FINAL

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ANCHOR QEA

Memorandum

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

Document Date: September 20, 2023

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

cc: Larissa Rohrbach, Anchor QEA, LLC

Re: Final Minutes of the August 16, 2023, HCP Hatchery Committees and PRCC Hatchery Subcommittee Meetings

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plan Hatchery Committees (HCP-HCs) and Priest Rapids Coordinating Committee's Hatchery Subcommittee (PRCC HSC) meetings were held in person at the Douglas PUD Auditorium and virtually on Webex, on Wednesday, August 16, 2023, from 10:00 a.m. to 1:30 p.m. Attendees are listed in Attachment A to these meeting minutes.

Action Item Summary

Long-Term

Joint HCP-HCs and PRCC HSC

- Keely Murdoch and Mike Tonseth will obtain estimates of pre-spawn mortality from Andrew Murdoch to update the retrospective analysis for Wenatchee spring Chinook Salmon (Item I-A). *(Note: This item is ongoing; expected completion date to be determined.)*
- Members of the HCP-HCs and PRCC HSC will provide feedback to the Washington Department of Fish and Wildlife (WDFW)-revised version of questions on recalculation for Policy Committees (Item I-A). *(Note: This item is ongoing.)*
- Chelan PUD, Grant PUD, and WDFW will develop recommendations for reducing stress and mortality from disease for individual rearing groups at Eastbank Hatchery (Item I-A). *(Note: This item is ongoing.)*

Near-Term (to be completed by next meeting)

Joint HCP-HCs and PRCC HSC

- Catherine Willard will research feasibility questions around planning for potential emergency Okanogan Sockeye Salmon broodstock collection, including the following (Item II-C):
  - Capacity at Eastbank Hatchery for holding and isolation of adult Sockeye Salmon and eyed eggs

  - Permit requirements for transporting gametes or eyed eggs within the State of Washington
  - Quarantine requirements for transporting adult fish into Canada
  - Potential locations for Okanogan Sockeye Salmon broodstock collection in Washington
- All Committee members will revise the executive summaries and program-specific review tables for compilation by Tracy Hillman and Larissa Rohrbach, focusing on completion of the spring Chinook Salmon 10-Year Summary Report by the September meeting (Item II-D). *(Note: This item is ongoing.)*

Decision Summary

- None

Agreements

- None.

Review Items

- The 10-Year Comprehensive M&E Report chapters, compiled by species, were distributed on March 2, 2023.

Finalized Documents

- None

I. Welcome

A. Agenda, Approval of Past Minutes, Action Item Review

Tracy Hillman welcomed the HCP-HCs and PRCC HSC and reviewed the agenda. Rod O'Connor added a discussion on summer Chinook Salmon broodstock collection locations described in the Broodstock Collection Protocols (BCPs), Appendix D. Catherine Willard added a brief update on the Tumwater Dam Apron Maintenance Project.

Revised meeting minutes from July 19, 2023, were reviewed and approved by parties that attended that meeting. U.S. Fish and Wildlife Service and the Confederated Tribes of the Colville Reservation (CTCR) were absent from the July meeting and abstained.

Action items from the HCP-HCs and PRCC HSC meeting on July 19, 2023, were reviewed.
(Note: Italicized text below corresponds to action items from the previous meeting.)

Long-Term

Joint HCP-HCs and PRCC HSC

- *Keely Murdoch and Mike Tonseth will obtain estimates of pre-spawn mortality from Andrew Murdoch to update the retrospective analysis for Wenatchee spring Chinook Salmon (Item I-A). (Note: This item is ongoing; expected completion date to be determined.)*
  Tonseth said that Mike Hughes (WDFW) is still working on the carcass recovery elements of the model. Pre-spawn mortality estimates for the males seem near ready; estimates for the females need more work.
- *Members of the HCP-HCs and PRCC HSC will provide feedback to the WDFW-revised version of questions on recalculation for Policy Committees (Item I-A). (Note: This item is ongoing.)*
  Hillman noted that PRCC Policy representatives held an annual overview meeting on July 20, 2023, and this concept of generating questions for policy representatives was described as a means for communicating issues that could be brought to the Policy Committee for their guidance in the future.
- *Chelan PUD, Grant PUD, and WDFW will develop recommendations for reducing stress and mortality from disease for individual rearing groups at Eastbank Hatchery. (Item I-A). (Note: This item is ongoing.)*
  Tonseth said that this topic is ongoing. Megan Finley (WDFW Aquatic Veterinarian) is currently reviewing work that was done within their organization to further the discussion.

