

Memorandum

To: Wells, Rocky Reach, and Rock Island HCP Hatchery Committees and Priest Rapids Coordinating Committee Hatchery Subcommittee Document Date: July 12, 2023

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

cc: Larissa Rohrbach, Anchor QEA, LLC

Re: Minutes of the June 21, 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, June 21, 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

- Douglas PUD will provide an update on Twisp spring Chinook Salmon broodstock numbers via email by July 5, 2023, and identify whether an additional conference call with the HCP-HCs will be necessary to discuss a potential shortfall and to decide next steps (Item III-A).

- 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 III-B). *(Note: This item is ongoing.)*
- All Committee members will revise the executive summaries in the spring Chinook Salmon summary report templates and respond to Hillman and Larissa Rohrbach for compilation by July 12, 2023. Douglas PUD will prepare a program-specific analysis showing whether M&E objectives were met (Item III-B). *(Note: This item is ongoing.)*

Decision Summary

- None

Agreements

- The HCP-HC and PRCC HSC agreed to add John Rohrbach (Douglas PUD) to the primary email distribution list, pending approval by the Wells HCP-CC.

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. The following items were added:

- 2023 Twisp Spring Chinook Salmon Broodstock Collection
- Columbia River Life-Cycle Modeling

Revised meeting minutes from the May 17, 2023, meeting were reviewed and approved by parties that attended the meeting. U.S. Fish and Wildlife Service representatives did not attend the May meeting and abstained.

Action items from the HCP-HCs and PRCC HSC meeting on May 17, 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.)*
Pearsons asked whether it may be possible to coordinate a presentation from WDFW on the results of the Wenatchee spring Chinook Salmon Relative Reproductive Success Study. Katy Shelby said that she would reach out to Mike Hughes and A. Murdoch to ask about preparing a presentation to the Committees. Todd Pearsons stressed the timeliness of hearing the results, which can inform discussions and decisions on adjusting M&E programs.
- *Members of the HCP-HCs and PRCC HSC will provide feedback to the WDFW and Yakama Nation (YN)-revised version of questions on recalculation for the Policy Committees (Item I-A). (Note: This item is ongoing.)*
Bill Gale asked what the timeline is for this action item. Hillman said there is no timeline.
- *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.)*
Catherine Willard said this item is ongoing.

Near-Term (to be completed by next meeting)

Joint HCP-HCs and PRCC HSC

- *All Committee members will review the 10-Year Comprehensive Report chapters to identify main points that should be included in the HCP-HCs and PRCC HSC-authored summary report, including potential changes to the M&E Plan for PUD Hatchery Programs (Item III-B). (Note: This item is ongoing.)*
This item is ongoing and will be discussed in today's meeting.
- *Tracy Hillman will issue template outlines for the HCP-HC and PRCC-authored summary reports for each species. Representatives will strive to provide their populated templates to Hillman and Larissa Rohrbach for compilation by June 14, 2023, 1 week prior to the next meeting (Item III-B).*
Draft material has been contributed to the summary by Keely Murdoch and Catherine Willard, distributed on June 20, 2023. This item will be discussed in today's meeting.

II. PRCC HSC

A. Policy Meeting – Hatcheries Presentation

Todd Pearsons presented a draft PRCC Policy Meeting Hatchery Presentation entitled *Grant PUD Hatchery Mitigation Programs*.

Keely Murdoch thanked Pearsons for the recommended changes made since the slides were last reviewed in the May 17, 2023, meeting. She suggested referencing the Priest Rapids Salmon and Steelhead Settlement Agreement (SSSA) rather than just the Federal Energy Regulatory Commission (FERC) license. As presented, the presentation gives the impression that the new FERC license established the PRCC HSC and the mitigation, but actually they were established by SSSA predating the new license and were incorporated into the new license in 2008. Pearsons agreed: the PRCC HSC started meeting before the new license was finalized. K. Murdoch suggested adding a bullet about the settlement agreement that established No Net Impact (NNI) species and this PRCC HSC; that is the agreement the YN signed, which became part of the new license. Pearsons made that change to the presentation. Pearsons said there will be an overview by Tom Dresser (Grant PUD Fish and Wildlife Manager) of agreements and foundational developments.

