



Independent Scientific Review Panel

for the Northwest Power & Conservation Council
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Memorandum (ISRP 2015-1)

March 17, 2015

To: Phil Rockefeller, Chair, Northwest Power and Conservation Council

From: Greg Ruggione, ISRP Chair

Subject: Review of the Kootenai Tribe of Idaho's *"Kootenai River Reconnection Prioritization Framework"* for project #2002-008-00

Background

In response to the Northwest Power and Conservation Council's request, the ISRP reviewed the Kootenai Tribe of Idaho's *"Kootenai River Reconnection Prioritization Framework"* for the *Reconnect Kootenai River with Historic Floodplain Project* (#2002-008-00). This Prioritization Framework document was submitted to address a Council condition and ISRP qualification from the Resident Fish, Data Management, and Regional Coordination Category Review ([ISRP 2012-6](#)).

The ISRP's qualification stated:

The ISRP believes that the components of this project focused on the completion of the Ball Creek reconnection and the development of a prioritization tool for identifying future reconnect projects (Objectives 1 and 3) meet scientific criteria. However, the technical merits of Objective 2, the execution of future reconnect projects, cannot be evaluated from the information provided in the proposal. Thus, Objective 2 is currently not scientifically justified. Completion of the prioritization tool is required before future reconnect projects can be evaluated.

The Council's recommendation specified that the Kootenai Tribe of Idaho (KTOI) address the ISRP's qualification for Objective 2 and that implementation of future reconnect projects will be based on a favorable ISRP review of the prioritization approach (NPCC memo, Final Decision

Document – Resident Fish, Data Management, and Regional Coordination Category Review, July 10, 2012).¹

The Prioritization Framework is intended to provide an ecologically based foundation to assess reconnection potential of the Kootenai River and its floodplain. The Tribe considers the Framework a draft document and plans to update it based on comments received from the ISRP. Once complete, the Tribe intends to use the Framework to “guide project activities to areas where restoration of natural processes/functions can be reasonably and economically restored to a sustainable condition under the current and projected Libby Dam hydrologic regime (i.e., biophysical, flow, sediment, etc.).”

The Framework document provides a useful description of the overall project:

The Reconnect Kootenai River with Historic Floodplain Project aims to offset the isolation of the Kootenai River floodplain from the river in order to support the restoration of the floodplain ecosystem. The Reconnect Project is one component of a complex matrix of tribal projects (i.e., 1988-064-00, 1992-061-05, 1994-049-00, 2002-002-00, 2002-011-00) that are designed to assess, conserve, restore, and manage various aspects of the lower Kootenai River ecosystem, including the fundamental processes that are necessary for the functioning of ecological systems. The Reconnect Project specifically addresses impaired floodplain ecosystem processes, including river-floodplain connectivity, the altered hydrologic regime (including ground and surface water regimes as well as geomorphic processes that influence floodplain function), nutrient dynamic function, and conservation of habitat diversity. To further facilitate the effort, an associated Technical Review Team (TRT) was formed that consists of KTOI wildlife managers and key experts that facilitate scoping and completion of strategic planning and study efforts, and provide peer-review of reports and other work products.

The ISRP’s review was aided by a teleconference with the KTOI on January 29, 2015 to clarify issues about intended use and validation of the Framework.

¹ The ISRP also had a qualification that the suite of Kootenai River projects funded through the Fish and Wildlife Program produce a synthesis report that summarizes the results that have been obtained from the RM&E efforts associated with these projects. This qualification is being addressed separately from the qualification regarding Objective 2, the project prioritization framework.

ISRP Recommendation

Meets scientific review criteria (Qualified)

The ISRP understands that the Tribe submitted the Framework as a draft document, and the ISRP recommends that the Tribe address the following seven issues as they finalize and then implement the Framework. The qualifications are listed here and described in more detail in the overall comments section below.

1. Explore linkages between the specific anticipated benefits to wildlife and fish in relation to the Evaluation Conceptual Model.
2. In further detail, describe the Gatekeeper, Cost, and Cost/Benefit components and how they will be employed to develop final project priority scores and rankings.
3. Describe plans for validating and refining the Framework after its initial implementation.
4. Explain how GIS and professional judgment will lead to a description of expected outcomes, what items will be used as indicators, and what metrics will be used to measure outcomes.
5. Discuss the weighting of individual Framework/model components.
6. Reconsider the assumption of uniformity in effects of climate change throughout the project area as the program progresses.
7. Clearly address if and how long-term restoration is possible given the current operations of Libby Dam.

At intervals of about three years, the ISRP recommends review of the progress in improving the Framework, the overall site prioritization process, and how well Framework predictions were achieved.

Overall Comments

The general Framework approach is a step toward meeting the need to provide a landscape-scale prioritization of the relative restoration potential of individual potential projects. It provides an interesting and potentially useful tool for a broad-scale, strategic approach for restoration and potential mitigation in this area.

