Independent Scientific Review Panel
for the Northwest Power & Conservation Council
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Memorandum (2021-7) **June 11, 2021**

To: Richard Devlin, Chair, Northwest Power and Conservation Council

From: Stan Gregory, ISRP Chair

Subject: Follow-up Review of Hungry Horse Mitigation Projects

Background

At the Northwest Power and Conservation Council's request of March 22, 2021, the ISRP reviewed a response from the Confederated Salish and Kootenai Tribes (CSKT) and Montana Fish, Wildlife and Parks (MFWP), regarding Project 1991-019-01, *Hungry Horse Mitigation/Flathead Lake Restoration and Research, Monitoring and Evaluation (RM&E)* and Project 1991-019-03, *Hungry Horse Mitigation Habitat Restoration and Research, Monitoring and Evaluation (RM&E)*.

These projects address the loss of habitat, both in quality and quantity, in the interconnected Flathead Lake and River basin resulting from the construction and operation of Hungry Horse Dam. The projects implement mitigation actions and monitor the biological responses to those actions with the overarching goal to support ecosystem integrity and resilience, and thus conserve self-sustaining fisheries, native fish assemblages, and the habitats they occupy. The projects' collective actions encompass passage improvement and lake and stream habitat restoration to benefit native fish, including bull trout and local westslope cutthroat trout; management and suppression of non-native fish, including lake trout, non-native rainbow trout, brook trout, and northern pike; fish stocking to partially mitigate for lost angler opportunity; and research and monitoring to evaluate changes in fish populations and the ecosystem to assess the efficacy of mitigation actions.

The proponents' submittal, *Response to final ISRP and Council Resident Fish and Sturgeon category review comments and recommendations for Hungry Horse Mitigation (Projects 1991-019-01 and 1991-019-03)*, March 2021, is intended to address conditions placed on the projects, by the Council, as part of the *Resident Fish and Sturgeon Project Review* in October 2020. The Council requested, as part of their decision, that CSKT and MFWP also address the conditions placed on the United States Fish and Wildlife Service's (USFWS) Project 1991-019-04, *Hungry Horse Mitigation-Creston Hatchery*.

For the CSKT and MFWP projects, the Council recommended: "*Managers of #1991-019-01 and #1990-019-03 to jointly respond to ISRP conditions by March 31, 2021. Managers should also discuss, where pertinent, the conditions placed on USFWS (#1991-019-04) as they may relate to their projects.*"

The Council's recommendation for the USFWS's Creston National Fish Hatchery was *"Not Applicable – see recommendations for projects #1990-019-01 and #1990-019-03."* Consequently, the USFWS project

proponents were not required to submit a response to the Council for ISRP review. However, the ISRP reviewed responses from the CSKT and MFWP regarding stocking of fish from Creston National Fish Hatchery, including a supplemental response (May 19, 2021).

The ISRP's review (2020-8) raised the following conditions for the CSKT's Project 1991-019-01, *Hungry Horse Mitigation/Flathead Lake Restoration and Research, Monitoring and Evaluation (RM&E)* included:

- Condition 1. Statistical analyses
- Condition 2. SMART objectives for bull trout
- Condition 3. SMART objectives for Magpie and Skidoo creeks
- Condition 4. Cutthroat trout stocking

The ISRP's review (2020-8) raised the following conditions with the MFWP's Project 1991-019-03, *Hungry Horse Mitigation Habitat Restoration and Research, Monitoring and Evaluation (RM&E)*:

- Condition 1. Metrics for thermal, flow, and biological benefits
- Condition 2. Linkage between goals/objectives and limiting factors
- Condition 3. Priority of Martin Creek
- Condition 4. Non-native rainbow trout suppression assessments
- Condition 5. Priority of Wounded Creek
- Condition 6. SMART Objectives

The ISRP's conditions for the USFWS's Project #1991-019-04, *Hungry Horse Mitigation-Creston Hatchery*, that were addressed in the MFWP and CSKT original and supplemental responses included:

- Condition 1. Framework for production and pond stocking
- Condition 2. SMART objectives for in-hatchery operations
- Condition 3. Quantifiable objectives for triploid rainbow trout production
- Condition 4. Retrospective analysis of stocked fish performance
- Condition 5. Fish health screening methods
- Condition 6. Bull trout production
- Condition 7. Angler-use assessment

MFWP and CSKT embedded their responses point-by-point in the ISRP's final review comments and recommendations. Our review below follows the same point-by-point format, organized by the conditions.

ISRP Recommendation

The ISRP provides separate recommendations related to conditions for the three projects:

- CSKT project 1991-019-01, *Hungry Horse Mitigation/Flathead Lake Restoration and Research, Monitoring and Evaluation (RM&E)* - Meets Scientific Review Conditions

- MFWP project 1991-019-03, *Hungry Horse Mitigation Habitat Restoration and Research, Monitoring and Evaluation (RM&E)* - Meets Scientific Review Conditions

- USFWS project 1991-019-04, *Hungry Horse Mitigation-Creston Hatchery* - based on the supplementary information provided by the CSKT and MFWP:
    - Conditions 3 and 6 are met
    - Conditions 1, 4, and 7 are partially met
    - Conditions 2 and 5 were deemed Not Applicable to CSKT and MFWP; however, the ISRP includes some advisory recommendations.

ISRP Comments on the CSTK and MFWP Responses

CSKT Project 1991-019-01, *Hungry Horse Mitigation/Flathead Lake Restoration and Research, Monitoring and Evaluation (RM&E)*

In addition to the acknowledgement that the responses Meet Conditions, the ISRP has an additional general comment that the proponents may wish to consider in the future. Because fish populations may exhibit compensatory responses to exploitation and the goal is to shift predator-prey dynamics, the program will eventually need to revise upward the numbers harvested each year or to set a harvest level based on the bioenergetics of the predator-prey relationship. For instance, currently the goal is to remove 143,000 lake trout annually. As a response, the lake trout are predicted to become smaller in mean body size. If this prediction is realized, should the proponents change the goal to removal of a targeted biomass in addition to a number? Bioenergetics models, in this context, are designed to estimate predation pressure, which depends not only on the number of "mouths to feed" but also, importantly on consumption rates, which increase with predator body size. The original exploitation goal was based on a population structure that is expected to shift toward smaller individuals.

Condition 1. Statistical analyses - Meets Condition.

The proponents responded that statistical analyses are premature at this point and that thus far suppression netting efforts would yield scant statistically significant responses. Nevertheless, the proponents were able to demonstrate via statistical analyses that lake trout catch rates declined, relative weight (condition) increased, use of marginal habitat decreased, and average length declined, and that each of these trends was statistically significant. These are all indications of increased exploitation of this population that should lead eventually to declines in abundance, mean size, and mean age of individuals. They also could have analyzed their mark-recapture abundance estimates, which might show a negative, but non-significant, trend. This would support their claim that the suppression is causing a change in the right direction, but the change is too small to detect at this time.

Regarding analysis of changes in bull trout abundance, the proponents' results show that redd counts were stable and catches in gillnets (CPUE) increased significantly. In contrast to their claim that the metrics do not show meaningful or statistically significant change, the CPUE suggests that over 10 years the annual catch rate is expected to double from about 0.1/net to more than 0.2/net, which may be biologically important.

It will be helpful to managers, the ISRP, and other interested parties if these kinds of statistical analyses can be conducted and reported in annual reports "provisionally," until longer time series data are

available. We acknowledge that statistical significance (especially on an incomplete data set) may not be achieved in the short term, even in a situation where there may be a large actual effect. Nevertheless, reporting the patterns is important, as it helps inform whether the effect size is biologically important.

Condition 2. SMART objectives for bull trout - Meets Condition.

