

Memorandum

To: Wells, Rocky Reach, and Rock Island HCP Hatchery Committees, and Priest Rapids Coordinating Committee Hatchery Subcommittee Date: April 20, 2022

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

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

Re: Final Minutes of the March 16, 2022, 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 by conference call and web-share on Wednesday, March 16, 2022, from 11:00 a.m. to 1:20 p.m. Attendees are listed in Attachment A to these meeting minutes.

Action Item Summary

Joint HCP-HCs and PRCC HSC

Long-term

- Mike Tonseth will distribute the analysis showing feasibility of the Methow Spring Chinook Salmon Outplanting plan based on historical run size data (Item I-A). *(Note: This item is ongoing; expected completion to be determined.)*
- Kirk Truscott will work with Confederated Tribes of the Colville Reservation (CTCR) staff to develop a model that addresses the probability of encountering natural-origin Okanogan River spring Chinook Salmon at Wells Dam (Item I-A). *(Note: This item is ongoing; expected completion date to be determined.)*
- Kirk Truscott will determine the number of scales that should be collected from spring Chinook Salmon at Wells Dam for elemental signature analysis to discern Okanogan River spring Chinook Salmon from Methow River spring Chinook Salmon (Item I-A). *(Note: This item is ongoing; completion depends on the outcome of the previous action item.)*
- 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.)*
- Mike Tonseth and Greg Mackey will solicit input from hatchery managers on effective methods to count surplus fish (Item I-A). *(Note: This item is ongoing; expected completion by early 2022 for incorporation into Broodstock Collection Protocols [BCPs].)*

Near-term (to be completed by next meeting)

- Larissa Rohrbach will file and distribute *10-year Comprehensive Review* chapters and comments to the HCP-HCs and PRCC HSC for review as they are completed (Item I-A). *(Note: This item is ongoing.)*
- Todd Pearsons and Catherine Willard will revise Grant and Chelan PUD's draft Statements of Agreement on Sockeye Salmon Obligation for approval in an upcoming meeting (Item I-A). *(Note: This item is ongoing.)*
- Catherine Willard will revise Chelan PUD's tabulated recalculation sensitivity analysis components with proposed recalculated production levels for distribution by March 23, 2022 (Item II-A). *(Note: This item was completed and distributed on March 17, 2022.)*
- Greg Mackey and Todd Pearsons will prepare tabulated recalculation sensitivity analysis components with proposed recalculated production levels for distribution to the HCP-HCs and PRCC HSC no later than March 30, 2022 (Item II-A). *(Note: This item was completed by March 31, 2022.)*
- The HCP-HCs and PRCC HSC members will review the Interim Draft 2022 BCPs and provide comments to Mike Tonseth by Friday, March 18, 2022 (Item II-B). *(Note: This item was completed by March 18, 2022.)*
- Mike Tonseth will prepare a revised Interim Draft 2022 BCPs by Monday, March 21, 2022, for Wells HCP Coordinating Committee approval (Item II-B). *(Note: This item was completed; decisions noted in Decision Summary section.)*
- Bill Gale will organize a meeting with Mike Tonseth, Catherine Willard, and Michael Humling (U.S. Fish and Wildlife Service [USFWS]) to review and obtain USFWS approval of the 2022 Chiwawa Weir operations plan. *(Note: This item was completed by March 25, 2022.)*

Rock Island/Rocky Reach HCP-HCs

- None.

Wells HCP-HC

- None.

PRCC HSC

- None.

Decision Summary

The Interim Draft 2022 BCPs were approved by the HCP-HC and PRCC HSC on March 25, 2022, and by the Wells HCP Coordinating Committee on March 31, 2022.

Agreements

- The HCP-HCs and PRCC HSC members agreed to adjust the next meeting start time to 10 a.m.

Review Items

- Larissa Rohrbach distributed the tabulated recalculation sensitivity analysis components with proposed recalculated production levels prepared by each of the PUDs for HCP-HC and PRCC HSC review on March 31, 2022.

Finalized Documents

- None.

I. Welcome

A. Agenda, Announcements

Tracy Hillman welcomed the HCP-HCs and PRCC HSC and read the list of attendees (Attachment A). The meeting was held via conference call and web-share because of travel and group meeting restrictions resulting from the coronavirus disease 2019 (COVID-19) pandemic. All HCP-HCs and PRCC HSC representatives that were present approved the agenda. The meeting minutes from the February 4, 2022, extra meeting were approved by all parties who were present. No representatives of the CTCR were present in today's meeting; they provided their approval for the minutes by email. Tom Scribner represented the Yakama Nation (YN) at the February 4, 2022, extra meeting but was not present to approve the minutes; therefore, Keely Murdoch abstained from approving for the YN. The meeting minutes from the February 16, 2022, regular meeting were unanimously approved.

Action items from the HCP-HCs and PRCC HSC meeting on February 16, 2022, were reviewed and discussed (*Note: Italicized text below corresponds to action items from the previous meeting*).

Joint HCP-HCs and PRCC HSC

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- *Mike Tonseth and Greg Mackey will solicit input from hatchery managers on effective methods to count surplus fish (Item I-A). (Note: This item is ongoing; expected completion by early 2022 for incorporation into Broodstock Collection Protocols [BCPs].)*

Near-term (to be completed by next meeting)

- *Larissa Rohrbach will file and distribute 10-year Comprehensive Review chapters and comments to the Committees for review as they are completed.*
This item is ongoing. An update on this item will be provided in today's meeting (Item II-C).
- *Todd Pearsons and Catherine Willard will revise Grant and Chelan PUD's draft Statements of Agreement on Sockeye Salmon Obligation for approval in an upcoming meeting.*
This item is ongoing.
- *Kirk Truscott will report back to the HCP-HCs and PRCC HSC by Wednesday, February 23, 2022, whether the CTCR will support juvenile acclimation and rearing at the Goat Wall or Early Winters sites in 2022.*
This item was completed on February 24, 2022.
- *Catherine Willard will prepare an updated version of the proposed allocation of natural-origin adult equivalents among hatchery sites for Chelan PUD's mitigation.*
This item was distributed on March 1, 2022, and was discussed in the March 3, 2021, meeting. This item is complete.
- *Greg Mackey and Todd Pearsons will update Appendix A of the BCPs by Friday, February 18, 2022.*
This item is complete.
- *Mike Tonseth will create a truncated version of the 2022 BCPs by March 6, 2022, for distribution and approval in the March 16, 2022, meeting.*
This item was distributed on March 15, 2022, and will be discussed in today's meeting (Item II-B). This item is complete.

II. Joint HCP-HC and PRCC HSC

A. Hatchery Production Recalculation

Sensitivity Analysis Approach

Catherine Willard presented the summary of the sensitivity analysis approach (Attachment B). The PUD representatives read through the footnotes to the sensitivity components table describing how calculations were made. The sensitivity analysis components show the potential mitigation implementation plan elements for each PUD for replacement of natural-origin smolts using the Biological Assessment and Management Plan, unavoidable project mortality for federal National Fish Hatchery (NFH) smolts, inundation mitigation production, and unavoidable project mortality for other PUDs' inundation mitigation.

Todd Pearsons said the component of Grant PUD's spring Chinook Salmon reared at Chief Joseph Hatchery (CJH) (110,000 fish) should be added to the numbers shown, and this will be updated in the version sent out after the meeting.

Bill Gale said Winthrop NFH annually transfers 200,000 spring Chinook Salmon eyed eggs and juveniles to the CTCR for release into the Okanogan River as part of a reintroduction program, which is a federal obligation. Gale said he would like to better understand how compensation for mortality in that group is shown here. Greg Mackey said in Douglas PUD's agreement with CJH, and in the related HCP Hatchery Committee-approved Statement of Agreement (SOA), the overall target for spring Chinook Salmon production at CJH is 900,000 hatchery fish, including an Okanogan River release and a segregated release. The 200,000 10j program fish became a part of that 900,000. To compensate for their unavoidable project mortality of 3.96%, Douglas PUD funds CJH for 3.96% of the cost of monitoring and evaluation and operations and maintenance, which amounts to 35,640 fish funded by Douglas PUD for No Net Impact (NNI). As an aside to this question, the Wells HCP contemplated new populations, such as having a spring Chinook Salmon reintroduction in the Okanogan Subbasin prior to development of CJH. It was stated in the HCP that if a new population, such as the Okanogan spring Chinook Salmon, reaches a threshold population size, defined as 500 natural-origin adults across a 5-year average counted at Wells Dam, mitigation for natural-origin fish from the Okanogan would be included in Douglas PUD's NNI calculation.

