the HCP-HC and PRCC HSC on February 7, 2019)*
- Tracy Hillman will send the Statement of Agreement (SOA) regarding conflicts of interest to Larissa Rohrbach for inclusion of language in the meeting protocols (Item II-E). *(Note: The most recent Conflict of Interest Policy, dated January 26, 2013, was emailed by Hillman to Rohrbach on January 17, 2019)*

Wells Hatchery Committee

- Greg Mackey will provide a revised version of Douglas PUD's draft 2019 Monitoring and Evaluation (M&E) Implementation Plan for HCP-HC approval by email (Item III-A).

Decision Summary

- The HCP-HC and PRCC HSC agreed to add analysis of linkage disequilibrium to the Hatchery M&E Plan (update to the 2017 Plan). Chelan PUD, Douglas PUD, Grant PUD, U.S. Fish and Wildlife Service (USFWS), WDFW, CCT, and the Yakama Nation (YN) approved during the meeting on January 16, 2019, and NMFS abstained (Item II-A). *(Note: Brett Farman [NMFS] approved via email on February 13, 2019).*

Agreements

- The HCP-HC and PRCC HSC agreed to the following items regarding joint meetings:
  - Combine meeting attendance into one forum
  - Issue one meeting agenda (including estimated duration for discussion items) and one set of meeting minutes
  - Develop similar protocols for documentation and distribution of materials in emails, pending agreement to final distribution lists
  - Develop joint meeting protocols
- Chelan PUD, Douglas PUD, Grant PUD, USFWS, WDFW, CCT, and YN approved during the meeting on January 16, 2019, and NMFS abstained (Item II-E). *(Note: Brett Farman [NMFS] approved via email on February 13, 2019)*

Review Items

- Larissa Rohrbach sent an email to the Rocky Reach and Rock Island HCs on January 21, 2019, notifying them that the 2019 Wells HCP Action Plan is available for a 30-day review with edits due to Tom Kahler by February 21, 2019.

Finalized Documents

- No items have been recently finalized.

I. Welcome

A. Review Agenda, Review Last Meeting Action Items, and Approve the December 19, 2018 Meeting Minutes (Hillman)

Tracy Hillman welcomed the HCP-HCs and PRCC HSC and explained the purpose for changes in the structure of today's agenda. Hillman noted that this will be the first meeting in which the HCP-HCs and PRCC HSC will meet with a single chair/facilitator on the same day. To meet the needs of the newly-formed meeting structure, changes have been made to the format of the agenda including subsections that reflect grouping of agenda items by the names of the committees (i.e., Wells, Rocky Reach, Rock Island, or PRCC HSC) and addressing action items within each subsection of the agenda. These changes will allow different parties to join or leave portions of the meeting that are relevant to their agreements.

Hillman asked for any additions or changes to the agenda. Additions were requested as follows:

- Hillman struck the NMFS consultation update due to lack of NMFS representation at the meeting.
- Sarah Montgomery moved the "Streamlining HCP-HCs and PRCC HSC meetings" discussion from the PRCC HSC section of the agenda to the Joint HCP-HCs/PRCC HSC section of the agenda.
- Catherine Willard added an item to the Rocky Reach and Rock Island HCs regarding an update on Tumwater Dam fishway repairs.

Larissa Rohrbach said there were only editorial or clarifying revisions to the December 19, 2018 meeting minutes and no substantive revisions requiring review by the HCP-HCs and PRCC HSC representatives. Representatives for Douglas PUD, Chelan PUD, Grant PUD, YN, and USFWS approved the December minutes. Representatives from WDFW and CCT abstained. Representatives from NMFS were not present due to the partial federal government shutdown, causing Hillman to delay final approval of the minutes for an additional 5 business days at which time NMFS may respond with their approval via email, or a lack of response will be noted as abstention from voting. If no response is obtained by January 24, 2019, Larissa Rohrbach said she will notify the NMFS representatives via email that the December minutes are approved. Brett Farman (NMFS) approved via email on February 13, 2019.

Action items from the HCP-HC meeting on December 19, 2018, and follow-up discussions were addressed *(note: italicized text below corresponds to agenda items from the meeting on December 19, 2018)*:

- *Tracy Hillman will review aspects of the Independent Scientific Advisory Board's Review of Spring Chinook Salmon in the Upper Columbia River under Hatchery Committees' purview (Item I-A).*
  Hillman provided an update on the status of this action item by describing the multiple paired before-after, control-impact (MPBACI) modeling tool, which demonstrates population-level responses to spring Chinook salmon supplementation in paired treatment and control streams. Hillman said the model was built using data from the Coordinated Assessments Data Exchange[1] and other sources from the YN and Nez Perce tribes. He said he is still compiling data and revising the model.