Suggestions for improving the Prioritization Framework's quality include the following:

1. Linkages between the specific anticipated benefits to wildlife and fish in relation to the Evaluation Conceptual Model should be further explored. The ISRP previously suggested that the Prioritization Framework could be fine-tuned based on species or species groups. In the teleconference, the sponsors provided contextual information relevant to this topic. The sponsors recognized at the outset that a prioritization process focusing on single species could not capture the ecosystem goals for multiple species, so an ecological process and natural function approach was pursued in developing the Prioritization Framework. Therefore, the Evaluation Conceptual Model does not provide or consider any specific

measures of expected benefits to particular fish or wildlife species. Although the ISRP is not suggesting that the sponsor's chosen approach of modeling based on ecological function be refocused on fish and wildlife species, the ISRP is suggesting that linkages between function and key species be adequately considered and potentially evaluated while moving forward.

2. A complete and detailed discussion is needed regarding Gatekeeper, Cost and Cost/Benefit components and how they will be employed to develop final project priority scores and rankings. Although the teleconference discussion helped clarify the Gatekeeper function, more information is needed on how all three components—Gatekeeper, Costs, and Costs/Benefits—will actually be used in establishing priority scores/rankings. How will the three components be employed in conjunction with the Ecological Value Score (i.e., Reconnection Potential Quality Score, Project Area Footprint, Hydrologic Regime, Presence of Key Communities and Seral Stages, Wetland Area; Page 30 of their report) to help develop final project priority scores and rankings (Page 6 of their report)? These three components are shown as items that are considered after calculation of an Ecological Value Score for Prioritization Evaluation, but there is limited information on how they will actually be used in establishing priority scores and rankings. The ISRP suggests attempting to assign point totals for Gatekeeper, Cost, and Cost/Benefit components within the evolving Framework to provide a final score for each project. It is unclear how project Cost estimates are developed early in the project development stage, and whether they include costs for planning, design, land acquisition or easement development, and periodic maintenance. The component called Cost/Benefit should likely be called an Index of Cost Effectiveness. It utilizes Total Ecological Value to provide an index of benefits and does not provide a quantifiable measure of actual benefits or their economic and social values. Discussion is needed of how changes in this index relate to actual, quantifiable benefits from project work.
3. Framework validation and refinement is needed. As the project moves forward, it is vital that the Framework and its application be refined in an adaptive-learning approach so that its actual use is demonstrated and its effectiveness assessed. To aid in refining the Framework, the ISRP suggests the Framework be used on any future on-the-ground projects, in future proposals, and for projects selected. As part of these trial applications, the sponsors should clearly indicate the anticipated outcome of the prioritized projects among proposed projects. In addition, applying the Framework should include post-implementation evaluation.

As noted in footnote 1 above, the Kootenai Tribe of Idaho is working with other sponsors of Kootenai River restoration and mitigation projects funded through the Fish and Wildlife Program to produce a synthesis report that provides a comprehensive interpretation of community and system-scale responses from past restoration actions that can be used to guide current and future restoration efforts on this system. The ISRP also expects that the synthesis document will clarify the relationships and coordination among the various restoration projects that are being implemented on this stretch of the Kootenai River. The ISRP looks forward to reviewing that document and expects that future versions of the

Prioritization Framework will be refined based on findings from the synthesis report and the ISRP's review of the synthesis report.

During the teleconference, the sponsors stated that they do not plan to do sensitivity analysis or ground-truthing with the existing four "small" projects that they are looking at now. However, they plan to improve the Framework based on results of projects completed in the future. Given that nearly two-thirds of the area is rated as having high or very high potential for restoration, additional critical assessment of the information could provide a more strategic restoration/mitigation approach tied to the landscape-scale evaluation. Specifying geographic areas (single or combined "high" and "very high" priority map units) and their associated acreage provides an excellent foundation for development of a strategic plan. A broad strategy could better inform the development and prioritization of individual projects. This broader-scale approach could also allow comparison of likely outcomes from work in high potential areas against project objectives. One example of this could include overlaying a map of strongholds for fish and/or wildlife with high productivity/value/diversity on the current map of Floodplain Reconnect Potential. This overlay could then be examined to find areas where fish and wildlife strongholds overlap areas of high or very high reconnection potential. Where these overlaps occur, it would be possible to look at opportunities to expand the stronghold areas through various reconnection projects. This approach could focus work in a way that would maximize fish and wildlife benefits while ensuring work was done in areas of high or very high reconnection potential. Given the area for potential treatment and the relatively high costs of restoration/mitigation, such a strategic approach appears critical for making a measurable difference in providing lasting fish and wildlife benefits.