Near-Term (to be completed by next meeting)

Joint HCP-HCs and PRCC HSC

- *All Committee members will review the 10-Year Comprehensive Review chapters to identify main points that should be included in the HCP-HCs and PRCC HSC-authored summary report, including potential changes to the Monitoring and Evaluation (M&E) Plan for PUD Hatchery Programs (Item II-D). (Note: This item is ongoing.)*
  This item will be discussed in today's meeting.
- *All Committee members will revise the executive summaries in summary report templates for each species for compilation by Tracy Hillman and Larissa Rohrbach. PUD authors will prepare program-specific analysis showing whether M&E objectives were met (Item II-D). (Note: This item is ongoing.)*
  This item will be discussed in today's meeting. The focus to date has been on spring Chinook Salmon. O'Connor said that he has some streamlined draft materials that are more specific to other species.
- *Tom Kahler will update the HCP-HCs and PRCC HSC of the outcomes of the Twisp spring Chinook Salmon broodstock collection decision via email during the week of July 24, 2023. (The approved suite of actions was documented in an email from Hillman sent on July 19 and response from Bill Gale on July 21; Item I-A).*

A sufficient number of males were not collected during the agreed-to timeline, and actions were taken to release captured fish back to the river, as described in the July 19 emails. This item is complete.

- *Tonseth will inquire as to whether Hughes's (WDFW) presentation to the Bonneville Power Administration (BPA) on the Wenatchee Spring Chinook Salmon Relative Reproductive Success Study may be distributed to the HCP-HCs and PRCC HSC (Item I-A).*
  Tonseth said that Hughes was not comfortable sharing this presentation because it was originally formatted and prepared for a different purpose. To that end, WDFW is working to include Hughes and Mike Ford (NOAA Fisheries) in a presentation to the HPC-HCs and PRCC HSC in October or November.
- *Hillman will distribute the agenda for the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries) Habitat Assessment and Restoration Planning model development on August 9, 2023 (Item II-E).*
  This item is complete and will be discussed in today's meeting.
- *Kahler will coordinate with Methow Hatchery staff to plan an in-person meeting at Methow Hatchery on September 20, 2023 (Item III-A).*
  This item will be discussed in today's meeting.

II. Joint HCP-HCs and PRCC HSC

A. Summer Chinook Salmon Broodstock Collection Locations

Rod O'Connor said that in the current version of the BCPs, Appendix D, Table 4, bullet 2, there is text that mentions collection of summer Chinook Salmon broodstock at the Wells Dam east and west fish ladders but does not include collections in the Wells Hatchery Volunteer Channel (volunteer channel). Grant PUD is requesting the flexibility to collect adults from the volunteer channel to support summer Chinook Salmon collection for the Carlton program and that text be included in the next version of the BCPs. That program targets unmarked summer Chinook Salmon, and Grant PUD is seeking to have access to all possible sources of broodstock.

Keely Murdoch said that the reason the volunteer channel was not included is because the goal is to target wild fish and avoid hatchery-origin fish that are returning to Wells Hatchery. Tom Kahler said that Douglas PUD definitely handles natural-origin (unmarked) fish in the volunteer channel and those fish are returned back to the river. Brandon Kilmer (Douglas PUD) said that unmarked fish are observed in the volunteer channel on a daily basis, though he is uncertain of the numbers. Bill Gale asked how many of those fish could be mis-clipped hatchery-origin fish versus true natural-origin fish. Gale said that his concern would be including mis-clipped Wells Hatchery fish into other integrated broodstock. Kilmer said that the M&E group would have those data because they analyze scales on all fish handled, whether they are retained or returned to river. Gale asked whether more than 1% of the returns are unmarked fish; if it is not greater than 1%, those might all be mis-clips.

Catherine Willard said that because they are marked at Eastbank Hatchery, the mis-clip rate was higher in recent years, around 20% 4 years ago, although it has improved considerably since then. John Rohrback asked how many fish are handled and how many are returned to river. Kilmer said that, for example, yesterday, approximately 200 fish were live-surplussed and 15 were returned to river. That number can change on any given day. He suspects that natural-origin fish from tributaries move into the volunteer channel seeking cooler water there. A certain number are allowed in our brood collection.

O'Connor said that for Douglas PUD's Methow-Okanogan (Me-Ok) program, there is an option included in the BCPs to collect fish from the volunteer channel. Grant PUD's request mirrors what is already included for the Me-Ok program. Todd Pearsons said that a reason to discuss this is the potential for collection shortages at the east and west ladders in the future and to provide another option for collection to meet hatchery program targets, especially as water is warming and fish numbers decline as the season progresses. Kilmer said that as ladder operations progress and numbers go down, the volunteer channel is an additional third option if needed. They are essentially the same fish but in a different location.

