720 Olive Way, Suite 1900
Seattle, Washington 98101
206.287.9130

ANCHOR QEA

Memorandum

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

Date: February 16, 2017

From: Tracy Hillman, HCP Hatchery Committees Chairman

cc: Sarah Montgomery, Anchor QEA, LLC

Re: Final Minutes of the January 18, 2017, HCP Hatchery Committees Meeting

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees meeting was held at the Grant PUD office in Wenatchee, Washington, on Wednesday, January 18, 2017, from 9:00 a.m. to 12:30 p.m. Attendees are listed in Attachment A to these meeting minutes.

Action Item Summary

- Sarah Montgomery and Tracy Hillman will renumber the Hatchery Monitoring and Evaluation (M&E) Plan appendices and append them to the Hatchery M&E Plan (Item I-A). *(Note: this item is ongoing.)*
- Sarah Montgomery will add a summary table to the draft summary of the 5-Year Hatchery M&E Review process (Item I-A). *(Note: this item is ongoing.)*
- Keely Murdoch will research who is leading the Columbia River Inter-Tribal Fish Commission's (CRITFC's) parentage-based tagging effort in order to coordinate with Mclain Johnson (Washington Department of Fish and Wildlife [WDFW]) about genetic sampling (Item IV-E). *(Note: this item is ongoing.)*
- Justin Yeager and Brett Farman will discuss internally the Douglas PUD Twisp gamete request and provide National Marine Fisheries Services' (NMFS') vote to the Hatchery Committees (Item II-A). *(Note: Farman provided NMFS approval on January 27, 2017.)*
- Douglas PUD will review WDFW's white paper, "Twisp Steelhead Hatchery Broodstock Issues," which Sarah Montgomery distributed to the Hatchery Committees on January 18, 2017, and provide comments to Mike Tonseth (Item II-B).
- Greg Mackey will coordinate with Chelan and Grant PUDs to develop a statement of agreement (SOA) describing the components in the proposed Hatchery M&E Reporting Timeline, which Sarah Montgomery distributed to the Hatchery Committees on January 13, 2017 (Item IV-C). *(Note: Mackey sent the draft SOA to Montgomery on February 13, 2017, which she distributed to the Hatchery Committees.)*
- Hatchery Committees members will review the Upper Columbia Salmon Recovery Board (UCSRB) Draft Hatchery Report and provide edits and comments to Greer Maier (UCSRB) by

January 31, 2017, and invite Maier to discuss comments in person at an upcoming Hatchery Committees meeting (Item IV-D).

- McLain Johnson will revise the timeline for conducting genetic analysis for HCP program species incorporating suggestions provided during the Hatchery Committees January 18, 2017, meeting (Item IV-E).
- McLain Johnson and WDFW geneticists will perform a power analysis to inform genetic analysis intervals and intensity for HCP program species (Item IV-E).
- Todd Pearsons (Grant PUD) will write a white paper about factors affecting the brood year stray rates of hatchery fish and considerations for revising stray rate targets (Item IV-F). *(Note: Pearsons sent his paper, "Stray Rate Targets for Hatchery Programs" to Sarah Montgomery on February 6, 2017, which she distributed to the Hatchery Committees.)*

Decision Summary

- The Rocky Reach, Rock Island, and Wells Hatchery Committees approved Douglas PUD, Chelan PUD, and WDFW's request for gametes from four female and four male Twisp River hatchery-origin steelhead that WDFW will collect at the Twisp Weir in 2017 for use in pilot studies on egg-to-fry survival, as follows: Douglas PUD, Chelan PUD, WDFW, U.S. Fish and Wildlife Service (USFWS), Yakama Nation (YN), and Colville Confederated Tribes (CCT) approved on January 18, 2017; and NMFS approved via email on January 27, 2017.

Agreements

- The Hatchery Committees agreed they will hold back-to-back meetings with the Priest Rapids Coordinating Committee Hatchery Sub-Committee (PRCC HSC) at Grant PUD's Wenatchee, Washington, office, with the Hatchery Committees meeting from 9 a.m. to as late as 12:30 p.m., unless prevented by lengthy agenda items or logistical constraints. *(Note: this was discussed as a joint item during the PRCC HSC November 17, 2016, meeting.)*

Review Items

- Sarah Montgomery sent an email to the Hatchery Committees on January 18, 2017, notifying them the Chelan PUD 2017 Draft Action Plan is available for review, with comments due to Catherine Willard. *(Note: the hatchery portion of the Chelan PUD 2017 Draft Action Plan will be a decision item at the Hatchery Committees February 15, 2017, meeting.)*

Finalized Documents

- No documents have been finalized recently.

I. Welcome

A. Review Agenda, Review Last Meeting Action Items, and Approve the October 19, 2016, Meeting Minutes (Tracy Hillman)

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

- Mike Tonseth added a discussion about the Twisp steelhead program.
- Tonseth added a joint item regarding the off-ladder adult fish trap (OLAFT) at Priest Rapids Dam.

The Hatchery Committees reviewed the revised draft October 19, 2016 meeting minutes. Sarah Montgomery said there are several outstanding comments to be discussed, which the Hatchery Committees reviewed and addressed. Hatchery Committees representatives present approved the draft October 19, 2016, meeting minutes, as revised.