Todd Pearsons said Grant PUD's funding agreement with CJH is to produce 110,000 fish to satisfy Grant PUD's spring Chinook Salmon mitigation. Gale said he would like to understand how the 110,000 fish target is calculated, because in 10 years' time, that 200,000 fish transferred from Winthrop NFH to the CTCR could be directed elsewhere, and at that time there would be a need to reconsider how it would be compensated for. Gale will reach out to Truscott to clarify this point.

Tracy Hillman thanked the PUDs for preparing the analysis components. Hillman asked if the PUDs could share their thoughts on proposed implementation plans.

Mackey said, speaking for Douglas PUD, they would be flexible identifying other options for some of the steelhead safety net program. There hasn't been a fishery on those fish in several years and the utility of the Columbia Safety Net component is uncertain. If there is a more attractive option, Douglas PUD would be willing to be flexible on allocation of that production. For summer Chinook Salmon, of the 93,000 juveniles for total NNI mitigation, 58,000 are allocated to CJH and approximately 35,000 are currently allocated to the Methow River, according to the SOA for CJH. Douglas PUD would be open to ideas for that 35,000—either alternatives to rearing and release approaches or a change to species, depending on what would be most important to the programs.

Willard said Chelan PUD has prepared proposed production levels based on the sensitivity analyses to begin discussions (Attachment D). Chelan PUD is proposing no change to production at CJH and will continue to fund that program at the current level. In the last recalculation, a species swap was made for steelhead in place of Lake Wenatchee Sockeye. There is a need to consider if the Committees still support that, keeping the capacity of the Chiwawa Acclimation Facility in mind. Murdoch thanked Willard for preparing this proposal and said that it initially seems reasonable, but she will bring this to the YN for internal discussion. Gale thanked Chelan PUD for preparing the spreadsheet and said that compensation for fish from the Methow are currently allocated to different places, such as Chiwawa Acclimation Facility, which might be something the USFWS wants to change, but he would want to see the whole picture from the other PUDs first. Gale said he is tracking whether or not the mitigation is being returned to the places the fish came from. He looks forward to further discussions about the Sockeye Salmon species swap.

Mike Tonseth asked if the row for summer Chinook Salmon at Dryden Pond includes NNI for Wenatchee, Methow, and Entiat subbasins combined, noting that it would be helpful to see how the mitigation is spread out proportionally among those populations. If production is shifted to different locations, there may be a need to apply a different hatchery smolt-to-adult return to those values. Willard said she would incorporate Tonseth's suggestion and break out the production numbers by mitigation for each tributary.

Tonseth asked if Douglas PUD and Grant PUD could prepare a similar spreadsheet for consideration, or if the PUDs plan to develop a draft implementation plan for the parties to respond to. Mackey said Douglas PUD could produce the sensitivity analysis and a similar spreadsheet fairly rapidly, but the bigger challenge would be preparing the implementation plan, which results from what all the parties think would work well. Mackey said he would prefer to move forward with a proposed implementation plan, hoping to work with people between meetings to prepare a draft that would be suitable for discussion.

Pearsons said he would prepare a similar spreadsheet for Grant PUD's programs using this as a template. Pearsons said Grant PUD would start with what is currently in the implementation plan, which is to mitigate at the high end for spring Chinook Salmon, the mid-range for summer and fall Chinook Salmon, and at the "below low" level for steelhead, because the 2008 Biological Opinion (BiOp) on the Priest Rapids Project issued by National Marine Fisheries Service (NMFS) states that Grant PUD can release no more than 100,000 steelhead. References to that BiOp should be included with a statement at the end that these numbers are maximums for production. Tonseth said Action 27 in the Priest Rapids Salmon and Steelhead Settlement Agreement speaks to the maximum of 100,000 steelhead as well.

The PUDs agreed to coordinate internally and with other members to provide proposed recalculated production tables no later than March 30, 2022. After the tables are shared, representatives will meet with their own staff internally to discuss the PUDs' proposals. The Joint Fisheries Parties will also meet to discuss the proposals the week of April 11, 2022.

Hillman encouraged members to work diligently among themselves so the Committees may be able to approve the production numbers during the next meeting, which will be held on April 20, 2022. Following approval of production numbers, the next steps would be to prepare the implementation plans and BCPs. Pearsons requested that any critical questions that are identified in the process be brought to everyone's attention before the April 20, 2022, meeting.

B. 2022 Broodstock Collection Protocols Preparations

Mike Tonseth said the Interim Draft 2022 BCPs are solely focused on spring Chinook Salmon in case a recalculated implementation plan is not completed by the time spring Chinook Salmon broodstock collection needs to begin. The Interim Draft 2022 BCPs would at least be approved by the HCP-HCs and PRCC HSC, followed by the Wells HCP Coordinating Committee, and provided to NMFS by April 15 to allow spring Chinook Salmon broodstock collection to begin. The following revisions were made:

- All species were included in the updated Appendix A on biological assumptions and Appendix B with site-specific trap locations, because it did not make sense to tease out the spring Chinook Salmon information from those appendices. Specific operational details for trapping are included in the body of the document.
- Tonseth said the spring Chinook Salmon adult returns this year are not expected to be very different from last year. This year's collection targets are based on previous production levels, and production levels are likely to decline after recalculation, so these numbers represent a maximum to be collected. Spring Chinook Salmon brood collection needs only vary by a couple of fish year-to-year given the production numbers have been the same for the past 10 years.
- Operation of the Chiwawa Weir has always been a point of major discussion in past years. The threshold for Bull Trout impacts has been included based on last year's Bull Trout spawning

survey data. The proposed weir operation is the same as last year. There is no plan to operate the adult bypass structure in the adult collection box this year based on technical difficulties last year (an in-season decision was made last year to cease using that structure and it has since been sealed up). The Chiwawa Weir can be operated following a conventional operations plan, consistent with the Section 10 permit and Wenatchee batched BiOps, which identify the work window (opening June 15) and number of Bull Trout encounters. Catherine Willard reminded the Committees of an update she provided after the trapping season last year; sufficient brood were obtained without meeting the Bull Trout trap encounter limits. It was hypothesized that a later start time to trapping over the past 2 years (in early July) allowed for more spring Chinook Salmon to be collected in a shorter period of time, reducing the number of Bull Trout encounters. Bill Gale suggested setting up a meeting with Michael Humling (USFWS) who will be the Ecological Services contact for USFWS Bull Trout encounters.

- Greg Mackey suggested inserting a comment noting that when new implementation plans are approved and updated brood needs are determined, extra broodstock would be returned to the proper river for natural spawning.

Brett Farman confirmed that the Committees can send a request to NMFS to postpone submission of the full BCPs. This same approval process will be carried out for the full comprehensive document. Tonseth included language in the introduction stating that an approved comprehensive document would then invalidate this interim version.

Tonseth asked if it would be possible to obtain any revisions to this version by end of this week (March 18), so it can be provided to the Wells HCP Coordinating Committee for their meeting next week. *(Note: The draft Interim BCPs were approved by the HCP-HCs and PRCC HSC by email on March 25, 2022. Approval of the Wells Coordinating Committee was obtained by email on March 31, 2022.)*

Keely Murdoch and Tom Kahler agreed to include this topic on next week's Wells HCP Coordinating Committee agenda to explain the delay in producing a comprehensive version. Kahler said the Wells HCP Coordinating Committee's nexus with the BCPs is around trapping operations at Wells Dam, and there will be no change for spring Chinook Salmon. Gale noted that aspects that Humling is reviewing are not relevant to the Wells HCP Coordinating Committee because the Chiwawa Weir trapping is based in the Wenatchee Basin.