  Hillman showed MPBACI models in his draft spreadsheet "Spring Chinook Stock/Recruit Data for Treatment and Reference Areas," and shared the following:
  - Calculation of before-after, control-impact (BACI) contrasts, which show the magnitude of supplementation effects
  - Graphical analysis of BACI data
  - Preliminary results from different statistical tests including analysis of covariance (ANCOVA), randomization tests, Monte Carlo simulations, simple T-tests using difference scores, and complex, mixed-model analyses of variance (ANOVA) using raw data. The latter includes fixed and random factors with nested and fully crossed factors.
  - A variance table showing the sources of variation that are analyzed using the mixed-model ANOVA model.
  - The advantages of using complex mixed models over simpler models. Hillman developed the complex models in SYSTAT.

  Hillman said he sent the mixed model to Dr. Barb Downes (University of Melbourne) for peer review, and she gave it a positive review. To check the model, Hillman said he ran it using data from both Drs. Downes and Carl Schwarz (Simon Fraser University, retired) and found the model performed correctly.

  Hillman will use this information to update the M&E Plan (update to the 2017 Plan). Greg Mackey asked what the difference is between this method and the previous approach. Hillman said this approach includes comparing a supplemented population with all control

[1] Further information about the Coordinated Assessments Data Exchange can be found at: https://www.streamnet.org/coordinated-assessments-des.

populations using one analysis. Previous plans used separate analyses for each paired treatment and control population. Hillman said he is still troubleshooting the equation for estimating the BACI contrast. In preliminary tests using data in Schwarz, (2015)[2] the equation does not always give the same answer provided by Schwarz. Hillman said when he is finished testing the models, he will make changes in the M&E Plan and pass the document to the HCP-HC and PRCC HSC for review.

- *Greg Mackey will continue researching whether to include age-3 males in broodstock and discuss it with Craig Busack (National Marine Fisheries Service [NMFS]; Item I-A).*
  Mackey reminded the group that the purpose of this task is to determine whether to include jacks in broodstock, and if so, what is the appropriate number or percentage. He said on the pragmatic side in a small program, if the program is short on wild brood, it may be better to use a wild jack versus an older hatchery-origin male. He proposed avoiding a blanket prohibition against using jacks in broodstock collection protocols. Mike Tonseth agreed, considering managers would want to know parental origin of a jack to avoid using progeny of naturally spawning hatchery fish. Mackey agreed but noted that managers would also not want to exclude genetic variability associated with jacks. Keely Murdoch said previous analyses of spring Chinook salmon in the Wenatchee Basin as part of the reproductive success study show a stronger association with females than males. She said for this reason, incorporating age-3 males in the broodstock may not be a major issue. Mackey noted the question is whether early maturation is heritable and whether programs would increase early-maturing males in the hatchery population by including jacks in broodstock, and how that would vary in different years based on frequency-dependent spawning rates. Tonseth said there is a bigger size disparity between jacks and older males in spring Chinook salmon than summer Chinook salmon and suggested that broodstock chosen by size inevitably includes some jacks and excludes some older fish. He suggested that managers review data from previous years to find out if this has happened. Todd Pearsons said there may be some adjustments to the protocols this year to achieve numbers needed due to predicted low abundance. Tonseth confirmed the need to include some age-3 fish due to low projected escapement for 2019. Mackey noted this item is still ongoing and will not be resolved for the 2019 Broodstock Collection Protocols.
- *Keely Murdoch will provide coho salmon broodstock collection protocols to Mike Tonseth by late February or early March 2019 for inclusion in the 2019 Broodstock Collection Protocols (Item I-A).*

[2] Schwarz, C.J. 2015. Analysis of BACI experiments. Chapter 12 in course notes for beginning and intermediate statistics. Available at: http://www.stat.sfu.ca/~cschwarz/CourseNotes.

Tracy Hillman suggested that Murdoch provide coho salmon broodstock collection protocols to Mike Tonseth earlier than late February to allow for draft broodstock collection protocols to be distributed 10 days before the February meeting, in line with the SOA specific to PUD programs. Murdoch said this is very early for developing their typical YN coho salmon protocol because coho salmon spawn so late in the year. Murdoch will attempt to provide the protocols in January.

- *Mike Tonseth will coordinate with Andrew Murdoch (Washington Department of Fish and Wildlife [WDFW]) regarding presenting pre-spawn mortality modeling results for spring Chinook salmon at an upcoming Hatchery Committees meeting (Item I-A).*
  Tonseth said additional analysis is needed and the timeline for providing modeling results will be extended because some federal staff involved in the modeling are furloughed due to the partial federal government shutdown.
- *Keely Murdoch will send the conservation program size spreadsheets to the Hatchery Committees (Item I-A).*
  Murdoch provided the 2018 Sliding Scale and Safety Net Update spreadsheet to the HCP-HC via email on January 3, 2019. Murdoch said this action item is complete. This item will be discussed in today's meeting (Item II-B.6).
- *Keely Murdoch will research past co-mingling ratios of coho salmon to spring Chinook salmon at Winthrop National Fish Hatchery or other locations (Item I-A). (Note: this item is ongoing.)*
  Murdoch said this action item is ongoing.
- *Keely Murdoch will provide information about the passive integrated transponder (PIT)-tagging strategy for the coho salmon that will be acclimated at Twisp Pond (Item I-A).*
  Murdoch provided this update via email to the HCP-HC on January 3, 2019. Murdoch said this action item is complete.
- *Sarah Montgomery will obtain approval for the October and November 2018 meeting minutes from NMFS (Item I-A).*
  Montgomery said final versions of the meeting minutes were distributed on December 20, 2018, and this action item is complete.
- *Hatchery Committees representatives will review recommendations provided by the geneticist panel and send any additional questions to Tracy Hillman by January 7, 2019 (Item II-A).*
  Hillman said he received no feedback. All HCP-HC and PRCC HSC representatives agreed that information provided was sufficient. Hillman said he will follow up with geneticists to finalize the feedback. This item will be discussed in today's meeting (Item II-A).
- *Sarah Montgomery and Tracy Hillman will compile potential March 2019 conference call dates and send a poll to the Hatchery Committees representatives (Item IV-A).*