Action items from the Hatchery Committees meeting on October 19, 2016, and follow-up discussions were addressed *(note: italicized text below corresponds to agenda items from the meeting on October 19, 2016)*:

- *Justin Yeager will check when the Yakama Nation (YN) most recently reviewed the Wenatchee steelhead draft Biological Opinion and provide that date to Keely Murdoch (Item I-A).*
  This item is complete.
- *The U.S. Fish and Wildlife Service (USFWS) will send a letter to the HCP Coordinating Committees describing changes in USFWS representation on the Hatchery Committees (Item II-A).*
  This item is complete. Jim Craig (USFWS) emailed a letter to Tracy Hillman describing this change on October 21, 2016.
- *Sarah Montgomery will assist USFWS in acquiring Hatchery Committees cc: email access for Michael Humling (USFWS; Item II-A).*
  This item is complete. Montgomery added Humling to the Hatchery Committees email cc: distribution list on October 20, 2016.
- *A subgroup led by Catherine Willard will convene to prepare a plan to outplant adult spring Chinook salmon in the Chewuch River (Item II-C).*
  Willard said the subgroup met on January 9, 2017, and the plan will be discussed today.
- *Keely Murdoch will research who is leading the Columbia River Inter-Tribal Fish Commission's (CRITFC) parentage-based tagging effort in order to coordinate with Mclain Johnson about genetic sampling (Item II-D).*
  This item is ongoing.

- *Mclain Johnson (Washington Department of Fish and Wildlife [WDFW]) will revise the timeline for conducting genetic analysis for HCP program species and send it to Sarah Montgomery for distribution to the Hatchery Committees (Item II-D).*
  This item will be discussed today.
- *The Hatchery Committees will review the timeline for conducting genetic analysis for HCP program species and provide additional questions to Johnson (Item II-D).*
  This item is ongoing.
- *Mike Tonseth will ask WDFW geneticists about a technical methodology for deciding analysis intervals (Item II-D).*
  This item will be discussed today.
- *Sarah Montgomery and Tracy Hillman will renumber the Hatchery Monitoring and Evaluation (M&E) Plan appendices and append them to the Hatchery M&E Plan (Item II-E).*
  This item is ongoing.
- *Todd Pearsons (Grant PUD) will distribute the paper by Ford et al. (2015) regarding brood year stray rates to the Hatchery Committees for review (Item II-E).*
  This item is complete. Pearsons sent the paper to Montgomery, which she forwarded to the Hatchery Committees on October 20, 2016, and it will be discussed today.
- *Catherine Willard will add a summary table to the draft summary of the 5-Year Hatchery M&E Review process (Item II-F).*
  This item is ongoing. Sarah Montgomery said she is working on it.
- *Craig Busack will discuss proportion of hatchery-origin spawners (pHOS) targets for Methow steelhead with Amilee Wilson (National Marine Fisheries Service [NMFS]), and follow up with the Hatchery Committees by October 21, 2016 (Item III-A).*
  This item is complete. Busack emailed Hatchery Committees representatives on October 21, 2016, stating the consultation has been transferred to Charlene Hurst (NMFS alternate), and Hurst and Busack will further discuss pHOS targets.
- *Sarah Montgomery will provide the WebEx phone number on the agenda for future Hatchery Committees meetings (Item V-B).*
  This item is complete. Montgomery added the WebEx phone number to the January 18, 2017, agenda.

II. Douglas PUD

A. Decision: Twisp Hatchery-origin Steelhead Gametes (Tom Kahler)

Tom Kahler shared a document titled, "Estimating steelhead egg-to-fry survival in the Twisp River: 2017 pilot study," which Sarah Montgomery distributed to the Hatchery Committees on January 6, 2017 (Attachment B). Kahler said Douglas PUD requests gametes from three female and three male Twisp hatchery-origin steelhead, which are surplus to broodstock and escapement needs, that WDFW will collect at the Twisp weir in spring 2017 for use in the egg-to-fry survival study. Mike Tonseth asked when the fish would be collected and where they would be held. Kahler said he does not have a definitive answer because Douglas PUD wants to get approval from the Hatchery Committees before working through logistics, but the tentative plan is to collect fish at the Twisp weir and hold them at Methow Fish Hatchery. Tonseth said WDFW and Chelan PUD are also working on a steelhead egg-to-fry survival study. Because there are no surplus adult steelhead in the Wenatchee River, WDFW and Chelan PUD are interested in sourcing eggs from another location and noted that no surplus adults are available at Wells Dam or other programs due to spawn timing. Tonseth asked what Douglas PUD plans to do with the balance of gametes that are not needed for the study, and said there is potential for WDFW and Chelan PUD to use the extra gametes. Kahler said the extra gametes would be disposed of, or Douglas PUD may consider egg-planting above an anadromous barrier. Tonseth asked to increase the gamete request to include collecting four female and four male Twisp hatchery-origin steelhead, so WDFW and Chelan PUD can utilize the unused gametes from the Douglas PUD study in their own study, which requires gametes from four female and four male steelhead. He said there would be extra gametes from the Douglas PUD study, which only requires 1,500 eggs, and collection of four female and four male steelhead. Doing this would meet requirements for both studies without targeting a separate collection location for the Chelan PUD study. Catherine Willard added that the spawn timing for steelhead in the Chelan River is late March to early April, and Kahler said steelhead spawn around April in the Twisp River. Greg Mackey said that WDFW could collect the two extra fish, assuming there are enough surplus hatchery-origin steelhead present.

Bill Gale asked if there will certainly be enough hatchery-origin steelhead at the Twisp weir to supply this request in addition to broodstock and pHOS needs. Gale also asked how this gamete request relates to the next discussion (Item II-B) regarding Twisp steelhead program broodstock issues. Tonseth said he thinks there will be enough hatchery-origin steelhead at the weir to meet all program needs plus this surplus gamete request. He said part of the discussion regarding Twisp steelhead program broodstock issues involves potentially reducing the pHOS target in the Twisp River from 0.5 to 0.3, which would make more hatchery steelhead available for surplus. Willard

said Chelan PUD supports Tonseth's idea of coordinating the studies and adding two additional hatchery-origin steelhead (one female and one male) to the gamete request.

