

Memorandum

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

Date: January 30, 2023

From: John Ferguson, HCP Coordinating Committees Chairman

cc: Kristi Geris, HCP Coordinating Committees Support

Re: Final Minutes of the December 16, 2022, HCP Coordinating Committees Conference Call

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plan (HCP) Coordinating Committees met by conference call on Friday, December 16, 2022, from 9:00 a.m. to 12:30 p.m. Attendees are listed in Attachment A to these conference call minutes.

Action Item Summary

1. Chelan PUD will continue providing Rocky Reach Dam and Rock Island Dam turbine unit maintenance updates as information becomes available (Item I-C).
2. Chelan PUD will verify dates and times the Rock Island Adult Ladder Tailrace Entrance was closed while calculating adult conversion rates for the 2021 Rock Island Dam Confirmation Survival Study (Item I-C).
3. Chelan PUD will provide a synopsis of the engineering options considered to meet the minimum 1.0-foot head differential target at all four entrances at the Rock Island Dam Right Bank Adult Fishway during high spring flows in the Columbia River (Item I-C).
4. Douglas PUD will distribute a draft Statement of Agreement (SOA) to change the timing of Wells Dam bypass operations, beginning in 2023 and going forward, for a vote in January 2023; and this change in operations will be reflected in the 2023 Wells Bypass Operating Plan for a vote in February 2023, before the plan is due to Washington State Department of Ecology (Ecology) on February 28, 2023 (Item III-B). *(Note: Tom Kahler provided the draft SOA for review on December 19, 2022, which was distributed to the Wells HCP Coordinating Committee by Kristi Geris that same day.)*
5. Wells HCP Coordinating Committee representatives will contact Douglas PUD with questions, if any, about the draft SOA to change the timing of Wells Dam bypass operations prior to the HCP Coordinating Committees conference call on January 24, 2023 (Item III-B).
6. The next scheduled HCP Coordinating Committees meeting is on Tuesday, January 24, 2023, from 12:00 p.m. to no later than 4:00 p.m., and is to be held by conference call (Item VI-A).
7. Washington Department of Fish and Wildlife (WDFW) will distribute weblinks to access the codes for the models and simulations discussed in the steelhead overshoot presentation during today's HCP Coordinating Committees conference call (Item VII-A). *(Note: Andrew Murdoch provided these weblinks, which were distributed to the HCP Coordinating Committees by Kristi Geris on December 19, 2022.)*

Decision Summary

1. Wells HCP Coordinating Committee representatives present approved the *Summary of 2022 Juvenile Fish Bypass Operations at Wells Hydroelectric Project* (2022 Wells Post-Season Bypass Report) and appended *Proportion of Juvenile Plan Species Outmigrating through Wells Dam during Juvenile Bypass Operations in 2022* (Passage-Dates Analysis) (Item III-B).
2. The *2021 Public Utility District No. 1 of Douglas County Northern Pikeminnow Removal and Research Program* (Douglas PUD 2021 Northern Pikeminnow Removal Annual Report) was approved by the Wells HCP Coordinating Committee on December 22, 2022, after no disapprovals were received prior to the 30-day review period deadline (Item III-A).

Agreements

1. Rock Island and Rocky Reach HCP Coordinating Committees representatives present agreed that starting in 2023, Chelan PUD will release fish rescued during fish salvage operations accordingly, upstream or downstream of the dam, based on life stage (Item IV-C).

Review Items

1. The Douglas PUD 2021 Northern Pikeminnow Removal Annual Report was distributed to the Wells HCP Coordinating Committee by Kristi Geris on November 22, 2022, and was available for a 30-day review with edits and comments due to Tom Kahler by December 22, 2022 (Item III-A).
2. The *2022 Biological Evaluation of the Rocky Reach Juvenile Fish Bypass System Draft Report* (2022 Rocky Reach Juvenile Fish Bypass System Report) was distributed to the Rocky Reach HCP Coordinating Committee by Kristi Geris on December 2, 2022, and is available for a 90-day review with edits and comments due to Lance Keller by February 28, 2023 (Item IV-A).
3. The *2022 Rock Island Dam Smolt Monitoring Program and Gas Bubble Trauma Evaluation Draft Report* (2022 Rock Island Smolt and Gas Bubble Trauma Evaluation Report) was distributed to the Rock Island HCP Coordinating Committee by Kristi Geris on December 2, 2022, and is available for a 90-day review with edits and comments due to Lance Keller by February 28, 2023 (Item IV-A).
4. Wells Project Land-Use Permit Application for LUP 130B-01 was distributed to the Wells HCP Coordinating Committee by Kristi Geris on December 15, 2022, and was available for a 30-day review with edits and comments due to Tom Kahler by January 14, 2023 (Item III-D).
5. The draft SOA *Wells Dam 2023 Bypass Operations and Methods* was distributed to the Wells HCP Coordinating Committee by Kristi Geris on December 19, 2022, and is available for a 30-day review with edits and comments due to Tom Kahler by Wednesday, January 18, 2023 (Item III-B).
6. Wells Project Land-Use Permit Application for LUP 644-01 was distributed to the Wells HCP Coordinating Committee by Kristi Geris on December 27, 2022, and is available for a 30-day review with edits and comments due to Tom Kahler by January 26, 2023.

7. Wells Project Land-Use Permit Application for LUP 57.0D-01 was distributed to the Wells HCP Coordinating Committee by Kristi Geris on January 11, 2023, and is available for a 30-day review with edits and comments due to Tom Kahler by February 10, 2023.
8. Wells Project Land-Use Permit Application for LUP 136-01 was distributed to the Wells HCP Coordinating Committee by Kristi Geris on January 11, 2023, and is available for a 30-day review with edits and comments due to Tom Kahler by February 10, 2023.
9. The draft *2023 Total Dissolved Gas Abatement Plan* and appended *Wells Bypass Operating Plan* was distributed to the Wells HCP Coordinating Committee by Kristi Geris on January 12, 2023, and is available for a 30-day review with edits and comments due to Tom Kahler by February 11, 2023.
10. A draft non-capacity amendment to revise the Rock Island Recreation Plan for the Wenatchee Riverfront Park Development was distributed to the Rock Island HCP Coordinating Committee by Kristi Geris on January 13, 2023, and is available for a 30-day review with edits and comments due to Lance Keller by February 12, 2023.
11. The draft *2023 Wells HCP Action Plan* was distributed to the Wells HCP Coordinating Committee by Kristi Geris on January 17, 2023, and is available for a 30-day review with edits and comments due to Tom Kahler by February 16, 2023.
12. Wells Project Land-Use Permit Application for LUP 337B-01 was distributed to the Wells HCP Coordinating Committee by Kristi Geris on January 20, 2023, and is available for a 30-day review with edits and comments due to Tom Kahler by February 19, 2023.

Finalized Documents

1. The final 2022 Wells Post-Season Bypass Report and Passage-Dates Analysis was distributed to the Wells HCP Coordinating Committee by Kristi Geris on December 19, 2022 (Item III-B).
2. The Douglas PUD 2021 Northern Pikeminnow Removal Annual Report distributed on November 22, 2022, is the final version, as approved by the Wells HCP Coordinating Committee on December 22, 2022 (Item III-A).

I. Welcome

A. Review Agenda (John Ferguson)

John Ferguson welcomed the HCP Coordinating Committees and reviewed the agenda. Ferguson asked for any additions or changes to the agenda. The following revisions were requested:

- Tom Kahler added: 1) 2022/2023 Wells Dam Fishway Maintenance Update; and 2) Wells Project Land-Use Permit Application for LUP 130B-01.

B. Meeting Minutes Approval (John Ferguson)

The HCP Coordinating Committees reviewed the revised draft November 15, 2022, conference call minutes. Kristi Geris said no comments or revisions were received from members of the Committees. She added Douglas PUD's Wells Project Land-Use Permit Application for LUP 130B-01 under *Review Items*. Kirk Truscott corrected a grammatical error (i.e., "breaks" was changed to "brakes") under *Item VI-A. Rock Island Relicensing Plan Species Topic – Protection for Natural-Origin Chinook Salmon*. HCP Coordinating Committees members present approved the November 15, 2022, meeting minutes as revised. WDFW abstained because a representative did not participate in the November 15, 2022, conference call.