Kirk Truscott noted that in the overview of facilities investments, the Saint Mary's Acclimation Site was not mentioned. Pearsons said that there was also new construction at other facilities, like Wells Hatchery and Eastbank Hatchery, and asked whether the Saint Mary's Acclimation Site would fit under the Chief Joseph Hatchery facilities. Truscott said that no, Chinook Salmon are reared at the Chief Joseph Hatchery, whereas the Saint Mary's site acclimates steelhead. Deanne Pavlik-Kunkel agreed that the Saint Mary's site should be mentioned separately.

Truscott said, regarding the section on challenges and successes, that attendees are likely to ask what is meant by local and regional challenges and suggested providing some examples.

Tracy Hillman asked about Atlas et al. (2023). Pearsons said that study was a coastwide assessment of abundance trends associated with different life-history strategies, primarily subyearling and yearling life-history types. The publication points to large-scale declines across the entire coast from California to Alaska.

Truscott said that the Okanogan steelhead are referenced as a reintroduced population in the presentation, included with Sockeye Salmon, Coho Salmon and Okanogan Spring Chinook Salmon. Steelhead are different in that they were never functionally extirpated. Pearsons agreed to remove Okanogan steelhead from that list, but noted they may have different perspectives; there is some debate as to whether there was an extant naturally spawning population. Bill Gale said that he agrees: Sockeye Salmon and Coho Salmon reintroductions have been demonstrated to be a success,

but he did not know whether it has been determined that Okanogan Spring Chinook Salmon reintroduction has been a success yet. It is a success in that there is a program implemented now and there are more spring Chinook Salmon in the Okanogan Basin than there were before implementation.

Truscott suggested making clear whether Grant PUD is conveying support or not for reintroduction efforts in all of the extant, blocked areas of the Columbia Basin. Pearsons said one of the reasons Grant PUD is presenting the information in the subcommittee is to make sure representatives are comfortable with the information being presented to the Policy representatives.

Gale suggested deleting references to fall Chinook Salmon, which are not part of Grant PUD's mitigation. Pearsons said that the presentation includes other programs. For instance, the U.S. Army Corps of Engineers pays for supplementing the Hanford Reach fall Chinook Salmon. There were some years with low fall Chinook Salmon abundance when Priest Rapids Hatchery fall Chinook Salmon were used by different programs, and in recent years, this has been more related to the YN program.

Gale noted that many facilities are shared with other partners and suggested avoiding language like "we have" facilities. Gale suggested adding a slide describing the partnerships that have emerged from working to meet NNI mitigation obligations. He suggested mentioning all the agencies that contribute to meeting mitigation obligations, such as WDFW—which is contracted to operate facilities and fish health—and similar roles of the YN and Confederated Tribes of the Colville Reservation (CTCR). The first layer of the partnership is the work that happens in the PRCC HSC. Pearsons agreed and said that he would add text on partnerships. Katy Shelby agreed that she would appreciate seeing WDFW specifically mentioned because they have such a large role in operating the programs. Shelby asked about including Dryden Pond in the list of facilities. Pearsons said that it would be included as part of the Eastbank Hatchery Complex.

III. Joint HCP-HCs

A. Twisp River-Methow Spring Chinook Salmon Broodstock Collection

Tom Kahler said routine broodstock collection for the Twisp River spring Chinook Salmon conservation program has been underway since spring Chinook Salmon have been arriving at Wells Dam (WEL). Staff are nearly done with collection of the Methow Hatchery (MetComp) program, targeting 56 pairs. They are awaiting genetic assignments for 18 fish. The pairs collected for MetComp brood are all wild fish, and only one fish thus far has genetically assigned to the Twisp program.

