FINAL

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ANCHOR QEA

Memorandum

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

Date: August 16, 2018

From: Tracy Hillman, HCP Hatchery Committees Chairman

cc: Sarah Montgomery and Larissa Rohrbach, Anchor QEA, LLC

Re: Final Minutes of the July 18, 2018 HCP Hatchery Committees Meeting

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plan (HCP) Hatchery Committees meeting was held in Wenatchee, Washington, on Wednesday, July 18, 2018, from 9:00 a.m. to 4:30 p.m. Attendees are listed in Attachment A to these meeting minutes.

Action Item Summary

- Kirk Truscott will work with Casey Baldwin (Colville Confederated Tribes [CCT]) to summarize the CCT's current protocols for genetic sampling (Item I-A). *(Note: this item is ongoing.)*
- Tom Kahler and Greg Mackey will provide historical information to Tracy Hillman for incorporation in the Draft Hatchery Program Timelines (Item I-A). *(Note: this item is ongoing.)*
- Tracy Hillman will review aspects of the Independent Scientific Advisory Board's *Review of Spring Chinook Salmon in the Upper Columbia River* under Hatchery Committees' 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.)*
- Betsy Bamberger (Douglas PUD) will coordinate with the Washington Animal Disease Diagnostic Lab (WADDL) to obtain optical density values to inform culling for bacterial kidney disease (Item I-A). *(Note: this item is ongoing.)*
- Keely Murdoch and Mike Tonseth will provide an update on their evaluation of the size of conservation programs in October 2018 (Item I-A). *(Note: this item is ongoing.)*
- 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). *(Note: this item is ongoing.)*
- Tom Scribner will discuss internally the potential to release surplus Winthrop National Fish Hatchery (NFH) brood year 2018 wild-by-wild steelhead parr at Yakama Nation (YN) restoration sites in the Methow Basin in October (Item I-A). *(Note: this item is ongoing.)*

- Hatchery Committees representatives will review and edit Todd Pearson's list of questions regarding genetics monitoring, which Sarah Montgomery distributed to the Hatchery Committees on June 19, 2018, and provide revisions to Tracy Hillman (Item II-E).
- Brett Farman will nominate a National Oceanic and Atmospheric Administration (NOAA) geneticist to participate on a panel that will help identify appropriate genetics monitoring and evaluation protocols for the upper Columbia River hatchery programs (Item II-E). (*Note: Farman has nominated Morgan Robinson and provided contact information in an email to the HCP-HC on 8/7/2018)*.
- Keely Murdoch will send contact information for the Columbia River Inter-Tribal Fish Commission (CRITFC) geneticists she nominated for inclusion in the Genetic Monitoring panel to Larissa Rohrbach and Sarah Montgomery (Item II-E). (*Note: Keely Murdoch confirmed contact information for CRITFC gentecists Dr. Shawn Narum and Dr. Ilana Koch in an email to Larissa Rohrbach on 8/7/2018*)
- Larissa Rohrbach and Sarah Montgomery will make an HCP Hatchery Committees distribution list for the geneticist panel (Item II-E). (*Note: Action Item to be completed at the close of the 8/15/2018 meeting pending additional nominations or approval of existing nominees from DPUD and CCT*)
- Tracy Hillman will provide an email update to the geneticist panel based on discussions during the July 18, 2018 Hatchery Committees meeting (Item II-E).
- Hatchery Committees representatives present will review the Priest Rapids Dam (PRD) OLAFT Sampling Expansion Project document, which Larissa Rohrbach distributed to the Hatchery Committees on July 10, 2018, and provide questions and comments to Mike Tonseth and Andrew Murdoch (Washington Department of Fish and Wildlife [WDFW]; Item II-I). (*Note: feedback was provided via email to the HCP-HC by USFWS [8/10/2018] and GPUD [8/9/2018*]).
- Greg Mackey will revise the Draft 2018 Methow Basin Spring Chinook Adult Management Plan and provide it to the Hatchery Committees (Item IV-C).
- Greg Mackey will coordinate with Charles Frady (WDFW), Charlie Snow (WDFW), Michael Humling (U.S. Fish and Wildlife Service [USFWS]), and the WDFW Methow Field Office to provide weekly updates on adult management of spring Chinook salmon in the Methow Basin to the Hatchery Committees (Item IV-C).
- Tracy Hillman will request the CCT vote on the Wells Hatchery Committees item regarding collecting 110% of the brood year 2018 brood stock collection target for Wells summer Chinook salmon (Item IV-E). *(Note: Hillman obtained a positive vote from Truscott on July 24, 2018, as described in the Agreements section below.)*
- Betsy Bamberger (Douglas PUD) will research past occurrences of *Saprolegnia* spp. at Wells Fish Hatchery (FH) (Item IV-F).

Decision Summary

- The Wells Hatchery Committee approved Douglas PUD's pilot study, Control of *Saprolegnia* spp. Growth on Spring Chinook (*Oncorhynchus tshawytscha*) Eggs, provided fish are in excess to other needs previously identified, as follows: Douglas PUD, WDFW, USFWS, NOAA, and YN approved on July 18, 2018, and CCT approved via email on July 17, 2018 (Item IV-F).

Agreements

- The PRCC HSC representatives present (and CCT via email) agreed to retain the overage in the brood year 2017 wild-by-wild component of the Nason Creek spring Chinook salmon conservation program, and reduce the brood year 2017 hatchery-by-hatchery component of the Nason Creek safety-net program by an equivalent amount with the excess hatchery-by-hatchery fish to be released in non-anadromous waters and the total Nason Creek program release not to exceed 110% of its target (Item II-G).
- The Wells Hatchery Committee representatives present agreed that Douglas PUD can collect 110% of the brood year 2018 summer Chinook salmon target identified for the Wells yearling summer Chinook program in the 2018 Broodstock Collection Protocols, to ensure enough fish are available for the survival study planned for 2020 (Item IV-B). (*Note: Kirk Truscott also provided approval from the CCT via email on July 24, 2018*.)

Review Items

- Larissa Rohrbach sent an email to the Rocky Reach and Rock Island Hatchery Committees on July 19, 2018, notifying them that the Draft 2019 Chelan PUD Hatchery Monitoring and Evaluation Implementation Plan is available for a 30-day review, with edits and comments due to Catherine Willard by August 17, 2018 (Item III-A).

Finalized Documents

- No items have been recently finalized.

I. Welcome

A. Review Agenda, Review Last Meeting Action Items, and Approve the June 20, 2018 Meeting Minutes (Tracy Hillman)

Tracy Hillman welcomed the Hatchery Committees and asked for any additions or changes to the agenda. Mike Tonseth added an item for Nason/Chiwawa spring Chinook salmon Broodstock Collection Update. Greg Mackey added an item for Chewuch Canal Company Water Rights issue.

The Hatchery Committees representatives reviewed the revised draft June 20, 2018 meeting minutes. Sarah Montgomery said there are some outstanding comments, which the Hatchery Committees reviewed and addressed. Hatchery Committees representatives present approved the draft June 20, 2018 meeting minutes as revised. Tonseth noted that he only approves the portion of the minutes taken while he was present at the meeting.

Action items from the Hatchery Committees meeting on June 20, 2018, and follow-up discussions were addressed *(note: italicized text below corresponds to agenda items from the meeting on June 20, 2018)*:

- *Mike Tonseth will coordinate with Todd Seamons (Washington Department of Fish and Wildlife [WDFW]) to produce an outline or recommended approach for genetic monitoring (Item I-A).*
  Tonseth said Seamons will participate on the panel for genetic monitoring, so this item is complete.
- *Mike Tonseth will coordinate with Todd Seamons (WDFW) regarding reviewing the memorandum, "Alternatives for Methow Basin Conservation Steelhead Programs" (Item I-A).*
  Tonseth said this item is complete.
- *Kirk Truscott will work with Casey Baldwin (Colville Confederated Tribes [CCT]) to summarize the CCT's current protocols for genetic sampling (Item I-A).*
  Tracy Hillman said this item is ongoing.
- *Tom Kahler and Greg Mackey will provide historical information to Tracy Hillman for incorporation in the Draft Hatchery Program Timelines (Item I-A).*
  Hillman said this item is ongoing. He noted that the Wells Program has gone through several changes over time and therefore some of the historical information may not be needed. Mackey agreed.
- *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 said this item is ongoing. He said he has been working on developing generalized linear models for doing multiple before-after-control-impact (BACI) design analyses and has successfully replicated analyses conducted by others. He said he will next work on the statistical component of the Monitoring and Evaluation (M&E) Plan.
- *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 said this item is ongoing and suggested it be discussed during the August 15, 2018 Hatchery Committees meeting.