Montgomery sent the poll following the meeting on December 19, 2018, requesting feedback by January 4, 2019. Montgomery asked the representatives which date is best for an optional conference call to discuss broodstock collection protocols. She said the goal is to resolve changes to the protocols prior to the March 20, 2019 meeting. All representatives agreed to set a placeholder for a conference call on Monday, March 11, 2019, at 2:30 pm. Larissa Rohrbach said she will send a meeting invitation.

II. Joint HCP-HCs and PRCC HSC

A. Genetic Monitoring (Tracy Hillman)

Tracy Hillman reminded the committees that they received recommendations from the geneticist panel on December 10, 2018, in a document titled, *Response to questions posed by the HCP Hatchery Committee regarding the PUD M&E Plan*. Hillman said this item was available for review and discussion in December and no major issues were identified. Further, he received no requests from the HCP-HC or PRCC HSC representatives asking for additional information from the geneticists. Mike Tonseth suggested including this background information in the M&E Plan for PUD Hatchery Programs (update to the 2017 Plan). He said the responses from geneticists confirmed the committees are correct in their assumptions about monitoring. Hillman suggested also appending the document from the geneticists to the M&E Plan.

Todd Pearsons said there was one question about whether linkage disequilibrium was calculated for both hatchery and natural fish and asked if this has been resolved since the last conference call with geneticists. Greg Mackey confirmed the work has been done and included in the previous genetic reports. Pearsons said one reason feedback is needed now was to make sure genetic analysis was included in the M&E Plan to allow the PUDs to initiate contracting for genetics analysis and reporting.

Hillman asked the HCP-HC and PRCC HSC whether to include analysis for linkage disequilibrium (item No. 1 in the response from geneticists) in the current M&E Plan, which would allow the PUDs to contract for the work accordingly. Representatives present from the Wells, Rocky Reach, and Rock Island HCP HCs and PRCC HSC (Douglas PUD, Chelan PUD, Grant PUD, USFWS, YN, WDFW, and CCT) approved adding linkage disequilibrium analysis to the M&E Plan. A NMFS representative was not present (and unable to respond to a delayed vote for longer than 5 business days); therefore, NMFS abstained from voting. (Note: Brett Farman (NMFS) approved via email on February 13, 2019.)

Catherine Willard volunteered to update the M&E Plan by the March meeting.

B. Broodstock Collection Protocols Review (Todd Pearsons)

Mike Tonseth stated the level of likely adult management needed this year will likely be minimal due to low predicted returns for spring and fall Chinook salmon. He predicts meeting broodstock targets will be difficult. Todd Pearsons asked whether the HCP-HC and PRCC HSC can move forward with reviewing the broodstock collection protocols without run projections, because they have been a cause of delay in previous years. Tonseth answered that WFDW is on time for drafting the 2019 Broodstock Collection Protocols with run projections. Because early forecasts were showing such low numbers, WDFW is prioritizing incorporating realistic numbers into the protocols before releasing them for review. Tonseth said he will share the draft 2019 Broodstock Collection Protocols before February 10, 2019.

Pearsons said there is a need to resolve the discussion around the use of jacks in the broodstock. He said the existing protocols are very prescriptive. He asked if the protocols can be revised so they are more like guidelines rather than prescriptions—define the ideal but provide ways to deviate and find alternative choices. Tonseth said he has revised the draft for some programs to have less prescriptive protocols and allow for defaulting to backup options if in-season run forecasting changes.

Tracy Hillman reviewed issues that were raised during discussions of the 2018 Broodstock Collection Protocols (summarized in the document, *Emerging Discussions from draft 2018 Broodstock Collection Protocols*) to determine which ones are still outstanding.

1. Yakama Nation Summer Chinook Egg Requests at Wells Hatchery

This item was discussed throughout 2018 and is no longer outstanding.

2. Use of Age-3 Males in Broodstock

Greg Mackey is continuing to work on this item as discussed during review of the action items.