Kahler explained that the Twisp component has not been a strong run this year. The first passive integrated transponder (PIT)-tagged Twisp-origin fish was detected at the Twisp River array on June 6, but the spring Chinook Salmon do not seem to be moving into the tributaries of the Methow River yet. Although the Twisp fish may just be delayed, staff are starting to worry that there will not be enough Twisp fish to meet broodstock targets. Staff continue to trap spring Chinook Salmon at WEL, but the run is winding down. Kahler said he has been tracking detections of PIT-tagged Twisp fish at Bonneville Dam (BON) and is following them through their upstream migration. All have been detected on arrays farther upstream except for four fish that were lost between BON and The Dalles (TDA) dams. All others have passed over WEL, except for two fish that are still working their way up the Columbia River. There have been no other detections of Twisp fish at BON since Saturday. There could be a few dozen additional untagged wild fish in the migration. A total of 22 PIT-tagged Twisp fish (hatchery and wild) have passed over WEL; 1 was trapped but released, which was perhaps related to not taking more than 33% of the run. At BON, 9 PIT-tagged wild Twisp fish have been detected, 2 were then lost between BON and TDA, 5 made it to WEL, and 2 are still in transit between McNary Dam and WEL. Once the last two fish pass over WEL, it is probably not worth continuing to trap at WEL. Per the broodstock collection protocols, the trap operation has already moved into the phase for broodstock trapping only 3 days a week, and spring Chinook trapping ends on June 28. Staff are likely to encounter more fish at the Twisp weir. Douglas PUD will trap at WEL for another week, while continuing trapping at the weir through July 5, a decision based on the run timing over the last 5 years. Based on historical detections of wild Twisp fish on the lower Twisp River PIT-tag array, all wild fish pass into the Twisp River by the first week of July. There tend to be a few hatchery fish that pass later than that.

Kahler continued, explaining that the Twisp program needs seven (natural-origin) pairs to meet production targets; they currently have one female. The Twisp program cannot operate with fewer than three pairs. For practical purposes, as characterized in the HCP, program permits, and the broodstock collection protocols, the program cannot collect more than 33% of the wild Twisp fish. The program production number fluctuates based on brood availability, with the understanding that total juvenile numbers are backfilled with hatchery production from the MetComp program so that total production from the Methow Hatchery is not compromised due to shortfalls in the Twisp program. Kahler suggested that the broodstock collection status can be reevaluated on July 5, but the HCP-HC may need to approve an alternative plan for this year. It is looking bleak for the Twisp brood collection.

Bill Gale asked whether collection of MetComp fish increased in the past week and whether the MetComp program fish are also holding back between WEL and the Methow Hatchery. Gale said that at Winthrop National Fish Hatchery (NFH), and somewhat at Leavenworth NFH, the run appears to be trailing off, if not done. Gale said that collection of hatchery-origin fish at Winthrop NFH and

Methow Hatchery has been good this year. Kahler said that there are still many Twisp fish that appear to be between WEL and the lower Twisp River array; they just have not been turning into the Twisp River yet—perhaps it is a response to temperatures.

Kahler said that there are 49 pairs that have been collected and there are 30 fish awaiting genetic assignments. There may be extra MetComp fish that could be held to meet total production from the Methow Hatchery.

K. Murdoch asked whether the Twisp program can be backfilled with Twisp hatchery-origin fish crossed with natural-origin fish. Kahler said yes, but we do not have hatchery-origin fish either; the focus has been on collecting natural-origin fish so far, but we can redirect that focus. K. Murdoch recommended mixing in hatchery-origin brood.