- *Betsy Bamberger (Douglas PUD) will coordinate with the Washington Animal Disease Diagnostic Lab (WADDL) to obtain optical density values to inform culling for bacterial kidney disease (Item I-A).*
  Bamberger said she spoke with the aquatic lab manager at WADDL. The lab reported that they will not be able to receive samples until September 1 due to setting up new equipment and accommodating federal protocols. The lab has not yet decided whether optical density values can be released with caveats as to their interpretation. She said for spring Chinook salmon, managers will not be able to use a similar enzyme-linked immunosorbent assay (ELISA) results test that has been previously used to make culling decisions. Bamberger said she will continue to provide updates on coordination with WADDL. Mike Tonseth asked if the lab processes fresh or frozen samples. Bamberger said it depends on the test; for example, ELISA tests are typically performed on fresh samples and polymerase chain reaction (PCR) tests can be performed on frozen or fresh samples.
- *Keely Murdoch and Mike Tonseth will provide an update on their evaluation of the size of conservation programs in October 2018 (Item I-A).*
  Murdoch said this item is ongoing.
- *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).*
  Murdoch said this item is ongoing.
- *Sarah Montgomery will schedule a longer Hatchery Committees meeting on July 18, 2018, with times in the agenda, and coordinate with the Priest Rapids Coordinating Committee Hatchery Sub-Committee (PRCC HSC) facilitator (Item I-A).*
  Montgomery said this item is complete.
- *Betsy Bamberger will research the practicality of assessing bacterial kidney disease by culturing (Item I-A).*
  Bamberger said it depends on the lab. It takes 2 to 19 weeks to culture *Renibacterium* spp., and there is a lot of concern regarding contamination for this assessment method. She said it is not an appropriate screening assay and is generally used as a confirmation assay.
  Megan Finley (WDFW) asked if WADDL performs a secondary test for *Renibacterium*. Bamberger confirmed they do. Bamberger added that staff at WADDL communicated to her that it takes special equipment and training to culture *Renibacterium* spp.
- *Tom Scribner will discuss internally the potential to release surplus Winthrop National Fish Hatchery (NFH) brood year (BY) 2018 wild-by-wild steelhead parr at Yakama Nation (YN) restoration sites in the Methow Basin in October (Item II-A).*
  Keely Murdoch said this item is ongoing and she will be meeting with hatchery staff to discuss this. She said she will provide a draft release plan for these surplus fish to the Hatchery Committees to review.

- *The Hatchery Committees representatives will nominate geneticists to participate on a panel that will help identify appropriate genetics monitoring and evaluation protocols for the upper Columbia River hatchery programs (Item III-A).*
  Tracy Hillman said Bill Gale nominated a geneticist and this item is ongoing for other representatives and will be discussed today.
- *Hatchery Committees representatives will review Todd Pearson's list of questions regarding genetics monitoring, which Sarah Montgomery distributed to the Hatchery Committees on June 19, 2018 (Item IV-A).*
  This item will be discussed today.
- *Hatchery Committees representatives will review WDFW's 2018-2020 Brood-Year Adult Prophylactic Disease Management Plan for Eastbank Fish Hatchery Complex Spring and Summer Chinook Hatchery Programs, which was distributed on June 20, 2018, and provide comments to Mike Tonseth (Item III-D).*
  This item will be discussed today.
- *Hatchery Committees representatives will review Mike Tonseth's email regarding the Nason spring Chinook overage (distributed on June 20, 2018) and provide feedback to him by July 5, 2018 (Item IV-C).*
  This item will be discussed today.

II. Joint HCP-HC/PRCC HSC

A. Factors Influencing Steelhead Residualism (Chris Tatara/Matt Cooper)

Matt Cooper introduced Chris Tatara (NOAA Fisheries Northwest Fisheries Science Center [NWFSC]). Tatara gave a presentation entitled, "*Factors affecting residualism in hatchery steelhead trout*" coauthored by scientists from NOAA Fisheries, USFWS, and the University of Washington. Larissa Rohrbach sent the presentation (Attachment B) to the Hatchery Committees following the meeting on July 19, 2018.

<u>Background – Slides (2 – 9)</u>

Tatara described the natural steelhead (*Oncorhynchus mykiss*) life history cycle and the problem of residualism. He said it is the preference of hatchery managers to produce only anadromous fish. Hatcheries occasionally produce parr and mature males, which collectively become residuals that remain in freshwater streams.

Problems with producing residual hatchery steelhead include the following:

- Decreased efficiency of hatchery production, increased cost

- Producing residuals could lead to domestication selection
- Competition, predation with natural populations
- Complicates genetic management (e.g., accuracy of proportion of hatchery origin spawner (pHOS) estimates; mature males are difficult to observe spawning and do not need to survive long to spawn)

Tatara described a management experiment published in the *North American Journal of Fisheries Management* in which mortality and residualism were confounded (Tatara et al. 2017)[1].

Additional Data Analysis and Results (Slides 9-25)

Additional data were analyzed (21,598 fish total) to inform management. Residualism was characterized using the following:

- Passive integrated transponder (PIT) tags and tracking fish using PTAGIS records
- Residuals collected near Winthrop NFH; lethally sampled and identified by coded wire tags
- Putative residuals were tracked 1 year later (by PIT tag detections)

Tatara said non-lethal sampling was carried out at the end of March prior to release from the hatchery. Metrics included size, sex, and qualitative phenotype (parr, transitional, smolt, mature male). Differences between S1 and S2[2] rearing types were compared. Many more parr were observed among S1 and many more mature males among S2. Results indicated that residual phenotypes could occur among both groups.

Tatara said fish were tracked post-release using mark-recapture methods (PIT tags, coded wire tags, lethal collection in Spring Creek). Any fish detected in the Columbia River was considered a migrant. Anything not detected was categorized as a potential residual. Of all parr identified in pre-release sampling, 95% were never detected as migrants. Of fish identified as transitional, a greater proportion became known migrants (35 to 36%). Of fish identified as smolts, 60% were migrants. Mature males were rarely detected migrating from the Methow River. Size of transitionals and smolts was similar; size was not a significant factor. Most mature males were from the S2 program. It was determined that mature males were likely to be residuals.

Todd Pearsons asked whether fish are observed moving downriver and back upriver. Tatara responded no; this differs from precocious male Chinook salmon that have been observed moving

[1] Tatara, C.P., M.R. Cooper, W. Gale, B.M. Kennedy, C.R. Pasley, and B.A. Berejikian, 2017. "Age and method of release affect migratory performance of hatchery steelhead." *North American Journal of Fisheries Management* 37(4):700-713, DOI: 10.1080/02755947.2017.1317676

[2] S1 describes steelhead released from the hatchery at smolt age-1, S2 are released at smolt age-2

down and back up through Columbia River dams. He said steelhead seem to residualize and stay in natal streams.

A logistic regression determined that size was a significant factor determining whether parr residualize. To enumerate putative residuals, the number of parr measuring less than146 mm and mature males were summed. Age was a significant factor (S1 versus S2) determining residualization.

To collect direct evidence of residuals, electrofishing and angling surveys were conducted in August and September in Spring Creek (near Winthrop NFH) after the smolt migration period. Residuals were lethally sampled to confirm size and maturity. Abundance was used to calculate a residual index (number of residuals captured/number of fish released x 100). Data were standardized by catch per unit effort (CPUE) to compare across years. Little difference in the residual index was observed over years or by age (S1 versus S2); there was always a male bias in the residual population. Maturation criteria were determined by looking at Gonadosomatic Index (GSI) distribution. The distribution was trimodal, and it was determined that a threshold GSI of approximately 0.138 occurred below which fish were immature. Higher modes represent fish that would become mature or were already mature. Approximately 20% of the population were mature; a 10-fold larger number than observed in pre-release sampling, suggesting many more fish than expected were staying in the river to mature.

To collect indirect evidence of residuals, PTAGIS was queried for PIT detections after July 1 (after the smolt migration season) of the release year. Parr-phenotype residuals were mostly S1s, half were never detected again, and half were only detected in Spring Creek. Of these, approximately 1% migrated in the release year, approximately 1% became avian predation mortalities, less than 1% attempted migration in a subsequent year, one fish became a mature adult, and 1 to 2% were detected in upriver areas (Methow and Chewuch rivers). Of mature male-phenotype residuals, very few were migrants, most stayed in Spring Creek (75%) or were never detected (25%). Some were eaten by birds, none migrated the following year, no adult returns were observed, and more were detected upstream than downstream (in Methow and Chewuch rivers) coincident with the natural spawning period.

Recaptured residuals had instantaneous growth rates similar to natural-origin *O. mykiss* from the Methow River (Martens et al. 2014)[3]. Tatara said this suggests residuals effectively compete with natural-origin fish.