Justin Yeager asked if this gamete request would change any permitting that has been completed to date. Tonseth replied that it would not. Tonseth also clarified that for egg-to-fry survival studies, no progeny are released into the system; the eggs are put into boxes in gravel, and the boxes with fry are later removed.

Gale said a potential impact to bull trout is that the location of the boxes may overlap with bull trout redds. Mackey agreed that there is potential for overlap with bull trout spawning areas, but the chance is low because the boxes will be placed in the gravel in the Twisp River in the spring.

Tracy Hillman summarized that the gamete request is now for four females and four males, and the Wells Hatchery Committee is voting on the collection of gametes for use in Douglas PUD's egg-to-fry survival 2017 pilot study, and WDFW and Chelan PUD's related egg-to-fry survival study. Douglas PUD, WDFW, and the CCT voted yes. Keely Murdoch emphasized that the steelhead collected must be excess fish, and priority must be given to spawning, and YN voted yes. Gale emphasized that any potential issues with bull trout and permitting should be considered before the study is undertaken, and USFWS voted yes. Yeager said he and Brett Farman will discuss this internally and provide NMFS' vote via email. *(Note: Farman communicated NMFS' approval on January 27, 2017.)*

B. Twisp Steelhead Program Broodstock Issues

Mike Tonseth shared a document titled, "Twisp steelhead hatchery broodstock issues," which Sarah Montgomery distributed to the Hatchery Committees on January 18, 2017 (Attachment C). Tonseth said there is increasing concern about negative genetic effects to the Twisp River steelhead population due to continued operation of the Twisp River steelhead program. He said the current target number of Twisp River wild broodstock is small and, according to geneticists (Todd Seamons, WDFW), continued operation of the program will likely decrease the effective population size (Ne), termed a Ryman-Laikre effect, which has unacceptable long-term genetic risks. He said the Hatchery Committees should consider restructuring management of the Twisp River steelhead program and population. Currently, the population is being managed as a separate spawning aggregate, and the Twisp River is being used as a test basin to evaluate steelhead reproductive success, a wild-by-wild conservation approach, and pHOS management (currently 0.50), all possible because of the Twisp Weir and Twisp Acclimation Pond, as well as the intensive M&E performed in this river. He asked the Hatchery Committees to consider continuing to collect natural-origin adult steelhead at the Twisp Weir, which would be utilized in a USFWS Methow basin program (as opposed to a dedicated Twisp program), and the existing Douglas PUD Twisp program (48,000 steelhead) would be converted to a safety net program and targeted for release in the lower Methow River. He said

continued releases of juvenile steelhead in the Twisp River are desired, but could come from a composite group from Winthrop National Fish Hatchery (NFH) which would increase and diversify the number of spawners used to produce juveniles for release. He said there are a lot of changes to discuss, but the most immediate issue for spring 2017 is reducing the Twisp hatchery pHOS escapement target from 0.5 to 0.3. He said WDFW has suggestions outlined in Attachment C for real-time genetic analysis that could be implemented in future years in order to increase the number of families represented in the Twisp River, but the focus for 2017 should be on increasing the effective population size by incorporating juveniles from Winthrop NFH's smolt program.

Tonseth said the broodstock collection numbers identified in the 2016 Broodstock Collection Protocols should still be targeted, but the fish would be transferred to Winthop NFH, and juveniles would be released in the lower Methow River. Greg Mackey suggested Tonseth coordinate with Todd Seamons (WDFW), Craig Busack, and Charlene Hurst to determine the potential genetic effects of these proposed changes. Mackey recalled that the Twisp River population is managed as a separate spawning aggregate because it has weak genetic differentiation from other populations. Mackey said the Twisp program may further exacerbate genetic drift by removing hatchery adult steelhead (without being able to know their familial origins), and the Hatchery Committees should consider a better program design and how Douglas PUD's mitigation requirements fit into the program design. He said Douglas PUD is required to provide 8,000 steelhead as No Net Impact (NNI) mitigation, which is the conservation core of the Twisp program, and the rest of the steelhead released satisfy inundation mitigation requirements. He said the inundation mitigation requirement may be more appropriately managed as a safety net or harvest program. Tonseth summarized that changing the Twisp program will require a lot of coordination and discussion over time, but the first items to settle are broodstock collection and 2017 releases, and WDFW proposes to join the Twisp and Winthrop steelhead programs with releases into the Twisp River and the Methow River. Keely Murdoch said truck planting can also be considered for those releases. Tonseth said truck planting is a good idea because it works well for steelhead and because acclimation and release location affect the distribution of fish (i.e., truck planting would result in wider distribution). Tonseth indicated that the JFP were considering release at Buttermilk Bridge, which is upstream of the Twisp Acclimation Pond, in order to encourage spatial distribution of hatchery origin spawners further upstream. Mackey added that evaluating the appropriate release number of steelhead should be a component of these discussions as well, in order to make the best use possible of wild broodstock.

Tonseth said the distribution of steelhead in the Twisp River and Methow River can be evaluated using passive integrated transponder (PIT) tags, and an analysis of releases in the lower Methow River over a 2- to 3-year period could inform the future of releases in the Methow basin, such as if some releases need to be moved out-of-basin. Mackey added that radical shifts in program implementation could affect permitting, and NMFS should definitely be involved in these

discussions. Mackey said Douglas PUD will review WDFW's white paper, "Twisp Steelhead Hatchery Broodstock Issues" (Attachment C) and provide feedback to Tonseth.