3. Bacterial Kidney Disease Risk Assessment

Hillman said this outstanding issue is whether WADDL's testing and reporting methods for BKD risk assessment are consistent with PUD program management, monitoring and reporting requirements. Tonseth said WDFW performed enzyme-linked immunosorbent assay (ELISA) testing in 2018 because WADDL's laboratory was not set up to complete the testing. Mackey said Betsy Bamberger coordinated with WADDL regarding how to report ELISA results in a way that managers are able to use the results to make decisions consistent with the past (i.e., using optical density [OD] values), but WADDL was reticent to produce an OD number that does not meet certified laboratory standards. Tonseth said from a resource management perspective this is still useful. Mackey said WADDL's

approach is that if a fish has both a positive ELISA and quantitative polymerase chain reaction (qPCR) result, it is confirmed positive for BKD; however, the fish may be subclinical for pathology. Tonseth noted that a 2006 SOA specifies that OD values will be used to determine BKD risk assessment—this SOA would need to be updated. Tonseth said broodstock collection protocols are developed based on OD values for when to cull and when not to cull, so to be consistent with 2019 protocols, WADDL would need to provide a methodology that is relatable to the OD methodology.

Kirk Truscott asked whether a broodstock overage is always collected to allow for culling. Tonseth said yes, and if programs use WADDL for BKD risk assessment, there needs to be a method that allows managers to cull within the overage collected.

Mackey noted the WADDL approach is a more rigorous test and is less prone to false positives.

Mackey said he will work with Bamberger to compare the different testing and reporting methods between WDFW laboratories and WADDL and determine a management approach comparable to past years.

Hillman said this is a topic for future HCP-HC and PRCC-HSC meetings. Secondarily, the committees will need to determine whether a new SOA is needed with a new protocol for BKD culling.

4. *Differentiating Natural-Origin Okanogan River Spring Chinook Salmon During Methow Fish Hatchery Broodstock Collection at Wells Dam*

Hillman said this outstanding issue is how to identify Okanogan River natural-origin spring Chinook salmon from other natural-origin stocks during broodstock collection at Wells Dam for the Methow Fish Hatchery. This item is not relevant in 2019 but will be in the near future. Truscott and Tonseth determined the first 4-year-old returning fish from the Okanogan program will need to be differentiated at Wells Dam beginning in 2021.

Representatives present discussed possible methods for differentiating the stocks. Tom Kahler asked whether elemental scale analysis is a possible method. Truscott answered that it is possible to observe a signature from tributaries in different basins. The difficulty would be catching, holding, and analyzing fish in time. Pearsons said this was done with fish collected at Tumwater and results were mixed. Laser ablation was done on scales, fins, and otoliths. Life-history variation made it difficult as fish moved around between waters. Tonseth asked whether there is a way to set up methods in 2020 to analyze 3-year-old returners. Mackey suggested collecting yearling juveniles in September to test the methods. Truscott said that would likely not work because managers would need to collect scales from wild yearling smolts known to originate from the Okanogan. However, he said it may be worthwhile to collect scales in the future from PIT-tagging efforts and snorkel surveys. Tonseth

agreed that it may be worthwhile to start analysis now to determine a baseline, but he does not know of an easy way to differentiate adults. Hillman said elemental signature analyses work but are costly. Truscott agreed and volunteered to discuss internally the feasibility of using elemental signature analysis for differentiating adults.

5. *Priest Rapids Hatchery Fall Chinook Salmon Integration – How to Achieve It Without Fish from Alternative Collection Sites/Methodology*

Hillman said this issue is about whether fall Chinook salmon adults collected at various collection sites can be integrated into the broodstock.

Tonseth said hook and line provided many more natural-origin fish than sampling at the OLAFT in 2018. Pearsons said the time between when the fishery was closed and when hook-and-line collection started created a situation where fish were readily caught this year and survived transport well. Tonseth said based on the current run forecast, this could be repeated in 2019. Pearsons said staff working on fish transportation were overwhelmed on the first day and methods for handling will be improved in the future. Tonseth said it may be good practice to allow 1 week between fishery closure and broodstock collection. Pearsons agreed but said collecting too late begins to overlap with fish spawning, which is not desirable for broodstock collection.

6. *Conservation Program Size*

Hillman said this topic is about adjusting conservation program sizes for upper Columbia spring Chinook salmon to make sure programs are set at biologically defensible levels.

Hillman asked whether the draft 2019 Broodstock Collection Protocols will include any adjustments to sizes of conservation programs. Tonseth said the discussion hasn't been had with the Yakama Nation yet given interim timing on analyses using previous methods and updating those data. There are new data to incorporate. Tonseth said he would also like to see life-cycle modeling results. If there is a size adjustment in the 2019 protocols, it will be an interim proposal based on the original methodology. He said it may not make a difference this year as they will be limited to one third of the run for broodstock collection and will likely need to use safety-net fish for the Chiwawa program. Pearsons asked for clarification. Keely Murdoch said that the end goal is to determine how many natural-origin fish will be used for broodstock. Technically the conservation program would be the same size but would be backfilled by safety-net fish, as needed. The safety-net program would increase if the conservation program decreases. If there are not enough natural origin fish to meet the requisite component, then the shortfall will be backfilled by hatchery progeny. Tonseth said if they were to collect the target number of natural-origin fish for the Nason program in 2019, that may require collecting the entire run and the program would be in the negative for natural-origin

fish returning back to Nason Creek. He said we need to avoid "mining" the Chiwawa program to meet these needs. Pearsons asked, for instance, if the run projection is 75, the program would take one third (25 fish) and back-fill with safety-net fish? Tonseth answered yes. Pearsons said we may not need to know conservation program adjusted numbers for 2019—but it seems to take a long time to get updated program size so we should continue to work on it regularly (based on life-cycle modeling and pre-spawn mortality).

