

PRCC Hatchery Subcommittee Meeting

Wednesday, January 18, 2017

Via Conference Call

Meeting Summary

PRCC HSC Members

Matt Cooper, USFWS
Brett Farman, NOAA
Peter Graf, GPUD (alt)
Keely Murdoch, Yakama Nation
Todd Pearsons, GPUD
Mike Tonseth, WDFW
Justin Yeager, NOAA

Other Participants

Tom Kahler, DPUD (for agenda items 1 and 2)
Deanne Pavlik-Kunkel, GPUD
Elizabeth McManus, Facilitator
Andy Chinn, Facilitator

Decisions

- A. HSC members approved the November meeting summary.

Actions

1. Ross Strategic will coordinate Jeff Fryer's participation at the February HSC meeting to further discuss the PRH release timing question.
2. NMFS will discuss the Nason Creek precocious male sampling size question internally.
3. HSC members will make a decision on Nason Creek precocious male sampling size during the February meeting.

I. Updates and Meeting Summary Review

- A. November Meeting Summary** – HSC members approved the November meeting summary. *Note: See Appendix A for summary of joint HSC-HCP discussion during January HCP meeting.*

II. Permit Updates

- A. NMFS** – NMFS distributed the draft Colville TRMP for comments and did not receive any.
- B. USFWS** – USFWS will transmit its Methow Spring Chinook memo to NMFS in the next week or so. The USFWS concurrence memo for the Colville TRMP is in progress, and USFWS continues to review comments related to consultation on the Wenatchee basin biop.

III. Carlton Acclimation Facility

- A. Water Issues at Carlton** – An ice formation upstream of the Carlton Facility is preventing the surface water intake from drawing sufficient surface water to supply the facility. Facility staff have switched to groundwater and under the existing water right GPUD has a certain amount of time to draw groundwater for the facility. The on-station fish are not adversely affected and GPUD is monitoring the situation and investigating whether the

time allotted for groundwater withdrawal can be extended to ensure sufficient water is available until the ice blockage goes away. The intake is ice-free and fish culturists do not believe it will be an issue for the intake to resume operating with surface water.

- B. Nason Creek Facility Status** – The fish are doing well and the new intake has been performing as intended. Surface ice is present at Nason but there have not been any associated issues with the new intake. The backup system is in place and has been tested.

IV. Priest Rapids Hatchery

- A. Release Timing** – Fish culture staff would like flexibility to release fish earlier than usual at PRH. PRH has five ponds for final acclimation, each populated by different spawn groups, and as such some groups reach their size targets early and their growth has to be modulated while other groups have to be pushed to reach their size targets at release. The fish culturists would like to release the fish when they are ready rather than wait for the targeted release date which is set to occur after tagging work in the Hanford Reach. A complicating factor is CRITFC's coded-wire tag work in the Hanford Reach, during which CRITFC aims to mark 200,000 fall Chinook. If PRH releases fish earlier than June 12, there would be some overlap with CRITFC's fish marking work. PRH staff would not alter the size-at-release for the fish. Preliminary discussions indicate CRITFC preference to hold fish until June 4 or 5. GPUD would also like to release some of the PRH fish at night and some during the day to study the survival difference. The release protocols do not specify a preference between day and night for juvenile release.
 - WDFW commented that there should be mechanisms in place to evaluate survival of PRH fish post-release, in other words adequate number of PIT-tags evenly distributed through the ponds to evaluate smolt-to-smolt survival.
 - GPUD noted that there are 40,000 PIT-tags distributed through the five PRH ponds.
 - GPUD noted that the PRH fish are larger than the natural origin fish that CRITFC is tagging but Jeff Fryer from CRITFC has more information on this.
- B. Next Steps** – Ross Strategic will coordinate Jeff Fryer's participation at the February HSC meeting to further discuss the PRH release timing question.