Tracy Hillman mentioned the results from Mackey's steelhead proportionate natural influence (PNI) modeling work (discussed during the Hatchery Committees October 19, 2016 meeting) which members, especially the YN, questioned regarding the use of a pHOS of 0.3. Murdoch said YN had agreed to a pHOS of 0.5 and does not want to agree to anything more restrictive than they already have. In reference to Mike Tonseth's statement that pHOS would be adjusted from 0.50 to 0.30, Keely Murdoch stated that this was not discussed by the JFP. She said, based on past conversations, YN supports the concept of taking Twisp River natural-origin returns to Winthrop NFH as long as the progeny are released back into the Twisp River. Tonseth clarified that the desire to reduce pHOS from 0.5 to 0.3 starting in 2017 is because there was acollapse of the 1-salt return, and because the population is already small; during the next 2 years they would only be able to collect adults from one age class if the program were not mixed with the Winthrop program. He said WDFW is not advocating for changing pHOS targets for the entire basin, but for a short-term reduction in order to prevent impacts to the Twisp River steelhead effective population size.

Bill Gale said the Winthrop program obligations come from production tables in U.S. v. Oregon[1], and are a sliding goal from 100,000 to 200,000 steelhead. He said USFWS has been able to meet the 200,000 goal when broodstock is available. He said the Winthrop program is also 100% adipose (ad)-clipped, and the Twisp program is not; this may initiate a discussion about steelhead marking in the Methow and Okanogan basins, but is important to consider. Murdoch said it is concerning that the progeny of natural-origin broodstock are ad-clipped in the Winthrop program. Tonseth said there is a lot to consider regarding the Twisp steelhead program, and this can be a topic at the next Hatchery Committees meeting on February 15, 2017.

III. Chelan PUD

A. Chelan Falls Broodstock Collection: Canal Trap Pilot Results

Catherine Willard shared a document titled, "Pilot Concept to Trap Summer-Run Chinook Salmon at the Chelan River Habitat Channel Water Conveyance Canal Outlet: Results," which

[1] 2008-2017 *United States v. Oregon* Management Agreement. May 2008. Available: http://www.westcoast.fisheries.noaa.gov/publications/fishery_management/salmon_steelhead/sr--079.2008-2017.usvor.management.agreement_042908.pdf

Sarah Montgomery distributed to the Hatchery Committees on January 18, 2017 (Attachment D). Willard said the Chelan Falls Canal Trap (CFCT) pilot study was successful in collecting 100 summer Chinook salmon for Chelan Falls broodstock. She said trapping occurred from August 4 to August 10, 2016, and during operation of the CFCT, 51 males and 49 females were collected. She said four fish died while being held at Eastbank Hatchery, resulting in 49 males and 47 females being spawned. She said Chelan PUD evaluated the potential effects of high water temperature on gamete quality because the warm water temperatures of the Chelan River have the potential to affect gamete quality of fish collected at the CFCT. She said gametes from CFCT fish were kept separate from Eastbank Outfall (EBO) and Entiat National Fish Hatchery (ENFH) fish, and eye-up rates were similar for the groups of fish, with CFCT fish having a slightly higher eye-up rate (93% compared to 91%). She said no bull trout were encountered, and Chelan PUD plans to continue the pilot study in 2017. She said in 2017, Chelan PUD intends to start collecting broodstock at the CFCT in July, earlier than in 2016, in order to collect fish throughout the summer Chinook salmon run. She said Chelan PUD intends to use ENFH as the backup broodstock collection location, and does not plan to collect summer Chinook salmon broodstock at EBO due to safety issues. Bill Gale said Chelan PUD and USFWS can discuss using ENFH as the backup broodstock collection location closer to collection time.

Mike Tonseth said the CFCT pilot also included assessing disease profiles for collected female summer Chinook salmon using enzyme-linked immunosorbent assays (ELISA). He asked if any females from the CFCT, EBO, or ENFH had high ELISA values. Willard said there were no females with high ELISA values.

B. Chelan PUD 2017 HCP Action Plan (Catherine Willard)

Catherine Willard shared a spreadsheet titled, "Draft 2017 Rock Island and Rocky Reach HCP Action Plan," which Montgomery distributed to the Hatchery Committees on January 18, 2017 (Attachment E). She said the action plan includes typical items such as the annual Hatchery M&E Report, annual Implementation Plan, broodstock collection, and hatchery releases, as well as pilot studies (Chelan Falls Broodstock Collection and Outplanting Adult MetComp in the Chewuch River), ongoing water quality monitoring at Dryden Acclimation Facility, working on coho salmon NNI mitigation, and permitting activities. She said the draft 2017 Rock Island and Rocky Reach HCP Action Plan is available for review, and will be a decision item at the February 15, 2017, Hatchery Committees meeting.

IV. Joint HCP-HC/PRCC HSC

A. USFWS Bull Trout Consultation Update (Bill Gale)

Bill Gale said Karl Halupka (USFWS) sent him an update on USFWS consultations, which he summarized:

- The memorandum describing Halupka's gap analysis and the strategy to rely on the 2012 Wells Relicensing Bull Trout Biological Opinion (BiOp) for coverage for the Methow spring Chinook salmon program has been approved internally and will be transmitted soon.
- Regarding the Okanogan program consultation, USFWS is working on a letter of concurrence for the Tribal Resources Management Plan (TRMP), which will be reviewed internally soon.
- Regarding the draft BiOp covering hatchery programs in the Wenatchee basin, USFWS is waiting for comments on the revised draft from Chelan PUD and WDFW.

B. NMFS Consultation Update (Justin Yeager)

Regarding the Methow spring Chinook salmon consultation, Justin Yeager said Charlene Hurst distributed draft permits to the applicants for final review, and NMFS expects edits and comments by January 19, 2017. He said regarding the Okanogan steelhead TRMP, the TRMP was available for public comment through the end of December 2016, and NMFS is currently reviewing and addressing comments.