C. Last Meeting Action Items (John Ferguson)

Action items from the HCP Coordinating Committees meeting on November 15, 2022, and follow-up discussions were as follows (*Note: Italicized text corresponds to agenda items from the meeting on November 15, 2022*):

1. *Chelan PUD will continue providing Rocky Reach Dam and Rock Island Dam turbine unit maintenance updates as information becomes available (Item I-C).*
This will be discussed during today's conference call and will also be carried forward.
2. *Chelan PUD will verify dates and times the Rock Island Adult Ladder Tailrace Entrance was closed while calculating adult conversion rates for the 2021 Rock Island Dam Confirmation Survival Study (Item I-C).*
This action item will be carried forward.
3. *Chelan PUD will provide a synopsis of the engineering options considered to meet the minimum 1.0-foot head differential target at all four entrances at the Rock Island Dam Right Bank Adult Fishway during high spring flows in the Columbia River (Item I-C).*
This action item will be carried forward.
4. *Douglas PUD will review with Chad Jackson spill coverage for subyearling Chinook Salmon during the 2022 Wells Dam bypass season that will be reflected in the 2022 Wells Dam Post-Season Bypass Report and Passage-Dates Analysis and voted on during the HCP Coordinating Committees conference call on December 16, 2022 (Item IV-A).*
This was discussed during today's conference call (see Item III-B).
5. *Wells HCP Coordinating Committee representatives will be prepared to vote on Douglas PUD's proposal for Wells Dam bypass operations, beginning in 2023 and going forward, and the vote will need to occur before late February so that it can be reflected in the 2023 Wells Bypass Operating Plan due to Ecology on February 28, 2023 (Item IV-A).*
This will be discussed during today's conference call.
6. *Anchor QEA, LLC, will coordinate with Bryan Nordlund (Priest Rapids Coordinating Committee [PRCC] Facilitator) regarding holding a joint agenda item with the PRCC for a presentation of data by WDFW on steelhead overshoots during the HCP Coordinating Committees conference call on*

December 16, 2022 (Item V-A).

This coordination took place, and the joint agenda item will be convened, as requested.

7. *Chelan PUD will provide initial internal feedback during the HCP Coordinating Committees conference call on December 16, 2022, regarding discussions about protection for outmigrating natural-origin juvenile Chinook Salmon related to a Rock Island Relicensing Plan Species topic brought forward by the Confederated Tribes of the Colville Reservation (CTCR) during the HCP Coordinating Committees conference call on November 15, 2022 (Item VI-A).*

This will be discussed during today's conference call.

II. HCP Hatchery and Tributary Committees Update

A. HCP Hatchery and Tributary Committees Update (Tracy Hillman)

Tracy Hillman updated the HCP Coordinating Committees on the following actions and discussions that occurred during the HCP Hatchery Committees meeting on November 16, 2022 (*Note: Joint HCP Hatchery Committees/PRCC Hatchery Subcommittee items are noted by "joint," Wells HCP Hatchery Committee items are noted by "Wells," and Rock Island and Rocky Reach HCP Hatchery Committees items are noted by "Rock Island/Rocky Reach"*):

- *2022 Broodstock Collection Protocols (joint)*: The Wells, Rocky Reach, and Rock Island HCP Hatchery Committees approved the 2022 Broodstock Collection Protocols. The approved protocols were submitted to National Marine Fisheries Service (NMFS).
- *Rock Island and Rocky Reach 2023 Hatchery M&E Implementation Plan (Rock Island/Rocky Reach)*: Chelan PUD convened the Hatchery Evaluation Technical Team (HETT) to evaluate different methods used to estimate steelhead spawning escapement within the Wenatchee River. One method estimates spawning escapement based on adjusted redd counts, and the other method uses mark-recapture techniques adjusted for overwinter/prespawn mortality. Because of time constraints, the HETT was unable to make a consensus-based recommendation to the Rock Island and Rocky Reach HCP Hatchery Committees on which method to use. Nevertheless, draft notes from the HETT meeting were shared with the Committees, who will review and vote on the 2023 Hatchery M&E Implementation Plan during the HCP Hatchery Committees meeting on December 21, 2022.
- *Wells 2023 Hatchery M&E Implementation Plan (Wells)*: Douglas PUD submitted the Wells 2023 Hatchery M&E Implementation Plan for Wells HCP Hatchery Committee review. The Committee will review and vote on the 2023 Hatchery M&E Implementation Plan during the HCP Hatchery Committees meeting on December 21, 2022.
- *Next Meeting*: The next meeting of the HCP Hatchery Committees will be on December 21, 2022.

Hillman updated the HCP Coordinating Committees on the following actions and discussions that occurred during the HCP Tributary Committees meeting on December 8, 2022:

- *Time Extension:* The Rock Island HCP Tributary Committee received a time extension request from Cascade Fisheries on the Big Meadow Creek Fish Passage Restoration Project. The sponsor indicated that because of contracting issues and insurance requirements with one of the funding entities, they need additional time to complete the project. Thus, the sponsor asked to extend the contract from December 31, 2022, to December 31, 2023. The Rock Island HCP Tributary Committee approved the time extension.
- *Time Extension:* The Rock Island HCP Tributary Committee received a time extension request from Chelan County Natural Resources Department (CCNRD) on the Lower Chiwawa River Floodplain Reconnection and Instream Enhancement Project. CCNRD indicated that they would like their timeline to match the schedule and timeline of the U.S. Bureau of Reclamation, who is helping with the design concepts for this project. As such, CCNRD asked to extend the contract from December 31, 2022, to March 31, 2023. The Rock Island HCP Tributary Committee approved the time extension.
- 7. *Budget Amendment:* The Rock Island HCP Tributary Committee received a budget amendment request from Cascade Fisheries on the Big Meadow Creek Fish Passage Restoration Project. The sponsor indicated that they would like to move \$750 from Contract Labor to Travel. The Rock Island HCP Tributary Committee approved the budget amendment with the understanding that the budget amendment will not change the overall budget amount for the project.
- *General Salmon Habitat Program Application:* The Methow Salmon Recovery Foundation submitted an application titled *M2@3R Proposal to Advance Preferred Concepts Project*. The purpose of the project is to develop 30% and 60% designs that will improve the complexity, quantity, and access to cold-water refugia between river mile (RM) 46.25 and RM 47.25 on the Methow River. This project will benefit several Plan Species including spring Chinook Salmon, summer Chinook Salmon, steelhead, and Coho Salmon. The total cost of the project was \$204,444. The sponsor requested \$184,444 from HCP Plan Species Account Funds. The Wells HCP Tributary Committee elected to contribute \$184,444 to the project.
- *General Salmon Habitat Program Application:* Cascade Fisheries submitted an application titled *Twisp to Carlton Reach Side Channel Project*. The purpose of the project is to conduct alternatives analyses and prepare a 30% design for a 0.15-mile-long side channel located at RM 35.5 on the Methow River. The current side channel is connected with the mainstem only at high flows, which results in juvenile salmonids being stranded in the side channel during lower flows. The project will consider several alternative concepts that focus on improving connectivity and habitat quality within the side channel. The project will be designed to benefit spring Chinook Salmon, summer Chinook Salmon, steelhead, and Coho Salmon. The total cost of the project was \$107,502. The sponsor requested \$73,772 from HCP Plan Species

Account Funds. The Committees tabled this project and requested additional information from the sponsor. The Committees will reevaluate the proposed project in January 2023, after they receive additional information.

- *Joint HCP Tributary Committees and PRCC Habitat Subcommittee Item:* CCNRD provided an update on conservation measures implemented on the Nason Ridge Property. Annual updates are a requirement associated with funding this project. This was the first update since the property was acquired with Plan Species and PRCC Habitat Subcommittee funds. CCNRD described actions implemented under the Community Forest Management Plan, including access and recreation planning, stream habitat restoration, road management and sediment reduction, forest health and resiliency, and invasive species management.
- *Joint HCP Tributary Committees and PRCC Habitat Subcommittee Item:* Chris Fisher (CTCR) shared a presentation on Enloe Dam. The presentation included the history of the dam and Okanogan PUD's initial interest in relicensing the dam and then their decision to terminate the Federal Energy Regulatory Commission license. Fisher described studies associated with the dam, including sediment sampling, toxicity sampling, adult fish passage studies at Coyote Falls/Similkameen Falls, and modeling of salmon and steelhead spawning and rearing habitat capacity upstream from the dam. In summary, initial sediment sampling revealed elevated levels of arsenic, copper, and cadmium in isolated areas. Both adult steelhead and Chinook Salmon can navigate the falls at a wide range of flows and there is habitat upstream from the dam to support millions of parr (estimates will be refined this winter). The next step is to conduct a feasibility study (pending funding) and prepare a 30% design to deconstruct the dam. John Ferguson asked which habitat model is Fisher using. Hillman said he is using the Morgan Bond and Tim Beechie model from a 2019 published paper on spring Chinook Salmon parr in the entire Columbia River basin. Hillman said the CTCR were asked to conduct more intensive modeling upstream of Enloe Dam, so the CTCR are tweaking the model. Kirk Truscott said this is correct. The *Seattle Times* issued an article this month indicating that Trout Unlimited and the CTCR received a joint grant from NMFS for \$2.3 million to further investigate removal of Enloe Dam, including feasibility planning and additional information on sediment removal, such as where to place the spoils. Hillman said the U.S. Geological Survey conducted sediment studies. Since then, Ecology funded additional core sampling, and these results will be available by the end of this year. Hillman said Fisher indicated there is also additional work ongoing upstream of the dam, and Hillman suggested that the HCP Coordinating Committees invite Fisher to present on this. Ferguson said the area has high potential in terms of habitat. Scott Carlon asked if there is an estimate of how much sediment is behind the dam. Truscott said there is an estimate in the Enloe Dam Report. He does not recall the amount, but it is a lot.
- *Next Meeting:* The next meeting of the HCP Tributary Committees will be on January 12, 2023.