V. Precocious Male Sampling

- A. Nason Creek Sampling** – GPUD would like to repeat precocious male sampling in Nason Creek in 2017 similar to 2016 sampling. Normally GPUD would sample 300 fish from natural origin matings; in 2016 WDFW requested an additional sample of 300 hatchery matings, so there is a question of whether the HSC would like to sample 300 or 600 fish.
 - WDFW supports sampling 600 fish.
 - USFWS supports sampling 600 fish (higher sample size will improve precision).
 - YN supports sampling 600 fish.
- B. Next Steps**
 - NMFS will discuss the Nason Creek precocious male sampling size question internally.
 - HSC members will make a decision on Nason Creek precocious male sampling size during the February meeting.

VI. Broodstock Collection

- A. 2017 Protocols** – The 2017 broodstock collection protocols will be rolled out prior to the February HSC meeting and will be on the February HCP agenda as a joint item. The HSC agenda will also include space for the protocols to allow for discussion of any non HCP-related issues as needed.

VII. Wrap Up and Next Steps

- A. Next Meeting:** Wednesday, February 15, 2016
- B. Potential Agenda Items:**
- 2017 Broodstock Collection Protocols
 - PRH Early Release Strategy
 - Precocious Male Sampling

Meeting Materials

The following documents were provided to HSC members in advance of this meeting:

- WDFW preliminary 2017 release numbers
- November hatchery report

Appendix A: Joint Agenda Item from January HCP-HC Meeting

IV. Joint HCP-HC/PRCC HSC

A. USFWS Bull Trout Consultation Update (Bill Gale)

Bill Gale said Karl Halupka (USFWS) sent him an update on USFWS consultations, which he summarized:

- The memorandum describing Halupka's gap analysis and the strategy to rely on the 2012 Wells Relicensing Bull Trout Biological Opinion (BiOp) for coverage for the Methow spring Chinook salmon program has been approved internally and will be transmitted soon.
- Regarding the Okanogan program consultation, USFWS is working on a letter of concurrence for the Tribal Resources Management Plan (TRMP), which will be reviewed internally soon.
- Regarding the draft BiOp covering hatchery programs in the Wenatchee basin, USFWS is waiting for comments on the revised draft from Chelan PUD and WDFW.

B. NMFS Consultation Update (Justin Yeager)

Regarding the Methow spring Chinook salmon consultation, Justin Yeager said Charlene Hurst distributed draft permits to the applicants for final review, and NMFS expects edits and comments by January 19, 2017. He said regarding the Okanogan steelhead TRMP, the TRMP was available for public comment through the end of December 2016, and NMFS is currently reviewing and addressing comments.

C. M&E Report Scheduling (Greg Mackey/Catherine Willard)

Greg Mackey shared a presentation titled, "Hatchery M&E Reporting: Synching to Required Milestones," which Montgomery distributed to the Hatchery Committees on January 13, 2017 (Attachment F). Mackey said the goal of this discussion is to determine a logical reporting schedule that meets Chelan and Douglas PUD's HCP and Grant PUD's Aquatic Settlement Agreement (ASA) requirements. He summarized the HCP requirements for survival studies, recalculation, updating the M&E Plan, performing a Program Review, and Section 10 permitting. He said the proposed timeline (slide 6) includes survival studies (next in 2023), updating the M&E Plan (next in 2018), and Program Review (next in 2020), as well as other milestones. He said performing the Program Review in 2020 makes sense so it is coordinated with recalculation and M&E plan updates and reports. He said the 5-year M&E Report is not an HCP requirement, but is stipulated in the M&E Plan, and the M&E Plan does not stipulate a 10-year Report/Program Review, but the HCPs do. He said the focus/content of the reports may change as well. He said the PUDs are envisioning the annual M&E reports will contain the data collected that year with summary statistics plus cumulative data, and note any exceptions to field methods and the M&E plan. He said the 5-year Report/Statistical Report would include the results of statistical analyses of each M&E objective with an explanation of the assumptions of the analyses, but with limited interpretation of the analyses. This would allow

managers to assess the program and identify any red flags but would make the report shorter and more concise. He said the 10-year Report/Program Review would be a much larger report that would include the type of analyses done in the 5-year cycles with additional analyses as warranted, integrated with regional findings for better context. Chapters in the Program Review would be written in scientific manuscript style to provide a high level of scientific rigor and concise writing in order to enhance interpretation of results and promote the possibility of publishing some of the work. He said the Program Review will be used as part of the adaptive management process and would inform recalculation (slide 3 Mackey said the format and function of each report still needs to be determined and finalized, but agreeing on the timeline for the reports is the first step.

