Independent Scientific Review Panel
for the Northwest Power & Conservation Council
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Memorandum (ISRP 2014-10) **November 18, 2014**

To: Bill Bradbury, Chair, Northwest Power and Conservation Council

From: Greg Ruggerone, ISRP Chair

Subject: Follow-up Review of Progress Report for Upper Columbia Programmatic Habitat Restoration Projects (#2010-001-00 and #2009-003-00)

Background

At the Northwest Power and Conservation Council's October 1, 2014 request, the ISRP reviewed a response from the Upper Columbia Salmon Recovery Board (UCSRB) for Project #2010-001-00, *Upper Columbia Programmatic Habitat* and Project #2009-003-00, *Upper Columbia Habitat Restoration*. The Recovery Board developed the response to address the ISRP's concerns raised in the review of the projects' progress reports (ISRP 2014-5; May 2, 2014). The Bonneville Power Administration provided background information on programmatic habitat projects and associated monitoring and evaluation that the ISRP considered in this review.

This response review is part of an iterative review of the projects dating back to 2010. Our most recent review (2014-5) describes the review history in detail, but this review largely follows from the ISRP's recommendation in the Geographic Review: *Meets Scientific Review Criteria (Qualified): "The qualification to this proposal is that project staff should submit a comprehensive report summarizing their progress to date, including areas where they have experienced difficulties and areas where they have clearly achieved their objectives. This check-in report should describe the cooperative activities taking place between the project and other regional restoration efforts ..."*

The ISRP (2014-5) found that the progress report provided a *"current snapshot of the effort to implement habitat improvement actions under a programmatic umbrella, and, in general, it adequately addresses progress in gaining administrative and project selection efficiencies. Their description of highlighted actions yielded enough detail for the ISRP to believe that the showcased projects were based on sound restoration principles."*

However, the ISRP emphasized that not enough information was provided to verify that *"these specific programmatic efforts are on track for achieving BiOp, Recovery Plan, or Fish and*

Wildlife Program objectives with regard to action effectiveness." The ISRP identified several important questions that remained unanswered in the check-in document and requested a response on those questions. The ISRP's review below is organized by these four questions.

ISRP Recommendation

Meets Scientific Review Criteria (Qualified)

Qualification: Quantitative evidence of fish responses and examples of how monitoring results are used to inform restoration actions are needed to show that the UCSRB projects are on track to meet Fish and Wildlife Program, Biological Opinion, and Recovery Plan objectives.

Over the course of the ISRP reviews of this umbrella project, the UCSRB has provided a comprehensive overview of their umbrella project. The documents are clearly written, thoughtful, and highly informative, especially at the process level. The UCSRB response described the coordination, adaptive management approach, and research, monitoring, and evaluation efforts that apply to the Upper Columbia projects. This qualitative description addressed a large part of what the ISRP asked for in our most recent review. However, additional scientific information on quantitative results and specific examples on the use of monitoring information to shape restoration actions were not reported directly in the response letter. Simply stated, some aspects of our questions were not satisfactorily addressed, as described in more detail below.

Answers to these questions rely on the coordinated effort of the UCSRB, the Yakama Nation, the Bonneville Power Administration, and the regional habitat research, monitoring, and evaluation effort which includes the Fish and Wildlife Program funded Integrated Status and Effectiveness Monitoring Program (ISEMP), Columbia River Habitat Monitoring Program (CHaMP), the Okanogan Basin Monitoring and Evaluation Program (OBMEP), and Bonneville's Action Effectiveness Monitoring program (AEM). Consequently, future reviews of the UCSRB, in regard to our qualification, should include participation by those programs.

Several existing review processes are underway that provide opportunities to address the ISRP's questions:

- As described in the Council's programmatic recommendation on umbrella habitat restoration projects, a progress report is due January 2015 to cover *"project actions to date, project cost, project title, location and short project summary, including anticipated benefits to fish and wildlife, and implementation timeline."* Existing analyses from NOAA Fisheries (Zabel and Cooney 2013) and ISEMP could be summarized and included in the report. An ISRP review role is currently not specified for this progress report.