III. Douglas PUD

A. Douglas PUD 2021 Northern Pikeminnow Removal Annual Report (Tom Kahler)

Tom Kahler said the draft Douglas PUD 2021 Northern Pikeminnow Removal Annual Report is available for review. Douglas PUD has received comments from U.S. Fish and Wildlife Service, and Kahler asked if anyone else has comments at this time. John Ferguson asked, when is the comment deadline? Kahler said comments are due by December 22, 2022. Chad Jackson said he has been out sick but will call if WDFW has questions. Kahler noted that the document is short and should be a quick review.

The Douglas PUD 2021 Northern Pikeminnow Removal Annual Report was approved by the Wells HCP Coordinating Committee on December 22, 2022, after no disapprovals were received prior to the 30-day review period deadline. The draft report that was distributed on November 22, 2022, is considered the final version.

B. DECISION: 2022 Wells Dam Post-Season Bypass Report and Passage-Dates Analysis (Tom Kahler)

The draft Passage-Dates Analysis document was distributed to the Wells HCP Coordinating Committee by Kristi Geris on November 16, 2022, for a 30-day review period. Tom Kahler said the review deadline is today. The draft 2022 Wells Post-Season Bypass Report (distributed on December 2, 2022) provides context for the appended Passage-Dates Analysis document. Douglas PUD walked through the Passage-Dates Analysis during the last HCP Coordinating Committees meeting.

Kahler said to Chad Jackson (who was absent during the last meeting), the take home is that historically, Wells Dam bypass operations have provided 95% migration coverage for all Plan Species every year until this year, when operations apparently missed the 95% coverage for the subyearling Chinook Salmon migration. In 2022, bypass operations at Wells Dam terminated on August 9, a date first selected in the 2021 Bypass Operating Plan and again in the 2022 plan. This year was an unusual subyearling migration in that it ran later than any of the last 10 years. It was not until August 11, 2022, that the 95th percentile of the PIT-tagged subyearlings was estimated to have passed. The current basis for selecting the bypass operations termination date is a function of an estimated travel time between Wells and Rocky Reach dams and passive integrated transponder (PIT) tag detections at Rocky Reach Dam. The challenge with the current approach is there are few PIT-tagged subyearlings detected at Rocky Reach Dam, and travel time is based on a very small subsample of the total PIT-tagged population (those detected at both Wells and Rocky Reach dams), which dictates how bypass standards are achieved. It is a frustrating exercise for Douglas PUD to base this determination on a guess, and Douglas PUD has concerns about continuing to guess and potentially missing the standard again. Therefore, Douglas PUD evaluated options to avoid relying on the "preseason guess" that would allow for basing the end-of-spill date on an in-season evaluation of

passage timing. Chelan PUD uses the Columbia River Data Access in Real Time database (Program Real Time, or DART) for bypass end times at Rocky Reach Dam. Douglas PUD thinks this is the answer for the Wells Project. Using Program Real Time would provide a conservative estimate for a stop date, and there is no correction for estimated travel time from Wells to Rocky Reach dams. Going forward, Douglas PUD is interested in discussing a proposal to adopt Program Real Time, with no adjustment for travel time, to dictate Wells Dam bypass operation timing. In the meantime, Douglas PUD is also requesting approval of this draft 2022 Wells Post-Season Bypass Report and Passage-Dates Analysis. No comments were received from Wells HCP Coordinating Committee representatives on the draft report. He welcomed any comments at this point, and if there are none, he asked for a vote on the report.

Chad Jackson said he skimmed the report and if the Wells HCP Coordinating Committee is ready to vote, so is WDFW.

Wells HCP Coordinating Committee representatives present approved the 2022 Wells Post-Season Bypass Report and Passage-Dates Analysis document.

Note: The final 2022 Wells Post-Season Bypass Report and Passage-Dates Analysis was distributed to the Wells HCP Coordinating Committee by Geris on December 19, 2022.

John Ferguson said Kahler provided a good overview of the reasoning behind potential changes to Wells Dam bypass operations timing. The meeting minutes from the last HCP Coordinating Committees conference call on November 15, 2022, also capture this discussion well. Ferguson opened up the discussion for comments on proposed changes to the bypass timing.

Kirk Truscott asked if Kahler could explain what exactly is changing one more time. Kahler said that each year since 2012, Douglas PUD (Columbia Basin Research) would calculate the date on which the 95th percentile of PIT tagged known-origin subyearling Chinook Salmon originating from above Wells Dam passed Rocky Reach Dam and would subtract from that date an estimate of travel time (days) between Wells and Rocky Reach dams to determine passage dates at Wells Dam, as described in these annual Passage-Dates Analysis reports. From 2012 to 2020, the bypass operations end date was August 19. In 2021, the end date was adjusted to August 9 based on 9 years of data, a review by the Wells HCP CC, and approval of an SOA. In 2021, 95% migration coverage was met for all Plan Species. However, in 2022, the end date of August 9 was apparently 2 days earlier than needed to meet 95% coverage for the subyearling migration. Douglas PUD feels using the fixed end date is a gamble each year. The change proposed is to not use a forecast approach each year, and instead to use the Program Real Time estimate of passage percentage that Chelan PUD uses at Rocky Reach Dam. That is, use the Rocky Reach Dam bypass operations termination date that is not adjusted for travel time between Rocky Reach and Wells dams, and accept this as being a conservative end date for Wells Dam bypass operations going forward.

Truscott asked, in recent years, have there been more PIT tag detections at Wells Dam? Kahler said this is highly variable. Last year, there were more. He noted that historical fyke-net data indicate subyearlings pass Wells Dam more on the Douglas County side of the river (the PIT tag array is located near the Chelan County side in Spillway 2). There are good detections for steelhead, Coho Salmon, and yearling Chinook Salmon at the location in Spillway 2.

Keely Murdoch asked, for clarification, the proposal is to end bypass operations at Wells Dam on the same date as Rocky Reach Dam? Kahler said yes. Lance Keller further clarified that Chelan PUD uses Program Real Time data to dictate bypass operations at Rocky Reach Dam. Chelan PUD publishes these data to DART knowing other agencies use the data. However, bypass operations at the two dams are still independent of one another, to some degree. Chelan PUD still needs to meet additional criteria to shut down bypass operations. Ferguson added that sometimes Chelan PUD also waits a few extra days to be certain about meeting these other criteria. Keller said this is correct. Kahler clarified that the change is to base the Wells Dam bypass operations end date on Program Real Time's determination that the 95th percentile of the subyearling Chinook Salmon outmigration has passed Rocky Reach Dam, instead of forecasting and adjusting travel time for passage dates at Wells Dam.

Andrew Gingerich said another advantage of using Program Real Time is the determination will be based on a larger proportion of the total population instead of relying on a small proportion comprising hundreds or maybe a few thousands of fish. Additionally, the proposed approach gets away from using a fixed date based on a preseason guess and coming back post season to see how well it worked. As Kahler mentioned, 2022 was different and the first time in 11 years that PIT-tagged subyearlings showed up so late. Some might speculate this has to do with changing temperatures, and using Program Real Time allows for environmental variability to be incorporated into the spill end date. This approach is more work for Douglas PUD, who will need to pay close attention to the data instead of relying on a fixed date. Chelan PUD is already doing this, and the PUDs will need to stay more coordinated.

Ferguson asked if Douglas PUD plans to distribute a draft SOA. Kahler said Douglas PUD was waiting to see what type of conversation came of this. This topic was just rolled out last month and it is new to Douglas PUD and to the Wells HCP Coordinating Committee, so he wanted to provide people with "soak time." He is prepared to distribute a draft SOA for a decision in January 2023 if the Wells HCP Coordinating Committee is satisfied with these explanations. If there are more questions, he would like to discuss these sooner rather than later. He wants everyone to have comfort in this change but also hopes the Committee understands Douglas PUD has a deadline in February 2023 for incorporating any changes into the Gas Abatement Plan and Bypass Operating Plan.

Ferguson asked if there are more questions or if anyone has strong reservations.

K. Murdoch said her initial thought is this seems like a reasonable proposal, and it may be better than the current approach, but she is still trying to fully understand it. It would help to see this written up in a brief 1-page proposal. Ferguson agreed and said perhaps the Statement portion of the SOA can state the change and the Background portion can cover the "why." K. Murdoch agreed this level of detail will be helpful. Truscott said, similar to K. Murdoch, his initial thoughts are positive, but he will want to review the SOA to fully understand everything. He applauded Douglas PUD for taking action to address the missed protection for subyearlings as opposed to just saying it was an anomaly. Jim Craig agreed and said this is a good use of adaptive management to propose a change to help subyearlings. Jackson said WDFW will need time to review the SOA but agreed with Truscott's comments. He appreciates Douglas PUD's attempt to quickly correct something. Scott Carlon said he likes the proposal. He appreciates the quick response and thought given on this, the thinking to correct it, and the proposed approach that will be more conservative.