Pearsons asked whether the spawner-recruitment curves and assumptions could be updated in the meantime with more recent information. Hillman answered the analyses will be updated for the 10-Year Program Review report. Pearsons suggested that escapement calculations could be based on adult-to-juvenile escapement, because it seems like the adult-to-juvenile data are cleaner, with stronger correlations (r value). Hillman said this was true for some tributaries (such as the Chiwawa River), but not for others (such as the White River and Nason Creek).

Tonseth said these analyses will make no difference for how fish are allocated in 2019 due to low projected numbers but agrees these are important for future years and proposed updating targets and collection curves with interim values while data are being finalized. Murdoch said updating pre-spawn mortality data is the highest priority, specifically, including details on sex-specific and hatchery versus wild variation in pre-spawn mortality. She said WDFW is working on pre-spawn mortality data and suggested that they could provide a pre-spawn mortality average for updating the calculations in the meantime while data are being finalized. Tonseth said Tumwater Dam is the location at which those fish can be managed, so having accurate estimates of pre-spawn mortality upstream from Tumwater Dam is important to management. Kahler said he believes migration through Tumwater Canyon is an energetic challenge and pre-spawn mortality would largely manifest itself upstream from the dam. Tonseth said there is a significant difference in pre-spawn mortality between natural-origin and hatchery-origin fish that could be due to differences in fat reserves. Murdoch said this could also be related to where different fish hold and the habitat quality in those holding areas; some holding areas are energetically expensive, such as in the lower Chiwawa River.

Murdoch shared the spreadsheet, "2018 Sliding Scale and Safety Net Update with composite analysis and current sliding scale," which Sarah Montgomery distributed to the committees on January 3, 2019 (Attachment B). She said the spreadsheet included updated escapement numbers, updated smolt-to-adult return rates, and updated broodstock needs. Pearsons asked what other items should be updated, even if data are provisional. Tonseth answered that spawner escapement (for the future years) should be updated. Murdoch said the analysis is mainly missing updates to escapement goals, pre-spawn mortality, and needs an updated adult-to-adult spawner-recruitment goal. A new curve could be used for the next spawner escapement estimate. Hillman said he will be updating spawner-recruitment curves for the 10-Year Program Review report. Tonseth said he will ask Andrew Murdoch

whether interim information can be used to update curves now, with footnotes indicating the curves are provisional and to be updated as pre-spawn mortality data are updated.

Pearsons asked what the next program is for evaluating changes to program size. Tonseth and Murdoch said the Wenatchee program should be analyzed and updated as much as possible before the Methow program, which does not yet have a management plan or technical document dictating the size of conservation programs in the basin. Tonseth said this has long been a recognized need for the Methow program and asked whether there is a need for a full-blown management plan as in the Wenatchee or something smaller. Pearsons asked if a rough schedule could be developed for including updated conservation size numbers for the Methow program in the 2020 broodstock collection protocols with the main motivation to avoid using more natural-origin fish than necessary. Tonseth said there is no previous analysis in the Methow to fall back on, so this will be a substantial amount of work, but can certainly be a goal for the committees. Kahler said that Douglas had analyzed this during the consultation for the Methow spring Chinook programs and had data and analysis to provide in the interim.

A discussion was had about adding a safety-net program to the Methow Hatchery programs. Murdoch asked whether a new population proportionate natural influence (PNI) model is needed for the Methow basin. Tonseth said there is no need for an additional safety-net program in the PNI model. Tonseth and Matt Cooper said the approach is to treat the Methow basin as an aggregate.

Pearsons said he is interested in completing these analyses and updates so it can be incorporated into the 2020 broodstock collection protocols knowing not all analyses or discussions will be done. Tonseth agreed but said it may not be reasonable due to uncertainties about feasibility. Pearsons asked to add the topic of evaluating conservation program sizes to the meeting agenda every few months to continue progress. Larissa Rohrbach said she will maintain this topic as a periodic agenda item.

Hillman said WDFW previously discussed streamlining the broodstock protocols and asked Tonseth how this effort is going. Tonseth said the protocols are shorter than previous years and he continues to find areas to streamline.

C. Re-Evaluating Conservation Program Size

See above discussion, Item II.B.6.