C. 10-Year Comprehensive Review Update

Greg Mackey provided an update and said the majority of chapters have been drafted and the review periods have closed. Catherine Willard is in the process of responding to internal comments and finalizing the chapter on spring Chinook Salmon migration timing, spawn timing, and distribution, which will then be provided for the Committees to review. Committee members' comments have been incorporated by the authors on the other chapters that have been reviewed.

Todd Pearsons has created a template for executive summaries for each species, which will be a collection of all abstracts relevant to each species, a broad introduction, and some organizational information. The executive summaries could be used as a springboard for the committee-authored synthesis report. The executive summaries will not need to be reviewed by the Committees because they are mainly an organizational document and the abstracts have already been reviewed. They will be used as a starting place for a Committees synthesis report that would ultimately have management recommendations; the review of the executive summaries would essentially take place during that process to accept, reject, or elucidate ideas that are included in those abstracts. Pearsons said, ultimately, all finalized chapters and PUD-authored executive summaries would be prepared as a package of PUD-authored species-specific reports and provided to the Committees, and he wanted to ensure the Committees would be supportive of the approach described above.

D. American Fisheries Society Annual Meeting – Spokane

Todd Pearsons said this year's American Fisheries Society (AFS) Annual Meeting will occur August 21 through 25, 2022, in Spokane, Washington. It will be a very large, combined meeting of the Western Division, WA-BC Chapter, and national AFS meetings. Abstract submission is open now through April 8.

There will be a symposium on reintroductions, likely to be 2 to 3 days of presentations, to include both the west and east coasts and multiple species (shad, salmon, lamprey, and others). The focus will be on ecological interactions of target species and non-target species. Pearsons asked if the YN might be interested in presenting on Coho Salmon reintroduction. Keely Murdoch thanked Pearsons and will encourage YN staff to present in the reintroduction symposium.

E. Twisp River Steelhead Reproductive Success Study update

Greg Mackey said the final annual report and an email summary was distributed earlier today. The report prepared by Washington Department of Fish and Wildlife (WDFW) is titled *Relative Reproductive Success of Twisp River Hatchery and Wild Steelhead (Oncorhynchus mykiss): Summary Report for SNP Genotyping of Adult Collections – Return Years 2020 and 2021*. Briefly, parent steelhead cohorts were sampled in the earlier years of the study, and offspring cohorts returned in the final years. Final tissue samples were obtained, and data collection was completed in 2021. Mackey said he and Todd Seamons (WDFW geneticist) are currently working on a report and possibly a publication, though they are not likely to have time to finish a complete report on the study until 2023 because of the backlog at the WDFW genetics lab due to COVID-19 work restrictions.

III. Administrative Items

A. Meeting Time Adjustments

The Committees discussed moving the meeting start time later to accommodate CTCR attendance. Most members would prefer to continue starting meetings at 9:00 am. In past years, the start time was pushed back to 10:00 am to accommodate school schedules. Farman said pushing the start time later creates challenges at the end of the day. Hillman said he will reach out to Truscott to determine whether he could get more support from his alternate Casey Baldwin.

B. Coronavirus Disease 2019 and Monitoring and Evaluation Activities

Tracy Hillman asked Committees' members to provide their monthly updates on impacts of COVID-19 restrictions on monitoring and evaluation activities. COVID-19 case rates are dropping rapidly and work restrictions are relaxing broadly.

- Bill Gale said May 2 is supposed to be the transition for returning to the USFWS offices. Staff will be expected to report to the office and telework accommodations will be reduced. Federal offices are following the Centers for Disease Control and Prevention's new guidance on masking depending on County risk status.
- Mike Tonseth said all WDFW agency offices will be open to the public starting March 21. All staff will be wearing masks when engaging with the public in person. That masking guidance will also apply to in-person meetings.
- Brett Farman said NMFS is still working on integration plans with a target for returning to the office approximately late April, contingent on local regulations.
- Greg Mackey said there are no updates from Douglas PUD.
- Keely Murdoch said she received a memo earlier this week about the YN moving to Phase 4 of their reopening plan today and she is still determining what that means. The YN is still maintaining the indoor masking mandate.
- Catherine Willard said Chelan PUD is requiring all staff to return to the office by April 8 with no requirements to wear masks in the office at this time.
- Deanne Pavlik-Kunkel said as of March 12 staff are back to normal operations for Grant PUD. Public visitor centers and tours will reopen on April 18.
- Kirk Truscott was not present at the meeting to provide an update for the CTCR.

Regarding meeting in person in April, Farman and Gale said that will be too soon for federal employees. NMFS staff may be back in the office and traveling by end of April. Federal staff are supposed to transition back to the office by May 2. The Committees decided to meet virtually in April and make a decision about meeting in person in the May. In the future, if meetings return in person, there will always be an option to join virtually.

C. Next Meetings

The next HCP-HCs and PRCC HSC meetings will be held on Wednesday April 20; Wednesday May 18; and Wednesday June 15, 2022; by conference call and web-share until further notice.

IV. List of Attachments

Attachment A List of Attendees

Attachment B Presentation: Sensitivity Analysis (revised March 28, 2022)

Attachment C Sensitivity Analysis Excel Spreadsheet (dated March 14, 2022)

Attachment D Proposed Recalculated Production for Chelan PUD

Attachment E Proposed Recalculated Production for Grant PUD

Attachment F Proposed Recalculated Production for Douglas PUD

Attachment A
List of Attendees

| Name | Organization |
|----------------------|--|
| Larissa Rohrbach | Anchor QEA, LLC |
| Tracy Hillman | BioAnalysts, Inc. |
| Scott Hopkins* | Chelan PUD |
| Catherine Willard* | Chelan PUD |
| Tom Kahler* | Douglas PUD |
| Greg Mackey* | Douglas PUD |
| David Duvall | Grant PUD |
| Rod O'Connor | Grant PUD |
| Deanne Pavlik-Kunkel | Grant PUD |
| Todd Pearsons‡ | Grant PUD |
| Brett Farman*‡ | National Marine Fisheries Service |
| Katy Shelby | Washington Department of Fish and Wildlife |
| Mike Tonseth*‡ | Washington Department of Fish and Wildlife |
| Keely Murdoch*‡ | Yakama Nation |
| Bill Gale*‡ | U.S. Fish and Wildlife Service |

Notes:

* Denotes HCP-HCs member or alternate

‡ Denotes PRCC HSC member or alternate

Attachment B
Presentation: Sensitivity Analysis (revised March 28, 2022)

Sensitivity Analysis

March 14, 2022

Summary of Sensitivity Analysis

The “sensitivity analysis” described herein is intended to confirm the general production levels calculated for natural-origin and hatchery-origin fish with the following exceptions:

- Production obligations include the same categories as previous recalculation with the exception of columns “c” and “e” which were not used previously (i.e., SAR corrections for federal facilities).
- The allocation of fish to facilities or tributaries are expected to be further negotiated between individual PUDs and the HC.

Sensitivity Components

| Sensitivity Components | | | | | | |
|------------------------|-----------------------------|-------------------------|--------------------------------------|------------------------------------|------------------------|-----------------------|
| PUD | Species | (a) | (b) | (d) | (f) | (g) |
| | | NOR Smolts 'BAMP' | UPM for NFH Smolts | Residuals for NFH Smolts 'MNNI' | Inundation | UPM for Inundation |
| GPUD | Spring Chinook ⁸ | 46,660 | 214,560 | 41,378 | - | - |
| | Steelhead | 81,367 | 25,940 | 5,003 | - | 60,311 |
| | Summer Chinook ⁹ | 460,174 | 53,640 | 11,595 | - | 112,778 |
| | Coho | YN Production Agreement | | | | |
| | Sockeye | ONA Agreement | | | | |
| | Fall Chinook | 127,306 | - | - | 5,000,000 ¹ | - |
| CPUD | Spring Chinook | 31,603 | 125,120 | 25,367 | - | - |
| | Steelhead | 30,721 | 14,920 | 2,878 | 165,000 | 21,970 |
| | Summer Chinook ² | 288,970 | 52,280 | 11,301 | 400,000 | 55,765 |
| | Coho | 9,002 | YN Production Agreement ³ | | | |
| | Sockeye (Wenatchee) | 43,652 | - | - | - | - |
| DPUD | Spring Chinook ⁵ | 4,927 | 15,840 | 3,755 | - | - |
| | Steelhead | 7,663 | 7,920 | 1,528 | 300,000 | - |
| | Summer Chinook ⁶ | 93,846 | - | - | 441,000 ⁴ | - |
| | Coho | 189 | YN Production Agreement ⁷ | | | |
| | Sockeye | Okanagan FWMT | | | | |