Ferguson said Douglas PUD will distribute a draft SOA to change the timing of Wells Dam bypass operations, beginning in 2023 and going forward, for a vote in January 2023; and this change in operations will be reflected in the 2023 Wells Bypass Operating Plan for a vote in February 2023, before the plan is due to Ecology on February 28, 2023. *(Note: Kahler provided the draft SOA, Wells Dam 2023 Bypass Operations and Methods, which was distributed to the Wells HCP Coordinating Committee by Geris on December 19, 2022, for a 30-day review with edits and comments due to Kahler by Wednesday, January 18, 2023.)*

Wells HCP Coordinating Committee representatives will contact Douglas PUD with questions, if any, about the draft SOA to change the timing of Wells Dam bypass operations prior to the HCP Coordinating Committees conference call on January 24, 2023. Kahler said Douglas PUD would appreciate that this not run into issues with meeting the Ecology deadline.

C. 2022/2023 Wells Dam Fishway Maintenance Update (Tom Kahler)

Tom Kahler said the Wells Dam west fishway was dewatered on December 6 and December 7, 2022, as described in a fish salvage memorandum sent to Scott Carlon and distributed to the HCP Coordinating Committees by Kristi Geris on December 7, 2022. The west fishway was put back into service yesterday, December 15, 2022. With cold temperatures next week and then the holiday the following week, the east fishway will not be taken out of service immediately. Instead, crews will wait until January 3 and January 4, 2023, to dewater the ladder and conduct a fish rescue. This was not the intended start date, but maintenance in the ladder should be a quick turnaround and is still on schedule for a return to service.

John Ferguson pointed out there was nothing remarkable regarding the fish salvaged. Kahler said this is correct.

D. Wells Project Land-Use Permit Application for LUP 130B-01 (Tom Kahler)

Wells Project Land-Use Permit Application for LUP 130B-01 was distributed to the Wells HCP Coordinating Committee by Kristi Geris on December 15, 2022, and is available for a 30-day review with comments due to Tom Kahler by January 14, 2023.

Kahler said this is one of those many land-use actions that have been ongoing for a long time, and as part of the new Federal Energy Regulatory Commission license, Douglas PUD is systematically identifying and permitting these. This one is for a mowed access trail to the Okanogan River. It has been there for as long as he can recall, and maybe as far back as 1996. Douglas PUD is formally permitting this. The LUP application is out for a standard review, and he asked that Wells HCP Coordinating Committee members call with any questions. There is not much to say beyond this; it is a routine process.

John Ferguson asked for questions. None were expressed.

IV. Chelan PUD

A. Draft 2022 Rock Island Smolt and Gas Bubble Trauma Evaluation Report and Draft 2022 Rocky Reach Juvenile Fish Bypass System Report (Lance Keller)

The draft 2022 Rock Island Smolt and Gas Bubble Trauma Evaluation Report and draft 2022 Rocky Reach Juvenile Fish Bypass System Report were distributed to the Rock Island and Rocky Reach HCP Coordinating Committees by Kristi Geris on December 2, 2022, and are available for a 90-day review with edits and comments due to Lance Keller by February 28, 2023.

Keller said these reports were drafted by Scott Hopkins (Chelan PUD Biologist) for distribution in December 2022, to provide a longer 90-day review. These reports are similar to those from past years. However, one change about the Rock Island report is that this was the first year the Rock Island Dam bypass was operated outside of the Smolt Monitoring Program, so this report summarizes these activities outside of that program. For example, gas bubble trauma monitoring was conducted, but more frequently compared to under the Smolt Monitoring Program.

B. 2022/2023 Rocky Reach and Rock Island Adult Fishway Winter Maintenance Update (Lance Keller)

Lance Keller reviewed the adult fishway maintenance updates at Rocky Reach Dam and Rock Island Dam, as follows:

Rocky Reach Dam

Lance Keller recalled the Rocky Reach HCP Coordinating Committee agreement to begin the 2022/2023 ladder maintenance outage at Rocky Reach Dam 1 month earlier than usual, on

December 1, 2022¹, mainly to allow the contractor into the upper ladder to address joint crack repairs. He heard from Rocky Reach staff that the contractor is in the ladder and hopes to complete these repairs this year. John Ferguson recalled Chelan PUD thinking these repairs may take another year, so completing the repairs this year is an improvement. Keller said correct, this update is directly from Rocky Reach staff and crews hope to complete the repairs this maintenance period.

Keller said the Rocky Reach Dam adult fish ladder was taken out of service on December 1, 2022, and a fishway rescue was conducted that same day. Headgates were installed at the top end of the ladder the morning of December 1, 2022. Chelan PUD Fish and Wildlife Department crews were onsite and when the water level dropped to a safe elevation staff entered the fishway to follow the receding water to the tailwater elevation. As the water level approached that equal to the tailrace, additional staff entered the fishway, rescuing fish along the way. All fish were returned upstream in the forebay. On December 2, 2022, another fish rescue was conducted in the upper portion of the upper fishway. This section does not dewater as quickly, so once crews complete the main upper fishway rescue, the upper portion of the upper fishway is dewatered separately. All fish were rescued successfully and returned to the forebay. Fish rescued from both sections are as follows:

Rocky Reach Dam Adult Fishway – Fish Rescued	Upper Fishway December 1, 2022	Upper Fishway (count window to exit) December 2, 2022
Adult Lamprey	207	0
Whitefish	3	13
Ad-present rainbow trout/steelhead (6 to 10 inches)	17	14
Ad-clipped rainbow trout/steelhead (10 inches)	2	0
Ad-clipped rainbow trout/steelhead (8 to 12 inches)	0	9
Ad-present Chinook Salmon (3 inches)	0	1
Ad-present Coho Salmon (3 inches)	0	1

Note:

Ad: adipose fin

Keller noted that salvaging 207 adult Lamprey is not unusual, and that all fish rescued were alive and healthy. All three entrances to the tailrace remain open and water is maintained equal to the tailrace, so fish in the lower fishway are not trapped. Crews will conduct that fish rescue after January 1, 2023, and he will have those rescue numbers at the next meeting.

Keely Murdoch said she understands why adult fish would be released upstream in the forebay, and asked, why not release juvenile fish downstream in the direction those fish are likely headed? Keller said he understands K. Murdoch’s thinking here. Sorting juvenile and adult fish for release in

¹ As agreed upon during the HCP Coordinating Committees meeting on October 25, 2022.

different locations can be considered for future fish rescues if this is the direction from the Rocky Reach and Rock Island HCP Coordinating Committees. K. Murdoch said she likes this idea. Jim Craig and Chad Jackson provided a “thumbs up” on WebEx. Ferguson asked if others had questions or comments on this idea. None were expressed. He asked Keller if he needs to discuss this internally. Keller said no, Chelan PUD can just plan on implementing the change moving forward, even starting with the fish rescue in January 2023.

Rock Island and Rocky Reach HCP Coordinating Committees representatives present agreed that starting in 2023, Chelan PUD will release fish rescued during fish salvage operations accordingly, upstream or downstream of the dam, based on life stage.

Rock Island Dam

Keller said, in the Rock Island Dam right adult fishway, the upper portion was dewatered on December 6, 2022. Chelan PUD Fish and Wildlife Department crews were onsite. Headgates were installed. After the water receded to a safe elevation, staff entered the fishway and rescued fish as the water continued to recede. On December 7, 2022, the lower portion of the right adult fishway was dewatered, and a fish rescue was conducted. All fish were returned to the forebay. In the future, juvenile fish will be placed downstream, as just discussed. Fish rescued from both sections are as follows:

Rock Island Dam Right Adult Fishway – Fish Rescued	Upper Fishway December 6, 2022	Lower Fishway December 7, 2022
Adult Lamprey	0	5
Whitefish	16	2
Ad-present rainbow trout/steelhead (4 inches)	1	0
Ad-present rainbow trout/steelhead (8 to 10 inches)	0	5
Ad-present rainbow trout/steelhead (8 to 12 inches)	8	0
Ad-clipped rainbow trout/steelhead (12 to 14 inches)	0	3
Ad-present Chinook Salmon (4 inches)	0	1
Ad-present Chinook Salmon (4 to 6 inches)	6	0
Ad-clipped Chinook Salmon (4 to 6 inches)	7	0
Ad-present Coho Salmon (4 inches)	4	0
Ad-present Coho Salmon (6 inches)	0	1
Ad-present Chinook Salmon (adult)	1	0

Note:
 Ad: adipose fin

Keller noted that the one adipose fin-present adult Chinook Salmon was 15 to 20 pounds. It had a little fungus on the head but was lively. An adult of this size being encountered during a fish rescue is not super rare but is also not very common.

Keller said the Rock Island Dam middle adult fishway was dewatered on December 14, 2022, and a fish rescue was conducted; staff rescued two sculpins.