D. Brood Year 2020 Steelhead Sampling at the Off-Ladder Adult Fish Trap

Mike Tonseth informed the committees that WDFW PIT-tagging efforts at the Priest Rapids Dam OLAFT will switch from steelhead to spring Chinook salmon. This work is funded by the Bonneville Power Administration (BPA), and WDFW is proposing to use those funds to develop spring Chinook

salmon mark-recapture escapement models. Thus, the PUDs may need to take over some portion or all of steelhead sampling at the OLAFT (in 2019) and/or funding future PIT-tag arrays operation and maintenance (O&M) that will lose funding from BPA. He said key questions to support a PIT-tag-based escapement model for steelhead have been answered and WDFW plans to redirect funds to the study of spring Chinook salmon. WDFW cannot use BPA funds to fund both steelhead and spring Chinook salmon investigations. He said WDFW needs to know whether there will be a PUD funding back-fill for PIT-tag-based steelhead work by early March. If there is no plan to fund steelhead sampling at the OLAFT, PIT-tag arrays currently funded by BPA for steelhead will be turned off for steelhead returns and switched on again for spring Chinook salmon returns. This affects the 2020 brood because sampling for brood at the OLAFT occurs in 2019. He said sites may be switched off in July 2019.

Tom Kahler asked for clarity on discretionary funding and the impetus for moving investigations to spring Chinook salmon rather than continuing work with steelhead. Kahler asked what the program will get from switching to spring Chinook salmon. Tonseth answered that this would allow for estimating spawning and pre-spawn mortality with a PIT-tag-based model rather than relying on spawner surveys. Keely Murdoch said there is a knowledge gap between spring Chinook salmon returning and spawning. In the Wenatchee Basin, data collected at Tumwater Dam and the reproductive success study provide some information, but there is a data gap for the rest of the upper Columbia Basin. Kahler said some of that information is available from sampling at Wells Dam. Tonseth said sampling at the OLAFT addresses the entire evolutionary significant unit, whereas sampling at Tumwater or Wells dams addresses local populations. Specifically, information is lacking on pre-spawn mortality in the Entiat River and lower Wenatchee River to estimate mainstem Columbia impacts to tributary populations. Kahler said it seems preliminary to use a PIT-tag-based model for spring Chinook salmon until results are finalized for steelhead.

Catherine Willard asked if WDFW is seeking PUD funding for the 2019 steelhead PIT-tagging at the OLAFT if the PUDs choose to use PIT-tag-based escapement calculations. Tonseth said he is making the PUDs aware that WDFW's plan is to move the funding to spring Chinook salmon because WDFW has determined their work on steelhead is complete. The redd-count-based model and PIT-tag-based model are currently available. He said the intent of this discussion to inform the HCP-HC and PRCC-HSC that PIT-tag-based escapement estimates for steelhead may not be available for 2020 without funding from the PUDs. The PUDs could fund PIT-tagging at the OLAFT or array O&M; although, the cost of array O&M is less predictable.

Kirk Truscott asked whether the lack of funding will affect PIT-tag arrays in the Okanogan and how eliminating arrays would affect spawner escapement estimates. Tonseth said certain arrays would stay on; the lowest mainstem arrays would stay functional for adult management and most others

would be turned off. Truscott said most in the Okanogan would remain functional as they are funded by other entities, but there is a concern that money spent maintaining arrays in the Okanogan may not be well-spent if arrays in the Methow are being turned off and spawning escapement cannot be estimated because the PIT-tag-based model relies on escapement data from other tributaries. Tonseth said this should not be a concern because the lowest array will still be operating.

Todd Pearsons asked whether the BPA funding is Accord funding that goes to the State. Tonseth answered this is BPA Accord money that goes to WDFW to fund BPA's mitigation obligations; the State has some flexibility on where to use the funding. Willard asked if BPA needs to approve the switch of funding from sampling steelhead to Chinook. Tonseth stated WDFW informs BPA how the funding is being used. Tracy Hillman provided some history on how monitoring activities were identified for BPA funding. He said several years ago the region identified steelhead escapements as a data gap. It appears the data gap has been addressed with the development of the mark-recapture model and WDFW is now proposing to use BPA funding to address other data gaps. Hillman said it is up to the HCP-HC and PRCC HSC to determine if they will use the model, which requires PIT tagging and PIT-array maintenance, or use a different approach to estimate steelhead escapement. He said for spring Chinook salmon, carcass surveys will still be needed even if an escapement model is developed. The distribution of natural-origin and hatchery-origin fish is not well addressed with mark-recapture models.

Greg Mackey said the factors in this decision for Douglas PUD are sampling fish at Wells Dam versus OLAFT. The program could stop stock assessment at Wells Dam and could cut back collection in the fall at Wells Dam, but Douglas PUD needs to know how many arrays need O&M and how many are critical for decision making. Programs need to do a cost-benefit analysis to determine the most effective choice. Mackey asked whether other entities like the USFWS would contribute if they are producing steelhead, or are all entities producing spring Chinook salmon going to participate. It would be difficult to support PIT-tagging or array O&M if only one PUD supports it. Kahler said there is added scrutiny because PUDs are not allowed to fund activities without remuneration. Tonseth said it may make sense for the PUDs to fund arrays that are required for meeting obligations rather than PIT-tagging.