Notes:

1. This value does not include the 273,961 subyearling smolts converted from 1 million fry.
2. CPUD has additional production obligations through the CJH funding agreement including: 12.65% of 1.3M summer Chinook yearlings=164,386; 13.51% of 700,000 subyearlings=94,570; 12.65% of 900,000 spring Chinook yearlings=113,806; and 169,615 'BAMP' calculated NOR smolts.
3. CPUD has additional production obligations through the YN coho funding agreement including: 13.51% of the Methow and Wenatchee sub-basins hatchery production.
4. The 441,000 yearlings noted here reflect the sum of 1) inundation production obligation of 320,000 yearlings and 2) inundation production obligation 484,000 subyearlings converted to yearlings based on the target release sizes of 40 fpp (subyearling) to 10 fpp (yearling).
5. DPUD funds 3.96% of CJH spring Chinook for NNI that is not included in this table (35,640).
6. DPUD funds 3.96% of CJH Summer Chinook for NNI (63,730) that provides NNI for the Okanogan and CJH production. This production is embedded in the 93,846 number presented in this table.
7. DPUD produces additional Coho under the Coho NNI agreement (currently 27,720).
8. The CJH funding agreement provides for an additional 110,000 spring Chinook Salmon for NNI that is not included in this table.
9. The CJH funding agreement provides for production of 305,000 summer Chinook Salmon for NNI that is embedded in this table.

Summary

| | | Sensitivity Options | | | Agreed upon production last recalc |
|------|-----------------------------|--------------------------|--------------------------|--------------------------|------------------------------------|
| PUD | Species | OPTION 1 | OPTION 2 | OPTION 3 | |
| | | a+b+f | a+b+d+f | a+b+d+f+g | |
| GPUD | Spring Chinook | 261,220 | 302,598 | 302,598 | 467,796 |
| | Steelhead | 107,307 | 112,310 | 172,621 | 100,000 |
| | Summer Chinook | 513,814 | 525,409 | 638,188 | 659,816 |
| | Coho | YN Production Agreement | YN Production Agreement | YN Production Agreement | YN Production Agreement |
| | Sockeye | ONA Production Agreement | ONA Production Agreement | ONA Production Agreement | ONA Production Agreement |
| | Fall Chinook | 5,127,306 | 5,127,306 | 5,127,306 | 5,325,543 |
| CPUD | Spring Chinook ¹ | 156,723 | 182,090 | 182,090 | 204,182 |
| | Steelhead | 210,641 | 213,519 | 235,489 | 247,300 |
| | Summer Chinook ¹ | 741,250 | 752,552 | 808,316 | 894,000 |
| | Coho | YN Production Agreement | YN Production Agreement | YN Production Agreement | YN Production Agreement |
| | Sockeye (Okanogan) | ONA Production Agreement | ONA Production Agreement | ONA Production Agreement | ONA Production Agreement |
| | Sockeye (Wenatchee) | 43,652 | 43,652 | 43,652 | 46,000 |
| DPUD | Spring Chinook | 20,767 | 24,522 | 24,522 | 29,123 |
| | Steelhead | 315,583 | 317,111 | 317,111 | 308,352 |
| | Summer Chinook | 534,846 | 534,846 | 534,846 | 489,540 |
| | Coho | YN Production Agreement | YN Production Agreement | YN Production Agreement | YN Production Agreement |
| | Sockeye | Okanagan FWMT | Okanagan FWMT | Okanagan FWMT | Okanagan FWMT |

1. These values do not include the spring and summer Chinook CJH production.

NOR “BAMP” Compensation for PRP (column “a”)

| PROJECT Owner | Species | Stock_Tributary | Adult Equivalent TRIBUTARY ALLOCATION | PUD HATCHERY | HATCHERY SAR | SMOLTS OWED | TOTAL PRODUCTION |
|---------------|----------------|-----------------|---------------------------------------|-----------------|--------------|-------------|------------------|
| GPUD | Spring Chinook | SPCH_METH | 76.0 | Methow | 0.527% | 14,428 | 46,660 |
| GPUD | Spring Chinook | SPCH_OKAN | 3.2 | CJH | N/A | | |
| GPUD | Spring Chinook | SPCH_ENTI | 46.6 | Nason | 0.610% | 7,632 | |
| GPUD | Spring Chinook | SPCH_WEN | 150.1 | Nason | 0.610% | 24,600 | |
| GPUD | Steelhead | STL_METH | 186.9 | Okanogan | 0.572% | 32,672 | 81,367 |
| GPUD | Steelhead | STL_OKAN | 61.8 | Okanogan | 0.572% | 10,812 | |
| GPUD | Steelhead | STL_ENTI | 86.7 | Okanogan | 0.572% | 15,154 | |
| GPUD | Steelhead | STL_WEN | 130.0 | Okanogan | 0.572% | 22,729 | |
| GPUD | Summer Chinook | SUCH_METH | 1464.0 | Carlton | 0.818% | 178,973 | 460,174 |
| GPUD | Summer Chinook | SUCH_OKAN | 2347.0 | CJH Similkameen | 2.076% | 113,054 | |
| GPUD | Summer Chinook | SUCH_WEN | 1325.0 | Dryden | 0.788% | 168,147 | |
| GPUD | Fall Chinook | FACH | 1824.3 | Priest Rapids | 1.433% | 127,306 | |

NOR “BAMP” Compensation for RI (column “a”)

| PROJECT Owner | Species | Stock_Tributary | Adult Equivalent TRIBUTARY ALLOCATION | Hatchery | HATCHERY SAR | SMOLTS OWED | TOTAL PRODUCTION |
|---------------|----------------|-----------------|---------------------------------------|---------------------|--------------|-------------|------------------|
| CPUD | Spring Chinook | SPCH_METH | 29.7 | Chiwawa | 0.575% | 5,165 | 18,735 |
| CPUD | Spring Chinook | SPCH_OKAN | 1.2 | Chiwawa | 0.575% | 215 | |
| CPUD | Spring Chinook | SPCH_ENTI | 18.2 | Chiwawa | 0.575% | 3,162 | |
| CPUD | Spring Chinook | SPCH_WEN | 58.6 | Chiwawa | 0.575% | 10,193 | |
| CPUD | Steelhead | STL_METH | 35.5 | Chiwawa | 0.535% | 6,636 | 16,526 |
| CPUD | Steelhead | STL_OKAN | 11.7 | Chiwawa | 0.535% | 2,196 | |
| CPUD | Steelhead | STL_ENTI | 16.5 | Chiwawa | 0.535% | 3,078 | |
| CPUD | Steelhead | STL_WEN | 24.7 | Chiwawa | 0.535% | 4,616 | |
| CPUD | Summer Chinook | SUCH_METH | 318.1 | Dryden | 0.774% | 41,099 | 293,880 |
| CPUD | Summer Chinook | SUCH_OKAN | 1479.8 | CJH Similkameen | 1.993% | 74,248 | |
| CPUD | Summer Chinook | SUCH_ENTI | 52.4 | Dryden | 0.774% | 6,767 | |
| CPUD | Summer Chinook | SUCH_CHEL | 109.0 | Chelan Falls | 1.782% | 6,118 | |
| CPUD | Summer Chinook | SUCH_WEN | 1282.1 | Dryden | 0.774% | 165,649 | |
| CPUD | Sockeye | SOCK_WEN | 2754.4 | Natural Wenatchee * | 6.310% | 43,652 | 43,652 |
| CPUD | Coho | COHO_METH | 3.2 | YN Methow | 0.268% | 1,194 | 7,299 |
| CPUD | Coho | COHO_WEN | 25.2 | YN Wenatchee | 0.413% | 6,105 | |

* Wenatchee SAR based on the natural-origin production from the Wenatchee.