Keller said the Rock Island Dam left adult fishway fish will remain in operation until the right or middle fishways are returned to service. He anticipates the left fishway will be taken down for maintenance at the end of January 2023, considering the amount of maintenance planned in the other ladders.

C. Rock Island Dam Powerhouse 1 Maintenance Update (Lance Keller)

Lance Keller said crews are well into the disassembly of Turbine Unit B3, where work continues in the draft tube. He does not yet have a firm return-to-service date, but biweekly communication is ongoing, and he will provide an update once he receives one.

D. Rocky Reach Dam Turbine Units Maintenance Update (Lance Keller)

Lance Keller said Turbine Unit C4 was brought back to commercial operation on November 4, 2022. Now that Turbine Unit C4 is back in operation, this frees up additional maintenance staff to work on Turbine Unit C5. Additionally, the damaged picking hook on the south gantry crane has now been repaired, and the crane was released for work on December 5, 2022. This critical piece of equipment is needed to complete maintenance on Turbine Unit C5. Based on the anticipated amount of remaining work and crews working overtime, maintenance staff are reporting a return-to-service date for Turbine Unit C5 on March 8, 2023, which provides a contingency period of 1 month before initiating the 2023 Rocky Reach Dam Confirmation Survival Study in late April 2023.

Keller recalled that Turbine Units C8, C9, C10, and C11 are the larger-capacity units, and Turbine Units C1 to C7 are the smaller-capacity units. In 2013, during routine maintenance on Turbine Unit C10, mechanical crews identified a deep hairline crack in the servo rod that supplies oil to the servo motor that adjusts the pitch of Kaplan turbine blades. Engineers discovered the crack was due to a design flaw in the servo rod, which was manufactured thinner than it should have been. Based on consultation with the Rocky Reach HCP Coordinating Committee and Bryan Nordlund (former NMFS HCP Coordinating Committee Representative), the blades were fixed in a set position determined to be most efficient on the turbine unit curve and safest for fish passage. Permanent fixes in the large units were scheduled to be completed by 2018. This repair schedule was then delayed due to issues discovered in the small unit hubs causing oil leaks. All of these repairs contributed to the deferment of the Rocky Reach Dam Confirmation Survival Study. Maintenance crews just confirmed, as discussed during the deferment discussions with the Rocky Reach HCP Coordinating Committee, that Turbine Unit C11 will be out of service during the 2023 Rocky Reach

Dam Confirmation Survival Study. This means the confirmation study will be conducted under conditions of a 10-unit powerhouse versus 11 units being available for operation. Turbine Unit C11 is the northernmost unit, and past studies determined that only 2.5% of spring migrant juveniles passed Rocky Reach Dam via this unit. With this unit offline during the study, fish will likely choose an adjacent turbine passage route and the change should have little effect on the representativeness of study conditions tested. Crews anticipate that Turbine Unit C11 will be out of service until January 2024, when it will be brought back online in its Kaplan configuration.

Chelan PUD will continue providing Rocky Reach Dam and Rock Island Dam turbine unit maintenance updates as information becomes available.

V. Confederated Tribes of the Colville Reservation

A. Rock Island Relicensing Plan Species Topic: Protection for Natural-Origin Chinook Salmon – Chelan PUD Feedback (Kirk Truscott and Lance Keller)

John Ferguson recalled an action item for Chelan PUD to provide initial internal feedback regarding discussions about protection for outmigrating natural-origin juvenile Chinook Salmon related to a Rock Island Relicensing Plan Species topic brought forward by the CTCR during last month's meeting. The presentation, *Outmigration Timing of Yearling Chinook at Rock Island Dam*, (Attachment B) was distributed to the HCP Coordinating Committees by Kristi Geris prior to the HCP Coordinating Committees conference call on December 16, 2022. Lance Keller shared Attachment B on WebEx.

Slide 2

Keller read the first bullet. He said Kirk Truscott has brought up this topic before, and Chelan PUD acknowledges its importance. Keller read the second bullet. Chelan PUD thinks it is important to implement the Rock Island HCP for all Plan Species.

Slide 3

Keller read the first bullet. This is talking about hatchery versus wild and that the HCP does not differentiate between run origin. Keller read the second and third bullets. Chelan PUD currently does this. The spill plan spells out using run-timing and bypass counts by monitoring DART. If these numbers increase, operators initiate spill earlier. This action is conducted annually and relies on the in-season migration information.

Slide 4

Keller read this slide. He noted that DART considers historical data back to 1985. Chelan PUD's view is that a critical component of changing spill operations is the data need to show that fish are at the dam outside of the usual migration period. The HCP envisioned assessing this on a routine basis

(every 10 years), and Chelan PUD did this in 2014. At both Rocky Reach Dam and Rock Island Dam that year, the HCP Coordinating Committees chose to evaluate the period beyond August 31 by running the bypass system/trap through September 15 and monitoring bypass counts. The HCP Coordinating Committees determined the bypass end date of August 31 provided appropriate coverage. Another 10-year assessment is due in 2024, which presents an opportunity for the Rock Island HCP Coordinating Committee to request that Chelan PUD evaluate the April 1 start date.

Slide 5

Keller read the bullets on this slide. Chelan PUD wanted to bring this topic back to the HCP for discussion.

Discussion

Ferguson said the Rock Island HCP Coordinating Committee likely will not close out this topic today. Considering Truscott's original comments and Chelan PUD's response, perhaps each Rock Island HCP Coordinating Committee Representative can share their initial thoughts.

Truscott said he appreciates Chelan PUD discussing this topic internally. Regarding Chelan PUD's position, he is a little disappointed, but he did expect this and understands it. He does not think Chelan PUD misquoted anything, but the HCP identifies not only the intent to achieve No Net Impact but also to support recovery. In reviewing the past 5-year status reports by the National Oceanic and Atmospheric Administration (NOAA), he cannot recall a time when the status of listed stocks was based on the number of returning hatchery-origin fish. The Regional Technical Groups make these recommendations based on returning natural-origin fish. This is the emphasis he wants to direct people's attention to as a provision to the HCP. The HCP is not a recovery plan, but it is intended to support recovery. However, if the HCP is supporting hatchery fish more than natural-origin fish, he has difficulty coming to grips with seeing how the HCP is supporting recovery. He knows there will be more discussion of this topic moving forward. He hopes there is an acknowledgement of trap data from the tributaries that indicates the probability is that natural-origin spring Chinook Salmon enter the project before starting spill and the bypass on April 1. He thinks operations at Rock Island Dam should start earlier than April 1 to cover the full breadth of the spring Chinook Salmon emigration period. That is, he feels there is a need to look at the data to determine whether spill operations are meeting 95% protection for natural-origin spring Chinook Salmon, even though the HCP does not differentiate between origin.

Keller said he appreciates Truscott's comments. He recalled that implementation of the HCP and achievement of No Net Impact is often referred to in terms of the three-legged stool of meeting juvenile and adult survival. Chelan PUD believes implementation of the HCP is aiding in recovery but that the recovery effort extends to actions outside of the Rock Island Project.

Keely Murdoch said one aspect she thinks has been lost in the shuffle is that Plan Species means spring Chinook Salmon, not yearling Chinook Salmon. Looking at a 95% curve for yearlings and subyearlings is not the same thing. A lot of hatchery-origin yearling summer Chinook Salmon are released later than spring Chinook Salmon, which then skews the 95% yearling curve later than the spring Chinook Salmon curve would be. Keller is correct about the language in the HCP, but she believes there was an inherent understanding that protecting 95% of the Plan Species' migration was intended to protect both hatchery- and natural-origin fish. She does not think there was the understanding initially that these fish were entering the project earlier, and she thinks it is important to continue this discussion. She agreed with Truscott that the HCP was intended to support recovery. The HCP includes a paragraph on adaptive management, which allows for the use of new scientific information to change the way things are managed. She encouraged the HCP Coordinating Committees to discuss ways to collect data to figure out what is going on and thinks Truscott's suggestion to operate the bypass earlier is a good one.

Jim Craig agreed with the comments shared, notably about using adaptive management and new information on migration timing for natural-origin spring Chinook Salmon, which do not appear to be doing well. He looks forward to more discussion and he thinks additional data will be helpful.

Chad Jackson has no additional comments beyond what has already been shared. He looks forward to future discussions.

Scott Carlon said he joined the HCP Coordinating Committees after the last 10-year check-in, and he asked Keller to explain again what the purpose of this was. Keller said, per the HCP, every 10 years there needs to be a check-in that bypass operations provide 95% coverage for the Plan Species' migrations. In 2014, the Rocky Reach and Rock Island HCP Coordinating Committees evaluated whether August 31 was the appropriate end date for the subyearling migration. Chelan PUD provided updates on daily counts, and on September 15, the Rocky Reach and Rock Island HCP Coordinating Committees agreed that the end date of August 31 provided 95% coverage for both projects. Ferguson added, per the HCP, 2024 is the next opportunity to sample outside the typical bypass operations date range, but the timing of the additional bypass operations would be up for discussion with the Rocky Reach and Rock Island HCP Coordinating Committees. Keller asked if this addresses Carlon's question. Carlon said yes, and it sounds like in 2024 there may be an opportunity to test whether fish are moving much earlier.