<u>Conclusions (Slides 26 – 27)</u>

[3] Martens, K.D. and P.J. Connolly, 2014. "Juvenile anadromous salmonid production in Upper Columbia River side channels with different levels of hydrological connection." *Transactions of the American Fisheries Society* 143(3):757-767, DOI: 10.1080/00028487.2014.880740

- Age at release (S1 versus S2) did not affect number of residuals but did affect type of residuals. Both have poor overwinter survival and negligible contribution to anadromous production (smolt to adult return [SAR] ratio = 0.06%). It would be prudent to reduce residualism rates.
- Methods to reduce residualism include: 1) volitional release: most effective for retaining parr as mature males tend to leave to spawn; or 2) manual sorting: effective for removing both types but labor intensive and stressful for fish.

Rearing methods to reduce residual production (Slides 28-35)

Preliminary experiments at NWFSC Manchester station underway with natural-origin Winthrop NFH fish raised by the S1 method. How early can we tell if a fish will not smolt?

Experiment 1: Fish were marked with colored elastomer tags based on size and PIT tagged later when they achieve taggable size to track growth over time. Results: small fish tend to remain small. The size distribution was bimodal suggesting there are two different types of fish that grow two different ways.

Experiment 2: Small and large fish were sorted and separated and compared with an unsorted control group. After 1 year the size distribution among the large fish stayed unimodal and large fish tended to become smolts. Size distributions of control and small size groups tended to become and stay bimodal and the small group did not smolt, suggesting small fish needed another year of growth before smolting. Not all steelhead will grow rapidly enough to smolt, but fast growers tend to become mature males.

Experiment 3: Fish were raised as S1s (high ration, growth rate) and sorted at 9 weeks to create a large body size S1 group and a small size S2 group. Lower mortality was observed in the S1 group. The S2 group is currently being tracked.

Questions

Mike Tonseth asked about the length of time when residuals were observed upriver. Tatara responded they were mostly observed in the same year of release.

Pearsons asked how much of this is idiosyncratic to the Methow Basin and whether the results can be applied to warmer environments. Tatara replied that there is a sliding scale depending on water temperature. Warmer hatcheries would be more successful at raising S1 smolts. Accumulation of thermal units and broodstock source determines spawn timing and juvenile growth. One could do the math to determine if a program has enough accumulated temperature units to have an S1 program. An experiment is ongoing to repeat the Manchester lab experiment (size tracking and

sorting) at Winthrop NFH to determine if this is feasible on a hatchery scale. The hatchery is using auto-sorting trailers to separate by size and hoping to replicate a couple of years to determine if number of residuals could be reduced on the program scale.

Pearsons asked what percentage of fish that are maturing are milting at the time of pre-release sampling. Tatara replied that almost all that have the residual coloration are milting.

The Hatchery Committees thanked Tatara for his presentation.

B. Early Maturation Monitoring (Katy Pfannenstein/Matt Cooper)

Matt Cooper introduced Katy Pfannenstein (USFWS). Pfannenstein gave a presentation entitled, "*Early Maturation Monitoring: Gonadosomatic Index (GSI) Methodology & USFWS Three Year Monitoring Results*" (Attachment C), which Larissa Rohrbach distributed to the Hatchery Committees following the meeting on July 19, 2018.

Background (Slides 2-7)

Early male maturation is hard to quantify and less than 5% of wild fish, depending on genetics and environmental conditions like water temperature and food availability, become precociously mature. Producing precocious males may negatively affect economic efficiency, increase competition with native stocks, affect genetics of natural and hatchery stocks, reduce return rates for harvest/broodstock, and skew sex ratios in anadromous returns.

Monitoring for early male maturation is directed in the Leavenworth NFH terms and conditions. Applying early maturation information to hatchery management depends upon program goals such as maximizing SAR ratio or producing fewer early maturing males.

Monitoring using the GSI methodology (Slides 8-14)

For this project, Pfannenstein said staff lethally sampled 300 fish per facility at time of release (April). This sampling follows methods developed by Larsen (2004)[4]; other methods can include testicular histology or plasma 11-ketotestosterone (11KT) measurement. Six to seven experienced samplers could process 100 fish per hour for GSI sampling with startup costs of approximately $3,700, with the primary cost being the microbalance. Data collected include fish size, sex, visual maturation call (testes are thickened in mature males), and gonad weight. Determining the stage of maturation

[4] Larsen, D.L. et al., 2004. "Assessment of High Rates of Precocious Male Maturation in a Spring Chinook Salmon Supplementation Hatchery Program." *Transactions of the American Fisheries Society* 133(1): 98-120, DOI:10.1577/T03-031.

visually can be difficult for fish that are "in-between." The cost of 11KT assays are approximately $10 per fish for supplies without accounting for labor.

USFWS Monitoring Methods and Results (Slides 9-30)

Three USFWS facilities (Leavenworth NFH, Winthrop NFH, and Entiat NFH) were sampled for spring Chinook salmon, summer Chinook salmon, and steelhead. Change in gonad development (GSI) is exponential. Spring Chinook salmon early maturing males were easiest to determine compared to summer Chinook salmon and steelhead. Spring Chinook salmon were 4 months from maturation, summer Chinook salmon were 6 months from maturation, steelhead were mature in May but fish that would mature in the following year were difficult to identify. A mixture model developed by Dr. Lea Medeiros (University of Idaho) was used to statistically determine the difference between modes in the GSI distribution.

Chinook salmon were sampled at time of release (April), and a subset was held to confirm maturation rates (in May). Early male maturation rates were 7% for Leavenworth NFH spring Chinook salmon, 8.5% for Winthrop NFH spring Chinook salmon, and 18.4% for Entiat NFH summer Chinook salmon (originally 23.4% in 2014 at Entiat NFH; however, hatchery managers reduced feed in the fall and reduced the rate to 14.6% by 2016). A large separation between GSI modes was observed at Entiat NFH, similar to Methow FH. Holding fish increased the detection rate because it was easier to determine differences between mature and immature testes; however, there was not a large difference between maturation rates estimated pre-and post-release. The influence of fork length on maturation depended on the stock. Results show that simple visual assessment of testis maturation may be possible in some stocks without measuring GSI.

Steelhead were similarly sampled at the time of release and 1 month post-release at Winthrop NFH. Results indicated that 21% were initiating maturation and 8.4% were milting. Sampling steelhead after holding for 1 month provided some separation between immature and mature males but not as much as Chinook salmon, because they still have 13 months until spawning. Pfannenstein said the visual assessment for "initiating" fish is not recommended for steelhead because the accuracy of visual detection was poor (65% to 80%). Initiation of maturation occurred across all sizes.

Conclusions (Slides 31-34)

Pfannenstein recommended that the results be considered in the broader scheme of each stock and rearing environment. She said sampling recommendations include holding fish for 1 month post-release and developing a 3-year baseline of monitoring to understand specific stocks. She said sampling with simple visual assessments can create efficiency.

Chris Moran (WDFW) asked if the steelhead sampled were S1s or S2s. Pfannenstein replied they were S2s.

The Hatchery Committees thanked Pfannenstein for her presentation.

C. Chewuch Canal Company Water Rights Issue (Greg Mackey)

Greg Mackey said that on Friday afternoon he received an email from the Chewuch Canal Company. The related newspaper article from the *Methow Valley News* was sent to the Committees by Larissa Rohrbach following the meeting on July 18, 2018. Mackey said a private group of investors is trying to buy the historic water rights of a ranch downstream of the Chewuch Acclimation Pond and trying to claim 33 of the 34 cubic feet per second (cfs) of water running through the canal as part of the purchase. He said Chewuch Canal Company is in opposition, and the Washington Department of Ecology asks that letters of support or opposition be submitted by Friday, July 20, 2018. Mackey said he does not think the investor group realistically thinks they will get all 33 cfs of water rights, but they will try to get as much as they can.

Keely Murdoch asked who are the parties involved? Mackey answered that the investors are retired partners of Goldman Sachs; it is made to look like a water conservation measure to put water rights into a state trust water program, but there is a sunset date allowing them to sell to the highest bidder. Murdoch said it seems like a major habitat issue. Mackey and Tom Kahler agreed that it could be seen as a conservation issue for keeping water in tributaries, but ultimately it is a money-making venture. Murdoch asked if the sale would affect water to Chewuch Pond? Mackey answered that this is unclear because the pond gets water prior to the typical irrigation season, but the pond could lose the ability to use the Chewuch Canal water later in the season. He said those water rights may not even be available to the Methow Valley; they could be sold to users in other regions or to municipalities. Bill Gale asked if 33 cfs of water goes into a trust, would it be unavailable for use? Mackey answered yes. He noted that further details on pond operations are unknown at this time.