Truscott asked whether WDFW would begin PIT-tagging spring Chinook salmon at the OLAFT in 2020 and whether a permit is needed. Tonseth said that technically, their permits already allow sampling at Priest Rapids Dam. Truscott said he recalled issues with fish movement at the OLAFT. Pearsons said spring Chinook were delayed due use of the OLAFT during the year of the Wanapum Dam fracture. Truscott agreed that presents one problem and asked whether another problem could be a funding shortfall for both tagging and array O&M—if there is no PIT-tagging, there would be

no reason to maintain arrays. Tonseth confirmed WDFW will fund either PIT-tagging at OLAFT or PIT array O&M, but not both.

Willard requested that Andrew Murdoch provide the PUDs with a list of arrays at risk of being shut down, the cost of maintaining those arrays, and the cost of tagging at Priest Rapids Dam.

Kahler asked what protocol would be followed for sampling spring Chinook salmon at the OLAFT. Tonseth answered the work would be the same as for steelhead in terms of staff time and tagging approximately 15% of the run. Kahler asked whether there is a concern about exacerbating pre-spawn mortality due to handling. Kahler said that adding another handling event to spring Chinook salmon will contribute to pre-spawn mortality, but at an unknown rate. Tonseth agreed there will be some double handling of fish, for instance at Priest Rapids and Tumwater dams, but the total number of fish handled will be less. Kahler asked whether they will all be trapped. Tonseth answered no. At Tumwater Dam (and Wells Dam), trapping would only be for adult management and broodstock collection because sampling at Priest Rapids Dam will have already collected data on age, gender, and other metrics, so fewer fish would be handled at upstream sites. Kahler said that reasoning may not apply to Wells Dam, where many wild fish need to be handled. Tonseth said a sort-by-code system could be used at upstream sites to avoid excessive handling if fish are tagged and sampled at Priest Rapids Dam.

Kahler said history indicates that teaming with BPA leads to establishing programs that then require PUD funding in the future. Truscott said the other way to look at it is that BPA funds the development of models, which then can be used by the PUDs for monitoring. Kahler said this is true for steelhead, but he does not see the utility for spring Chinook salmon because of the need to continue spawning-ground surveys to obtain carcass data. Murdoch said perhaps the PIT-tag data will provide more information or maybe it will be determined that carcass surveys provide more useful data for spring Chinook salmon. Programs should consider the best data sources on a case-by-case basis. Pearsons said that the same market forces (power prices) that are currently influencing BPA decisions and the same market conditions can also affect the PUDs funding decisions.

E. Streamlining HCP-HCs and PRCC HSC Meetings

Tracy Hillman summarized that the goal of facilitating HCP-HC and PRCC HSC meetings is to increase efficiency, but there is also a need to maintain separation between the committees. The following materials or approaches could be merged:

- Agendas and Minutes: Hillman suggested developing one set that covers everything and is sent to all members of all committees. Materials would be distributed in emails (rather than having to search a SharePoint site). The Grant PUD SharePoint and Douglas PUD Extranet sites would be treated as repositories for materials, but all materials will go out over email.

- Distribution lists: Sarah Montgomery said the distribution lists need to be approved by the HCP Coordinating Committees for distributing Wells, Rocky Reach, and Rock Island HCP materials to non-committee members. Douglas PUD and Chelan PUD need to review their rules about distribution. Representatives present agreed that draft minutes and draft materials should only go to representatives and alternates due to confidentiality requirements. Anything final should go to the larger distribution groups. Larissa Rohrbach said she will develop proposed distribution lists and send them out to representatives and alternates for their review. Once the HCP-HC approve the lists, they will be provided to the HCP Coordinating Committees for approval.
- Protocols: Hillman noted his roles for the HCP-HC is Chairman and for the PRCC HSC is Facilitator, which entail different roles in decision-making processes between the HCP-HC and PRCC and HSC. Rohrbach will update protocols to reflect merging meeting forums and make any updates based on the realistic application of the protocols. Rohrbach will send updated protocols to representatives and alternates for approval. Hillman said the protocols need updated language on conflicts of interest and will send updated language to representatives and alternates for approval.
- Agenda order: Hillman asked whether the order that the committees present their items on the agenda should rotate or be fixed. All agree that Joint HCP-HC items should come first, then committees with shortest agenda items (i.e., those that can be addressed quickly) should go first following joint items. Todd Pearsons asked whether predicted times could be added to the agenda. Hillman said there has been pushback against this idea within the HCP-HC because they want to make sure agenda items are fully vetted without a time limit. Mike Tonseth said adding times lets invited speakers know when they should arrive or call into the meeting. Greg Mackey said time limits are good for items that may not be resolved in the current meeting. All agreed to include estimated times for each agenda item (representatives will include a time estimate when they propose an agenda item).
- Naming conventions: the committee name will be used to indicate discussion topics (i.e., Wells HC, Rocky Reach HC, Rock Island HC, and PRCC HSC) in both the agenda and meeting notes. In merged materials, the group will be named "HCP-HC and PRCC HSC" or shortened to "HC/HSC."