Gale asked whether Grant PUD is asking to include fish from the volunteer channel this year. O'Connor said that no, this is to clarify the language in the BCPs reflecting concerns that are being raised during this year's collection. Pearsons said that the reason for bringing this to the PRCC HSC was because it appeared there could be a shortage this year, but that has been made up since Monday.

Mike Tonseth asked to what degree the east ladder has been used. Kilmer said that has been used 3 days a week. The west ladder was used until the Sockeye Salmon started peaking in numbers; the peak has passed, and the west ladder is being used again. As of this week, the east ladder is not in use because of dam safety work. The final collection of two males for Carlton broodstock is occurring now, and the Me-Ok collection is complete.

Tonseth said that including the volunteer channel for targeting Me-Ok fish was never intentional and appears to be an oversight. Tonseth said that WDFW has some concerns about collecting fish for integrated programs that are coming into the volunteer channel because some of those are likely to be unclipped hatchery-origin fish, and it is uncertain whether it would be possible to identify their origin. There are natural-origin fish that come into other places, like Chelan Falls Hatchery and other places lower in the Columbia River. The program might inadvertently be including fish from Chelan Falls or other downriver populations.

Tonseth said that he is struggling to understand why the broodstock collection is falling so far behind for the Carlton program. The program used to be able to collect more than a sufficient number of fish. Tonseth said that a more appropriate conversation would be to discuss the structure of the weekly collection quotas so that collection occurs across the majority of the return in a timelier

manner. Pearsons said that one of the concerns is warm water later in the season and resulting poor gamete quality in fish collected toward the end of the run; this is a tradeoff with collecting across the entire run. Tonseth agreed that, with climate changes, disease and warm water are concerns across all summer Chinook Salmon programs. Tonseth suggested the need for additional thinking about the collection strategy to determine whether the risks associated with shifting collection to avoid the later part of the run are greater than those associated with collecting fish across the entirety of the run, when prevalence of disease and poor gamete quality might negatively affect broodstock, particularly for integrated programs targeting natural-origin fish.

Tonseth said that the BCPs are intended to lay out the general collection plan. Weekly collection targets are not included in the BCPs where refinement for both the Me-Ok and Carlton programs could be made. Tonseth suggested looking at multiple factors that can cause a shortfall, such as suspicion of columnaris due to warm-water temperatures and developing a decision matrix so that if certain environmental conditions precipitate, the collection numbers could be shifted earlier.

Murdoch said that her preference would be to avoid collecting from the volunteer channel, but she would prefer collecting from the volunteer channel rather than falling short. She suggested that the Committees consider adding the volunteer channel as a backup location to make the BCPs consistent between the Me-Ok and Carlton programs. She supported having a conversation about broodstock collection curves.

Kilmer asked what to do about adipose fin (ad)-present fish captured in that the volunteer trap and then returned to the river, but then are trapped in the east or west ladders and taken for broodstock. Tonseth said that they would be identified by a caudal clip given when they are captured in the volunteer channel. Thus, these fish should not be retained for broodstock.

Gale asked, based on scale analyses, what percentage of fish that are presumed to be natural-origin fish are in fact hatchery-origin fish? This is needed, to understand whether hatchery-origin fish are already being incorporated into integrated programs.

Tonseth said that the BCPs do allow for retention of up to 10% ad-present for the Wells Hatchery program. Data on ad-present fish that have been retained in the past could be reviewed to help inform what proportion of those ad-present fish were actually mis-clipped hatchery-origin fish. Kilmer confirmed that those data are available and said the program could have retained some fish from the east and west ladder traps that were ad-present with a caudal fin clip unless specific notes were recorded.

Flexibility in the BCPs for collection at the volunteer channel will be discussed further in the October meeting.

B. Tumwater Dam Apron Maintenance Project Update

Catherine Willard informed the HCP-HCs and PRCC HSC about upcoming maintenance on the Tumwater Dam apron. Some substrates under the apron have eroded away, which may threaten the stability of the dam. The project went out to bid this summer and work will begin this fall and will occur in two phases. During phase 1, work will occur on river-right. A temporary bridge will be installed to get equipment to the other side of the river. They plan to be done with the Phase 1 by mid-October, then move to Phase 2, which includes work on river-left. The project should be completed by the end of December. The fishway will remain open at all times. If there is a need to shut down the fishway at any time, the contractor will notify Chelan PUD within 5 days in advance of the shutdown, and a shutdown will only be allowed for a few hours. Broodstock collection for steelhead and Yakama Nation (YN) Coho Salmon will continue. Chelan PUD will ensure that there will be vehicle parking and coordination with construction staff to allow broodstock collection staff access to the site. Construction crews will only work during daytime hours.