C. M&E Report Scheduling (Greg Mackey/Catherine Willard)

Greg Mackey shared a presentation titled, "Hatchery M&E Reporting: Synching to Required Milestones," which Montgomery distributed to the Hatchery Committees on January 13, 2017 (Attachment F). Mackey said the goal of this discussion is to determine a logical reporting schedule that meets Chelan and Douglas PUD's HCP and Grant PUD's Aquatic Settlement Agreement (ASA) requirements. He summarized the HCP requirements for survival studies, recalculation, updating the M&E Plan, performing a Program Review, and Section 10 permitting. He said the proposed timeline (slide 6) includes survival studies (next in 2023), updating the M&E Plan (next in 2018), and Program Review (next in 2020), as well as other milestones. He said performing the Program Review in 2020 makes sense so it is coordinated with recalculation and M&E plan updates and reports. He said the 5-year M&E Report is not an HCP requirement, but is stipulated in the M&E Plan, and the M&E Plan does not stipulate a 10-year Report/Program Review, but the HCPs do. He said the focus/content of the reports may change as well. He said the PUDs are envisioning the annual M&E reports will contain the data collected that year with summary statistics plus cumulative data, and note any exceptions to field methods and the M&E plan. He said the 5-year Report/Statistical Report would include the results of statistical analyses of each M&E objective with an explanation of the

assumptions of the analyses, but with limited interpretation of the analyses. This would allow managers to assess the program and identify any red flags but would make the report shorter and more concise. He said the 10-year Report/Program Review would be a much larger report that would include the type of analyses done in the 5-year cycles with additional analyses as warranted, integrated with regional findings for better context. Chapters in the Program Review would be written in scientific manuscript style to provide a high level of scientific rigor and concise writing in order to enhance interpretation of results and promote the possibility of publishing some of the work. He said the Program Review will be used as part of the adaptive management process and would inform recalculation (slide 3 Mackey said the format and function of each report still needs to be determined and finalized, but agreeing on the timeline for the reports is the first step.

Mike Tonseth asked if the PUDs had considered doing 10-year reports for each species, staggered by different years. Mackey said that was considered, and they also considered organizing the report by basins (e.g., Wenatchee, Methow, Okanogan) to put things into regional context, and then by species. Gale asked if a repeating Hatchery Scientific Review Group (HSRG) review should be included in the proposed timeline. Alene Underwood said the purposes of these reports are to answer questions in the M&E plan within the HCP framework. Tonseth said HSRG reports are more holistic compared to M&E reports. Todd Pearsons agreed and said M&E reports have more specificity about programs and data. Mackey said, after this discussion regarding the timeline, the PUDs can write a description of the components of each report. Underwood suggested writing an SOA so the decision to adopt a new reporting schedule is easily accessible. Tom Kahler summarized that the 10-year Program Review is an HCP requirement, the 5-year Statistical Report is an M&E Plan requirement, and the M&E Plan itself is a requirement of permitting, so any SOA regarding this material should speak only to the reporting timeline and not the pieces in the timeline. Gale asked if the HCP and M&E Plan requirements for Chelan PUD and Douglas PUD are similar to Grant PUD's ASA requirements. Pearsons said it is similar. Mackey said he will coordinate with Chelan and Grant PUDs to develop an SOA describing the components in the proposed Hatchery M&E Reporting Timeline.

D. UCSRB Hatchery Report – Review Period Extension (Tracy Hillman)

Tracy Hillman said the UCSRB's Draft Hatchery Report was distributed to members of the Hatchery Committees for review by Greer Maier. He said Maier agreed to extend the review period and requests comments back to her by January 31, 2017, but the deadline may be flexible. Alene Underwood said Chelan PUD has many comments and will try to respond by January 31, but might need more time. Hillman said after the UCSRB reviews the comments from members of the Hatchery Committees, he will invite Maier to a Hatchery Committees meeting to discuss the comments. *(Note that the UCSRB Draft Hatchery Report was not provided to the Hatchery Committees*

as an official document for review and approval; therefore, it is not listed under Review Items and is not posted to the HCP Hatchery Committees Extranet Site.)

E. Genetic Analysis for HCP Program Species (McLain Johnson)

McLain Johnson shared a document titled, "Draft Genetic Sampling Timeline," which Sarah Montgomery distributed to the Hatchery Committees on January 18, 2017 (Attachment G). He said he revised the timeline to show analysis needs, the projected year of analysis, and requirements for M&E Plan reporting. He said he and Todd Seamons are still trying to find samples for fall Chinook salmon in the Hanford reach so the stock can be added to the timeline. He said he is still working with Keely Murdoch and CRITFC to acquire more samples for analysis from the Priest Rapids stock. He said WDFW and CRITFC have a growing and positive relationship, which will help in coordinating these genetic analyses. He said developing single nucleotide polymorphism (SNP) panels for analysis incurs an upfront cost and exploratory work, but analyzing a sample using SNPs is relatively inexpensive once a panel has been developed. Many SNPs for these stocks are already established. He said CRITFC, for example, has been doing genetic work related to Lake Cle Elum and can differentiate between Okanagan and Wenatchee sockeye salmon. Tom Kahler added that University of British Columbia researchers have also been working on Okanagan sockeye salmon SNP panels, and similarly, researchers at the Department of Fisheries and Oceans (Canada) have a microsatellite panel for Okanagan sockeye salmon.