- A progress review of the ISEMP/CHaMP/AEM programs is planned for March 2015, and a key question for that review is whether results of those programs are informing habitat restoration actions. The Upper Columbia could be used as an example. An ISRP review role is part of this process.

- Also, as part of the Council's programmatic recommendation on umbrella projects, a conference and review is called for these projects in 2016. An ISRP review is envisioned for this process.

Finally, this is a large, complex umbrella project that deserves a more detailed and comprehensive review by the ISRP in the next few years. The review should cover the full suite of restoration and mitigation actions implemented in the Upper Columbia, including hatchery programs. The previous ISRP review also suggested that direct dialog between the ISRP, UCSRB, Yakama Nation, and others could help clarify review issues. The ISRP continues to believe this face-to-face dialog is necessary to understand such a complex program.

ISRP Comments

1. ***How, specifically, is this project coordinated with, and informed by, existing effectiveness monitoring programs in the Upper Columbia region?*** *The monitoring programs include the Integrated Status and Effectiveness Monitoring Program (ISEMP), Columbia River Habitat Monitoring Program (CHaMP), and the Okanogan Basin Monitoring and Evaluation Program (OBMEP; a programmatic companion to the Okanagan Subbasin Habitat Implementation Program [OSHIP]). Some of these programs have been in place for a decade or more. Despite this work, the ISRP's overall impression from the check-in report and accompanying letters of support is that available data should be better utilized in project planning and in demonstrating the biological effectiveness of the ambitious suite of restoration actions undertaken by UCSRB. The ISRP understands that issues specific to RM&E are linked to larger ongoing basinwide RM&E efforts.*

The response adequately covers the process of how this project is coordinated with and potentially informed by Fish and Wildlife Program monitoring programs in the Upper Columbia region including CHaMP, ISEMP, OBMEP, and now BPA's Action Effectiveness Monitoring program (AEM), as well as the U.S. Forest Service's PACFISH/INFISH Biological Opinion (PIBO) Effectiveness Monitoring effort, among others. Although not provided to the ISRP as part of the response package, the UCSRB web site includes a useful description and summary table of the Upper Columbia monitoring and evaluation efforts: "Research and monitoring information in the Upper Columbia; what is collected, why it is collected, and what else is needed." As described in that document, and the UCSRB response to the ISRP, the process for using the monitoring information to evaluate restoration actions and better inform decisions is not solely the UCSRB's responsibility. Communication and collaboration between the restoration programs and the monitoring programs is critical to the program's success, and, while

appearing to be reasonable in the UCSRB response, the collaboration and communication may not be as effective as necessary. Consequently, evidence that these multi-program efforts are producing results should be reported on a regular basis to ensure that restoration actions are on track for meeting goals related to salmon recovery. BPA, the UCSRB, and ISEMP/CHaMP/OBMEP/AEM should be jointly involved in the reporting and review process, commensurate with their responsibilities.

In reality, the processes that are in place may not be enough to show that the UCRSB's restoration actions are achieving BiOp, Recovery Plan, and Fish and Wildlife Program objectives. It is possible that additional project-specific monitoring will be needed, even if at a minimal level.

2. ***How have the findings from these RM&E programs been incorporated into project selection, restoration planning, and implementation under the UCSRB umbrella?*** *The ISRP would like to see specific examples of how coordination with action effectiveness monitoring programs has improved, how monitoring results have been factored into restoration planning, and how monitoring data have been used to demonstrate restoration success to concerned stakeholders.*

Tangible findings or specific examples are not sufficiently reported. Instead, the response states, *"Unfortunately, although each of the programs has produced a substantial volume of observational data points and there are some very interesting analyses and reporting products currently under development, we are unaware of any body of findings yet reported from these programs."* In addition, the UCSRB seems to indicate that new information has not been directly utilized because monitoring has not shown the need to deviate from the initial plan developed with Ecosystem Diagnosis and Treatment (EDT) and the expert panel.