C. Feasibility of Alternate Gamete Collection for Okanagan Sockeye Salmon

Catherine Willard reviewed the specific language from the RI/RR HCP-HCs *Statement of Agreement Regarding Chelan PUD's Okanagan Sockeye Salmon Obligation Through Release Year 2041* (dated January 18, 2023). A similar statement of agreement (SOA) was prepared for the PRCC HSC and Grant PUD. The SOA states that "Chelan PUD (in conjunction with Grant PUD, the ONA, and the HC) will determine the feasibility of collecting broodstock and/or gametes to support hatchery production at the kɬ cp̓əlx̓ stim̓ Sockeye Salmon hatchery in years when conditions are prohibitive or limited in the Okanagan River." Willard reminded the Committees that feasibility will be discussed first, then if collection is determined to be feasible, the next step will be to prepare a consensus-based collection plan within 2 years.

Willard invited Ryan Benson (ONA) to participate in today's discussion. Willard asked Benson to give an overview of what actions have been discussed in the past, or what actions might be feasible. She noted that today's discussion is a brainstorming exercise, and all ideas are welcome at this stage.

Benson said that discussion of emergency brood collection started in 2015 when a major die-off of Sockeye Salmon occurred in the Columbia River before the fish made it to the confluence of the Okanogan River, resulting in the lowest broodstock and egg-take in the history of the program. The program barely produced 300,000 eggs. The condition of the females was terrible, and egg quality was poor (eggs were mushy); the lowest egg-to-fry survival rates of the programs history were observed. This started the discussion of an emergency response in years when broodstock quality was poor or the number of broodstock would be limited. In the worst case, if numbers were so limited, broodstock might not be collected at all in that year.

Benson continued that even-number years tend to have good runs, odd-number years seem to be depressed. The 2023 broodstock numbers appear to be low. This concern is renewed every June of

an odd-number year when the potential crisis emerges again. During winter of 2022, discussions started between the Okanogan Nation Alliance (ONA) and CTCR but were again back-burnered since last year's (2022) large run. Benson summarized the progress made on ideas and major limitations as follows:

- Transport of live adult Sockeye Salmon across the U.S.-Canada border is overseen by the Canadian Food Inspection Agency (CFIA), which requires quarantine of fish for at least 3 weeks. Holding live Sockeye Salmon in a transport truck for that long would likely be impossible. Holding fish in a hatchery for a few weeks is feasible; even 90% or more of the green fish held for a week or two do eventually mature, but that usually occurs at the beginning of October when the females would be at a more mature stage. Capturing females in June at downstream traps to be held for a longer period of time creates risk of disease transmission and mortality.
- High temperature and low dissolved oxygen conditions in Lake Osoyoos in August typically create a temporary migration barrier that dissipates in September. The group has discussed capturing adult Sockeye Salmon during the migration and planting them in the southern basin of Lake Osoyoos near Oroville, Washington—then there would be no need for border transfer permits. The hope is that they would move up-lake quickly through the central basin to the north basin where better conditions exist. The group discussed using the CTCR purse seine fishery near Brewster, which usually occurs in August as a means to collect adults. Benson has also been communicating with Jeff Fryer (CRITFC) about the potential of taking a subset of Sockeye Salmon marked with passive integrated transponder (PIT) tags as part of Fryer's annual tagging program at Wells Dam and transporting those to the southern basin of Lake Osoyoos. The transport would require coordination with WDFW. By PIT tagging the fish, the survival of transported versus in-river migrants could be compared. However, the cost could be thousands of dollars to potentially obtain a few hundred fish for broodstock.

Keely Murdoch asked what the terms of the quarantine requirements are, whether 3 weeks is the minimum and whether those fish could be quarantined at a U.S. hatchery like Eastbank, then transferred up to the hatchery when the timing is correct later in the season. She asked, if there is hatchery space, whether fish could be spawned and incubated at Eastbank Hatchery, then transferred to Canada as eyed eggs. Benson said that he did not know the terms of the CFIA quarantine requirements; however, they may be able to work with CFIA using a certified procedure, and he offered to follow up on those terms. Benson said that transfer of eyed eggs would be the preferred option; there would be no need for permits. This has been done for Chinook Salmon. The main problem is that when the fish are in Washington in June, they are months away from spawning. If there was a way to hold fish until spawning, collect eggs and milt or spawn them on the U.S. side of the border and then transport eyed eggs, that would be preferrable. They could be reared separately after transfer to observe the treatment effect.