D. NMFS Consultation Update (Brett Farman)

Brett Farman said the draft permit for the Wells Complex Summer Steelhead Program is available for Hatchery Committees review. He said Charlene Hurst (NOAA) drafted the permit. (*Note: the permit was distributed to the Hatchery Committees by Larissa Rohrbach on July 19, 2018, and previously by Farman on July 13, 2018*.) Farman requested comments and edits by July 27, if possible by July 25. It was determined that this permit pertains only to the Wells Complex and that USFWS still needs to review the Winthrop NFH steelhead permit. Farman noted that Hurst will be on detail after July 27, only working 1 day per week on permitting tasks.

Regarding the Biological Opinion for the Columbia River unlisted programs that Emi Kondo (NOAA) has been working on, Farman said the current plan is to update the Proposed Action in the Project Planning Database instead of the Hatchery and Genetic Management Plans, which he thinks will be faster.

E. Genetic Monitoring (Todd Pearsons)

Todd Pearsons shared the document entitled, "*Genetics monitoring questions for hatchery programs,*" which Sarah Montgomery distributed to the Hatchery Committees on June 19, 2018. He led the discussion on the most appropriate and efficient ways to engage geneticists to streamline genetic monitoring among hatchery programs in the upper Columbia River

Pearsons suggested that the goal should be to do something similar to the White River program because it worked well. A lot of time was spent on genetic planning; major gains were made by talking to a panel of geneticists with continued discussions and questions. The process resulted in 2 to 3 calls with the geneticists. There was some need for facilitation for initial contact among the geneticists, then the geneticists found time amongst themselves to discuss. A final presentation was facilitated by the PRCC Hatchery Sub-Committee. He suggested using this model so that hatchery M&E and reporting answers the correct genetic questions for all programs. Keely Murdoch said she supports the approach and that Shawn Narum (CRITFC) would like to participate with staff geneticist Ilana Koch (CRITFC).

Bill Gale said he is in favor of facilitation to keep participants focused. Mike Tonseth said that the first step is to agree upon a reasonable set of questions to keep the process focused. Tonseth suggested inviting the geneticists to a meeting to explain what the questions are about and remove some ambiguity. Gale asked whether Tracy Hillman could facilitate the communication, instead of asking geneticists to attend in person, for efficiency. Tonseth and Hillman supported geneticists attending a meeting in person to provide context and history prior to reviewing the genetics M&E plan, then to give them their assignment; the goal is to set them up to provide wise counsel. Pearsons questioned if an in-person introductory meeting would be necessary and said he wants to make this a workload the geneticists can accommodate so participation is good. Hillman agreed and suggested a half-day introductory meeting, so all the geneticists receive the same messaging. Gale agreed to keep the scope limited to Hatchery Committees programs, but said that at the end it would be great to have a set of guidelines and standard approach to apply to the broader set of mid- and upper-Columbia River hatcheries. Tonseth supported the goal of broad application. Pearsons agreed there are no consistent genetic monitoring principles across agencies; a broad goal could be a long-term approach to genetic monitoring. Gale noted that emerging and changing [molecular genetics] technologies prevent the accumulation of a long-term dataset. Representatives present thought a set of questions should be developed from which the geneticists can start.

Some baseline questions were proposed as follows:

1. (Pearsons) Sampling interval: There are genetic data collected on an annual basis, how can these be used?

2. (Tonseth) Do baselines based on microsats need to be rerun to keep up with modern technology/information?

Greg Mackey said there is a need to help the geneticists understand how the data will be used to serve the program outcomes. The main goal is to figure out if the hatchery programs affect native species. Is using a population genetics approach the correct approach to be looking for genetic drift that takes a long time? Perhaps a parentage-based analysis is needed to assess each generation. Pearsons said that right now programs are monitoring phenotype and genotype indices. The NMFS approach has been to contain the risk using indices like proportionate natural influence (PNI) and stray rate. Mackey asked whether results from molecular genetics may not be informative when a program is already using wild by wild breeding and containing stray rates as much as possible: what would be the management application? Gale answered we may learn whether programs that are closely related are coming closer together genetically.

Hillman said the Hatchery Committees should explain to the geneticists the history of the programs, current status, and future goals. He said future goals could come from the recovery plan; however, achieving those goals may be difficult if the hatchery programs are not allowing local adaptation within populations as described in the recovery plan. He said appropriate genetic monitoring could tell us whether we are achieving recovery goals, maintaining current genetic structure and diversity, or reducing genetic structure and diversity. Hillman said we can provide the geneticists with the current M&E Plan and ask them whether it is sufficient to assess within-population structure. If it isn't, they can offer recommendations to improve the M&E Plan. Catherine Willard noted that there are questions identified in the M&E Plan, but it is unclear whether these are the right questions. Tonseth noted that recovery plans only cover listed species; similar monitoring for unlisted species is needed.

Peter Graf (Grant PUD) noted there seems to be two different issues on the table: 1) reducing genetic risk to natural populations; and 2) directing hatchery programs toward some future goal. Mackey said that both risk aversion and goals are valid questions to ask. Gale asked if we want to be able to observe drift caused by hatchery programs or local adaptation? Hillman answered that according to the recovery plan, hatchery programs should not preclude local adaptation within populations; M&E should help us determine whether the hatchery programs are increasing, reducing, or maintaining within-population structure. He said conservation biologists at the NOAA NWFSC would like to see more within-population structure in the upper Columbia River. Mackey noted that old objectives (e.g., Objective 7) focus more on preventing the loss of what structure exists. Pearsons said the core basis of the M&E Plan was to prevent adverse effects on wild populations. Graf noted that by compositing stocks, diversity will be limited. Hillman responded that compositing is intended to help meet abundance targets, but if abundance is increasing, then hatchery programs should do what

they can to allow local adaptation. Gale said that the ultimate goal would be to remove hatchery production once programs like the Chiwawa and Nason programs achieve abundance goals. Hillman suggested that managing genetics—which the programs currently try to do through broodstock collection, adult management, and reducing straying—should occur before abundance goals are met. Hillman summarized the need to identify the goals and questions for monitoring.

Pearsons suggested that the original intent of the genetics monitoring questions document was to try to figure out a common approach, and he requested comments and edits to the document. He wondered whether an accepted approach exists in another region that could be applied locally. Pearsons noted there is a timeline challenge to include some genetic data in the 2020 comprehensive report.

Willard, Murdoch, and Gale all supported the need for geneticists to weigh in on asking the appropriate questions. They support an approach to create broader questions with supporting discussion points to provide geneticists freedom to weigh in on whether the right questions are being asked of the programs.

Hatchery Committees representatives will review the questions for geneticists presented by Pearsons and provide comments to Hillman via email. Hillman will discuss the proposed process with Kirk Truscott (not in attendance). The Hatchery Committees will have a focused session during the August meeting to finalize the questions to geneticists. Representatives will come prepared with comments and nominations of geneticists. USFWS will not have a representative at the meeting; they will provide comments prior to meeting, then will review the approved set of questions after the meeting to provide their approval. Farman will discuss this process with Mike Ford (NMFS) and Craig Busack and see whether one or both are willing to serve on the genetics panel. Douglas PUD will consider whether they will nominate a geneticist. Chelan PUD approved the proposed nominees. Hillman will send a summary of this plan to nominated geneticists after this meeting to sustain their engagement.

F. WDFW's Adult Prophylactic Disease Management Plan (Mike Tonseth)

Mike Tonseth summarized WDFW's Adult Prophylactic Disease Management Plan for Eastbank FH Complex Spring and Summer Chinook Programs in 2018-2020, which Sarah Montgomery distributed to the Hatchery Committees on June 20, 2018 (Attachment D). He said there has not been a consistent prophylactic treatment pattern at Eastbank FH, and WDFW supports moving away from using antibiotics when they are not necessary. However, last year, Tonseth was unaware that prophylactic antibiotic use ended, and he is not supportive of ending its use without further study or consideration. High rates of disease and culling individuals resulted last year, prompting the need to develop a plan to either move away from or provide management direction for use of prophylactic

antibiotics. There have been many conversations on what to do with infected fish/eggs in the Hatchery Committees, and it is appropriate for the Hatchery Committees to review disease management plans. However, in the past, the Hatchery Committees have not discussed which fish are treated and with what drug. That is decided by the health experts and should remain a decision made by the health experts.

Brett Farman asked whether moving away from prophylactic antibiotic use is a state policy. Tonseth answered that the trend is driven by broader U.S. Food and Drug Administration recommendations. For instance, azithromycin is no longer an option for treatment. Bill Gale noted that USFWS considers it a higher priority to address the root causes of disease rather than rely on prophylactic uses of antibiotics.