On the other hand, two recent reports on the UCSRB web site include very useful discussion of how well their projects are addressing the ecological concerns prioritized in earlier recovery planning documents: "Integrated Recovery Program, Habitat Report, June 1014" and the "Decision-Maker's Guide" (a short version of the Habitat Report). Project implementation is evaluated relative to the priority of ecological concerns in the overall region, within watersheds, and by project class (protection vs restoration) and intrinsic potential of watersheds. This evaluation reveals some discrepancies in priority during the early phase of implementation, and it shows that steps have been taken to reduce gaps in implementation.

The response has not fully addressed the ISRP's previous request to see specific examples of how coordination with action effectiveness monitoring programs has improved, how monitoring results have been factored into restoration planning, and how monitoring data have been used to demonstrate restoration success to concerned stakeholders. At a minimum, quantitative goals are needed for the reach-scale restoration actions, and the proponents need to undertake some evaluations (and potentially monitoring) themselves. For instance, they could provide quantitative goals for expected habitat outcomes, juvenile densities, SARs, and successful spawning adults, and then they could evaluate progress on appropriate time scales.

3. ***How have limiting factor assumptions and the way in which subbasin plans and models, such as EDT, been used in setting restoration priorities – apart from administrative efficiency? And how will they be used in future priority setting efforts?***

The UCSRB's response about limiting factor assumptions and subbasin plans was generally informative, at a very broad level, but the response lacks the specifics needed for evaluation by the ISRP. The response states that *"EDT runs became the basis for much of the identification in the Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan … Those limiting factors, and the associated strategies became the basis for the Upper Columbia Regional Technical Team's Biological Strategy. Although those original assumptions are now 10 years old, we have no other information to date that suggests we are off track or that those assumptions were wrong."*

And later: *"Several modeling efforts, each with different various promised features, are starting to make progress towards completion. However, it is important to acknowledge that until a new or revised modeling effort, or sufficient data from the existing monitoring programs proves or discounts our original assumptions, we continue operating under the same strategies."*

The ISRP would like to learn more about the current modeling efforts and how these are being used to improve restoration effectiveness. It is hard to imagine that impressions of limiting factors and restoration assumptions have not been modified, even slightly, after a decade of work. Although not provided as part of this review, the 2014 Integrated Recovery Report (on UCSRB web site) does provide a good summary of restoration goals and priorities based on the current understanding of limiting factors.

4. ***Evidence is needed that these actions are on track for achieving BiOp, Recovery Plan, and Fish and Wildlife Program objectives. This will require evaluating restoration action effectiveness and adopting suitable metrics of success.***

See the discussion above.

The response states that *"BPA is in the process of updating a summary of the benefits of habitat improvement projects that was first prepared in 2013"* and *"The Fish and Wildlife Program also monitors habitat and fish response at the local project level scale as well, but as the standardized AEM approach was just initiated during the 2014 field season, results are not yet available. As noted in the response to question 1, results will soon be available across the Columbia Basin that will not just inform project sponsors on which actions are most effective in improving habitat condition but also better inform the nature of the fish response."* The ISRP would like an estimated schedule of when the results will be available.

Useful information that partially addresses this question is contained in the final sections of the 2014 Integrated Recovery Report (on the UCSRB web site). In the Habitat Report, the sponsors note that habitat improvements in the tributaries cannot, by themselves, achieve recovery

targets. Density dependence needs to be considered in their evaluation of benefits to fish at the population level because fish density will likely influence fish growth, steelhead age-at-smoltification, Chinook dispersal to downstream habitats, survival of juveniles, and survival of adults prior to spawning.

Additional Comments on the Habitat Report

After looking at the Habitat Report summary, the ISRP has identified technical issues that should be examined. Specifically, how did the UCSRB calculate that their efforts *"achieved 4-6% progress"*? The UCSRB response indicated that monitoring has produced little information that can, or, has been used by UCSRB. Yet, the Habitat Report claims 4-6% progress. A future review should provide a comprehensive review of all salmon and habitat-related efforts in the upper Basin.