Mike Tonseth asked if the PUDs had considered doing 10-year reports for each species, staggered by different years. Mackey said that was considered, and they also considered organizing the report by basins (e.g., Wenatchee, Methow, Okanogan) to put things into regional context, and then by species. Gale asked if a repeating Hatchery Scientific Review Group (HSRG) review should be included in the proposed timeline. Alene Underwood said the purposes of these reports are to answer questions in the M&E plan within the HCP framework. Tonseth said HSRG reports are more holistic compared to M&E reports. Todd Pearsons agreed and said M&E reports have more specificity about programs and data. Mackey said, after this discussion regarding the timeline, the PUDs can write a description of the components of each report. Underwood suggested writing an SOA so the decision to adopt a new reporting schedule is easily accessible. Tom Kahler summarized that the 10-year Program Review is an HCP requirement, the 5-year Statistical Report is an M&E Plan requirement, and the M&E Plan itself is a requirement of permitting, so any SOA regarding this material should speak only to the reporting timeline and not the pieces in the timeline. Gale asked if the HCP and M&E Plan requirements for Chelan PUD and Douglas PUD are similar to Grant PUD's ASA requirements. Pearsons said it is similar. Mackey said he will coordinate with Chelan and Grant PUDs to develop an SOA describing the components in the proposed Hatchery M&E Reporting Timeline.

D. UCSRB Hatchery Report – Review Period Extension (Tracy Hillman)

Tracy Hillman said the UCSRB's Draft Hatchery Report was distributed to members of the Hatchery Committees for review by Greer Maier. He said Maier agreed to extend the review period and requests comments back to her by January 31, 2017, but the deadline may be flexible.

Alene Underwood said Chelan PUD has many comments and will try to respond by January 31, but might need more time. Hillman said after the UCSRB reviews the comments from members of the Hatchery Committees, he will invite Maier to a Hatchery Committees meeting to discuss the comments. *(Note that the UCSRB Draft Hatchery Report was not provided to the Hatchery Committees as an official document for review and approval; therefore, it is not listed under Review Items and is not posted to the HCP Hatchery Committees Extranet Site.)*

E. Genetic Analysis for HCP Program Species (McLain Johnson)

McLain Johnson shared a document titled, "Draft Genetic Sampling Timeline," which Sarah Montgomery distributed to the Hatchery Committees on January 18, 2017 (Attachment G). He said he revised the timeline to show analysis needs, the projected year of analysis, and requirements for M&E Plan reporting. He said he and Todd Seamons are still trying to find samples for fall Chinook salmon in the Hanford reach so the stock can be added to the timeline. He said he is still working with Keely Murdoch and CRITFC to acquire more samples for analysis from the Priest Rapids stock. He said WDFW and CRITFC have a growing and positive relationship, which will help in coordinating these genetic analyses. He said developing single nucleotide polymorphism (SNP) panels for analysis incurs an upfront cost and exploratory work, but analyzing a sample using SNPs is relatively inexpensive once a panel has been developed. Many SNPs for these stocks are already established. He said CRITFC, for example, has been doing genetic work related to Lake Cle Elum and can differentiate between Okanagan and Wenatchee sockeye salmon. Tom Kahler added that University of British Columbia researchers have also been working on Okanagan sockeye salmon SNP panels, and similarly, researchers at the Department of Fisheries and Oceans (Canada) have a microsatellite panel for Okanagan sockeye salmon.

Johnson said samples for most of these analyses are collected annually, and the WDFW genetics lab recommends performing analyses on 2 years of samples to increase the robustness of the sample dataset. Mike Tonseth added that the Hatchery Committees still need to discuss whether to vary analysis intervals based on listing status or another factor, and whether to synch analysis years for species. Mackey said genetic analyses should be completed for all populations of the same species in the same year. He said, during the last discussion about this, Todd Pearsons mentioned that a power analysis could determine how large of a genetic change could be detected in a population and how rapid it may occur, which could ultimately inform analysis intervals; populations at risk or with genetic structure that could change a lot or change quickly could be analyzed more frequently (e.g., small populations). Tonseth said Twisp steelhead are an example of a population where genetic change was detected after a few years of genetic analysis, and the population is at risk due to a low effective population size. Pearsons said a power analysis could also be based on the size of programs compared to the size of their receiving natural population; one would expect to see genetic differences occur more quickly in small populations.