The ISRP acknowledges that framing bull trout response objectives in a SMART format is not a straightforward endeavor, given the indirect effect of lake trout suppression on bull trout abundance. This is especially true given the project timeline and the maturity schedule, that is, maturity and longevity for bull trout. We also recognize that the measurement of lake trout harvest may serve as a modest interim proxy and a necessary precursor for estimating how the bull trout respond, especially given predictions from previous models.

The ISRP commends the proponents for using the statistical analysis conducted for Condition 1 to predict CPUE of bull trout in gill nets to 2025. As described above, this suggests that CPUE is expected to more than double by 2025 (from about 0.1 to >0.2). The actual level achieved by 2025 can then be compared to this benchmark, and offer the reasons why it has, or has not, been achieved. From these analyses, progress can be assessed and used to make changes in an adaptive management framework.

Condition 3. SMART objectives for Magpie and Skidoo creeks - Meets Condition.

The proponents provided a response with additional detail on SMART criteria. Moreover, the ISRP appreciates the detailed response about the objectives for these two populations, which have vastly different proportions of non-native brook trout, and the additional response regarding the potential for using brook trout YY-males in the future.

Condition 4. Cutthroat trout stocking - Meets Condition.

The ISRP appreciates the proponents' commitment to convening an Expert Panel to assist with the proposed actions. The proponents are correct that the ISRP considers it critical to conduct and complete the Expert Panel process (by 2022) before beginning the culturing program in 2024. The Expert Panel's findings and recommendations would also benefit from an ISRP review prior to initiating the fish culture program.

MFWP's Project 1991-019-03, *Hungry Horse Mitigation Habitat Restoration and Research, Monitoring and Evaluation (RM&E)*

Condition 1. Metrics for thermal, flow, and biological benefits - Meets Condition.

The proponents' response included target thermograph information (Figure 1 and Table 1) that depicts "optimum" temperatures bounded by 2° min and max range for June through December each year (based on Marotz et al. 1996). Similar targets for flow (hydrograph) and biological variables (plankton and macroinvertebrates) were not included even though they are key elements of an anticipated MOU with USBOR. The ISRP recognizes that the final flow and biological targets may be incomplete or remain under negotiation. However, a description of the direction these are taking is warranted, as well as an

anticipated timeframe for adoption. Also, is there an expected timeline under which the MOU will be completed?

Condition 2. Linkage between goals/objectives and limiting factors - Meets Condition.

The proponents provided additional descriptions and linkages between goals and limiting factors, ones that are well reasoned and more transparent. The ISRP recognizes the complexity and challenges that limiting factors present for mitigating Hungry Horse Dam's construction and operation. The ability to address these issues simultaneously, effectively, within a limited timeframe, and within a defined budget requires extensive cooperation with stakeholders as well as well-developed professional skills by the proponents. The context provided within the Flathead Subbasin Plan is an important overarching framework.

Condition 3. Priority of Martin Creek - Meets Condition.

The proponents adequately describe the rationale for the non-native trout suppression in Martin Creek above the falls. The ISRP recommends that the proponents compile and present a strategic list of watersheds that require suppression before any proposed future suppression actions.

Condition 4. Non-native rainbow trout suppression assessments - Meets Condition.

The proponents provided sufficient details on the approach employed for assessments within the Flathead Subbasin. The ISRP emphasizes the need for a robust assessment of suppression effectiveness and appreciates the proponents' efforts in this regard.

Condition 5. Priority of Wounded Buck Creek - Meets Condition.

The proponents provided sufficient justification for the choice of Wounded Buck Creek bull trout for examining vital life history parameters. The choice of this stream's population was based on some practical considerations, including opportunities to locate a video observation platform and to census the entire population of adult bull trout migrating upstream to the known spawning grounds. Moreover, the relative isolation of the video platform provides a modest level of security for equipment.

Condition 6. SMART Objectives - Meets Conditions.