Murdoch asked, regarding transfer and release of fish into the southern basin of Lake Osoyoos, how many would need to be transferred to meet broodstock targets. She said this might be a great option for the rescue of natural-origin fish. Benson said that the number of adult fish that would be necessary to transfer into Lake Osoyoos is unknown; he agreed that if transporting only 1,000 fish, and only 10% survive to spawn, it may potentially help natural production but would not be the most cost-efficient approach. Ideally, the program would want to prioritize collecting gametes when fish are in hand; releasing them back to the environment is high risk.

Willard said that she would inquire about capacity at Eastbank Hatchery for holding adult females until transfer to Penticton Hatchery or holding adult females and males and spawning at Eastbank Hatchery, then transferring eyed eggs. The previous capacity for Lake Wenatchee Sockeye Salmon production at Eastbank Hatchery has been shifted toward other programs (steelhead).

Murdoch suggested identifying the minimum number that could be held or spawned as a backup to the full program.

Hillman asked whether other hatchery facilities would be considered. Willard said that because it is a Chelan PUD and Grant PUD-funded program, their facilities should be considered. Additionally, holding at Chief Joseph Hatchery may not be feasible due to temperature concerns.

Murdoch asked about Priest Rapids Hatchery. Rod O'Connor said that he does not know, but it may depend on the fall Chinook Salmon holding schedule.

Benson said that many years ago, ONA piloted a method for holding adults in the hatchery to determine whether strict protocols would control disease. He said ONA took a few years to develop the protocol, but it has been proven feasible at Penticton Hatchery for holding adults during the spawning period from October onward. However, ONA hatchery managers have indicated that they would not be willing to hold fish from June onward, given the propensity for fish to breakout in disease. Holding adult Sockeye Salmon through summer may require some testing and protocol adjustments. In British Columbia, regulations state that Sockeye Salmon and Chinook Salmon must be held separately, which may be a major concern for the Washington facilities. John Rohrback asked how many fish were held and at what densities successfully for the ONA program. Benson did not know exact numbers, but it has now grown to several hundred fish, and the protocol has become the standard procedure for any female captured on the spawning ground. Mike Tonseth asked whether adults are held on surface water or pathogen-free groundwater. Benson answered groundwater, with a consistent temperature of 10°C, making it suitable year-round. Tonseth asked, aside from fungus, what other pathogens are observed. Benson said that bacterial kidney disease, infectious hematopoietic necroses (IHN), and parvicapsula have been major concerns. IHN is endemic to this population, so the risk is managed. Tonseth asked whether columnaris has been observed. Benson said that columnaris has not been a major problem, although it is present at background levels. Tonseth said that columnaris has been a significant pathogen in the United States and is managed

for summer-run stocks with limited fish health management options, so it is likely to be a significant challenge for facilities in the United States.

Benson said that the number of eggs from females trapped and transported to the hatchery for spawning has varied each year: for Brood Year (BY) 2016, 800,000 eggs; for BY2017, 600,000 eggs; and 2018, 900,000 eggs were collected. It is a bookkeeping challenge to track fish among holding vessels, long capture days and long holding times on the transport truck. The hatchery was able to increase capacity from 3.5 million to 5 million eggs based on raceway capacity by carrying out some earlier releases. Tonseth asked whether a minimum hatchery program size has been determined, and Benson answered that ONA has not determined a minimum population size. To date, their approach has been to raise as many offspring as possible, and the lowest has been 300,000 eggs. In even-number years, releases have been expanded into Lake Okanagan (since 2017); in odd-number years, fish are only released to Skaha Lake to rebuild from the BY2015 low. Tonseth said that it would be important to know whether capacity would limit the PUD facilities to 100,000 or 500,000 eggs. Benson said that in the low years, an additional 100,000 or even 50,000 could be a helpful number.

Tonseth asked whether there are different permitting challenges with bringing gametes or eyed eggs across the border. Benson said that permitting would be part of the fertilization protocol; there is no concern as long as there is a letter indicating their origin.

Rohrback commented that in 2015, while working for the CTCR at the Chief Joseph Hatchery ladder, there were quite a few Sockeye Salmon strays from the Wenatchee basin, which should be taken into account if trying to collect Okanogan-origin fish. Benson agreed that including Wenatchee strays into the Okanagan Program is a potential concern. He said Columbia Rive Inter-Tribal Fish Commission does a lot of tagging and suggested that obtaining fish at tagging locations may help to identify fish (such as at Wells Dam or Bonneville Dam). Murdoch said that the Wenatchee Sockeye Salmon program is no longer in operation, and all fish reared at Eastbank Hatchery have shown a propensity to stray. Wenatchee is a relatively cold-water system, so those wild fish may not have a propensity to stray upstream in search of cold-water refugia. Willard said that through the YN introduction program, genetic data could be examined to better understand stray rates. Benson said that Jeff Fryer questioned whether transporting fish could shift the run timing if this is done more frequently. Tracy Hillman showed stray numbers from the Wenatchee Sockeye Salmon population; 2015 was a unique year with an uncharacteristic high stray rate.