Johnson said, historically, samples were analyzed using microsatellite panels, and samples can be reanalyzed with SNP panels. Tonseth said a baseline period for each program needs to be determined, because hatchery programs change over time especially in regards to broodstock. For example, he said the Wenatchee steelhead program started in 1989 using stock from Wells Fish Hatchery, and transitioned to locally adapted broodstock in 1998, so the baseline could be set at 1998. This needs to be discussed and agreed to for each program and can determine whether old samples need to be reanalyzed with SNP panels.

Todd Seamons joined the meeting via phone, and asked about the purpose of genetic monitoring for HCP program species. Catherine Willard said the purpose, as described in the M&E Plan for PUD Hatchery Programs, is to determine if genetic diversity, population structure, and effective population size have changed in natural spawning populations as a result of the hatchery program. Seamons asked what the consequences are to hatchery operations if genetics are found to be changing. Tonseth said it could change the program, for example, a program might have to be segregated rather than integrated. Seamons said analysis intervals can be determined by how much change is acceptable before the genetics “problem” is identified and addressed. He said, after one generation, changes are unlikely to be identified; after two generations, there may be an identifiable trend; and after three generations (likely longer than 10 years), the problem is likely identifiable but at this point, the problem has been compounding for three generations and will be harder to fix. Pearsons said the acceptable risk of genetic change, and therefore the time between analysis intervals, is partially determined by how at-risk the population is. He said a small program might warrant more frequent analysis than a large program because a small program has greater potential for rapid and substantial genetic change—a power analysis can help determine the potential for effects and level of change for each program. Seamons used the Twisp steelhead program as an example of intensive sampling (due to the relative reproductive success study), where a problem has been identified with analysis intervals capturing only one generation (due to the fact that a parentage study has been underway for eight years), a problem which may not have been detected using the diversity statistics other programs use at broader time intervals. The opportunity to address problems after only one generation comes from a different (more intense) level of analysis.

Bill Gale said the USFWS is interested in synching sampling and analysis intervals with the HCP program species timeline. He said the spring Chinook salmon safety-net program at Winthrop NFH could be synched with the Methow spring Chinook salmon analysis. For steelhead, safety-net releases from the Methow Fish Hatchery could also be included in these analyses. USFWS collects summer Chinook salmon in the Entiat River, which could be coordinated with the HCP program analyses. He said the timeline can be modified to include USFWS sampling and analysis, and USFWS can perform analyses at Abernathy Fish Technology Center, or help fund analyses. Seamons said the WDFW genetics lab and Abernathy Fish Technology Center work together frequently, and coordinating those analyses would not be a problem. Gale said he would send a report about genetic analysis of summer Chinook salmon in the Entiat River to Johnson. (*Note: Montgomery distributed the USFWS report, “Summer Chinook Salmon in the Entiat River: Genetic Analysis of Hatchery and Natural Origin Adults Spawning in the Wild” to the Hatchery Committees on January 18, 2017.*)

Hillman summarized the Hatchery Committees feedback for Johnson regarding the Draft Genetic Sampling Timeline and discussions regarding genetic sampling intervals for HCP program species:

- 1) perform genetic analyses for all stocks of spring Chinook salmon in the same year (i.e. 2018);

2) add USFWS programs to the timeline; 3) work with the WDFW genetics lab on a power analysis to determine recommended analysis frequency; and 4) determine a baseline period for each analysis.