The ISRP requests that the proponents continue to develop a more complete set of objectives with the SMART criteria, especially in terms of metrics to be measured as well as key (or quantitative) benchmarks over time that can be evaluated for progress.

The proponents offered some additional specificity for Objectives 1a, 5a-c. The information provided for Objectives 5b and 5c is the most complete in addressing the criteria required for SMART objectives (although where the 20 acres is located for Objective 5c remains unclear).

For Objective 1a, the proponents provided information on thermal targets, but not for flow or biological ones (see comments above for Condition 1). Some thermal benefit might be expected as a response to a proposed selective withdrawal scheme. Moreover, no realistic or expected timeline is provided for the steps necessary to complete the MOU.

For Objective 3a, no additional detail was provided in proponents' response.

The ISRP is not requesting a response at this stage but rather encourages the proponents to continue framing their objectives in the SMART format and report them in their next annual report.

MFWP and CSKT response for USFWS Project #1991-019-04, *Hungry Horse Mitigation-Creston Hatchery*

The Council recommended that MFWP and CSKT should discuss*, "where pertinent, the [ISRP's] conditions placed on USFWS (#1991-019-04) as they may relate to their projects.*" MFWP and the CSKT response addressed Conditions 1 and 7 in their original response and Conditions 2 through 6 in their supplemental response. The Council did not ask the USFWS to respond to the ISRP conditions.

Condition 1. Framework for production and pond stocking - Partially Meets Condition.

The proponents' response justifies the stocking program in terms of the HHD Loss Statement (~167,500 kokanee, juvenile westslope cutthroat trout, and adult bull trout) and as mitigation for lost harvest opportunity from the depleted fish populations.

Supplementary information provided by the proponents indicates the related projects (Projects 1991-019-01-CSKT and 1991-019-03-MFWP) implement the biological mitigation and provide the overarching framework for the subbasin. The proponents also indicate that beginning in FY 2023, the closed-pond stocking program will transition toward westslope cutthroat trout (and away from triploid rainbow trout in FY 2022). The ISRP appreciates the pivot toward a native species as a risk reduction strategy that may also have an educational value. The ISRP recommends this transition be recorded in the proposal, annual reports, and other supporting documents.

Condition 2. SMART Objectives for in-hatchery production - Condition Not Applicable.

This condition concerns the USFWS's in-hatchery operations. Therefore, no further information is requested on this condition from MFWP and CSKT. The ISRP recommends the Creston National Fish Hatchery staff continue to frame and articulate its activities as SMART objectives in cooperation with the receiving agencies.

Condition 3. Quantifiable objectives for triploid rainbow trout production - Meets Condition.

The ISRP seeks specific quantifiable objectives and benchmarks for triploid rainbow trout production. For example, when will it be implemented, what will be the source of tested and certified eggs, and what standard of certification for triploidy will be used (e.g., >99%?). This change in the hatchery policy is a logical time to revise objectives. Also, the ISRP requested that the proponents provide additional information on the source and strain of the westslope cutthroat trout to ensure consistency with the drainage specific approach used for westslope cutthroat trout restoration activities in the subbasin.

Additional methodology and efficacy testing for triploidy was provided in the proponents' response (Loopstra, D.P. and P.A. Hansen. 2008. Induction of triploidy in rainbow trout [*Oncorhynchus mykiss*] using hydrostatic pressure. Alaska Dept. Fish and Game, Fisheries Data Series No. 08-22). The additional

information provided for Condition #1 suggested that the production of triploids would be reduced beginning in 2022. The ISRP appreciates this clarification and recommends incorporating such information into annual PISCES reporting.

Regarding the origins of westslope cutthroat trout, the proponents provided additional information regarding the use of the MFWP's MO12 stock maintained at Washoe State Fish Hatchery. These trout may have originated in the Flathead basin but represent an admixture from multiple drainages. Regardless, they are reserved for the closed-basin fishing ponds rather than release into waters with remnant local populations.