Return year	Methow and Okanogan Run Escapement		
	Run escapement*	Expanded detections	Percent
2008	165,334	0	0.00
2009	134,937	57	0.04
2010	291,764	183	0.06
2011	111,508	51	0.05
2012	326,107	75	0.02
2013	129,993	78	0.06
2014	490,804	0	0.00
2015	187,055	858	0.46
2016	216,036	0	0.00
2017	42,299	0	0.00
Average	***209,584***	***130***	***0.07***
Median	***176,195***	***54***	***0.03***

Larissa Rohrbach asked whether concerns have been raised about bringing fish to maturation in captivity, noting that the Redfish Lake Sockeye Salmon captive broodstock program relied on gonadotropin-releasing hormone analog injections to accelerate and synchronize female maturation. Willard said that this could be a concern because water temperatures in Eastbank Hatchery groundwater lag behind the main river. She said that for Wenatchee Sockeye Salmon that were collected in July, then transferred to net pens in Lake Wenatchee, maturation problems were never encountered. Benson said that he would ask hatchery managers whether they had concerns about bringing females to maturation; the disease risk was the primary concern around long-term holding. Typically, adults begin to be captured during the first week of October, and by the end of season there are always a handful that do not mature.

Tonseth said that to test feasibility of transferring adults to Skaha Lake, collection at Wells Dam may be most appropriate because collecting adults may not be easily done with a purse seine. Dave Duvall said that the Okanagan Weir inadvertently captures a lot of Sockeye Salmon at a time of year when the river should be conducive for migration, but it depends on when that temperature and dissolved oxygen cline sets up. He noted that a lot of groups in the meeting are experts in these activities. ONA and YN are experts at adult transport, and ONA and CTCR are experts in gamete transport.

As next steps, Willard will inquire about capacity at Eastbank Hatchery for holding adults and/or spawning and incubation. She will inquire about disease requirements for transporting green eggs, eyed eggs, and adults within Washington, noting that another option may be to collect eggs only and use cryopreserved milt. Willard will also obtain the terms of the Canadian requirements for quarantine from Benson.

D. 10-Year Comprehensive Review

The HCP-HCs and PRCC HSC continued their review of program-specific outcomes for each monitoring objective of their M&E Plan (updated in 2019).

Program-specific Tables for Objective Outcomes

John Rohrback said that PUD staff tried to make the conclusions on the spring Chinook Salmon programs very digestible for the committee members and is interested to received feedback on the content. Rod O'Connor said they worked to standardize the format and they would like to receive feedback today to determine whether this format is working well, and if so, PUD staff will move ahead on summaries for the other species.

Keely Murdoch said that she likes this approach to formatting. Brett Farman said that he likes the format, and that it is straightforward to understand. Mike Tonseth said that he likes the format; he followed with a comment on how to characterize whether targets were met. If tables indicate that results were mixed, it seems like they should state whether targets were met or not met. The text can describe this as "met in 3 of 5 years," or "unmet in 2 of 5 years". Bill Gale suggested adding some definition of what is meant by met, unmet, mixed, or inconclusive. Gale also suggested adding a column that describes the broader question that each objective relates to. Catherine Willard said that Table 1 from the M&E Plan meets that need.

Chiwawa, Nason Spring Chinook Salmon

Willard reviewed updates to the Chiwawa program objectives and conclusions table.

Murdoch said that she generally agrees with the conclusions shown, with the exception of spawner distribution being characterized as inconclusive. Analyses are showing that spawner distributions are different between natural-origin and hatchery-origin fish. The M&E Plan does not identify proportion of hatchery-origin spawners (pHOS) by reach as a way to evaluate spawner distribution, and pHOS by its nature is a population-scale metric of gene flow, not a metric of spawner distribution. It is clear that this objective is not being met and that meeting this objective is necessary to meet the primary objectives of increasing natural-origin productivity and abundance. She added that either having hatchery-origin spawners in the same area as the natural-origin spawners is preventing the population from achieving objectives, or spawner distribution is one part of understanding why populations are not meeting the primary objectives. Stating that results are inconclusive based on using pHOS by reach is not consistent with the M&E Plan. Tom Kahler said that the intent was to use the pHOS and proportionate natural influence (PNI) construct as a way to report what NOAA Fisheries wants to know as part of the permit conditions. This should be considered value-added information. Kahler agreed that it is correct to state what the M&E Plan says and state whether that has been answered.