Johnson said samples for most of these analyses are collected annually, and the WDFW genetics lab recommends performing analyses on 2 years of samples to increase the robustness of the sample dataset. Mike Tonseth added that the Hatchery Committees still need to discuss whether to vary analysis intervals based on listing status or another factor, and whether to synch analysis years for species. Mackey said genetic analyses should be completed for all populations of the same species in the same year. He said, during the last discussion about this, Todd Pearsons mentioned that a power analysis could determine how large of a genetic change could be detected in a population and how rapid it may occur, which could ultimately inform analysis intervals; populations at risk or with genetic structure that could change a lot or change quickly could be analyzed more frequently (e.g., small populations). Tonseth said Twisp steelhead are an example of a population where genetic change was detected after a few years of genetic analysis, and the population is at risk due to a low effective population size. Pearsons said a power analysis could also be based on the size of programs compared to the size of their receiving natural population; one would expect to see genetic differences occur more quickly in small populations.

Johnson said, historically, samples were analyzed using microsatellite panels, and samples can be reanalyzed with SNP panels. Tonseth said a baseline period for each program needs to be determined, because hatchery programs change over time especially in regards to broodstock. For

example, he said the Wenatchee steelhead program started in 1989 using stock from Wells Fish Hatchery, and transitioned to locally adapted broodstock in 1998, so the baseline could be set at 1998. This needs to be discussed and agreed to for each program and can determine whether old samples need to be reanalyzed with SNP panels.

Todd Seamons joined the meeting via phone, and asked about the purpose of genetic monitoring for HCP program species. Catherine Willard said the purpose, as described in the M&E Plan for PUD Hatchery Programs, is to determine if genetic diversity, population structure, and effective population size have changed in natural spawning populations as a result of the hatchery program. Seamons asked what the consequences are to hatchery operations if genetics are found to be changing. Tonseth said it could change the program, for example, a program might have to be segregated rather than integrated. Seamons said analysis intervals can be determined by how much change is acceptable before the genetics "problem" is identified and addressed. He said, after one generation, changes are unlikely to be identified; after two generations, there may be an identifiable trend; and after three generations (likely longer than 10 years), the problem is likely identifiable but at this point, the problem has been compounding for three generations and will be harder to fix. Pearsons said the acceptable risk of genetic change, and therefore the time between analysis intervals, is partially determined by how at-risk the population is. He said a small program might warrant more frequent analysis than a large program because a small program has greater potential for rapid and substantial genetic change—a power analysis can help determine the potential for effects and level of change for each program. Seamons used the Twisp steelhead program as an example of intensive sampling (due to the relative reproductive success study), where a problem has been identified with analysis intervals capturing only one generation (due to the fact that a parentage study has been underway for eight years), a problem which may not have been detected using the diversity statistics other programs use at broader time intervals. The opportunity to address problems after only one generation comes from a different (more intense) level of analysis.

Bill Gale said the USFWS is interested in synching sampling and analysis intervals with the HCP program species timeline. He said the spring Chinook salmon safety-net program at Winthrop NFH could be synched with the Methow spring Chinook salmon analysis. For steelhead, safety-net releases from the Methow Fish Hatchery could also be included in these analyses. USFWS collects summer Chinook salmon in the Entiat River, which could be coordinated with the HCP program analyses. He said the timeline can be modified to include USFWS sampling and analysis, and USFWS can perform analyses at Abernathy Fish Technology Center, or help fund analyses. Seamons said the WDFW genetics lab and Abernathy Fish Technology Center work together frequently, and coordinating those analyses would not be a problem. Gale said he would send a report about genetic analysis of summer Chinook salmon in the Entiat River to Johnson. (*Note: Montgomery distributed the USFWS report, "Summer Chinook Salmon in the Entiat River: Genetic Analysis of*

Hatchery and Natural Origin Adults Spawning in the Wild" to the Hatchery Committees on January 18, 2017.)

Hillman summarized the Hatchery Committees feedback for Johnson regarding the Draft Genetic Sampling Timeline and discussions regarding genetic sampling intervals for HCP program species: 1) perform genetic analyses for all stocks of spring Chinook salmon in the same year (i.e. 2018); 2) add USFWS programs to the timeline; 3) work with the WDFW genetics lab on a power analysis to determine recommended analysis frequency; and 4) determine a baseline period for each analysis.

Seamons said he and the WDFW genetics lab are very busy, but could likely work with Johnson to perform the power analysis in the next 6 months. Mackey asked if there are any new genetic techniques that might replace using SNP panels. Seamons said he does not imagine that anything would replace the use of SNP panels. He said the way SNP genotypes are obtained or the analysis methods could change, but an entirely different marker type being developed is unlikely at this point. Mackey mentioned Hatchery Committees parties are considering reanalyzing older samples with SNP panels that were initially analyzed with microsatellite panels, but if another technique were on the horizon, it would affect that decision. Seamons said detection power is affected by the number of markers used in the analysis, and more and more markers are being developed. For example, a sample could be reanalyzed with a SNP panel with 296 markers (e.g., CRITFC's steelhead panel), but if more markers are added to the panel for a total of 500 markers, the sample could be reanalyzed again with increased statistical power. He said parties should consider whether the benefit of added statistical power is worth the cost. He said WDFW intends to have SNP panels with many markers, and use the same panels as CRITFC, which also adds loci regularly to their panels.