Pre-spawning mortality. The ISRP would also like to learn more about specific projects to reduce pre-spawning mortality, a life stage which is often related to fish density and to river conditions. The 2014 Habitat Report mentions the exceptionally high pre-spawning mortality of Chinook and steelhead in the Upper Columbia (~50% of all potential spawners die in the tributaries before spawning). Pre-spawning mortality of ~50% is a significant problem that will affect the viability of any salmon population. The report provides references for other regions where density and environmental conditions cause pre-spawn mortality. The summary report mentions (but does not specifically identify) actions in the Upper Columbia that may reduce pre-spawning mortality in addition to improving juvenile survival. Reductions in pre-spawning mortality could be monitored. Maybe actions to reduce pre-spawning mortality were discussed in detail in the Biological Strategy and this comment can be ignored. If not, then this issue suggests discordance between what salmon need and the project's current suite of habitat restoration actions.

Conflicting information. The 2014 Habitat Report provides some conflicting information. In the letter to the reader, as an example, Mr. Towry states *"We estimate that the region has moved the needle between 4-6% from the time of listing toward an estimated restoration potential of 15% in improved habitat. Improvements have been substantial…."* On page 6, the report states: *"The region's underlying hypothesis is that by <u>using scientific evaluation to identify priority habitat and habitat needs</u>, the collective impact will more quickly and effectively address those factors limiting natural fish production, and move the listed species toward a viable, natural existence."*

Yet, the following conflicting statements are noted near the end of the report:

P. 60. *"Although habitat data are being collected at a watershed scale, current information at the assessment unit scale is limited and generally inadequate in the highest priority watersheds. There is a lack of summary metrics for habitat being used by habitat monitoring programs, and no clear connection between the habitat data and the salmonid population concerns being*

identified and targeted. Collecting habitat data that is consistent, summarized, and clearly linked to ecological concerns at the assessment unit and reach scale would benefit future habitat actions."

P. 60. "It is clear from the available information in this report that there is insufficient information available to adequately assess the benefit of habitat actions to listed species, and to evaluate the extent to which these benefits translate into progress toward recovery. We recommend that there be an increase in project- and reach-scale monitoring of fish response to restoration projects, and that the metrics chosen to monitor fish response are as robust as possible."

As an umbrella project, the ISRP would expect the UCSRB to be working hand-in-hand with the various monitoring programs. In other words, they should be active participants in those programs rather than waiting for a workshop or report to receive information as indicated in the response letter to the ISRP.

Density Dependence. Zabel and Cooney (2013) show significant life-cycle density dependence of spring Chinook and steelhead populations in the Upper Columbia Basin. Most of the density dependence likely occurs within the tributary habitats where the species spawn and rear. It is important to ongoing restoration to find if density dependence is occurring prior to spawning, during spawning, or during the juvenile rearing stages. This information may help guide restoration efforts so that they target specific life stages that are limiting production.

The UCSRB should consider density dependence when evaluating fish responses to habitat restoration actions because density affects key populations metrics, such as fish growth, dispersal from natal rivers, juvenile survival, pre-spawning mortality, and SAR. These fish metrics could be misleading if the potential influence of fish density is not considered. For example, the simple scenario of examining the egg-to-emigrant survival necessary to reach recovery targets of natural origin Chinook and steelhead (Fig. 24 of the Habitat Report) did not seem to account for how the large number of hatchery spawners might influence egg-to-migrant survival. As density increases, egg-to-migrant survival will likely go down. If density decreases, then egg-to-migrant survival will go up.

Zabel and Cooney (2013) show that the current capacity of these watersheds to support salmon and steelhead is often exceeded, as indicated by a return per spawner less than 1. Using these data, how many spawners are needed to produce maximum adult returns or population equilibrium (R/S = 1)? To what extent is the exceptionally high pre-spawning mortality due to adult density, and how does pre-spawning mortality affect recruitment? Many if not most of the spawners are hatchery-origin fish. Do hatchery fish have a higher rate of mortality, and to what extent do they contribute to pre-spawning mortality?

In early 2015, the ISAB will release a report on density dependence in the Columbia Basin. We encourage the UCSRB to utilize the information in the report.

References

Zabel, R. and T. Cooney. 2013. Appendix C: Recruits-per-Spawner in Base Versus Current Time Periods—Do they differ? 2014 FCRPS Supplemental Biological Opinion, NOAA Fisheries, January 17, 2014.