Kahler said the term "inconclusive" is used as a flag for something that the Committees should discuss further. Murdoch said this should be characterized as "not met," and distribution of hatchery-origin and natural-origin fish is something that the YN has been concerned about for a while. Farman said that he agrees with Murdoch and also agrees with Kahler that it's useful to have the reach-scale information about pHOS. Tracy Hillman noted that this objective was identified as not met during the first comprehensive review and indicated that the finer the spatial scale of analysis, the more likely you are to find a difference. Hatchery-origin fish tend to spawn closer to where they were released. In addition, changes in the Chiwawa Weir operations over time and with source water may also influence distribution patterns. Stating that the objective was not met is consistent with the statistical results.

Murdoch suggested adding the total number of spawners to the table. If adult fish were not removed from this population for adult management or broodstock, the outcome of this metric might have been different. Removal of the adults is influencing the total spawner metric, which is not done in the control stream. We are not actually letting all the hatchery-origin returns spawn. Hillman said that another approach could look at population escapement instead of spawning escapement. Murdoch said that should be considered in the next version of the M&E Plan. O'Connor agreed that these are important statements and information to consider for the next M&E Plan but that generally by developing the tables, the PUD authors were trying to limit the text to the information that was used to generate the report.

Tonseth said that there may be a need for some brief contextual statements about factors that were not considered, especially for when objectives are inconclusive or objectives are not met, to provide the history for why that statement is being made. These tables may be shared with a broad audience, and we risk misinterpretation if we do not provide some context for the results. Hillman said that some of that may be captured in the main text of the summary report.

Tonseth commented that, regarding whether size targets were met, the text should be refined to state the number of years in which they were met, and context for what constitutes meeting the targets.

White River Spring Chinook Salmon

The White River Spring Chinook Salmon program was a short-lived program, so there are many inconclusive or unmet objectives.

Murdoch said that, regarding spawner distribution, the table states that it is inconclusive. There was some information from the Relative Reproductive Success study that showed the spawner distribution, so it may have been met. All agreed to change the spawner distribution conclusion to "met" for the White River program.

Methow-Chewuch Spring Chinook Salmon

This table represents objectives for the combination of the Methow and Chewuch spring Chinook Salmon programs.

Gale suggested adding that the multi-population PNI model was used, compared to the Wenatchee population, which uses the sliding scale for setting PNI targets. Murdoch suggested separating the years before adult management into different cells, which are not applicable because there were no PNI targets at that time. Gale agreed. Tonseth said that this might be confounded in years when adults are managed for escapement and not PNI. Murdoch agreed that the number of years in which this occurred should be noted.

Rohrback said that he used the term "mixed" when some components of the target were met, and some were not met. Instead of using the term mixed, he agreed to indicate which target was met and which was not met. He asked, regarding in-basin and out-of-basin stray targets, whether it is necessary to meet both targets to meet the objective. O'Connor, Willard, and Tonseth noted that they are different metrics; one is going to be more biologically meaningful than the other. Gale suggested separating in-basin and out-of-basin stray targets on different rows in all the species tables.

Gale stated that, regarding size targets, it should be noted how often targets are not being met, by how much, and in what direction (e.g., too large or too small). There should be some bounds around what is acceptable. Hillman asked Farman whether there are confidence intervals around size target for other programs, such as in the Snake River basin. Farman agreed that it would be more correct to establish some acceptable bounds. Gale asked what the importance of smolt size is for NOAA Fisheries. Farman said it is tied to size of a migration-ready smolt and size for piscivory in the ocean. Gale said that there could be challenges with establishing a fish-size target in consultation because it would have to be related to take. Farman suggested the proponent should still define what the targets and bounds for size mean, even if they are not included in terms and conditions. Hillman noted that, looking at the graphed data, it looks like fish were managed for length, which appeared to vary less than weight over years. Tonseth suggested stating the metric was met but also reporting the mean and standard deviation for size over years.

Twisp Spring Chinook Salmon

Gale said it will be important to describe changing pHOS targets for the Twisp program and how they may have influenced spawner distribution. It was agreed the spawner distribution objective was not met. Kahler said that the multi-population PNI is reported; however, the PNI for just the Twisp population is actually higher and is elevating the PNI for the entire Methow population.

Kahler asked whether the explanation when results are inconclusive should exist in the table or in the narrative. Gale said that some brief text in the tables will be necessary, but it will likely also need some explanation in the narrative.