Gale said this is an Hatchery Committees discussion and decision issue because it has been proposed as a study/experiment and he has concerns with the study design. USFWS generally defers to fish health guidance from the veterinarians, but in this case, there is conflicting guidance. Some are saying not to use prophylactic treatments, while others are saying go ahead. Tonseth disagreed that this is a Hatchery Committees issue. He noted that some hatchery programs may not have the liberty to cull individuals (because of Endangered Species Act status) and leaving prophylactic treatments off the table is posing an unknown risk.

Betsy Bamberger said the decision not to prophylactically inject adults last year was made independently without knowledge of the Hatchery Committees. Based on her understanding, there were no data either through necropsy or other records to suggest that without prophylactic use there would be significant problems. She noted that for food animals, prophylactic use is not the preferred action and should require proof to support use.

Tonseth acknowledged communication was poor last year. Tracy Hillman said any proposed experiments should be reviewed by the Hatchery Committees, because these reviews not only improve study designs, but they keep the Committees apprised of various hatchery activities. He added, if a disease outbreak occurs, there is no need for the Committees to review and approve any treatment plan. That is the job of the health experts. However, the Committees should be informed of the issues and the prescribed treatments. Tonseth asked whether any deviation from past practices constitutes an experiment and a need for Hatchery Committees approval? Farman answered that one should consider the underlying driver—if guidance and policy poses the need to assess risk, it's a different case than a curiosity or hypothesis driven experiment.

Megan Finley (WDFW Fish Health Veterinarian) said it would be informative to know whether prophylactic use is useful for a given population or not. Matt Cooper noted that USFWS carried out a similar experiment 4 to 5 years ago that did not provide very informative results; instead, other

improvements were made in fish rearing to reduce stress over several seasons. Tonseth noted that Leavenworth NFH and the Winthrop NFH programs (prior to brood year 2006) are heavily domesticated with heavy culling historically and low bacterial kidney disease incidence. Wenatchee, Similkameen, and other integrated stocks would not be expected to perform the same as other programs.

Gale said the Hatchery Committees should examine facilities and rearing practices to be able to minimize stress and disease transmission in order to move away from prophylactic antibiotic uses. Bamberger and Finley fully support this goal.

Willard said Chelan PUD defers to fish health professionals, but asks for improved and earlier communication. Truscott (in an email sent to Hillman prior to the meeting) supports improved communication between fish health experts and the Hatchery Committees and supports 100% prophylactic inoculation of spring Chinook salmon because of their Endangered Species Act status. He suggests that results of the proposed study are likely to be confounded by stock origins. Todd Pearsons asked whether the fish will be prophylactically treated this year? Tonseth answered that inoculations have happened and WDFW is not planning to handle fish to inoculate again.

For future years, Tonseth proposes adding another appendix to the annual Broodstock Collection Protocols that can be reviewed by the Hatchery Committees. He will draft the report with Bamberger, Finley, Jed Varney (WDFW), and Trista Welsh-Becker (USFWS). Bamberger expressed concern that they will be locked into a protocol without flexibility to treat disease. Tonseth explained that the Broodstock Collection Protocol is intended to be a dynamic document with a basic level of detail. Having a protocol in the document doesn't preclude change within a year. Gale agreed and said this will provide a historical record of disease management, which will be useful when there is staff turnover.

G. Nason Creek Spring Chinook Salmon Overage (Mike Tonseth)

Mike Tonseth said he notified the Hatchery Committees about an overage in the Nason Creek spring Chinook salmon program for broodyear 2017, which was discussed over email. He said Brett Farman provided input indicating that his recommendation was to keep all wild-by-wild fish in the conservation component of the program. Farman said he was comfortable with the conservation component being 130% of the conservation production goal as long as the overall program (conservation and safety-net components combined) is no more than 110% of the program production goal. Tonseth said WDFW's preference is to move the overage from the conservation program into the safety-net program. Chelan PUD suggested moving the wild by wild overage to the Chiwawa conservation program. Tonseth said overages should have an avenue to be moved into other programs, but in this case, fish originating from the Chiwawa River can be moved into the

Nason program but not from the Nason program into the Chiwawa program (unless genetic assignment is 95% certain to be of Chiwawa origin, starting in 2018). This is because the Chiwawa program is not composited. He said by the time the overage in the Nason conservation program was discovered, the progeny had been comingled, so separation of Chiwawa-origin fish was not feasible. Catherine Willard said in 2018, the brood will be kept separate until genetic assignment is complete.

Tonseth said WDFW prefers moving the excess conservation fish to the safety-net program (and ad-clipping them to appear as safety-net fish) and releasing excess fish from the safety-net program into nonanadromous waters. He said WDFW does not support retaining the fish as unmarked conservation program fish; however, he said since this is just for the 2017 broodyear, and contingencies are already in place for future years, WDFW will go along with NOAA's suggestion to retain the overage in the conservation program. He said this complicates the adult management strategy when these fish return. Having a full safety-net program may allow for a conservation fishery to manage for pHOS and PNI. With a significant reduction in the size of the safety-net program, a conservation fishery might not be implemented, and all adult management would need to occur at Tumwater Dam. He said Grant PUD would need to fund those additional efforts to collect adults at Tumwater Dam. Willard said Chelan PUD and Grant PUD fund adult management at Tumwater Dam to whatever level is required to meet terms and conditions of permits. Tonseth reiterated the WDFW's preference for implementing a conservation fishery. Keely Murdoch said the YN is not supportive of ad-clipping conservation fish. Tonseth said WDFW continues to want to provide an opportunity at removing these fish using recreational anglers as management tools.

Tracy Hillman summarized that no representatives have opposed the current plan to retain the overage of wild-by-wild Nason Creek spring Chinook salmon in the conservation program, subtract an equal amount of fish from the safety-net program, which will be released in nonanadromous waters, and not exceed the total program release of 110%. He said all wild-by-wild fish would be ad-present and wire tagged. Bill Gale added that in the same release year, the Chiwawa program will meet their production targets with a mix of hatchery-by-hatchery and wild-by-wild fish in opposite proportions to the Nason program. Gale said with the same amount of hatchery-by-hatchery fish leaving the basin, he does not see an overall change to adult management practices at Tumwater Dam. Todd Pearsons and Deanne Pavlik-Kunkel agreed and said Grant PUD is not sure whether WDFW is asking to put an additional caveat on how adult management is paid for. Murdoch added that a caveat does not seem reasonable because there are other factors contributing to potential adult management at Tumwater, such as the contribution of Leavenworth NFH-origin fish and overlapping brood years of returning fish. Tonseth said he is not asking for an additional caveat to be added. He cautioned that the amount of effort for adult management might be higher if more conservation program fish are released. Farman said adult management is a permit condition regardless of this decision.

Tom Scribner said he does not favor releasing hatchery-by-hatchery spring Chinook salmon in nonanadromous waters and asked whether there are any alternatives. He asked whether incorporating them into the Leavenworth program is an option or are there other options outside of the constraints of the PUD permits. Matt Cooper said the Leavenworth program is already at capacity for brood year 2017. Gale said the segregated Carson stock also needs to be kept separate from the Nason program stock because it would not be desirable for the Nason program hatchery-by-hatchery fish to be incorporated into the Leavenworth broodstock which could negatively influence the low stray rates into the upper Wenatchee River currently observed for the LNFH program. Scribner suggested marking the fish so they can be removed at Tumwater Dam, and Gale said he is concerned about the future progeny of Nason program hatchery by hatchery fish straying into the upper river. Farman said moving the overage to Leavenworth NFH is not an option from a permitting perspective.

Tonseth said the overage is relatively insignificant, only approximately 20,000 to 30,000 smolts. Scribner said even though that is a relatively small number of fish, there is a political stigma to putting the fish in nonanadromous waters. Pavlik-Kunkel agreed and asked what is being done to prevent this overage from happening again in the future? Tonseth said the overage was an operational error; the fish should have been destroyed at the eyed-egg stage. There are contingency plans in 2018 to prevent this from happening again.

Hillman summarized that the plan for Nason Creek spring Chinook overage is to retain all wild-by-wild fish as part of the conservation program and release an equal amount of hatchery-by-hatchery fish from the safety-net program into nonanadromous waters. Tonseth said he should have final numbers of fish soon and he will distribute that information. The PRCC Hatchery Subcommittee representatives present agreed to retaining the Nason Creek conservation program overage and releasing an equivalent amount of the safety-net program to nonanadromous waters as follows: WDFW, Grant PUD, NMFS, USFWS, and YN approved on July 18, 2018. Hillman said Kirk Truscott also provided approval from the CCT for this item via email on July 17, 2018.