K. Murdoch said that trapping continues at WEL for Sockeye Salmon and summer Chinook Salmon. She asked whether the spring Chinook Salmon run has been running late. If a spring Chinook Salmon is encountered, is there a way it could be kept for broodstock? Kahler said that spring Chinook Salmon are encountered in the Wells Volunteer Channel, which is not included in the broodstock collection protocols as a collection point. K. Murdoch recommended making sure that the people doing the work are prepared to retain those fish and call someone. Kahler said that one of the challenges is that the Twisp Hatchery fish are not differentially marked externally from the MetComp fish. If a fish turns out to be a Twisp fish after coded wire tags have been read, it is questionable whether it could be ripe at the same time as the other Twisp fish. K. Murdoch asked, because wild Twisp fish are being differentiated by genetics, can that be done for the hatchery-origin fish? Kahler said that yes, the next group will be sent for genetic analysis on July 5. The genetics lab cannot read samples for this program submitted after July 12; there is one more opportunity to include some hatchery samples after July 5. However, no hatchery-origin fish have been collected yet.

John Rohrback said that it may be unwise to hold all hatchery-origin return (HOR) spring Chinook Salmon collected at the WEL trap after genetic testing is no longer available, in case some of them are Endangered Species Act 10j program returns to the Okanogan River. We could hold and test HOR fish that return to the Methow Hatchery outfall or Twisp weir. Rohrback continued that the total Twisp release was just under 30,000 before recalculation, which was recently shifted to about 24,000. A total of approximately 5,000 were tagged out of 30,000, which is a tag rate of about 17%. The expanded number of Twisp returns based on 18 raw PIT detections would be up to 108 fish. Only 7 of those 18 PIT-tagged fish have been detected in the Methow River. Because of the detection efficiency of Methow River instream PIT arrays, there's not much confidence regarding how many fish are actually in the Methow River. Since the end of May, only two fish have arrived in the Methow River.

Tracy Hillman asked how long the Twisp weir operates, and Kahler said that can be operated into August (until spawning).

Rohrback said that because its infeasible to create a Twisp program with fewer than three pairs, we may not want to hold on to just a few fish to try to meet the Twisp program. The mitigation obligation for the Methow Basin can be made up with MetComp production, using wild fish that are already in hand. A decision not to fulfill the Twisp program this year is one option that could be considered by July 5. Gale asked whether not releasing fish from the Twisp program would perpetuate this problem in future years. Kahler agreed that is a concern.

Hillman asked Kahler to provide an update by email to the HCP-HC on July 5, then plan a conference call by July 7 to agree to an alternative path forward, if needed. Fish will continue to be held in the interim at WEL awaiting genetic assignment.

Katy Shelby and Douglas PUD staff will reach out to Mike Tonseth to inform him of today's discussion (Rohrback emailed Tonseth on Thursday, June 22).

B. 10-Year Comprehensive Review – Spring Chinook Salmon Summary Report Content

Tracy Hillman reviewed the HCP to remind the Committees of the direction given for preparing a 10-year report and, separately, an HCP-HC-led review of programs. Todd Pearsons said that although Grant PUD does not have an obligation to generate a 10-year review under the SSSA, there is a requirement for adaptive management, so Grant PUD is participating in the 10-year review process. Keely Murdoch said it would also be helpful to review the 2017 statement of agreement (SOA); she noted in the last meeting, it was agreed in the 2017 SOA that the 10-Year Comprehensive Report would be the same thing as the HCP-HC review of programs, so it should not have been a PUD-authored report. We are now in the process of trying to correct that.

Hillman reviewed the template approach to preparing the first summary report, which was focused on spring Chinook Salmon and distributed on May 22, 2023. Hillman showed the revised statements and management recommendations provided to date by K. Murdoch and Catherine Willard.

Willard also prepared a table summarizing some of the main findings and useful information for the Chiwawa spring Chinook Salmon program. Willard noted that the results are included in the reports as written but are integrated with all the other spring Chinook Salmon programs and are difficult to identify for a single program. Willard showed a summary stoplight table of whether program objectives had been met. Tom Kahler said this tabular approach was helpful for a single program and asked what the Committees would want to do for the summary report—whether to focus on our executive summaries or reorganize the summary report around the programs. It seems that