NOR “BAMP” Compensation for RR (column “a”)

| PROJECT Owner | Species | Stock_Tributary | Adult Equivalent TRIBUTARY ALLOCATION | HATCHERY | HATCHERY SAR | SMOLTS OWED | |
|---------------|----------------|-----------------|---------------------------------------|-----------------|--------------|-------------|---------|
| CPUD | Spring Chinook | SPCH_METH | 41.0 | Methow | 0.527% | 7,780 | 12,869 |
| CPUD | Spring Chinook | SPCH_OKAN | 1.7 | Methow | 0.527% | 324 | |
| CPUD | Spring Chinook | SPCH_ENTI | 25.1 | Methow | 0.527% | 4,764 | |
| CPUD | Steelhead | STL_METH | 42.3 | Chiwawa | 0.535% | 7,909 | 14,196 |
| CPUD | Steelhead | STL_OKAN | 14.0 | Chiwawa | 0.535% | 2,617 | |
| CPUD | Steelhead | STL_ENTI | 19.6 | Chiwawa | 0.535% | 3,669 | |
| CPUD | Summer Chinook | SUCH_METH | 408.6 | Dryden | 0.774% | 52,789 | 164,705 |
| CPUD | Summer Chinook | SUCH_OKAN | 1900.7 | CJH Similkameen | 1.993% | 95,367 | |
| CPUD | Summer Chinook | SUCH_ENTI | 67.3 | Dryden | 0.774% | 8,692 | |
| CPUD | Summer Chinook | SUCH_CHEL | 140.0 | Chelan Falls | 1.782% | 7,858 | |
| CPUD | Coho | COHO_METH | 4.4 | YN Methow | 0.268% | 1,629 | |

NOR “BAMP” Compensation for Wells (column “a”)

| PROJECT Owner | Species | Stock_Tributary | Adult Equivalent TRIBUTARY ALLOCATION | PUD HATCHERY | HATCHERY SAR | SMOLTS OWED | |
|---------------|----------------|-----------------|---------------------------------------|----------------------------|--------------|-------------|--------|
| DPUD | Spring Chinook | SPCH_METH | 26.0 | Methow | 0.527% | 4,927 | |
| DPUD | Spring Chinook | SPCH_OKAN | 1.1 | CJH-Spring Chinook Funding | NA | | 4,927 |
| DPUD | Steelhead | STL_METH | 41.9 | Wells/Methow | 0.728% | 5,758 | |
| DPUD | Steelhead | STL_OKAN | 13.9 | Wells/Methow | 0.728% | 1,905 | 7,663 |
| DPUD | Summer Chinook | SUCH_METH | 330.9 | CJH Similkameen | 1.993% | 16,605 | |
| DPUD | Summer Chinook | SUCH_OKAN | 1539.4 | CJH Similkameen | 1.993% | 77,242 | 93,846 |
| DPUD | Coho | COHO_METH | 1.7318 | YN Twisp | 0.915% | 189 | 189 |

Mitigation for NFH Production + Residuals (columns “b” and “d”)

| PUD | Federal Hatchery Program | Species | Federal Smolt Release | Project | Survival | Mortality | UPM (Less smolts) | MNNI Residuals | TOTAL UPM + MNNI |
|------|--------------------------|---------|-----------------------|---------|----------|-----------|-------------------|----------------|------------------|
| GPUD | WNFH | SPCH | 400,000 | PRP | 86.59% | 13.41% | 53,640 | 12,714 | 66,354 |
| GPUD | WNFH | StHD | 200,000 | PRP | 87.03% | 12.97% | 25,940 | 5,003 | 30,943 |
| GPUD | ENFH | SuCH | 400,000 | PRP | 86.59% | 13.41% | 53,640 | 11,595 | 65,235 |
| GPUD | LNFH | SPCH | 1,200,000 | PRP | 86.59% | 13.41% | 160,920 | 28,664 | 189,584 |
| CPUD | WNFH | SpCH | 400,000 | RRH | 93.00% | 7.00% | 28,000 | 6,637 | 34,637 |
| CPUD | WNFH | SpCH | 400,000 | RIS | 93.93% | 6.07% | 24,280 | 5,755 | 30,035 |
| CPUD | WNFH | StHD | 200,000 | RRH | 95.79% | 4.21% | 8,420 | 1,624 | 10,044 |
| CPUD | WNFH | StHD | 200,000 | RIS | 96.75% | 3.25% | 6,500 | 1,254 | 7,754 |
| CPUD | ENFH | SuCH | 400,000 | RRH | 93.00% | 7.00% | 28,000 | 6,053 | 34,053 |
| CPUD | ENFH | SuCH | 400,000 | RIS | 93.93% | 6.07% | 24,280 | 5,249 | 29,529 |
| CPUD | LNFH | SpCH | 1,200,000 | RIS | 93.93% | 6.07% | 72,840 | 12,974 | 85,814 |
| DPUD | WNFH | SPCH | 400,000 | Wells | 96.04% | 3.96% | 15,840 | 3,755 | 19,595 |
| DPUD | WNFH | StHD | 200,000 | Wells | 96.04% | 3.96% | 7,920 | 1,528 | 9,448 |

Inundation Production (column “f”)

| Summary Of Inundation Production Obligations | | | |
|--|---------------|----------------|-----------------------|
| PUD | Project | Species | Inundation Obligation |
| CPUD | RR | Steelhead | 165,000 |
| CPUD | RR | Summer Chinook | 400,000 |
| DPUD | Wells | Steelhead | 300,000 |
| DPUD | Wells | Summer Chinook | 441,000 |
| GPUD | Priest Rapids | Fall Chinook* | 5,000,000 |

* This value does not include the 273,961 subyearling smolts converted from 1 million fry

Mitigation for Upstream Inundation (column “g”)

Summary Of Mitigation For Indundation

| PUD | Species | Project Obligation | Inundation Program | Inundation Production | Combined UPM | Productiuon Obligation |
|------|----------------|--------------------|--------------------|-----------------------|--------------|------------------------|
| CPUD | Summer Chinook | RR+RI | Wells | 441,000 | 12.65% | 55,765 |
| CPUD | Steelhead | RR+RI | Wells | 300,000 | 7.32% | 21,970 |
| GPUD | Summer Chinook | PRP | Wells | 441,000 | 13.41% | 59,138 |
| GPUD | Steelhead | PRP | Wells | 300,000 | 12.97% | 38,910 |
| GPUD | Summer Chinook | PRP | RR | 400,000 | 13.41% | 53,640 |
| GPUD | Steelhead | PRP | RR | 165,000 | 12.97% | 21,401 |

Attachment C
Sensitivity Analysis Excel Spreadsheet (dated March 14, 2022)

| Sensitivity Components | | | | | | |
|------------------------|----------------|--------------------------|-----------------------|----------------------|------------|-----------------------|
| PUD | Species | (a) | (b) | (d) | (f) | (g) |
| | | NOR Smolts 'BAMP' | UPM for NFH Smolts | Residuals for NFH | Inundation | UPM for Inundation |
| GPUD | Spring Chinook | 46,660 | 214,560 | 41,378 | - | - |
| | Steelhead | 81,367 | 25,940 | 5,003 | - | 60,311 |
| | Summer Chinook | 460,174 | 53,640 | 11,595 | - | 112,778 |
| | Coho | YN Production Agreement | | | | |
| | Sockeye | ONA Production Agreement | | | | |
| | Fall Chinook | 127,306 | - | - | 5,000,000 | - |
| | CPUD | Spring Chinook | 31,603 | 125,120 | 25,367 | - |
| Steelhead | | 30,721 | 14,920 | 2,878 | 165,000 | 21,970 |
| Summer Chinook | | 288,970 | 52,280 | 11,301 | 400,000 | 55,765 |
| Coho | | YN Production Agreement | | | | |
| Sockeye (Okanogan) | | ONA Production Agreement | | | | |
| Sockeye (Wenatchee) | | 43,652 | - | - | - | - |
| DPUD | | Spring Chinook | 4,927 | 15,840 | 3,755 | - |
| | Steelhead | 7,663 | 7,920 | 1,528 | 300,000 | - |
| | Summer Chinook | 93,846 | - | - | 441,000 | - |
| | Coho | YN Production Agreement | | | | |
| | Sockeye | Okanagan FWMT | | | | |