F. Stray Rate Targets (Todd Pearsons)

Todd Pearsons shared a presentation titled, "Stray Rate Targets," which Sarah Montgomery distributed to the Hatchery Committees on January 18, 2017, following the meeting (Attachment H). He said he also distributed a paper by Ford et al. (2015)[2] after the Hatchery Committees last discussed stray rates in October 2016, which Montgomery distributed to the Hatchery Committees on October 20, 2016. He said this discussion focuses on the 5% brood year stray rate target (Question 6.1.1 in the Hatchery M&E Plan), and he has been trying to determine the origin of the

[2] Ford, M.J., A. Murdoch, and M. Hughes, 2015. Using parentage analysis to estimate rates of straying and homing in Chinook salmon (*Oncorhynchus tshawytscha*). Molecular Ecology 24, 1109-1121. Doi: 10.1111/mec.13091

target but has not received an explicit answer about how the 5% target was determined even after querying a number of scientists that were involved in the fundamental development of recovery plan guidelines. Monitoring Question 6.1.1 of the M&E Plan is: "Is the stray rate of hatchery fish less than 5% for the total brood return?" Pearsons said if natural stray rates are determined to be higher than 5%, it would be unexpected for hatchery-origin fish in the same basin to meet the 5% target; hence, natural stray rates can be used to inform targets.

He summarized many factors that can influence straying such as: imprinting quality; origin (hatchery vs. natural); species, stock or tributary; spawning habitat quality; access, including temperature, flow, and barriers; spawning density; dendricity; and geography. He said only some of these factors are affected by or under the control of hatchery programs. He said Ford et al. estimated natural-origin stray rates for the Chiwawa River, Little Wenatchee River, Nason Creek, the White River, and the Upper Wenatchee River, some of which exceeded 5% and approached 100% in one case. He said Ford et al. demonstrated that stray rates of natural origin fish are higher than previously thought (especially in the Little Wenatchee and Upper Wenatchee rivers), stray rates vary by tributary and generation/origin, and non-hatchery factors influence stray rates (e.g. tributary, habitat). Pearsons said, for example, the upper Wenatchee River does not have high-quality habitat, so it would make sense that stray rates are higher in that location.

Pearsons said imprinting is just one of many factors affecting stray rates. He said the hatchery experience appears to affect fish even when they are imprinted in the natural environment, and some factors are outside the purview of programs. He said he thinks the brood-year stray rate target for spring Chinook salmon is unrealistically low. He said data suggesting salmon imprinted in natural environments have varying stray rates that can be above 5% are not unique—an old study in California showed coho stray rates far exceeding 5% (cf. Quinn 2005[3]).

Pearsons identified one possible target refinement as adding together the possible sources of stray rates (i.e., the stray rate of natural origin fish from hatchery parentage + a stray rate addition as a result of the hatchery experience + a stray rate addition from poor habitat, high density, and other non-imprinting factors). He said fish are not controlled in their selection of a spawning site solely by imprinting, so targets related to the distribution of fish spawning should be realistic and consider the other factors affecting where a fish decides to spawn.

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[3] Quinn, Thomas P. *The Behavior and Ecology of Pacific Salmon and Trout*. American Fisheries Society, Bethesda (Maryland), in association with University of Washington Press, Seattle (Washington), 2005.

Tracy Hillman said he discussed this with Michelle McClure (NMFS) and she provided the following thoughts:

- The Technical Recovery Team (TRT) used some expert opinion in the selection of the 5% and 10% stray rate targets. (Note: the 5% and 10% stray rates apply to the recipient spawning aggregates.) The basic idea was to have the numbers in the flow chart/graph combo be congruent with the previous criterion for genetic integrity. In other words, how much introgression from non-evolutionarily significant unit (ESU) fish would produce impairment to the natural genetic structure of the population? Ultimately, disrupting population structure affects extinction risk, but not quite in the quantifiable way that abundance and productivity can.

She also added the following thoughts:

1. The TRT criteria cannot be formally changed at this point without (probably) a committee forming to review new information.
2. That said, the TRT was very explicit that things should be considered on a case-by-case basis, and the addition of new empirical information would certainly be a factor that should go into that case-by-case consideration. This is part of the reason why guidelines were provided with many disclaimers about making informed judgments based on the situation at hand; the TRT knew that there would be more information, situations would change, and so forth.
3. One word of caution, though, for the Upper Columbia, is that the genetic stock structure of the entire basin is incredibly altered (and basically homogeneous). To the extent that natal fidelity is genetically influenced (and we know that it has some elements of genetic influence and a good deal of environmental), the straying we're seeing empirically might be a result of previous anthropogenic activities (like mixing them all up).
4. It would be important to also include in the review of new empirical information other studies since the TRT guidelines on straying. She recalled one study on the Olympic peninsula, where researchers found that spawners were more closely related to individuals within a 50-yard radius (approximate distance) of their redd than individuals outside that area.

Pearsons said TRT criteria are unlikely to be changed without an entire committee forming to review new information, but empirical information should be a factor in a case-by-case assessment for PUD programs (particularly related to a BY stray target). He said, for the upper Columbia basin, the contemporary genetic stock structure is unnatural, and because natal fidelity is genetically influenced, stray rates could be a result of anthropogenic activities. He said there is flexibility in the case-by-case basis, but that might be decided by the National Oceanic and Atmospheric Administration, especially if the recovery plan needs to be modified or if they need to write a letter

describing the different stray rates and supporting data. Casey Baldwin (CCT) pointed out that the spatial aspect of stray rates needs to be considered and identified up-front. He said the initial criteria in the M&E Plan is straying between populations, and Pearsons' example using the Wenatchee basin is a within-population stray, and it is important to consider if strays are from outside the ESU. He said it should be identified whether the stray rate is for within-population strays, between-population strays, or out-of-ESU strays. Hillman asked if the TRT developed criteria for brood year return. Baldwin said the TRT did not have a set criteria for brood-year stray rates (Question 6.1.1). He said what matters more than brood year return is the spawner composition—the sum of strays to a population, not just the sum of strays from one program in the receiving population. Pearsons said he wants to focus this discussion on brood year stray rates. Hillman said brood year stray rate targets and Question 6.1.1 have implications for Questions 6.1.2 and 6.1.3. Pearsons said, if there are many issues in addition to imprinting, a 5% target will probably not be met in some cases no matter how much the program is shifted and tweaked. Baldwin suggested that weighting natural-origin stray rates based on abundance of natural origin fish could decrease stray rates in each spawning aggregate.