Ferguson said, considering the time and remaining agenda items, this seems to be a good place to close the discussion for now. This is an important topic that needs further discussion, and he encouraged HCP Coordinating Committees representatives to add this topic to future agendas when Geris distributes the request for agenda items. He suggested being specific so representatives can come prepared to discuss the aspect of this topic of most interest to members.

VI. HCP Administration

A. Next Meetings (John Ferguson)

The next scheduled HCP Coordinating Committees meeting is on Tuesday, January 24, 2023, from 12:00 p.m. to no later than 4:00 p.m., and is to be held by conference call.

The HCP Coordinating Committees meeting on February 28, 2023, is from 12:00 p.m. to no later than 4:00 p.m., and is to be held by conference call.

The HCP Coordinating Committees meeting on March 28, 2023, is from 12:00 p.m. to no later than 4:00 p.m., and is to be held in-person at Douglas PUD in East Wenatchee, Washington.

VII. Joint HCP Coordinating Committees and Priest Rapids Coordinating Committee

A. PRESENTATION: Rock Island Relicensing Plan Species Topics – Steelhead Overshoots (Chad Jackson and Andrew Murdoch)

John Ferguson said this joint agenda item is intended for information sharing and that the individual Committees will continue to discuss this topic at future meetings.

Slides 1 to 2

Chad Jackson said the final presentation, *Upper Columbia River Steelhead Overshoot Abundance and Migration Success*, (Attachment C) was distributed to the HCP Coordinating Committees and PRCC in early December 2022 (to the HCP Coordinating Committees by Kristi Geris on December 12, 2022). Andrew Murdoch will present on recently published work and will use the adaptive management and new information sections in the HCPs and Salmon and Steelhead Settlement Agreement to discuss increasing downstream passage survival for overshoot adult steelhead.

Slide 3

A. Murdoch said, as a result of regional processes, in the 2000s fishery managers started developing a new methodology for estimating abundance. The Waterhouse et al. 2020 paper² uses results from WDFW stock assessments conducted at Priest Rapids Dam (PRD) since the mid-1980s. When adding the numbers up, there was a significant gap between run escapement estimates and adjusted ladder counts at PRD. These findings indicated that thousands of fish were not assigning to 1 of 4 populations.³ Therefore, in addition to improving steelhead abundance estimates in the Upper Columbia River, managers were trying to figure out how to account for the missing fish, including

² Waterhouse, L., J. White, K. See, A. Murdoch, and B. X. Semmens. 2020. A Bayesian Nested Patch Occupancy Model to Estimate Steelhead Movement and Abundance. *Ecological Applications* 30(8): e02202. 10.1002/eap.2202.

³ Upper Columbia River steelhead DPS comprised of four populations (Wenatchee, Entiat, Methow, and Okanogan).

whether missing fish are part of the Upper Columbia River Steelhead Distinct Population Segment (DPS) or if something else is going on.

Slide 4

A. Murdoch reviewed the three objectives of their current work: 1) estimate fallback downstream of PRD (based on adults tagged at PRD and detected at downstream locations); 2) estimate overshoot at PRD; and 3) estimate fallback migration success.

Slide 5

A. Murdoch reviewed the methods used. The goal was to tag 15% of the run-at-large at PRD (the actual percentage varies among years) and then use the patch occupancy model (POM; Waterhouse et al. 2020) to estimate abundance, including estimates for each downstream location.

Slide 6

A. Murdoch reviewed a map of the Upper Columbia River DPS, Middle Columbia River DPS, and Snake River DPS. Areas downstream of PRD have PIT tag detection sites, including the Ice Harbor Dam location that accounts for all Snake River-bound fish. It also includes PIT tag arrays in the lower Walla Walla River, Three Mile Dam on the Umatilla River, Prosser Dam on the Yakima River, and at John Day Dam. The only system not accounted for is Rock Creek, a small tributary below McNary Dam on the Washington side of the Columbia River. This is the only location where overshoots have been observed but have not been incorporated in this experimental design—no other systems are missing. There are other locations downstream of PRD (e.g., Klickitat, Deschutes, and White Salmon rivers) that are cold-water systems, and the steelhead populations in these rivers do not overshoot like those occupying warmer systems such as the Snake and Yakima rivers. To summarize, there is good spatial coverage for the populations known to overshoot.

Slide 7

A. Murdoch said this research also includes monitoring PIT detections at hatchery locations. These fish have a differential fin clip, and this effort was included to make sure not to miss any potential groups of fish detected downstream of PRD.

Slide 8

A. Murdoch said the POM was used to estimate wild steelhead abundance at PRD and fallback proportion from 2010 to 2017, based on the date these fish were worked up. He pointed out that even after accounting for fallbacks, there is still a large group of fish that are not accounted for.

Slide 9

A. Murdoch said this slide presents the same information but for hatchery-origin fish, which also overshoot. On average, 15% of the hatchery-origin fish were accounted for via this fallback

estimation effort. Presumably, these fish were also exposed to harvest during their migration, which can be estimated based on radio-tag studies. For example, a lot of fish were recovered from Idaho anglers. Thus, the findings indicate that steelhead overshoots are not just a natural-origin-specific phenomenon; these include both hatchery and wild fish. Despite the abundance estimates for fish at downstream locations, there are still missing fish.

Slide 10

A. Murdoch said this slide shows where these fish are coming from. By far, the majority of fish falling back over PRD in their study came from the Snake River followed by the Yakima River. Other populations show up once in a while, but are minor components compared to fish from the Snake and Yakima rivers. A. Murdoch noted that the Snake River is an exact inversion of this graph. Most fish that overshoot into the Snake River are from the Touchet, Walla Walla, and Umatilla rivers and from below John Day Dam. Snake and Yakima overshoots are the dominant populations in the Upper Columbia River. In the Snake River, Yakima and Upper Columbia overshoots are very minor components.

Slide 11

A. Murdoch said this graph looks at the distribution of known overshoots. Known overshoots are defined as fish PIT tagged as juveniles in their natal subbasin that are observed at PRD (i.e., tagged as smolts or parr at a downstream location). These data are based on last known PIT tag detections. There is a good number of fish going over Wells Dam, a smaller amount at Rocky Reach Dam, a slightly larger amount at Rock Island Dam, and by far most fish overshoot PRD and Wanapum Dam. *(Note: Tom Kahler later asked, is the graph showing fish that were last detected at or above the respective projects [but below the project above, in the case of everything below Wells]? He said, if so, then the numbers are too large, because many of those fell back and were detected in downstream locations/other basins. Kahler suggested that the graph is actually showing the uppermost project passed by fish overshooting, irrespective of where they finally ended up. A. Murdoch clarified that Kahler is correct—the graph depicts last known detection at a mainstem dam.)*

Slide 12

A. Murdoch said this estimate of overshoot abundance is based on the relationship between known overshoot fallbacks and POM fallback abundance estimates. However, the sample size from any single population was too small to make a population-specific relationship, so the data were pooled, which produced some uncertainty associated with the estimates (he would like to see tighter estimates).

Slide 13

A. Murdoch said these stacked bar graphs are by brood year and show the number of overshoots relative to each of the four Upper Columbia River steelhead populations. This is a comparison

between adjusted dam counts at Priest Rapids Dam (circles) and summed estimates of the four upper Columbia River steelhead populations plus estimates of steelhead overshoots at PRD. There is a lot of uncertainty, but this shows a comparison to PRD adjusted ladder counts. He would like to do much better at estimating this migration past PRD, but in general, these data indicate that overshoots represent the single largest group of steelhead passing the dam each year. *(Note: Kahler later asked, are the error bars associated with the adjusted PRD counts, or with the estimates of overshoots? A. Murdoch clarified that the error bars represent total error for each of the four populations and overshoots. However, estimates of overshoots are responsible for a majority of that error.)*

Slide 14

A. Murdoch said the blue line is the adjusted dam count at PRD, and the orange line is the combined estimate. There are still places with a few missing fish, but this graph is showing that the estimation method is accounting for the majority of fish. Therefore, one could use this estimate of overshoot abundance and the estimate of fallback abundance to look at downstream passage rates (the proportion of fish that overshoot PRD and make it downstream of PRD). He also looked at hatchery overshoots and added mortality associated with harvest, but this confounded the analysis, so he stuck with evaluating just wild overshoots.

Slide 15

A. Murdoch said on average, wild overshoot abundance ranges from just over 400 fish to approximately 3,000 fish, with the majority coming from the Snake and Yakima rivers. Because of this relative abundance, wild overshoots are called the fifth population in the Upper Columbia River steelhead DPS and are the single largest group of fish up here. He hopes folks are up to speed on this issue. He can talk about causes and how best to get overshoots back downstream. There has been a lot of research, but he will not address this today. This phenomenon of overshoots is expected to increase in the future with increasing water temperatures. This issue is something to deal with now instead of waiting for it to get worse.