H. Nason/Chiwawa Spring Chinook Broodstock Collection Update (Mike Tonseth)

Mike Tonseth said he received notice that the bull trout incidental take limit at the Chiwawa Weir was met on July 7, 2018. He said Chris Moran and Catherine Willard drafted a letter to USFWS anticipating request for the incidental take. He said he reviewed the current run escapement and numbers of fish already collected. The collection consists of 37% natural origin fish, exceeding the 33% extraction limit, so he decided to stop collecting based on permit conditions. He said there are 32 wild females on hand for the Nason program; however, some are summer Chinook salmon or assign as out of basin fish. He said the collection is at 29 of the 32 fish goal for the conservation program and 31 of the 33 fish goal for the safety-net program. He said for the Chiwawa program, 27

of the 38 targeted fish goal has been collected. He said there was also a hatchery-origin component; these hatchery origin progeny will be held to backfill production shortfall. He said the Nason safety-net program can be backfilled with these additional collections and there are sufficient females to meet production obligations for both the Chiwawa and Nason programs even though there are fewer wild-by-wild brood than were targeted. He said the discussion about increasing bull trout takes at the weir was not pursued.

Brett Farman asked what is the typical bull trout encounter rate at the Chiwawa Weir? Tonseth said it has increased recently with 99 bull trout encountered in 6 days this year. He said PIT-tag detections at the Chiwawa Weir are used to time spring Chinook salmon broodstock trapping, and Chinook salmon and bull trout have similar migration timing and there is a robust spawning bull trout population in the Chiwawa River. Bill Gale recognized that the bull trout take limits make broodstock collection challenging in low abundance years. Tonseth said he and Keely Murdoch are assessing the size of conservation programs, so if there is potential to reduce the program size it might ease up broodstock collection restraints. He said a long-term strategy for collecting broodstock for these programs will also account for the long-term trajectory of spring Chinook salmon returns.

I. Expanded Sampling at the OLAFT (Mike Tonseth)

Mike Tonseth said during the May 16, 2018 Hatchery Committees meeting, Andrew Murdoch (WDFW) presented schemes for how sampling could be expanded at the off-ladder adult fish trap (OLAFT) at Priest Rapids Dam. He shared the document, PRD Expansion Project (Attachment E), which Larissa Rohrbach distributed to the Hatchery Committees on July 10, 2018. He said the discussion about expanding sampling at the OLAFT initiated further discussions and questions. He said Andrew Murdoch summarized answers to these questions in the document, and Tonseth asked the Hatchery Committees to review the document and provide any follow-up questions or comments to himself and Andrew Murdoch. He said Andrew Murdoch would like a decision soon about whether the Hatchery Committees favor expanding the sampling at the OLAFT and said this should be discussed again at the August 15, 2018 Hatchery Committees meeting.

III. Chelan PUD

A. Draft 2019 Implementation Plan (Catherine Willard)

Catherine Willard shared the draft document, Chelan County PUD Hatchery Monitoring and Evaluation Implementation Plan 2019 (Attachment F), which Larissa Rohrbach distributed to the Hatchery Committees on July 18, 2018. Willard said there are two main changes in the plan from the previous year. She said Chelan PUD does not plan to collect summer Chinook salmon survey data to inform the observer efficiency model, nor conduct snorkel surveys in the Chiwawa River Basin.

Snorkel surveys are used to estimate spring Chinook salmon and steelhead parr in the Chiwawa River Basin, and to estimate carrying capacity the Chiwawa River which additional years of data will not cause the estimates to be more accurate. Smolt data collected at the Chiwawa smolt trap are also used to evaluate freshwater productivity according to the M&E Plan. She said outmigration estimates, outmigration timing, and length and weight data obtained from the Chiwawa smolt trap will still be available for these fish, so duplicative field efforts in snorkel surveys are not needed.

Mike Tonseth said the snorkel survey dataset is robust with a long time series and asked if Chelan PUD has considered funding this work for a longer period, perhaps with Tributary Committees Funds. Willard said that has not been discussed internally. Tracy Hillman said in the early 1990s, it was unknown whether the smolt trap would provide reliable estimates of juvenile fish, so snorkel surveys were initiated. In terms of evaluating the hatchery program, the surveys have provided as much information as possible. He said the data are precise and carrying capacity estimates would not change unless there was a significant change in the environment or the hatchery program. He added there is no more information to be gained from the snorkel surveys that would benefit the Hatchery Committees; however, the surveys provide abundance, distribution, and habitat of different fish species in the basin, which have benefits outside the scope of the Hatchery M&E Plan. Hillman said the Chiwawa smolt trap has very high capture efficiencies and provides information on migration timing, length, weight, and condition, which snorkel surveys cannot provide.

Keely Murdoch acknowledged the duplication between the snorkel surveys and sampling at the trap and said the snorkel surveys have provided a lot of insight into the Chiwawa River, particularly for observations of other species such as cutthroat trout and bull trout. Murdoch suggested continuing the snorkel surveys at intervals other than every year. Tonseth asked when the surveys began. Willard said the surveys have been performed every year from 1992 to present except 2000.

Tonseth asked whether the snorkel survey data have been incorporated into the life cycle modeling work for the Wenatchee Basin. Hillman said yes, the data have been used for modeling carrying capacity and life-stage survivals. He said egg-to-parr and parr-to-smolt survival rates likely will not change much unless there is an environmental change in the basin or a major change in the hatchery program. He said the data have also been used to model density dependence. He summarized that the snorkel data are interesting, robust, and certainly have informed modeling efforts, but they provide little information beyond trapping data that will inform management of the hatchery program. The Committees will review the proposed changes to the 2019 M&E implementation plan and discuss it during the August meeting.

IV. Douglas PUD

A. Yakama Nation Summer Chinook Salmon Program (Melinda Goudy/ Keely Murdoch)

Keely Murdoch introduced Melinda Goudy, who is a YN biologist studying summer/fall Chinook salmon. Goudy shared the presentation, "*Yakima River Summer Chinook Re-Introduction*," (Attachment G), which Larissa Rohrbach distributed to the Hatchery Committees following the meeting on July 19, 2018. A summary of the presentation and questions and comments are included below.

Introduction and objectives (slides 1-5)

Summer Chinook salmon were extirpated from the Yakima River in the early 1970s, partly due to flow augmentation for irrigation. The YN endeavors to bring summer Chinook salmon back to the basin and began the process in 2006 with the ultimate goal of establishing a naturally spawning population.

Stock selection and rearing (slides 6-12)

There are multiple stocks and distinct spawning areas of mid-Columbia River summer Chinook salmon. The Wells FH "integrated" stock was chosen as broodstock based on fish health recommendations and logistics. Reintroduction began in 2008, when eggs and milt from broodstock were collected at Wells FH. Fertilization occurs at YN's Marion Drain Hatchery. Rearing also occurs at Marion Drain, after which fish are transported to acclimation sites throughout the basin (slide 11). The Wapatox acclimation site at river mile 17 on the Naches River is new for 2018, and the Nelson Springs site will be phased out. Fish are PIT-tagged at the acclimation sites and then released.

Results (slides 13-25)

Goudy summarized summer Chinook salmon survival to the mouth of the Yakima River by release year, and Prosser-to-McNary-Dam survival for fall Chinook salmon releases. Regarding the table on slide 13, Murdoch asked what the difference in release period represents. Goudy said the summer Chinook salmon are released in early May, mid-May, or late May. She said the fish need to be large enough to PIT tag before they can be released, but earlier release timing is preferred.

Goudy showed results for fall and summer Chinook salmon returning above Prosser from 2013 to 2017, PIT-tag data for returning adults, and migration timing for fall, spring, and summer Chinook salmon.

Goudy showed redd survey results from 2017, a year in which 592 summer Chinook salmon adults returned upstream from Prosser Dam. Todd Pearsons asked where redd surveys were conducted.

Goudy said in the Yakima River from Roza Dam to the confluence with the Naches River, and she acknowledged that the redd counts from the survey (33 redds) likely do not fully characterize all summer Chinook salmon spawning in the basin. She noted that redd surveys show the Naches River being used more in 2017 than in past years, where most of the spawning occurred near Cowiche Dam.

Murdoch asked whether staff have observed overlap in time and space between summer and fall Chinook salmon on the spawning grounds. Goudy said there are few to no fall Chinook salmon redds in the Naches River, and they mostly spawn in separate areas (slide 25). She said there could be overlap in the Union Gap area.