recommendations would be program specific. K. Murdoch agreed and noted that program-specific reporting was done in the last program review. The Chiwawa program summary prepared by Willard presents it even more succinctly, so it is more easily reviewed for each program. K. Murdoch said that she also likes the approach of editing the executive summaries. She suggested editing the executive summaries to make them a Committee-authored summary and then create a table for each program, just as Willard has started to do. Hillman suggested including a program-by-program review in the Adaptive Management Decisions section. The outline is set up to summarize results by objective and species and then by each individual program. K. Murdoch said that management and M&E recommendations are sometimes intertwined. Kahler said he is willing to go through the Methow Basin programs to replicate what Willard has prepared for the Chiwawa program. Kirk Truscott said he likes the idea of editing the executive summaries and creating these stoplight charts showing monitoring outcomes. Willard asked that members review the stoplight charts carefully.

Truscott said that in some years, based on the Before-After-Control-Impact (BACI) analysis, there are significant results for natural-origin spawners (NOSs) but not for natural-origin returns (NORs) to the basin; is that because some returns are lost to pre-spawn mortality, proportion of hatchery-origin spawners (pHOS) management, or removing fish from the river for broodstock? Truscott noted that NOR includes all returns (including those that go to harvest, jacks, brood, and strays to other rivers), but NOS includes only spawners, and he asked whether NOSs include those other groups. Truscott asked what the meaning of the result would be—whether a significant reduction in spawners should be attributed to the hatchery program when it may have been the result of a management decision associated with the hatchery programs, compared to the reference streams that have no hatchery influence. Truscott noted that these objectives were established before 2012, the year when adult management actions were first implemented and could affect the analysis. K. Murdoch said that, in theory, there would have to be so many more returns to compensate for taking fish away from spawning in the river for broodstock and adult management removal of HORs from the population that would have spawned. Edits can be made to the executive summary to clarify that. Gale said that it is not that the NOSs have been significantly decreased in the basins, but that NORs have not significantly increased. Hillman showed tabulated data and figures from the BACI results that illustrate this. Gale noted that overlap in confidence intervals makes it difficult to have confidence in whether NOSs actually decreased. Willard noted that the results of statistical tests with all reference populations together were not reported in the reports due to time constraints, but the data tables were provided during the draft document review.

Gale said that the 2013 Biological Opinion¹ (BiOp) really drove meeting pHOS and proportionate natural influence (PNI) targets; the results during the timeframes before and after the BiOp should be discussed and meeting the standards of the BiOp and Chiwawa program Hatchery and Genetic Monitoring Plan in 8 out of 11 years is a success. Willard noted that in the years in which targets were not met, it is because the PNI target was set higher, at 0.80, using the sliding scale for years with high NORs.

Gale also said that the outcomes for harvest should also be rated a success. Conservation programs do not have a harvest goal, so it could be identified as a success if the conservation programs are contributing to harvest at all. Willard said that she does not know how much conservation programs should contribute to harvest, so she left it as a mixed result in her table. K. Murdoch agreed that the conservation programs are not meant to contribute to harvest, but it does happen when a conservation harvest is allowed, and this result will require some explanation around this objective for the Chiwawa program.

It was also noted that release targets have been met and could also be shown as a success. The Chiwawa program is meeting numbers and is nearly meeting length and weight targets, although coefficient of variation in lengths are not being met. Katy Shelby said that length targets exist, but no weight targets are available, and it is hard to trace back where those calculations came from. She would like to better identify those sources in the next annual M&E report. Hillman said that the original size targets were based on the length-weight relationships in the Piper et al. (1982) hatchery management book. It was determined that those size targets do not apply here for these Upper Columbia programs. Gale said that the targets should be somewhat specific to the programs, and he would support breaking up reporting of the objective results between meeting number released and size released. The results show that there is more variability in size at release than is desirable. Gale said that it is important to track the fish size as a metric of quality of release, but he asked whether condition factor is also being tracked. Shelby said there was no target for length, although those data are collected, so condition factor could be calculated. Hillman said that in reporting these data for the comprehensive report, they found that in years when the weight target is met, the length as identified in Piper et al. (1982) is not met, and vice versa. The Committees have adopted the concept of using condition factor and length targets, but condition factor targets have not been determined by the Committees. Gale and Truscott noted that juvenile size is important for survival through the hydro-system. Hillman noted that this is counterbalanced by the fact that larger size at release also contributes to residualism and earlier age at return.