Slide 16

A. Murdoch said the annual estimate of fallback migration success is the ratio of fallback estimates to overshoot estimates. From 2010 to 2017, the mean, annual fallback migration success is estimated to be approximately 60%, and ranges from 31% to 74%. There is a little variability here, and although the analysis was not trying to account for variability, it did account for differences in detection probabilities. The reasoning for the variation is yet unexplained. Also, there is a harvest component included in these estimates equaling a 1% impact. There was a question about the level of natural mortality occurring. To assess natural mortality, their analysis looked at Yakima River steelhead that did not overshoot PRD or Ice Harbor Dam. Looking at the conversions of these fish to Prosser, there

was a 5% mortality rate for fish residing in the river and not exhibiting the overshoot behavior. This was incorporated into the estimate. He agreed that evaluating this natural mortality rate is important, notably with expected climate change and increasing water temperatures. He suggested using this group of fish as a control and for estimating a natural mortality rate.

Slide 17

A. Murdoch said this graph looks at the relationship between overshoot return rates and the number of dams fish went over. It shows that the more dams overshoot fish must pass migrating upstream, the more dams overshoot fish need to pass going downstream and the lower the overshoot return rate. He noted that most of these fish are migrating downstream during non-spill periods.

Slide 18

A. Murdoch said that two out of five wild steelhead at PRD are overshoots. There is an alarming abundance of overshoot fish at PRD. Also, of the fish that do overshoot, two out of five do not make it back downstream. There was a small group of fish last seen entering tributary habitats, but only 3% of the overshoots were observed on spawning grounds.

Slide 19

A. Murdoch said a radio-telemetry study (Fuchs et al. 2021⁴) was conducted to test the assumptions of the POM using an independent method, and based on the results, they believe the POM is producing unbiased information. Additionally, a receiver array was set up downstream of PRD to confirm the estimates of downstream passage were good. This slide shows results for 165 fish monitored over a 2-year period. This is the downstream distribution at PRD beginning essentially at the start of tagging through the following year. The bars on the graph represent the summer and spring spill periods. It shows that only 9% and 2% of overshoot fallbacks passed PRD during the summer and spring spill periods for juvenile passage, respectively. Research conducted at other dams has shown that surface passage routes are the most effective means of passing adult steelhead downstream past dams, which can be done relatively effectively (i.e., passage rate relative to water volume used).

Slide 20

A. Murdoch said Wanapum Dam and PRD are already taking measures to facilitate downstream passage of adult steelhead. These operations account for 65% of downstream passage in addition to fish that pass during summer and spring spill for juvenile passage, which still leaves 24% that must pass through turbines. He did not include return rates for specific dams or evaluate the effects of this approach on adult return rates. These can be done in the future, but he just wanted to show this for

⁴ Fuchs, N. T., C. C. Caudill, A. R. Murdoch, and B. L. Truscott. 2021. "Overwintering Distribution and Postspawn Survival of Steelhead in the Upper Columbia River Basin." *North American Journal of Fisheries Management*. ISSN: 0275-5947. DOI: 10.1002/nafm.10585.

discussion. The operation involved passing 2,500 cubic feet per second flow through the bypasses at both Wanapum Dam and PRD. This small bit of surface spill presumably gets fish downstream effectively.

Slide 21

A. Murdoch read the conclusions bulleted on this slide. Steelhead overshoot is not a new phenomenon, but now it can be quantified using the POM. A large portion of these fish return to the Yakima River, and an even larger group of fish is destined to the Snake River. Every population involved in this analysis is listed as threatened. He thinks it is time to take action. There is a system in place (surface spill) and changes in operations at the three dams that do provide surface spill outside of the juvenile migration period can get adult steelhead that overshoot downstream of dams. He feels that it is time to collaboratively develop spill operations for each project to benefit overshoot steelhead.

Discussion

Ferguson asked when Priest Rapids and Wanapum dams started providing fall spill. Tom Dresser (Grant PUD) could not recall the exact date, but he said fall spill for steelhead fallbacks has been ongoing since before 2004, likely based on radio-telemetry studies conducted in the late 1990s.

Ferguson asked if there is a PIT detection system at Wanapum Dam? Dresser said not at Wanapum Dam, only at PRD. There was a system at Wanapum Dam in 2014, during the fracture, but the installation was temporary.

A. Murdoch said the last time radio-telemetry studies were conducted at PRD was the English et al. studies in 1999 and 2001. He thinks those two study designs looked at evaluating project-level fallback rates. These studies also followed tagged fish through space and time. These were different studies than what he presented on today, conducted for a different purpose, but some of the information English et al. reported about overshoots and distribution is consistent with the information presented today.

Kirk Truscott said, in the Fuchs et al. (2021) graph on overshoots at PRD (Slide 19), the timing looks like spill at PRD is encompassing the period in time when fallbacks are prevalent, and then there is a gap from December through mid-February where not much is happening. Do the English et al. papers have a similar evaluation relative to the timing of fallbacks? A. Murdoch said he does not know if English et al. published downstream timing data, but the inter-annual variability shown in the Fuchs et al. (2021) graphs is similar between years (2015 and 2016). PIT tag data can get at downstream timing, so why setup a radio-telemetry array for this? It seems the fish have an internal behavior triggered by elevated temperatures. Once temperatures decrease, this triggers a response to migrate downstream. He is not sure there are any other data from the Snake River, or anywhere else, that looks across the entire migration period. There is a good report by Pacific Northwest

National Laboratory that looks at passage at McNary Dam, which might have some information on this. However, that study was an experiment with McNary Dam operations and had a complex study design. He is not sure there is other information comparable to his study. Truscott said, from an efficacy standpoint, passage timing is important. A. Murdoch said yes, which is why it was already known that this change in operations at PRD and Wanapum Dam would be a good way to get surface-oriented steelhead downstream. He thinks this is what needs to be done to provide a downstream passage route. It seems like providing a little surface flow is giving fish a way to get back downstream. Also, certainly, a delay in migration may occur as a result of overshoot behavior, which is more prevalent in the Snake River than the Upper Columbia River. However, surface spill for downstream passage of adult steelhead is passing 65% of fish downstream at two of the five dams. This says something, but there is still room for improvement.

Truscott said the mean abundance of wild overshoot steelhead at PRD is approximately 1,860 fish each year (Slide 15). This is a lot of fish. He asked what proportion of the population downstream of PRD do these fish account for? A. Murdoch said this evaluation has not been done because of the Yakima River. The Yakima River Steelhead Major Population Group (MPG) is not an individual population.⁵ This work goes way back to the Mid-Columbia Forum, where this was a big topic. Most of the Mid-Columbia River basin was exhibiting this overshoot behavior and it was confusing at one time. Now, estimates of overshoots are improving, but there is still variability in tag rates within populations. If everyone tagged a consistent proportion of a population, this would provide a better evaluation for comparison, notably where populations need to be pooled. During this early debate, folks were trying to figure out why fish were overshooting and thought about temperature. It was not surprising that overshoot populations were associated with irrigation withdrawals in the lower reaches of the Yakima River. In the lower Yakima River, most of the water has been diverted, and water temperatures in the river are warm. At least these animals were exhibiting this overshoot behavior, otherwise they would exhibit mortality. These fish are trying to survive. Truscott asked about looking at the biological significance of surviving fallback. A. Murdoch said one could take the abundance estimate for each location, and then do the math and modeling to arrive at an estimate of mortality (survival). Receiving an additional 40% may be a little generous, but for the sake of argument, if the overshoot passage rate was 100%, how would this change population viability? Truscott said the numbers seem eye popping. A. Murdoch said the problem with this is that the two largest locations each have multiple populations: the Yakima River MPG is comprised of four populations while the Snake River MPG has 25 populations. One could decompose these numbers into a population-level estimate, run a simulation, make assumptions, and assign similar rates. However, the limiting factor is the Yakima River MPG, which represents 20% of the total population.

⁵ The Upper Yakima population consists of all steelhead that spawn in the Yakima River and its tributaries upstream of the Naches confluence. Together these four populations make up the Yakima River MPG.

Bryan Nordlund said he understands the basic idea of what overshoot is, but what is an overshoot? A fish that ascends a dam then goes down below it? A. Murdoch said in this study, an overshoot is defined as a fish from a downstream population that passes upstream of PRD. In the Upper Columbia River, there are multiple populations that overshoot above PRD, and 90% of these fish come from the Yakima and Snake rivers. Once these fish are over PRD, the fish is classified as an overshoot. This only includes fish that were tagged as juveniles in their natal stream downstream of PRD. This is different than in the Deschutes River, where fish appear to be overshoots, but really are fish that were tagged at an upper location as adults. He wants this distinction to be clear.