Seamons said he and the WDFW genetics lab are very busy, but could likely work with Johnson to perform the power analysis in the next 6 months. Mackey asked if there are any new genetic techniques that might replace using SNP panels. Seamons said he does not imagine that anything would replace the use of SNP panels. He said the way SNP genotypes are obtained or the analysis methods could change, but an entirely different marker type being developed is unlikely at this point. Mackey mentioned Hatchery Committees parties are considering reanalyzing older samples with SNP panels that were initially analyzed with microsatellite panels, but if another technique were on the horizon, it would affect that decision. Seamons said detection power is affected by the number of markers used in the analysis, and more and more markers are being developed. For example, a sample could be reanalyzed with a SNP panel with 296 markers (e.g., CRITFC's steelhead panel), but if more markers are added to the panel for a total of 500 markers, the sample could be reanalyzed again with increased statistical power. He said parties should consider whether the benefit of added statistical power is worth the cost. He said WDFW intends to have SNP panels with many markers, and use the same panels as CRITFC, which also adds loci regularly to their panels.

F. Stray Rate Targets (Todd Pearsons)

Todd Pearsons shared a presentation titled, "Stray Rate Targets," which Sarah Montgomery distributed to the Hatchery Committees on January 18, 2017, following the meeting (Attachment H). He said he also distributed a paper by Ford et al. (2015)¹ after the Hatchery Committees last discussed stray rates in October 2016, which Montgomery distributed to the Hatchery Committees on October 20, 2016. He said this discussion focuses on the 5% brood year stray rate target (Question 6.1.1 in the Hatchery M&E Plan), and he has been trying to determine the origin of the target but has not received an explicit answer about how the 5% target was determined even after querying a number of scientists that were involved in the fundamental development of recovery plan guidelines. Monitoring Question 6.1.1 of the M&E Plan is: "Is the stray rate of hatchery fish less than 5% for the total brood return?" Pearsons said if natural stray rates are determined to be higher than 5%, it would be unexpected for hatchery-origin fish in the same basin to meet the 5% target; hence, natural stray rates can be used to inform targets.

He summarized many factors that can influence straying such as: imprinting quality; origin (hatchery vs. natural); species, stock or tributary; spawning habitat quality; access, including temperature, flow, and barriers; spawning density; dendricity; and geography. He said only some of these factors are affected by or under the control of hatchery programs. He said Ford et al. estimated natural-origin stray rates for the Chiwawa River, Little Wenatchee River, Nason Creek, the White River, and the

¹ Ford, M.J., A. Murdoch, and M. Hughes, 2015. Using parentage analysis to estimate rates of straying and homing in Chinook salmon (*Oncorhynchus tshawytscha*). *Molecular Ecology* 24, 1109-1121. Doi: 10.1111/mec.13091

Upper Wenatchee River, some of which exceeded 5% and approached 100% in one case. He said Ford et al. demonstrated that stray rates of natural origin fish are higher than previously thought (especially in the Little Wenatchee and Upper Wenatchee rivers), stray rates vary by tributary and generation/origin, and non-hatchery factors influence stray rates (e.g. tributary, habitat). Pearsons said, for example, the upper Wenatchee River does not have high-quality habitat, so it would make sense that stray rates are higher in that location.

Pearsons said imprinting is just one of many factors affecting stray rates. He said the hatchery experience appears to affect fish even when they are imprinted in the natural environment, and some factors are outside the purview of programs. He said he thinks the brood-year stray rate target for spring Chinook salmon is unrealistically low. He said data suggesting salmon imprinted in natural environments have varying stray rates that can be above 5% are not unique—an old study in California showed coho stray rates far exceeding 5% (cf. Quinn 2005²).

Pearsons identified one possible target refinement as adding together the possible sources of stray rates (i.e., the stray rate of natural origin fish from hatchery parentage + a stray rate addition as a result of the hatchery experience + a stray rate addition from poor habitat, high density, and other non-imprinting factors). He said fish are not controlled in their selection of a spawning site solely by imprinting, so targets related to the distribution of fish spawning should be realistic and consider the other factors affecting where a fish decides to spawn.

Tracy Hillman said he discussed this with Michelle McClure (NMFS) and she provided the following thoughts:

- The Technical Recovery Team (TRT) used some expert opinion in the selection of the 5% and 10% stray rate targets. (Note: the 5% and 10% stray rates apply to the recipient spawning aggregates.) The basic idea was to have the numbers in the flow chart/graph combo be congruent with the previous criterion for genetic integrity. In other words, how much introgression from non-evolutionarily significant unit (ESU) fish would produce impairment to the natural genetic structure of the population? Ultimately, disrupting population structure affects extinction risk, but not quite in the quantifiable way that abundance and productivity can.