| Sensitivity Options | | | | |
|---------------------|----------------|--------------------------|-----------|-----------|
| PUD | Species | OPTION 1 | OPTION 2 | OPTION 3 |
| | | a+b+f | a+b+d+f | a+b+d+f+g |
| GPUD | Spring Chinook | 261,220 | 302,598 | 302,598 |
| | Steelhead | 107,307 | 112,310 | 172,621 |
| | Summer Chinook | 513,814 | 525,409 | 638,188 |
| | Coho | YN Production Agreement | | |
| | Sockeye | ONA Production Agreement | | |
| | Fall Chinook | 5,127,306 | 5,127,306 | 5,127,306 |
| | CPUD | Spring Chinook | 156,723 | 182,090 |
| Steelhead | | 210,641 | 213,519 | 235,489 |
| Summer Chinook | | 741,250 | 752,552 | 808,316 |
| Coho | | YN Production Agreement | | |
| Sockeye (Okanogan) | | ONA Production Agreement | | |
| Sockeye (Wenatchee) | | 43,652 | 43,652 | 43,652 |
| DPUD | | Spring Chinook | 20,767 | 24,522 |
| | Steelhead | 315,583 | 317,111 | 317,111 |
| | Summer Chinook | 534,846 | 534,846 | 534,846 |
| | Coho | YN Production Agreement | | |
| | Sockeye | Okanagan FWMT | | |

| PRP | | | | | | | |
|---------------|----------------|-----------------|---------------------------------------|-----------------|--------------|-------------|------------------|
| PROJECT Owner | Species | Stock_Tributary | Adult Equivalent TRIBUTARY ALLOCATION | PUD HATCHERY | HATCHERY SAR | SMOLTS OWED | TOTAL PRODUCTION |
| GPUD | Spring Chinook | SPCH_METH | 76.0 | Methow | 0.527% | 14,428 | 46,660 |
| GPUD | Spring Chinook | SPCH_OKAN | 3.2 | CJH | N/A | | |
| GPUD | Spring Chinook | SPCH_ENTI | 46.6 | Nason | 0.610% | 7,632 | |
| GPUD | Spring Chinook | SPCH_WEN | 150.1 | Nason | 0.610% | 24,600 | |
| GPUD | Steelhead | STL_METH | 186.9 | Okanogan | 0.572% | 32,672 | 81,367 |
| GPUD | Steelhead | STL_OKAN | 61.8 | Okanogan | 0.572% | 10,812 | |
| GPUD | Steelhead | STL_ENTI | 86.7 | Okanogan | 0.572% | 15,154 | |
| GPUD | Steelhead | STL_WEN | 130.0 | Okanogan | 0.572% | 22,729 | |
| GPUD | Summer Chinook | SUCH_METH | 1464.0 | Carlton | 0.818% | 178,973 | 460,174 |
| GPUD | Summer Chinook | SUCH_OKAN | 2347.0 | CJH Similkameen | 2.076% | 113,054 | |
| GPUD | Summer Chinook | SUCH_WEN | 1325.0 | Dryden | 0.788% | 168,147 | |
| GPUD | Fall Chinook | FACH | 1824.3 | Priest Rapids | 1.433% | 127,306 | |

| RI | | | | | | | |
|---------------|----------------|-----------------|---------------------------------------|-------------------|--------------|-------------|------------------|
| PROJECT Owner | Species | Stock_Tributary | Adult Equivalent TRIBUTARY ALLOCATION | PUD HATCHERY | HATCHERY SAR | SMOLTS OWED | TOTAL PRODUCTION |
| CPUD | Spring Chinook | SPCH_METH | 29.7 | Chiwawa | 0.575% | 5,165 | 18,735 |
| CPUD | Spring Chinook | SPCH_OKAN | 1.2 | Chiwawa | 0.575% | 215 | |
| CPUD | Spring Chinook | SPCH_ENTI | 18.2 | Chiwawa | 0.575% | 3,162 | |
| CPUD | Spring Chinook | SPCH_WEN | 58.6 | Chiwawa | 0.575% | 10,193 | |
| CPUD | Steelhead | STL_METH | 35.5 | Chiwawa | 0.535% | 6,636 | 16,526 |
| CPUD | Steelhead | STL_OKAN | 11.7 | Chiwawa | 0.535% | 2,196 | |
| CPUD | Steelhead | STL_ENTI | 16.5 | Chiwawa | 0.535% | 3,078 | |
| CPUD | Steelhead | STL_WEN | 24.7 | Chiwawa | 0.535% | 4,616 | |
| CPUD | Summer Chinook | SUCH_METH | 318.1 | Dryden | 0.774% | 41,099 | 293,880 |
| CPUD | Summer Chinook | SUCH_OKAN | 1479.8 | CJH Similkameen | 1.993% | 74,248 | |
| CPUD | Summer Chinook | SUCH_ENTI | 52.4 | Dryden | 0.774% | 6,767 | |
| CPUD | Summer Chinook | SUCH_CHEL | 109.0 | Chelan Falls | 1.782% | 6,118 | |
| CPUD | Summer Chinook | SUCH_WEN | 1282.1 | Dryden | 0.774% | 165,649 | 43,652 |
| CPUD | Sockeye | SOCK_WEN | 2754.4 | Natural Wenatchee | 6.310% | 43,652 | |
| CPUD | Coho | COHO_METH | 3.2 | YN Methow | 0.268% | 1,194 | 7,299 |
| CPUD | Coho | COHO_WEN | 25.2 | YN Wenatchee | 0.413% | 6,105 | |

| RR | | | | | | | |
|---------------|----------------|-----------------|---------------------------------------|-----------------|--------------|-------------|---------|
| PROJECT Owner | Species | Stock_Tributary | Adult Equivalent TRIBUTARY ALLOCATION | PUD HATCHERY | HATCHERY SAR | SMOLTS OWED | |
| CPUD | Spring Chinook | SPCH_METH | 41.0 | Methow | 0.527% | 7,780 | 12,869 |
| CPUD | Spring Chinook | SPCH_OKAN | 1.7 | Methow | 0.527% | 324 | |
| CPUD | Spring Chinook | SPCH_ENTI | 25.1 | Methow | 0.527% | 4,764 | |
| CPUD | Steelhead | STL_METH | 42.3 | Chiwawa | 0.535% | 7,909 | 14,196 |
| CPUD | Steelhead | STL_OKAN | 14.0 | Chiwawa | 0.535% | 2,617 | |
| CPUD | Steelhead | STL_ENTI | 19.6 | Chiwawa | 0.535% | 3,669 | |
| CPUD | Summer Chinook | SUCH_METH | 408.6 | Dryden | 0.774% | 52,789 | 164,705 |
| CPUD | Summer Chinook | SUCH_OKAN | 1900.7 | CJH Similkameen | 1.993% | 95,367 | |
| CPUD | Summer Chinook | SUCH_ENTI | 67.3 | Dryden | 0.774% | 8,692 | |
| CPUD | Summer Chinook | SUCH_CHEL | 140.0 | Chelan Falls | 1.782% | 7,858 | |
| CPUD | Coho | COHO_METH | 4.4 | YN Methow | 0.268% | 1,629 | |

| WELLS | | | | | | | |
|---------------|----------------|-----------------|---------------------------------------|----------------------------|--------------|-------------|--------|
| PROJECT Owner | Species | Stock_Tributary | Adult Equivalent TRIBUTARY ALLOCATION | PUD HATCHERY | HATCHERY SAR | SMOLTS OWED | |
| DPUD | Spring Chinook | SPCH_METH | 26.0 | Methow | 0.527% | 4,927 | 4,927 |
| DPUD | Spring Chinook | SPCH_OKAN | 1.1 | CJH-Spring Chinook Funding | NA | | |
| DPUD | Steelhead | STL_METH | 41.9 | Wells/Methow | 0.728% | 5,758 | 7,663 |
| DPUD | Steelhead | STL_OKAN | 13.9 | Wells/Methow | 0.728% | 1,905 | |
| DPUD | Summer Chinook | SUCH_METH | 330.9 | CJH Similkameen | 1.993% | 16,605 | 93,846 |
| DPUD | Summer Chinook | SUCH_OKAN | 1539.4 | CJH Similkameen | 1.993% | 77,242 | |
| DPUD | Coho | COHO_METH | 1.7318 | YN Twisp | 0.915% | 189 | 189 |