Nordlund asked if the effects of irrigation withdrawals have been considered as causing overshoots in the first place. A. Murdoch said a paper was published a few years before this one (i.e., Murdoch et al. 2022⁶) that looked at causes and identified water temperature directly caused by irrigation withdrawals, but the research did not try to solve the mechanism for overshoot. It is important to restore the natural hydrograph in the system. The biggest group of overshoots is from the Snake River. These fish want to go to the Snake River, but the lower Snake River is too warm.

Ferguson said that several years ago he recalls data showing homing issues for the Snake River steelhead that were transported. A. Murdoch said a lot of fish have been tagged at Lower Granite Dam. Ferguson said that is a large sample population, and he is curious whether an evaluation has been conducted on the proportion of overshoots caused by homing issues, rather than being temperature related. A. Murdoch said a Richins and Skalski paper⁷ looked at this. Their research was interested in the mechanism, including water temperature, which side of the river fish migrated on, and hatchery practices. The paper also identified changes to programs, like when the steelhead program at Turtle Rock was moved within the basin and changes in the Snake River transportation program. As for the overall distribution of fish, looking downstream, they reported that fish on the left bank go to the Snake River and fish on the right bank from the Yakima River come up the Columbia River. It seems the fish followed the side of the river where they are from. To him, it seems as if a fish is trying to migrate up a bank and if the river is too hot, the fish would go to a river that is not as hot. Ferguson said right, this is normal behavior. A. Murdoch said he hopes a similar evaluation as what he presented is done in the Snake River. It is more complex over there; not only do you lose a lot of fish over Lower Granite Dam, but you also gain fish from the Tucannon River. He noted that overshoots in the Tucannon River are a whole different story. There are different conditions in the Snake River and there are more fish.

⁶ Murdoch, A. R., K. See, and B. L. Truscott. 2022. "Abundance and Migration Success of Overshoot Steelhead in the Upper Columbia River." *North American Journal of Fisheries Management*. 42:1066–1080, 2022. ISSN: 0275-5947. DOI: 10.1002/nafm.10800.

⁷ Richins, S. M., J. R. Skalski. 2018. "Steelhead Overshoot and Fallback Rates in the Columbia–Snake River Basin and the Influence of Hatchery and Hydrosystem Operations." *North American Journal of Fisheries Management*. 38:1122–1137, 2018. ISSN: 0275-5947. DOI: 10.1002/nafm.10219.

Ferguson said if status reviews of Upper Columbia River stocks by NOAA are based on spawner escapement, not dam counts, then the overshoot issue should not have had an effect on NOAA status reviews, correct? A. Murdoch said the overcounts do have a direct implication. During the next HCP Hatchery Committees meeting on December 21, 2022, Kevin See (WDFW) will share a presentation on Wenatchee spawner escapement. Originally, regional fisheries managers developed a comprehensive spreadsheet, which included data from two radio-telemetry studies from 1999 and 2001 and apportioned these fish into two populations. At that time, there was no perceived unbiased way to estimate escapement. The method developed was wrong, but it was unknown how wrong. The method used a combination of dam counts and radio-telemetry data to assign fish to one of four populations. Next, the best available estimates were compared to the "old way" of estimating spawner escapement. There was a good relationship here, but it also was biased. To verify these estimates, the population was estimated back to 1987, so now there is a new and improved time series of estimates from 1987 to 2021. The hope is to continue to improve other estimates in the Upper Columbia River basin. Most of this work has been published. This is a multiphase project that is still ongoing.

Andrew Gingerich recalled A. Murdoch suggesting using Yakima River steelhead as a control to look at natural overwinter mortality (Slide 16). Gingerich said 1% natural mortality is surprising to him, but maybe it is not to others. Understanding that these populations are subjected to a fishery, how does the model reconcile catch and release mortality, particularly in those fish not harvested? He has seen some literature from British Columbia, Canada, on catch and release mortality where the research estimated mortality rates on these fish much higher than 1%. A. Murdoch said the 1% impact rate is based on an assumed catch and release rate of 5%, which equals a 1% reduction in abundance. That is, 1% of the population is impacted by a fishery upstream of PRD. Other fisheries occurred downstream of PRD more frequently than upstream, and those fish are subjected at a higher impact rate. As these models are further developed, the catch and release rate of 5% can be adjusted. Agencies are trying to develop the models based on gear type and other factors to develop a better estimate.

Dresser said Grant PUD would like to review the data that feed into this model. Additionally, A. Murdoch seems extremely confident that every tributary is wired with no opportunity to miss fish. However, Dresser did not hear whether mainstem spawning was captured in the data collection efforts. A. Murdoch agreed he did not address this. WDFW does conduct mainstem floats looking for mainstem spawners; however, he does not believe any have been found, although it is possible it occurs. There is an antenna array right below PRD. To test this assumption, because all radio-tagged fish are also PIT tagged, one could look at what proportion of radio-tagged fish were also detected downstream. In a perfect system, if all 165 radio-tagged fish were also PIT tagged and observed at a downstream location, this might suggest there is no mainstem spawning in between. Dresser views the lack of information on mainstem spawning as a data gap.

Ferguson asked, to Dresser's first comment, how do people obtain access to the model details? Everything flows from the POM, and the estimate of abundance is the basis for a lot of conclusions. A. Murdoch said WDFW will distribute weblinks to access the codes for the models and simulations discussed in this steelhead overshoot presentation. (Note: A. Murdoch provided these weblinks, which were distributed to the HCP Coordinating Committees by Geris on December 19, 2022.)

Kahler said he has a lot of questions, many of which that might need to be addressed at a later time. Questions about the relationships depicted in Columbia River dams and successful overshoots and overwinter mortality expected from a population, among others. Looking at a Feeken et al. (2019) radio-telemetry study in the Snake River, that research found overwinter mortality rates ranging from 16% to 43% for wild steelhead, in a system that is subjected to a fishery. If one were to plot fishery or overwinter mortality on the x-axis against overall overshoot success, would the plot look like the figure in Slide 17 where the implication is that losses resulted from dam passage? He is curious, how did they address losses due to basic general overwinter mortality? A. Murdoch said the fallback passage success includes some level of natural mortality. What he suggested, at least for another group of fish that migrated directly to Prosser Dam without first passing PRD, is that it was 5% for that period of time when the fish migrated above McNary Dam to Prosser Dam. Whatever fisheries these fish were exposed to, 5% did not make it back to Prosser Dam. Kahler asked about survival to spawning for an overwintering fish detected at Prosser Dam versus the Upper Columbia; where the fish overwinters is one question, and where the fish ends up in the spring is another question. Overwintering and detection at Prosser Dam is not the same thing. We need to answer the following: What is the survival to spawning of fish that overwinter above Prosser Dam, and how does that compare with the survival to spawning of Yakima Basin fish that overwinter in the Upper Columbia? A. Murdoch said, during this entire study, fish were only tracked to those detection locations. This study did not address the question of overwintering fish suffering more prespawn mortality than non-overshoot fish. This research was more of an accounting project to try to decompose the group of fish that goes over PRD.

Nordlund said there will be further discussion on this topic in the respective committees. Ferguson thanked everyone for participating.

A. Murdoch noted, if anyone cannot attend the next HCP Hatchery Committees meeting, he can volunteer See to provide another presentation on spawning escapement estimates. This research includes data back to the mid-1980s.

List of Attachments

Attachment A List of Attendees

Attachment B *Outmigration Timing of Yearling Chinook at Rock Island Dam*

Attachment C *Upper Columbia River Steelhead Overshoot Abundance and Migration Success*

Attachment A
List of Conference Call Attendees

Name	Organization
John Ferguson	Anchor QEA, LLC
Kristi Geris	Anchor QEA, LLC
Tracy Hillman ^{††}	BioAnalysts
Bryan Nordlund [∞]	Fish Passage Engineering, PLLC
Denny Rohr [∞]	D. Rohr and Associates
Lance Keller [*]	Chelan PUD
Bill Towey [*]	Chelan PUD
Alene Underwood [∞]	Chelan PUD
Catherine Willard [⊙]	Chelan PUD
Scott Hopkins [∞]	Chelan PUD
Tom Kahler [*]	Douglas PUD
Andrew Gingerich [*]	Douglas PUD
Shane Bickford ^o	Douglas PUD
Tom Dresser [∞]	Grant PUD
Curt Dotson [∞]	Grant PUD
Scott Carlon [*]	National Marine Fisheries Service
Jim Craig [*]	U.S. Fish and Wildlife Service
Chad Jackson [*]	Washington Department of Fish and Wildlife
Andrew Murdoch [*]	Washington Department of Fish and Wildlife
Keely Murdoch [*]	Yakama Nation
Kirk Truscott [*]	Confederated Tribes of the Colville Reservation
Tom Skiles [∞]	Columbia River Inter-Tribal Fish Commission
Nathan Buck [∞]	Wanapum Tribe

Notes:

- * Denotes HCP Coordinating Committees member or alternate
- †† Joined for the HCP Hatchery and Tributary Committees update
- o Joined for the HCP Douglas PUD agenda items
- ⊙ Joined for the HCP Chelan PUD agenda items
- ∞ Joined for the joint HCP Coordinating Committees and PRCC presentation