She also added the following thoughts:

1. The TRT criteria cannot be formally changed at this point without (probably) a committee forming to review new information.
2. That said, the TRT was very explicit that things should be considered on a case-by-case basis, and the addition of new empirical information would certainly be a factor that should go into that case-by-case consideration. This is part of the reason why guidelines were provided with

² Quinn, Thomas P. *The Behavior and Ecology of Pacific Salmon and Trout*. American Fisheries Society, Bethesda (Maryland), in association with University of Washington Press, Seattle (Washington), 2005.

many disclaimers about making informed judgments based on the situation at hand; the TRT knew that there would be more information, situations would change, and so forth.

3. One word of caution, though, for the Upper Columbia, is that the genetic stock structure of the entire basin is incredibly altered (and basically homogeneous). To the extent that natal fidelity is genetically influenced (and we know that it has some elements of genetic influence and a good deal of environmental), the straying we're seeing empirically might be a result of previous anthropogenic activities (like mixing them all up).
4. It would be important to also include in the review of new empirical information other studies since the TRT guidelines on straying. She recalled one study on the Olympic peninsula, where researchers found that spawners were more closely related to individuals within a 50-yard radius (approximate distance) of their redd than individuals outside that area.

Pearsons said TRT criteria are unlikely to be changed without an entire committee forming to review new information, but empirical information should be a factor in a case-by-case assessment for PUD programs (particularly related to a BY stray target). He said, for the upper Columbia basin, the contemporary genetic stock structure is unnatural, and because natal fidelity is genetically influenced, stray rates could be a result of anthropogenic activities. He said there is flexibility in the case-by-case basis, but that might be decided by the National Oceanic and Atmospheric Administration, especially if the recovery plan needs to be modified or if they need to write a letter describing the different stray rates and supporting data. Casey Baldwin (CCT) pointed out that the spatial aspect of stray rates needs to be considered and identified up-front. He said the initial criteria in the M&E Plan is straying between populations, and Pearsons' example using the Wenatchee basin is a within-population stray, and it is important to consider if strays are from outside the ESU. He said it should be identified whether the stray rate is for within-population strays, between-population strays, or out-of-ESU strays. Hillman asked if the TRT developed criteria for brood year return. Baldwin said the TRT did not have a set criteria for brood-year stray rates (Question 6.1.1). He said what matters more than brood year return is the spawner composition—the sum of strays to a population, not just the sum of strays from one program in the receiving population. Pearsons said he wants to focus this discussion on brood year stray rates. Hillman said brood year stray rate targets and Question 6.1.1 have implications for Questions 6.1.2 and 6.1.3. Pearsons said, if there are many issues in addition to imprinting, a 5% target will probably not be met in some cases no matter how much the program is shifted and tweaked. Baldwin suggested that weighting natural-origin stray rates based on abundance of natural origin fish could decrease stray rates in each spawning aggregate.

Tonseth requested that Pearsons write a white paper about factors affecting the brood year stray rates of hatchery fish, and considerations for revising stray rate targets. Pearsons agreed and asked the representatives present to please contact him if they find any information on the sources of the brood year stray rate targets set in the M&E Plan.

G. Spring Chinook Salmon Outplanting in the Chewuch River (Catherine Willard/All)

Catherine Willard said a subgroup of Hatchery Committees members met on January 9, 2017, and made progress on a plan for outplanting adult spring Chinook salmon (MetComp) in the Chewuch River. She said several data gaps were identified, and participants are working on follow-up tasks. Willard said this will be discussed in more detail at the February 15, 2017, Hatchery Committees meeting.

H. Expanded Sampling at the OLAFT (Mike Tonseth)

Mike Tonseth said he plans to discuss expanded sampling at the OLAFT at Priest Rapids Dam with the Hatchery Committees at the February 15, 2017, meeting, and will follow up with an email describing the sampling before the next meeting.