All HCP-HC and PRCC HSC representatives present (Chelan PUD, Douglas PUD, Grant PUD, USFWS, WDFW, YN, CCT) voted to approve merging attendance, meeting agendas, meeting minutes, documentation, and distribution of materials in emails for HCP-HC and PRCC HSC business. A NMFS representative was not present and unable to respond to a delayed vote for longer than 5 business days; therefore, NMFS abstained from voting. (Brett Farman [NMFS] approved via email on February 13, 2019).

III.Wells Hatchery Committee

A. Douglas PUD 2019 Implementation Plan (Greg Mackey)

Keely Murdoch said the status quo in the Douglas PUD 2019 M&E Implementation Plan may not work for steelhead if certain aspects of steelhead PIT tagging and data analyses are not funded by BPA. Therefore, she requested revisions to the plan allowing for flexibility for planning around this uncertainty, as representatives did for the Chelan PUD 2019 Implementation Plan. Greg Mackey said the proposed revisions seemed vague, so he has not decided whether to send that version to the HCP-HC for approval. Murdoch said she attempted to use the same language as was approved for the Rocky Reach and Rock Island Plan that draws attention to the potential changes in activities in 2019 to support broodstock selection. Mackey said if a version with this proposed revision is approved, he foresees a need for a one-page amendment in the future once it is clear what methods will be used to enumerate steelhead. Murdoch said as phrased this does not commit Douglas PUD to one course of action or another. Mackey said the edits to the Douglas PUD plan have not been discussed yet and that today's discussion on funding PIT-tagging activities and arrays created the need for further internal discussion before finalizing the 2019 M&E Implementation Plan language. Mackey said he will distribute a revised version of the plan to the committees for approval once Douglas PUD discusses this internally.

IV. Rocky Reach and Rock Island Hatchery Committees

A. 2019 Spring Chinook Salmon and Coho Salmon Final Acclimation at Chewuch Pond (Catherine Willard)

Catherine Willard provided an update and reminder that 2019 is the first year coho salmon and spring Chinook salmon will be co-acclimated together in the Chewuch Pond. She said 80,000 coho salmon will be co-mingled with spring Chinook salmon. Chelan PUD is operating the pond.

B. Tumwater Dam Fishway Maintenance Update (Catherine Willard)

Catherine Willard provided an update on fishway maintenance at Tumwater Dam involving reinforcing the walls around the fishway. She said completion of the project has been delayed and the project will not be completed until mid- to late-March. The fishway will remain open through that time. Trapping will still occur at night around construction activities. Mike Tonseth said WDFW will be doing minimal adult management at Tumwater Dam this year and may not need to trap fish.

V. PRCC HSC

A. Committee Updates and Meeting Summary Review (Todd Pearsons)

Todd Pearsons asked the PRCC HSC representatives whether it is still useful to have routine updates on the activities of other committees such as the Fall Chinook Work Group, PRCC, or U.S. v. Oregon. Pearsons recommended eliminating these routine updates due to lack of interest and time constraints, but if there are important issues from other committee meetings, these will be brought onto the agenda. All representatives present agreed.

Pearsons said the November conference call meeting summary is going to be approved via email votes provided to Andy Chinn (Ross Strategic). Pearsons requests that all members make their votes before the end of January so Ross Strategic can finalize the last meeting summary of 2018.

VI. Administration

A. Next Meetings

Hillman asked the HCP-HC and PRCC HSC whether they want to schedule an additional conference call in March to potentially discuss broodstock collection protocols. All agreed. Sarah Montgomery noted the best date based on responses to the poll is March 11. All agreed to a potential conference call on March 11, 2019, at 2:30 p.m.

The next HCP-HC and PRCC HSC meetings are on February 20, 2019 (Grant PUD), potential conference call on March 11, 2019, and March 20, 2019 (Grant PUD).

VII. List of Attachments

Attachment A List of Attendees
Attachment B 2018 Sliding Scale and Safety Net Update with composite analysis and current sliding scale

Attachment A
List of Attendees

Name	Organization
Tracy Hillman	BioAnalysts, Inc.
Larissa Rohrbach	Anchor QEA, LLC
Sarah Montgomery	Anchor QEA, LLC
Catherine Willard*	Chelan PUD
Kirk Truscott*	Colville Confederated Tribes
Tom Kahler*	Douglas PUD
Greg Mackey*	Douglas PUD
Todd Pearsons‡	Grant PUD
Peter Graf‡	Grant PUD
Matt Cooper*	U.S. Fish and Wildlife Service
Mike Tonseth*	Washington Department of Fish and Wildlife
Ryan Fortierº	Washington Department of Fish and Wildlife
Keely Murdoch*	Yakama Nation
Pat Wyenaº	Wanapum Tribe

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