¹ 2013 NMFS Biological Opinion on the issuance of Three Section I(a)(1)(A) Permits for the Upper Columbia River Chiwawa River, Nason Creek, and White River Spring Chinook Salmon Hatchery Programs.

K. Murdoch said population-specific size targets should be reconsidered to clarify what we are comparing it to—what the baseline really might be. For instance, Mark Sorel (University of Washington and WDFW) found that subyearling outmigrants had better survival, but the caveat was that the age at return structure was different from yearling migrants.

All agreed to break up reporting on objective outcomes for release targets into number and size/condition targets and to similarly split up reporting on the outcome of PNI and PHOS.

Pearsons said it would be helpful to have a section on the significance of the results (not just statistical significance) so that we can state what we have found out and what it means. This could be similar to an impact statement or significance statement that many journals now require. It should identify what information is actionable; a place to communicate whether the information being collected has informed management or not. This is different from key conclusions that would be represented in the executive summary, although those may also include statements of biological significance. For instance, a statement of significance may explain whether producing fish that are maturing earlier than wild fish matters, whether this is a negative impact because it's different from the wild population, or whether survival is so much better that the programs are willing to accept that change in age structure—or for instance, whether a difference in spawner distribution between NOR and HOR is a function of habitat quality or juvenile acclimation. These would answer the “so what?” question.

Committee representatives agreed to review and revise executive summaries in the draft outline that was distributed on June 20, which includes content and revisions already provided by YN and Chelan PUD. Douglas PUD agreed to prepare program-specific analysis of whether objectives are met for Methow Basin spring Chinook Salmon programs. Grant PUD will review the materials distributed and decide whether to prepare similar document components for their programs.

IV. Administration

A. Douglas PUD Representation

Tom Kahler said that from within their department, John Rohrback has decided to step into supporting the Wells HCP-HC. Douglas PUD requested that Rohrback be added to the primary email distribution list, and the HCP-HC and PRCC HSC approved. Deanne Pavlik-Kunkel said the PRCC does not need to approve the email distribution of PRCC HSC materials.

B. Columbia River Life-Cycle Modeling

NOAA Fisheries Northwest Fisheries Science Center (NWFSC) scientists Tim Beechie, George Pess, Jeff Jorgensen, and Morgan Bond would like to hold a meeting with the Upper Columbia Regional

Technical Team and HCP and PRCC habitat and hatchery subcommittees to describe the foundations for their Habitat Assessment and Restoration Planning (HARP) model at a high level. They are preparing the HARP model for a large portion of the Columbia Basin as a way to evaluate the Bonneville Power Administration and Bureau of Reclamation habitat implementation program. They want to start in the upper Columbia subbasin because it is a data-rich region. They would like to hear from committee/subcommittee members regarding which questions need answering. Examples may be what changes in productivity and capacity could be expected if Enloe Dam were removed, if State Route 207 was relocated out of the floodplain on Nason Creek, or if all barriers were removed from Mission Creek. Following a general introduction and overview of the model and its objectives during the first meeting, they will then plan focused discussions with individual committees/subcommittees to establish the modeling framework and data availability.

Todd Pearsons said that it is difficult to track all of these different life-cycle models. There is a model developed by Jeff Jorgensen, which was recently updated by Mark Sorel, and now there is this HARP model approach—how do these models fit together? Tracy Hillman said that the HARP model, like the others is a life-cycle model, but currently HARP focuses on evaluating habitat restoration work. It takes measurements of habitat before and after restoration and translates habitat change into fish productivity and capacity. The other life-cycle models focus on modeling fish population dynamics and do not explicitly include changes in habitat conditions. The Jorgensen and Sorel models only focused on Wenatchee spring Chinook Salmon. Jorgensen is contributing to the HARP model and will be here to talk about it. They would like to incorporate a hatchery component if it has an effect on productivity and capacity.