| PUD | Federal Hatchery Program | Species | Federal Smolt Release | Project | Survival | Mortality | UPM (Less smolts) | MNNI Residuals | TOTAL UPM + MNNI |
|------------|---------------------------------|----------------|------------------------------|----------------|-----------------|------------------|--------------------------|-----------------------|-------------------------|
| GPUD | WNFH | SPCH | 400,000 | PRP | 86.59% | 13.41% | 53,640 | 12,714 | 66,354 |
| GPUD | WNFH | StHD | 200,000 | PRP | 87.03% | 12.97% | 25,940 | 5,003 | 30,943 |
| GPUD | ENFH | SuCH | 400,000 | PRP | 86.59% | 13.41% | 53,640 | 11,595 | 65,235 |
| GPUD | LNFH | SPCH | 1,200,000 | PRP | 86.59% | 13.41% | 160,920 | 28,664 | 189,584 |
| CPUD | WNFH | SpCH | 400,000 | RRH | 93.00% | 7.00% | 28,000 | 6,637 | 34,637 |
| CPUD | WNFH | SpCH | 400,000 | RIS | 93.93% | 6.07% | 24,280 | 5,755 | 30,035 |
| CPUD | WNFH | StHD | 200,000 | RRH | 95.79% | 4.21% | 8,420 | 1,624 | 10,044 |
| CPUD | WNFH | StHD | 200,000 | RIS | 96.75% | 3.25% | 6,500 | 1,254 | 7,754 |
| CPUD | ENFH | SuCH | 400,000 | RRH | 93.00% | 7.00% | 28,000 | 6,053 | 34,053 |
| CPUD | ENFH | SuCH | 400,000 | RIS | 93.93% | 6.07% | 24,280 | 5,249 | 29,529 |
| CPUD | LNFH | SpCH | 1,200,000 | RIS | 93.93% | 6.07% | 72,840 | 12,974 | 85,814 |
| DPUD | WNFH | SPCH | 400,000 | Wells | 96.04% | 3.96% | 15,840 | 3,755 | 19,595 |
| DPUD | WNFH | StHD | 200,000 | Wells | 96.04% | 3.96% | 7,920 | 1,528 | 9,448 |

Summary Of Inundation Production Obligations

| PUD | Project | Species | Inundation Obligation |
|------------|----------------|----------------|------------------------------|
| CPUD | RR | Steelhead | 165,000 |
| CPUD | RR | Summer Chinook | 400,000 |
| DPUD | Wells | Steelhead | 300,000 |
| DPUD | Wells | Summer Chinook | 441,000 |
| GPUD | Priest Rapids | Fall Chinook | 5,000,000 |

Summary Of Mitigation For Indundation

| PUD | Species | Project Obligation | Inundation Program | Inundation Production | Combined UPM | Production Obligation |
|------------|----------------|---------------------------|---------------------------|------------------------------|---------------------|------------------------------|
| CPUD | Summer Chinook | RR+RI | Wells | 441,000 | 12.65% | 55,765 |
| CPUD | Steelhead | RR+RI | Wells | 300,000 | 7.32% | 21,970 |
| GPUD | Summer Chinook | PRP | Wells | 441,000 | 13.41% | 59,138 |
| GPUD | Steelhead | PRP | Wells | 300,000 | 12.97% | 38,910 |
| GPUD | Summer Chinook | PRP | RR | 400,000 | 13.41% | 53,640 |
| GPUD | Steelhead | PRP | RR | 165,000 | 12.97% | 21,401 |

| Species | Stock_Tributary | Average NOS (2011-2020) | Percent Distributed on Above RI | Percent Distributed on Above RR | Percent Distributed on Above Wells |
|-------------------|-----------------|-------------------------|---------------------------------|---------------------------------|------------------------------------|
| Spring Chinook | SPCH_METH | 341 | 28% | 60% | 96% |
| Spring Chinook | SPCH_OKAN | 14 | 1% | 3% | 4% |
| Spring Chinook | SPCH_ENTI | 209 | 17% | 37% | |
| Spring Chinook | SPCH_WEN | 673 | 54% | | |
| Species Total (N) | | | 1237 | 564 | 355 |
| Steelhead | STL_METH | 677 | 40% | 56% | 75% |
| Steelhead | STL_OKAN | 224 | 13% | 18% | 25% |
| Steelhead | STL_ENTI | 314 | 19% | 26% | |
| Steelhead | STL_WEN | 471 | 28% | | |
| Species Total (N) | | | 1687 | 1215 | 901 |
| Summer Chinook | SUCH_METH | 1,367 | 10% | 16% | 18% |
| Summer Chinook | SUCH_OKAN | 6,357 | 46% | 76% | 82% |
| Summer Chinook | SUCH_ENTI | 225 | 2% | 3% | |
| Summer Chinook | SUCH_CHEL | 468 | 3% | 6% | |
| Summer Chinook | SUCH_WEN | 5,508 | 40% | | |
| Species Total (N) | | | 13924 | 8417 | 7723 |
| Sockeye | SOCK_OKAN | 170,143 | 82% | 100% | 100% |
| Sockeye | SOCK_WEN | 38,173 | 18% | | |
| Species Total (N) | | | 208316 | 170143 | 170143 |
| Coho | COHO_METH | 42 | 13% | 100% | 100% |
| Coho | COHO_WEN | 289 | 87% | | |
| Species Total (N) | | | 331 | 42 | 42 |

Attachment D
Proposed Recalculated Production for Chelan PUD

| Sensitivity Analysis | | | | | | | | | | | | | |
|----------------------|-----------------------|-------------------------------|------------------------------|-------------------|--|--------------------|---------------------------------|------------|--------------------|--------------------------|-------------------|---|---------|
| PUD | Species | Hatchery | Tribal Production Agreements | (a) | (a)* | (b) | (d) | (f) | (g) | Proposed 2022 Production | Last Recalc | | |
| | | | | NOR Smolts 'BAMP' | NOR Smolts 'BAMP' by tributary adult equivalents were allocated to | UPM for NFH Smolts | Residuals for NFH Smolts 'MNNI' | Inundation | UPM for Inundation | | | | |
| CPUD | Spring Chinook | Methow | | 12,868 | 7,780 | Methow | 28,000 | 6,637 | | | 47,505 | 65,000 | |
| | | | | | 324 | Okanagon | | | | | | | |
| | | | | | 4,764 | Entiat | | | | | | | |
| | Spring Chinook | Chiwawa | | 18,735 | 5,165 | Methow | 97,120 | 18,730 | | | 134,585 | 204,182 | |
| | | | | | 215 | Okanagon | | | | | | | |
| | | | | | 3,162 | Entiat | | | | | | | |
| | | | | 10,193 | Wenatchee | | | | | | | | |
| | Steelhead | Chiwawa | | 30,722 | | | 14,920 | 2,878 | 165,000 | 21,970 | 213,520 | trade of the recalculated production for sockeye (46,000) for additional steelhead production (60,300). | |
| | Summer Chinook | Chelan Falls | | 13,976 | 13,976 | Chelan Falls | 52,280 | 11,301 | 400,000 | 55,765 | 533,322 | 576,000 | |
| | Summer Chinook | Dryden | | 274,996 | 93,888 | Methow | | | | | | 274,996 | 318,000 |
| | | | | | 15,459 | Entiat | | | | | | | |
| | | | | | 165,649 | Wenatchee | | | | | | | |
| | Sockeye | Lake Wenatchee natural-origin | | 43,652 | | | | | | | | 46,000 that were swapped for steelhead last time | |
| Coho | YN Funding Agreement | 175,770 | 9,002 | 2,897 | Methow | | | | | 184,772 | Funding agreement | | |
| Coho | | | | 6,105 | Wenatchee | | | | | | | | |
| Summer Chinook | CJH Funding Agreement | 188,029 | 169,615 | | | | | | | 357,644 | Funding agreement | | |
| Spring Chinook | CJH Funding Agreement | 113,806 | | | | | | | | 113,806 | Funding agreement | | |

| | | Chiwawa Hatchery SAR | | Methow Hatchery SAR |
|----------------|----------------|----------------------|--------------|---------------------|
| Spring Chinook | Spring Chinook | 5,165 | Methow | 5,635 |
| | | 215 | Okanagon | |
| | | 3,162 | Entiat | 3,450 |
| | | 10,193 | Wenatchee | |
| Steelhead | | Dryden SAR | | Carlton SAR |
| Summer Chinook | Summer Chinook | 13,975 | Chelan Falls | |
| Summer Chinook | | 93,888 | Methow | 88,837 |
| | | 15,459 | Entiat | 14,627 |
| | | 165,649 | Wenatchee | |