Mike Tonseth asked what is the frequency for summer Chinook salmon redd surveys and the sex of fish or carcasses observed? Goudy said surveys are performed approximately weekly from mid-September in the lower reaches to the first week of November in the upper reaches, with peak spawning occurring in late October. They are unable to collect adults or carcasses; therefore, they are unable to determine sex ratios. Tonseth asked whether the redd counts have been expanded. Goudy said Bill Bosch (YN) performs those calculations to determine fish per redd estimates.

Next steps (slides 26-27)

Goudy said ongoing plans for the reintroduction program include using Wells summer Chinook salmon as broodstock and continuing to acclimate fish at both the Roza and Wapatox sites. Redd surveys on the Yakima River will also continue. She said the ultimate goal of the program is to convert to a local brood and discontinue using Wells summer Chinook salmon broodstock. Habitat restoration work and keeping temperatures as low as possible will also help the reintroduction project.

Pearsons asked what size the fish are upon release. Goudy said they are PIT tagged at approximately 65 to 70 millimeters and released shortly after tagging.

Tonseth noted that 2018 is the 11th year of requesting adult broodstock at Wells Dam for the reintroduction program, which has successfully produced approximately 1,300 returning adults. He asked whether there are plans to collect adults in the Yakima River to support this program. Goudy said adults are counted at Prosser Dam. She said there is a Denil fishway at Prosser Dam; however, water temperatures are generally high and opening the Denil to collect fish would stress the fish. Other options being considered are Roza Dam and Sunnyside Dam, but there are not yet enough fish returning to those two sites. Tonseth asked whether there is a timeline for the program to become self-sufficient in broodstock collection. Goudy said the program plans to rely on Wells summer Chinook salmon broodstock in the short-term. She does not expect that a collection facility

would be funded soon, but noted that reintroduction has proven to be feasible and broodstock targets could probably be met in most years.

Murdoch said that the program started as a feasibility study, based on experience with coho salmon, and transitioned to a long-term plan. Goudy agreed and added that predation is a concern for the program in the Yakima Basin, especially in the lower part of the river.

Bill Gale asked what number of redds or adults would be considered successful for the program to end or transition to local broodstock. Goudy said an escapement of 11,000 summer Chinook salmon would be considered a success, which would provide approximately 6,000 for harvest and 5,000 for escapement. She said the end goal for broodstock collection at Wells FH is when enough summer Chinook salmon can be collected in the Yakima River to suffice for program broodstock. Gale noted that the program sounds like it might eventually transition to an integrated program. He asked whether a segregated hatchery program would provide better survival rates, given predation issues in the basin. Tonseth asked whether long-term plans include broadening the hatchery component of the program, or if Goudy expects that natural production will provide the desired escapement. Goudy said the summer Chinook salmon reintroduction program is part of a larger master plan to achieve 1,000,000 summer and fall Chinook salmon smolts released to the river, with at least 11,000 adult summer and fall Chinook salmon adults returning to the river. She clarified that for summer Chinook salmon, 5,000 fish returning on a regular basis would be considered successful.

Pearsons asked whether Goudy has any ideas as to why there is such a discrepancy between the number of fish returning to Prosser and the number of redds surveyed. Goudy said visibility can be poor in the Yakima River during survey periods, especially when flows are lower. Then, in October, when most of the fish are in the river, flows are too high. She said the Naches River also has low visibility and she expects many redds are present there.

The Hatchery Committees thanked Goudy for her presentation.

B. Broodstock Collection for the Summer Chinook Survival Study (Greg Mackey)

Greg Mackey said the Wells HCP Coordinating Committee approved the use of summer Chinook salmon as the study species for survival studies at Wells Dam in 2020. He said broodstock for this study will be collected at Wells Dam in fall of 2018 and 100,000 fish are needed for the study. The HCP Coordinating Committees also agreed that those 100,000 fish would be part of the summer Chinook yearling salmon production component (out of 320,000 total). Mackey said Douglas PUD will be keeping a close watch on fish health of broodstock and may want to increase collections to ensure enough fish are available for the study.

Betsy Bamberger said the health of broodstock in the Wells program looks good so far and last week the first mortality was observed. She said the fish had abrasions with some *Flavobacteria* present, consistent with a columnaris infection. She said the pond where this fish was found will be treated with Diquat to protect from prespawn mortality losses. She said it was not clear that the bacteria were the primary cause of death, but there was enough evidence to warrant therapeutic intervention.

Mike Tonseth suggested collecting additional broodstock (up to 110%, as described in terms and conditions of permits) as a buffer to potential losses, especially considering warm river forecasts. He said if those fish are on hand and available early, they can be treated and used for broodstock if needed, or surplused. He said collecting additional fish later in the season presents the risk that they are harder to treat and may have a short life expectancy. Bamberger said the fish collected so far look healthy and she was surprised to see the single mortality. Matt Cooper asked whether the fish looked healthy last year. Tonseth said some of the fish looked healthy, but there were higher flows and more dissolved oxygen in the river in 2017.

Mackey proposed that Douglas PUD proceed with Tonseth's suggestion to collect 110% of the broodstock collection target and noted that extra fish would likely be available for the YN summer Chinook salmon program. Tonseth said by the time fish are spawned, broodstock numbers will likely be final and decisions can be made about any surplus fish. Brett Farman cautioned that surplus broodstock should not produce excess juveniles for the hatchery programs. Tracy Hillman asked whether the Wells Hatchery Committee approves Douglas PUD's request to collect up to 110% of the broodstock target for the Wells Chinook salmon yearling program. Representatives present agreed as follows: Douglas PUD, WDFW, NMFS, USFWS, and YN approved. Hillman said he will ask Kirk Truscott if the CCT also approves this item. *(Note: Truscott provided CCT approval via email on July 24, 2018.)*

C. Spring Chinook Adult Management (Greg Mackey)

Greg Mackey shared the document, *Methow Basin Spring Chinook Adult Management Plan 2018,* which Larissa Rohrbach distributed to the Hatchery Committees on July 17, 2018 (Attachment H). Mackey said the tools used for adult management in the Methow Basin in previous years were the outfall at the Methow FH and the outfall at Winthrop NFH. He said a sliding scale from the new ESA permit (18925; 20533) was used to determine removal targets based on projections of wild spawners. He said the Methow Basin Spring Chinook Adult Management Plan 2018 shows calculations based on this curve and provide the best estimates of removal targets in the Methow Basin for 2018. He said with approximately 447 wild spring Chinook salmon spawners expected, the pHOS target is 0.32. Murdoch asked whether 0.32 represents Douglas PUD's programs, or the entire basin? Mackey said 0.32 is the partial pHOS as identified in Douglas PUD's permits.

Mackey noted that adult management in reality is imprecise and these targets give the operators, staff, and Methow Field Office staff who evaluate fish origin and tally adult management numbers a threshold at which they should cease adult management. He said the calculations also include an assumption of 25% prespawn mortality. He summarized that the removal target is 196 hatchery fish, or allowing 214 hatchery-origin fish to spawn. Tonseth said some hatchery-origin fish are already on station and he noted that adults and progeny used for the egg-to-fry survival study should not come from conservation program adults. Tonseth said it would be helpful to have a weekly update of which fish are being held on station because ad-present broodstock should be used for the safety-net program. Michael Humling (USFWS) said the Winthrop NFH program would still like to collect more conservation program fish for its broodstock needs. Bill Gale suggested updating the document to add Winthrop NFH removal numbers and safety-net escapement goals. Mackey said he will work with Charles Frady, Charlie Snow, and Humling to revise the plan and distribute it to the Committee. He will also coordinate with those staff and the Methow Field Office to provide weekly updates on adult management.

D. Winthrop NFH Wild-by-Wild Steelhead Surplus Update (Greg Mackey/ Matt Cooper)

Greg Mackey said Douglas PUD met with USFWS staff to discuss the Winthrop NFH wild-by-wild steelhead overage, which the Hatchery Committees agreed can be reared at Methow FH. He said Douglas PUD's General Manager and attorney required that a Memorandum of Understanding (MOU) be agreed to by USFWS and Douglas PUD in order for the fish to be reared at Methow FH. Mackey said this MOU is under internal review and he hopes it will be signed quickly by both Douglas PUD and USFWS. Tom Kahler said the scope of the MOU is general and language specifies that this agreement is necessary for achieving permit conditions and implementing the comingled steelhead programs. Bill Gale said he also hopes the MOU will be signed quickly, though the broad focus of the MOU may cause delay during internal review.

E. Use of Spring Chinook for the 2030 Wells Verification Survival Study (Tracy Hillman)

Tracy Hillman said the Wells HCP Coordinating Committee asked that the Wells HCP Hatchery Committee be aware that a verification survival study with spring Chinook salmon is planned for 2030. Keely Murdoch said the Coordinating Committee was concerned about permitting limitations to using spring Chinook salmon in 2020 for the survival study. She said permits will need to be updated to allow for this study before 2030, and the Hatchery Committees should work with NMFS to update the Methow spring Chinook salmon permit accordingly and make sure the Hatchery and Genetic Management Plan is accurate so that use of spring Chinook salmon for the survival study is permitted.