Condition 4. Retrospective analysis of stocked fish performance - Partially Meets Condition.

The ISRP requested that various elements of the program be evaluated for the next annual reporting cycle. We did request, however, that in their response to these conditions the proponent and cooperating agencies describe specific objectives and monitoring methods to assess performance during production and after release (stocking).

The proponents partly address this condition in the supplementary response for Condition #7. To reiterate the ISRPs recommendation: "Ultimately, the ISRP recommends that the assessments need not be conducted on each pond at large expense, but rather for the various local angling population(s) as to whether this program meets their expectations and delivers on basic return to creel goals. The links to the assessments along with a brief summary in the annual PISCES reporting might clarify the basis for the program."

Condition 5. Fish health screening methods - Condition Not Applicable for MFWP and CSKT.

The ISRP sought reporting and submission of health screening methods in MonitoringMethods.org. This should be pursued by the Creston National Fish Hatchery staff. The supplementary information provided by the proponents indicates that standard methodology is undertaken "in accordance with U.S. Fish and Wildlife Aquatic Animal Health Policy (713-FW-1)" and with assistance from staff at USFWS Bozeman Fish Health Center. The ISRP recommends the methods aimed at screening of in-hatchery fish health conditions be entered into MonitoringMethods.org.

Condition 6. Bull trout production - Meets Condition.

The ISRP requested that the proponents describe the details for the bull trout production at Creston National Fish Hatchery in a response. As this information is more likely to be relevant to the cooperating agencies, MFWP or CSKT are likely better able to address response request. The ISRP requested information on current donor source(s), breeding/spawning protocol or design (e.g., single pair spawning vs. a matrix spawning vs. gamete pooling vs. other), location of releases, assessment of risks to donor and recipient populations, and other implementation information to achieve a conservation objective. If this information is described and included in a different program's proposal, it should be reported there but also cited by or linked to this program.

The proponents provided supplementary information indicating that MFWP and CSKT have not formally requested bull trout production from CNFH as a conservation aquaculture activity under current proposals. The ISRP appreciates the intent to follow the model used for westslope cutthroat trout by

Sekokini Springs Hatchery (Project 2019-001-00) and include MFWP and external experts to design a risk assessment (e.g., on candidate source populations) and an implementation plan.

Condition 7. Angler-use assessment - Partially Meets Condition.

Angler use (including motivations and preferences) would appear critical to evaluate whether the production and pond stocking program is providing a substantial mitigation value, and for which segment of the stakeholder population. The proponents suggest the feedback they receive about the program tends to be favorable and that conducting a broad assessment would be expensive (relative to other priorities in the subbasin). The proponents also state: "We apply cost-effective monitoring methods suited to each water body, including car-counters, mail-in survey cards, angler catch cards, and the statewide angler pressure survey." To our knowledge, the information from these monitoring methods has not been summarized or presented as they relate to this Program. Here, the proponents provided some additional information that these activities (and methods) are conducted outside the Council's Fish and Wildlife Program, thus they are not routinely reported in Pisces. The proponents further indicate that links to the assessments can be provided.

Ultimately, the ISRP recommends that the assessments do not need to be conducted on each pond at large expense, but rather focused narrowly for the various local angling population(s) as to whether this program meets their expectations and delivers on basic return to creel goals. The links to the assessments along with a brief summary in the annual PISCES reporting might clarify the basis for the program.

The proponents responded to conditions for the ISRP's Creston National Fish Hatchery review by stating, "We do not contend that pond fisheries direct fishing pressure away from conservation populations. Instead we contend that pond fisheries help satisfy the overwhelming demand for harvest opportunities that conservation populations are unable to sustain…" This clarification appears to differ from the USFWS's contention on this issue outlined in the original proposal. We suggest that CSKT and MFWP convey this clarification to USFWS in future proposals and reports.