Tonseth requested that Pearsons write a white paper about factors affecting the brood year stray rates of hatchery fish, and considerations for revising stray rate targets. Pearsons agreed and asked the representatives present to please contact him if they find any information on the sources of the brood year stray rate targets set in the M&E Plan.

G. Spring Chinook Salmon Outplanting in the Chewuch River (Catherine Willard/All)

Catherine Willard said a subgroup of Hatchery Committees members met on January 9, 2017, and made progress on a plan for outplanting adult spring Chinook salmon (MetComp) in the Chewuch River. She said several data gaps were identified, and participants are working on follow-up tasks. Willard said this will be discussed in more detail at the February 15, 2017, Hatchery Committees meeting.

H. Expanded Sampling at the OLAFT (Mike Tonseth)

Mike Tonseth said he plans to discuss expanded sampling at the OLAFT at Priest Rapids Dam with the Hatchery Committees at the February 15, 2017, meeting, and will follow up with an email describing the sampling before the next meeting.

V. HCP Administration

A. Representative Changes and Distribution Lists (Tracy Hillman)

Tracy Hillman welcomed Brett Farman (NMFS representative) and Casey Baldwin (CCT alternate) to the Hatchery Committees, and said Charlene Hurst has also been designated as the NMFS alternate.

Hillman said these changes in representation are described in letters distributed by Sarah Montgomery on December 23, 2016 (for Baldwin), and January 6, 2017 (for Farman and Hurst).

Hillman reminded the Hatchery Committees that HCP Parties designate representatives and alternates as they see fit, with no approval required from the Coordinating or Hatchery Committees. Representatives and alternates are automatically provided access to email distribution lists and the HCP Extranet Site. Hillman reminded the Hatchery Committees that Coordinating Committees review and approval is, however, required to provide non-HCP representatives/alternates access to HCP Extranet Sites and email distribution lists.

B. Letters to HCP Non-Signatories (Tracy Hillman)

Tracy Hillman said the HCP Coordinating Committees Chairperson (currently John Ferguson) sends a letter each year on behalf of the Parties to the Wells, Rocky Reach, and Rock Island HCPs to the HCP Non-signatory parties (American Rivers and the Confederated Tribes of the Umatilla Indian Reservation) offering to meet, discuss progress, and answer questions. Hillman said Ferguson sent the letters on January 4, 2017, and if a positive response is received, Hillman and Ferguson will set up a workshop that includes representatives from the Coordinating, Hatchery, and Tributary committees.

C. Back-to-back Meetings with the PRCC HSC (Sarah Montgomery)

Sarah Montgomery summarized that the Hatchery Committees discussed back-to-back meetings with the PRCC HSC as a joint item during the PRCC HSC November 17, 2016, meeting. Hatchery Committees representatives present agreed that they will hold back-to-back meetings with the PRCC HSC at Grant PUD's Wenatchee, Washington, office, with the HCP Hatchery Committees meeting from 9 a.m. to as late as 12:30 p.m., unless prevented by lengthy agenda items or logistical constraints. Montgomery said that agreement is summarized in these meeting minutes for clarity.

D. Next Meetings

The next Hatchery Committees meetings are February 15, 2017 (Grant PUD), March 15, 2017 (Grant PUD), and April 19, 2017 (Grant PUD).

VI. List of Attachments

Attachment A List of Attendees
Attachment B Estimating steelhead egg-to-fry survival in the Twisp River: 2017 pilot study
Attachment C Twisp steelhead hatchery broodstock issues
Attachment D Pilot Concept to Trap Summer-Run Chinook Salmon at the Chelan River Habitat Channel Water Conveyance Canal Outlet: Results

Attachment E Draft 2017 Rock Island and Rocky Reach HCP Action Plan
Attachment F Hatchery M&E Reporting: Synching to Required Milestones
Attachment G Draft Genetic Sampling Timeline
Attachment H Stray Rate Targets

Attachment A
List of Attendees

Name	Organization
Tracy Hillman	BioAnalysts, Inc.
Sarah Montgomery	Anchor QEA, LLC
Catherine Willard*	Chelan PUD
Alene Underwood*†	Chelan PUD
Tom Kahler*	Douglas PUD
Greg Mackey*	Douglas PUD
Todd Pearsons†‡	Grant PUD
Peter Graf†‡	Grant PUD
Deanne Pavlik-Kunkel†‡	Grant PUD
Bill Gale*	U.S. Fish and Wildlife Service
Matt Cooper*†	U.S. Fish and Wildlife Service
Michael Humling†	U.S. Fish and Wildlife Service
Justin Yeager*†	National Marine Fisheries Service
Brett Farman*†	National Marine Fisheries Service
Mike Tonseth*	Washington Department of Fish and Wildlife
McLain Johnson	Washington Department of Fish and Wildlife
Todd Seamons†[0]	Washington Department of Fish and Wildlife
Charlie Snow†	Washington Department of Fish and Wildlife
Keely Murdoch*	Yakama Nation
Casey Baldwin*†	Colville Confederated Tribes

Notes:
* Denotes Hatchery Committees member or alternate (note that Justin Yeager is the outgoing NMFS representative, and Brett Farman is the NMFS representative as of February 1, 2017)
† Joined by phone
‡ Joined for the joint HCP-HC/PRCC HSC discussion
[0] Joined for the Genetic Analysis for HCP Program Species discussion