Attachment E
Proposed Recalculated Production for Grant PUD

| Sensitivity Analysis | | | | | | | | | | | | | |
|----------------------|-----------------------|-----------------------|------------------------------|-------------------|--|--------------------|---------------------------------|------------|--------------------|---------------------------------|-----------------------------------|---------------------|--|
| PUD | Species | Hatchery | Tribal Production Agreements | (a) | (a)* | (b) | (d) | (f) | (g) | Proposed 2023 recalc Production | Last Recalc | Notes | |
| | | | | NOR Smolts 'BAMP' | NOR Smolts 'BAMP' by tributary adult equivalents were allocated to | UPM for NFH Smolts | Residuals for NFH Smolts 'MNNI' | Inundation | UPM for Inundation | | | | |
| GPUD | Spring Chinook | Methow | | 14,428 | Methow | 214,560 | 41,378 | | | 78,929 | 134,126 | | |
| | Spring Chinook | Nason | | 32,233 | 7,632 Entiat 24,600 Wenatchee | | | | | | | 223,670 | 223,670 |
| | Spring Chinook | CJH Funding Agreement | 110,000 | | | | | | | 110,000 | 110,000 | Same as last recalc | |
| | Steelhead | Okanogan | | | 81,367 | 32,672 Methow | 25,940 | 5,003 | | 60,311 | 100,000 plus a 7,307 species swap | 100,000 | Same as last recalc with the addition of a species swap to make up for steelhead greater than 100,000 (see * agreement text below) 2022 total includes yearling summer Chinook species swap for 7,307 steelhead that exceed 100,000 |
| | | | | | 10,812 Okanogan | | | | | | | | |
| | | | | | 15,154 Entiat 22,729 Wenatchee | | | | | | | | |
| | Summer Chinook | Carlton | | | 178,973 | Methow | 53,640 | 11,595 | | 112,778 | 95,491 | 200,000 | 2022 total includes species swap for 7,307 steelhead so that steelhead total does not exceed 100,000 (see * agreement text below) |
| | | CJH Similkameen | Fund | | 113,054 | Okanogan | | | | | 305,000 | 278,000 | CJH funding agreement, Total for combined SUC also includes 2022 Proposed Summer Chinook total includes 49,591 UMP for inundation fish to get to mitigation midpoint |
| | | Dryden | | | 168,147 | Wenatchee | | | | | 181,816 | 181,816 | Same as last recalc |
| | Fall Chinook | Priest Rapids | | | 127,306 | | | | 5,000,000 | | 5,127,306 | 5,325,543 | PRH total does not include additional fry to smolt converted number (273,961) which will be produced at PRH |
| Coho | YN Funding agreement | Fund | | | | | | | | Fund | Fund | | |
| Sockeye | ONA Funding agreement | Fund | | | | | | | | Fund | Fund | | |

* From NMFS 2008 BiOp for the PRP section 2.4.3: "It is important to note that these are maximum production numbers [100,000 steelhead] which may be adjusted downward if determined appropriate by the PRCC Hatchery Subcommittee."

Attachment F
Proposed Recalculated Production for Douglas PUD

| Sensitivity Analysis | | | | | | | | | | | | | | | | |
|----------------------|-------------------|-----------------------|------------------------------|-------------------|--|---------------------|---------------------------------|------------|--------------------|---------------------------------|------------------|---------------------|-----------------|---|---|---------------------------------|
| PUD | Species | Hatchery | Tribal Production Agreements | (a) | (a)* | (b) | (d) | (f) | (g) | Proposed 2022 Recalc Production | Release Location | Last Recalc | Comments | | | |
| | | | | NOR Smolts 'BAMP' | NOR Smolts 'BAMP' by tributary adult equivalents were allocated to | UPM for NFH Smolts | Residuals for NFH Smolts 'MNNI' | Inundation | UPM for Inundation | | | | | | | |
| DPUD | Spring Chinook | Methow | - | 5,133 | 4,927 | Methow | 15,840 | 3,755 | - | - | 24,728 | Twisp | 31,169 | Last Recalc number is the most recent NNI after 2020 Survival Study | | |
| | | | | | 206 | Okanogan | - | - | - | - | - | NA | - | | | |
| | | CJH Funding Agreement | 35,640 | - | - | Okanogan-Columbia | - | - | - | - | 35,640 | Okanogan-Columbia | 33,000 | Original calculation based on UPM = 3.7% | | |
| | Steelhead | Wells | | - | 7,663 | 5,758 | Methow | 7,920 | 1,528 | - | - | 17,111 | Twisp or Methow | 8,000 + 40,000 | Last Recalc NNI = 8,000. 40,000 Inundation added to that for Twisp Releases. Later split into two 24,000 programs | |
| | | | | | | 1,905 | Okanogan | - | - | - | - | - | NA | - | | |
| | | | | | | - | Methow | - | - | 100,000 | - | - | 100,000 | Methow | 100,000 | Inundation Harvest - Safety-Net |
| | | | | | | - | Columbia | - | - | 200,000 | - | - | 200,000 | Columbia | 160,000 | Inundation Harvest - Safety Net |
| | Summer Chinook | Wells | - | 93,847 | 16,605 | Methow | - | - | - | - | 35,437 | Columbia | - | 320,000 | NNI = 93,847: 58,410 yearling equivalents at Chief Joe with balance of 35,437 allocated to Columbia Yearlings | |
| | | CJH Funding Agreement | 58,410 | - | 77,242 | Okanogan | - | - | - | - | 58,410 | Okanogan-Columbia | 58,410 | - | | |
| | | Wells | - | - | - | Columbia - Yearling | - | - | 320,000 | - | 320,000 | Columbia - Yearling | 320,000 | 320,000 | Inundation includes 320,000 yearling and 484,000 subs | |
| | | | - | - | Columbia - Subs | - | - | 484,000 | - | 484,000 | Columbia - Subs | 484,000 | - | | | |
| Coho | Wells | - | 189 | 189 | Methow | - | - | - | - | - | - | - | - | NNI for wild coho. | | |
| | YN Coho Agreement | 27,720 | - | - | Methow | - | - | - | - | - | 27,909 | Methow | 37,000 | Initial production was 37,000 at 3.7% * 1,000,000 | | |

Tribal Production Agreements are fish produced under those agreements (at CJH [Chinook] and Wells for Coho).

NOR Smolts "BAMP" is the NNI calc for NORs only (NNI for hatchery fish is separate)

(a)* Simply shows the breakdown of the BAMP calculation by tributary

UPM for NFH Smolts is NNI for the Federal Hatchery Smolts (WNFH in our case)

Residual for NFH Smolts "MNNI" provides extra production to provide 100% of the NFH smolts below Priest Rapids Dam.

Inundation is PUD inundation production

UPM for Inundation is NNI for other PUDs inundation production (does not apply to DPUD)

Proposed 2022 Production is simply the total fish of a species that we are to produce under this recalculation with no modifications.

Last Recalc is more or less the number from the last recalc

Release Location is the proposed release location. Release locations for CJH are determined by the CCT

Comments are comments!