F. *Saprolegnia* spp. Egg Incubation Treatment Study Proposal (Greg Mackey/ Betsy Bamberger) - DECISION

Greg Mackey said Douglas PUD is interested in optimizing fish health and fish culture and proposes to study the egg incubation and treatment of *Saprolegnia*, a water mold with fungus-like properties. He shared the document, *Control of Saprolegnia spp. Growth on Spring Chinook (Oncorhynchus tshawytscha) Eggs*, which Larissa Rohrbach distributed to the Hatchery Committees on July 16, 2018 (Attachment I). Mackey said this proposed pilot study is an example of a study Douglas PUD wants to implement to treat and incubate eggs using prophylactic management. He said the approaches in the pilot study include formalin, ambient water, hydrogen peroxide, and salt. He identified a goal of performing this study on multiple species in different locations. Methow FH was chosen because there is a spare incubation room available, and staff are interested in participating. Spring Chinook salmon were chosen because they are of great interest in the basin. He said the goal of the pilot study is to determine how best to assess different treatments and obtain qualitative results so that the study can be expanded in the future. He said 45 replicates would be the sample size needed for a full study.

Mackey said the source of fish for the study will be extra spring Chinook salmon that happen to swim into facilities after surplusing is completed for Winthrop NFH and after broodstock needs are met. These fish would otherwise be surplused to a landfill. He said 24 pairs are desired for the pilot study. The study would run through the eyed-egg stage at which point live and dead eggs would be counted and the tray would be photographed (for a quantitative estimate of mold) and then shocked.

Mike Tonseth said he does not recall Methow FH having an issue with *Saprolegnia* in eggs, whereas Wells FH has had issues with it. Tonseth suggested looking for a facility with a history of fungus issues and using summer Chinook salmon instead. Betsy Bamberger said Methow FH has not had issues with fungus, but all eggs in the facility are treated with formalin, so not treating with formalin may produce interesting results. She said Methow FH was chosen specifically due to the staff being interested and committed to the project and the facility having capacity. She suggested that the study also move to Wells FH eventually, but there are logistical constraints to implementing the study there immediately. Tonseth questioned whether there would be an outbreak of *Saprolegnia* at Methow FH and asked whether performing the study at Methow FH would produce meaningful results compared to Wells FH, where it seems an outbreak is more likely. Bamberger said she is not sure what the historical rate of *Saprolegnia* is at Wells FH, but she will check.

Megan Finley asked what is the concentration of hydrogen peroxide proposed in the study? Bamberger said the pilot study will use 35% Perox-Aid and the exact amount is both indicated in the study protocol and consistent with label dosing recommendations. She said if there is no significant

difference between formalin and Perox-Aid, Perox-Aid is likely the preferred method because it is not a carcinogen. Bill Gale asked if there are difficulties in obtaining Perox-Aid and storing it. Finley said large amounts of hydrogen peroxide need to be registered and stored in a locked container. Bamberger said it is not difficult to obtain but requires certain documentation. Gale, Keely Murdoch, and Brett Farman expressed interest in the study and agreed that even if there is no outbreak, the investment is low, and infrastructure is already available. Bamberger said the study is proposed as a pilot study and could be moved to Wells FH in later years. Mackey reiterated interest in comparing multiple species and treatment types in one study. Bamberger agreed but cautioned that facility variables such as water quality and egg quality often differ significantly.

Gale asked about the specific fish to be used in this pilot study. He encouraged Douglas PUD to retain Winthrop NFH-origin fish that are returning to Methow FH and said he is not sure if Winthrop NFH has a surplus of adults to transfer to Methow FH. Bamberger said based on conversations with staff at Methow FH and Winthrop NFH, there may not be enough fish available this year, but Douglas PUD wanted to bring this to the Hatchery Committees to start the process.

Regarding the study design, Tracy Hillman suggested randomly assigning egg trays to treatment groups. Mackey said the plan is to pool all eggs per spawn date to reduce the family effect and distribute the eggs among the treatments. Hillman noted that the proposed study resembles a block design, because a given treatment flows from one tray to the next in the stack of three trays. Thus, the three trays within each experimental group do not appear to be independent. He suggested treating the three stacks of trays as blocks (because they are not truly independent), so differences among stacks or treatments can be assessed with analysis of variance (ANOVA).

Tonseth asked whether there is a plan to obtain baseline water quality data for the well water at Methow FH, such as chemical composition and pH. He said differences in water quality could affect the treatments and water quality varies greatly between facilities, influencing the applicability of results obtained at one facility to another facility. Bamberger said water quality measurements are not included for the pilot study but would be considered for the full study. Tonseth suggested taking multiple water quality measurements throughout the study. Gale asked whether dissolved oxygen and pH are monitored at the hatcheries. Mackey said dissolved oxygen and pH are automatically monitored at Wells FH; he is not sure about measurements at Methow FH. Matt Cooper said water quality is occasionally measured at Winthrop NFH. Tonseth said water quality varies greatly between surface water and groundwater so it could be an important variable through the study.

Mackey summarized that logistics are in place to begin this pilot study at Methow FH, with the potential to move it to Wells FH in future years. Hillman asked whether the Wells Hatchery Committee approves the pilot study provided there are enough fish available and any transfer details

between hatcheries are successfully determined. It was approved as follows: Douglas PUD, WDFW, USFWS, YN, and NMFS approved on July 18, 2018. CCT provided approval of this item prior to the meeting on July 17, 2018. Kirk Truscott noted in an email to Hillman that fish should be in excess to all other needs.

V. HCP Administration

A. Introducing Megan Finley, WDFW

Tracy Hillman welcomed Megan Finley to the Hatchery Committees meeting. She is a Doctor of Veterinary Medicine working for WDFW. She works with the Eastbank FH programs and Chiwawa Acclimation Facility and therefore has been added to the HCP HC: cc: email distribution list.
Todd Pearsons asked about her geographic scope of work. Finley said she supports the Chelan PUD facilities (Eastbank, Chelan and acclimation facilities - Dryden, Similkameen, Chiwawa, Nason), WDFW facilities (Omak, Naches, Wallace), and the Colville facilities (Colville, Chief Joe).

B. Next Meetings

The next Hatchery Committees meetings are on August 15, 2018 (Grant PUD), September 19, 2018 (Grant PUD), and October 17, 2018 (Grant PUD).

VI. List of Attachments

Attachment A List of Attendees
Attachment B Factors affecting residualism in hatchery steelhead trout
Attachment C Early Maturation Monitoring: Gonadosomatic Index (GSI) Methodology & USFWS Three Year Monitoring Results
Attachment D Adult Prophylactic Disease Management Plan for Eastbank FH Complex Spring and Summer Chinook Programs in 2018-2020
Attachment E PRD Expansion Project
Attachment F Chelan County PUD Hatchery Monitoring and Evaluation Implementation Plan 2019
Attachment G Yakima River Summer Chinook Re-Introduction
Attachment H Methow Basin Spring Chinook Adult Management Plan 2018
Attachment I Control of *Saprolegnia* spp. Growth on Spring Chinook (*Oncorhynchus tshawytscha*) Eggs

Attachment A
List of Attendees

Name	Organization
Tracy Hillman	BioAnalysts, Inc.
Sarah Montgomery	Anchor QEA, LLC
Larissa Rohrbach	Anchor QEA, LLC
Catherine Willard*	Chelan PUD
Tom Kahler*	Douglas PUD
Greg Mackey*	Douglas PUD
Betsy Bamberger	Douglas PUD
Todd Pearsons‡	Grant PUD
Peter Graf‡	Grant PUD
Deanne Pavlik-Kunkel‡	Grant PUD
Mike Tonseth*	Washington Department of Fish and Wildlife
Alf Haukenes°	Washington Department of Fish and Wildlife
Charlie Snow°	Washington Department of Fish and Wildlife
Chris Moran	Washington Department of Fish and Wildlife
Megan Finley	Washington Department of Fish and Wildlife
Matt Cooper*	U.S. Fish and Wildlife Service
Bill Gale*	U.S. Fish and Wildlife Service
Michael Humling	U.S. Fish and Wildlife Service
Katy Pfannenstein	U.S. Fish and Wildlife Service
Brett Farman*	National Marine Fisheries Service
Chris Tatara	National Marine Fisheries Service
Keely Murdoch*	Yakama Nation
Tom Scribner*°	Yakama Nation
Melinda Goudy	Yakama Nation

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