Pearsons asked whether there are linkages to Ecosystem Diagnosis and Treatment (EDT) modeling, noting that the CTCR have been using EDT for the Okanogan Basin. Hillman said that the NWFSC is working with John Arterburn (CTCR) to include habitat information that was collected for EDT modeling. The EDT model also stops at the Canadian border; it does not include the Canadian Okanogan and Similkameen River upstream from Enloe Dam. Hillman said the NWFSC is not developing HARP for the area upstream of Chief Joseph Dam, though it could be added later. Kirk Truscott said they just do not have the habitat information upstream of Chief Joseph Dam. Truscott said that EDT, as the CTCR has implemented it, is a long-term habitat status and trends model, not a population response model relative to habitat change. The CTCR believes they are both necessary to implement; they both provide important but different monitoring outputs. One provides long-term status and trends and one provides near-term habitat effectiveness results. Larissa Rohrbach noted that a paired approach with EDT and HARP modeling has been used in the Chehalis Basin.

Hillman said that most of the work to develop the HARP model is being funded by the NWFSC; it is their tool to evaluate the action agencies' habitat restoration program. Some regions already have life-cycle models (e.g., the Lemhi River and Grande Ronde River); HARP will cover all the populations that are not covered by ongoing life-cycle models.

Bill Gale asked whether the hatchery committees/subcommittees will be able to use the model to answer questions about productivity and capacity with adjustments in things like PHOS. Hillman said that this has not been a component of the other HARP models, but that is the kind of information the NWFSC would like to discuss with us.

Gale asked whether the model will cover all species. Hillman said that yes, it would cover spring Chinook Salmon, summer Chinook Salmon, steelhead, Coho Salmon, and possibly fall Chinook Salmon if fish-habitat relationships exist. Gale asked whether Bull Trout will be included; Hillman said probably not, but if the fish-habitat relationships are available, Bull Trout could be added. Hillman said that the model framework is fairly simple and will be explained during the meeting. The model generates both capacity and productivity estimates.

Hillman said the NWFSC group is aiming to complete the model for the Upper Columbia by the end of 2024. They may be able to move quickly because they have already been provided a lot of geospatial data.

Truscott said that it would be interesting to compare the outputs from this model to past estimates of Columbia River capacity.

Hillman said that the date set for an initial meeting is August 9, in place of the usual Upper Columbia Regional Technical Team meeting. Pearsons said that Grant PUD may have a schedule conflict on August 9.

A. Next Meetings

The next HCP-HCs and PRCC HSC meetings will be held on Wednesday, July 19; Wednesday, August 16; and Wednesday September 20, 2023, in person at the Douglas PUD Auditorium. Virtual access will also be available for those who cannot attend the meetings. The meetings will start at 10:00 a.m.

V. Attachments

Attachment A: List of Attendees

**Attachment A
List of Attendees**

Name	Organization
Larissa Rohrbach	Anchor QEA, LLC
Tracy Hillman	BioAnalysts, Inc.
Catherine Willard*	Chelan PUD
Scott Hopkins*°	Chelan PUD
Kirk Truscott*‡	Confederated Tribes of the Colville Reservation
Andrew Gingerich°	Douglas PUD
Tom Kahler*	Douglas PUD
Brandon Kilmer°	Douglas PUD
John Rohrbach	Douglas PUD
Deanne Pavlik-Kunkel°	Grant PUD
Tim Taylor°	Grant PUD
Todd Pearsons*‡°	Grant PUD
Brett Farman*‡°	National Marine Fisheries Service
Bill Gale*‡	U.S. Fish and Wildlife Service
Katy Shelby°	Washington Department of Fish and Wildlife
Keely Murdoch*‡	Yakama Nation
Cory Kamphaus*‡°	Yakama Nation

Notes:

* Denotes HCP-HCs member or alternate

‡ Denotes PRCC HSC member or alternate

° Joined remotely