Summary Report Revisions

Willard and Murdoch made edits to the spring Chinook Salmon Executive Summaries. All agreed to review the revisions and make any additional edits for compilation and review in the next meeting. Murdoch noted that she deleted sentences that were only relevant to other species; in some places she highlighted text she was not fully able to edit because it was not relevant to spring Chinook Salmon. Hillman suggested that spring Chinook Salmon revisions be concluded in the next meeting and that the Committees could then move on to the steelhead report.

E. NOAA Fisheries' Habitat Assessment and Restoration Planning Model Presentation Debrief

NOAA Fisheries' Northwest Fisheries Science Center staff Tim Beechie, Jeff Jorgensen, and George Pess gave a presentation on August 9 to Mid and Upper Columbia committees of their Habitat Assessment and Restoration Planning (HARP) Model to be developed for the Columbia Basin, starting with the Upper Columbia subbasin. Hillman summarized how the HARP Model works. It is a life-cycle model, but it takes into account habitat drivers and scenarios. There are similarities to other models, like the Ecosystem Diagnosis and Treatment model, when considering the difference between the historical condition and the current condition as a gap that can be filled with changes to habitat factors using restoration actions. The life-cycle model for hatchery-origin fish is the component of the model that is of most interest for the HCP-HC and PRCC HSC. The modelers need life stage-specific survival data to inform the model.

Bill Gale asked whether the intent is to evaluate how changes in the habitat are likely to affect production and whether the modeled changes in habitat are focused on the tributaries. Tracy Hillman said that the habitat portion is mainly focused on the tributaries. Gale asked whether this model will be able to identify whether the bottlenecks are in the tributaries or other places in the migratory corridor. Hillman said that the life-cycle component of this model will be able to identify where bottlenecks occur within the life cycle of the fish. Larissa Rohrbach said that HARP models for other basins have not to date included the estuaries and marine phases of the life cycle, so the ability to identify bottlenecks during those life stages from this effort will be somewhat unique.

Hillman said that the Upper Columbia component of the model will be ready by late 2024. The modelers will then move on to the Grande Ronde, Salmon, and Tucannon subbasins. Hillman said that the Action Agencies (Bonneville Power Administration and Bureau of Reclamation) will use the model to evaluate their tributary habitat program and to inform adaptive management. This work is funded by NOAA Fisheries and the Bureau of Reclamation. BPA is providing GIS support.

The modelers will be reaching out to the HCP-HCs and PRCC HSC for information that informs the model. They will be interested in life-stage-specific survival estimates.

III. Administration

A. Next Meetings and September Site Tour Planning

Douglas PUD personnel have arranged for the September meeting to occur at the Methow Hatchery (44 Wolf Creek Road, Winthrop, Washington 98862).

Brett Farman said that he will attend virtually.

The meeting will start at 9:00 a.m. and focus on the spring Chinook Salmon comprehensive report. Tom Kahler will coordinate stops at rearing and release sites throughout the Methow Basin. Sites may include Eight-Mile Acclimation Pond, Twisp Acclimation Pond, Methow Hatchery, Carlton Pond, and potentially Early Winters and Chewuch Acclimation sites. A stop at Winthrop National Fish Hatchery may be added to see the new adult spawning facility.

IV. Attachments

Attachment A List of Attendees

Attachment A
List of Attendees

Name	Organization
Larissa Rohrbach	Anchor QEA, LLC
Tracy Hillman	BioAnalysts, Inc.
Ian Adamsº	Chelan PUD
Scott Hopkins*º	Chelan PUD
Catherine Willard*	Chelan PUD
Brandon Kilmerº	Douglas PUD
Tom Kahler*	Douglas PUD
John Rohrback	Douglas PUD
Dave Duvallº	Grant PUD
Deanne Pavlik-Kunkelº	Grant PUD
Rod O'Connor‡	Grant PUD
Todd Pearsons‡º	Grant PUD
Tim Taylor	Grant PUD
Brett Farman*‡º	National Marine Fisheries Service
Ryan Bensonº	Okanagan Nation Alliance
Alf Haukenesº	Washington Department of Fish and Wildlife
Katy Shelbyº	Washington Department of Fish and Wildlife
Mike Tonseth*‡º	Washington Department of Fish and Wildlife
Bill Gale*‡	U.S. Fish and Wildlife Service
Nathan Buckº	Wanapum
Keely Murdoch*‡	Yakama Nation
Cory Kamphaus*‡º	Yakama Nation

Notes:
* Denotes HCP-HCs member or alternate
‡ Denotes PRCC HSC member or alternate
º Joined remotely