4. Further explanation is needed on how GIS and professional judgment will lead to a description of expected outcomes, what items will be used as indicators, and what metrics will be used to measure outcomes. How will these expected outcomes contribute to defining and addressing the overall quantitative objectives for the program? At the project scale, it is stated that Tribal managers will use GIS and professional judgment to conceptually assess the outcomes for a project and that indicators and milestones will be used to track progress towards attainment. To be useful, additional information is needed on sideboards for outcome assessment and how success indicators/milestones (Page 30) for each project will be established and tracked. These indicators could then be used to track effectiveness over the life of the project.
5. There needs to be an overall discussion of the weighting of individual Framework/model components. In the Evaluation (Objective 1), the four components are weighted equally (Page 6) even though Floodplain Inundation appears to be the most important concern. Also, Floodplain Inundation, Tributary Hydrology and Hydric Soils appear to be strongly related, yet they are presented as independent criteria. In the Prioritization section (Objective 2, Page 30), separate points are assigned to each of five individual components, including Floodplain Reconnection Potential (presumably from the Evaluation step). Maximum point totals, for each component, range from a low of 12 points for Project

Footprint to a high of 25 points for Hydrologic Regime. A more detailed discussion of how these point totals were assigned is needed. Providing some description of the logic track for doing this would be helpful.

6. The assumption of uniformity in effects of climate change throughout the project area should be reconsidered carefully as the program progresses. Prior to the teleconference, the ISRP was concerned that the response about invasive species was incomplete and that climate change was not being adequately considered. In the teleconference, the sponsors clarified that invasive species were a critical component of their prioritization process. Regarding climate change, the sponsors suggested that it would affect the 55-mile program area uniformly and thus might not be a factor in prioritizing projects. Nevertheless, specific projects may respond differently to climate change. The assumption of climate change uniformity should be reconsidered periodically as more information becomes available from this work and other studies in future years.
7. The sponsors should clearly address if and how long-term restoration is possible given the current operations of Libby Dam. The document states that the sponsors intend to use the Framework to guide project activities toward areas where restoration of natural processes/functions can reasonably and economically be restored to a sustainable condition under the current and projected Libby Dam hydrologic regime (i.e., biophysical, flow, sediment, and so forth). Currently, the Framework only seems to consider changes in the hydrologic regime and does not really address the long-term adverse effects to successful restoration that result from continued curtailment in delivery of sediment and organic materials, including large wood, from upstream areas. Because of Libby Dam, many ecological processes, which are critical to the long-term functioning of the floodplain, are lost and their recovery seems unlikely. Given this constraint, different approaches may be needed to achieve long-term results in localized areas. A potential example of how this might be addressed is that highest priority work would be centered on very high priority floodplain locations and associated with valley wall tributaries. The tributaries could help to ensure that a “natural” hydrograph will exist in treated areas and that there will be a continued delivery of sediment and organic material to the floodplain. An alternative approach might be to focus project work on high priority areas that are furthest downstream. In these areas, the main river hydrograph may be somewhat modified by tributary inputs and there may be some benefits from upstream recruitment of sediment and organic material. Other landscape-scale approaches might also be considered.

Specific comments (by page)

Page 5 - It is stated that the Framework is only for use in restoration/mitigation and not for protection or acquisition activities. However, protection and acquisition seem directly linked to the whole process of restoration/mitigation. Protection is a form of passive restoration and acquisition is almost a prerequisite for doing work on many sites. In addition, protection may

also represent an important component of actual project cost. It may be worth examining these two activities as part of the overall restoration toolbox and using this approach as a coarse screen to help guide future work. At the January teleconference, the sponsors were open to this suggestion. They cautioned, however, that information that might be viewed as targeting specific properties for restoration needs to be treated and shared in a way that respects landowners and the community.

Page 7 - Since many of the environmental changes took place a long time (i.e., decades) ago, reviewers suspect that the soils and vegetation reflect largely contemporary conditions. How will the sponsors determine the true potential of individual sites?

Page 9 - Historically, beaver were abundant in the floodplain, but there is no mention of how they could be used or managed to assist with restoration. How do beavers enter into the analyses—and restoration actions—especially in floodplain tributaries?

Page 11 - In the Analysis Method, the sponsors state that “*Where numerical base layers were not available, categorical numeric values were assigned to base layer attributes and reviewed by the TRT.*” This statement seems to imply that there was no random field checking to verify the accuracy. If not, that would be an important oversight. Additionally, a more complete description of the conditions and attributes that were considered by the TRT in making these assignments would be useful.

Page 12 - Fuzzy logic discussion – it appears that the fuzzy logic part of the model is limited to the Evaluation portion (Objective 1). However, results from the Evaluation are carried forward and used in the Prioritization portion (Objective 2). This mixing of techniques should be clarified in the document.

Page 13 - It is stated that valley cross sections were conducted every 1 to 2 miles unless more resolution was required. It would be useful to know what conditions prompted the need for “more resolution.”

- The sponsors recognize that floodplains require time (and water) to fill. How will upstream reconnections affect downstream reconnections in terms of siphoning off the available water (or influencing river stage heights)? In other words, is enough water available at various river stages to fully inundate the reconnected floodplain? If this is a practical concern, how do the sponsors plan to address this issue?

Page 22 - Land Cover discussion. There was good tracking to show how this effort condensed 20 cover units into nine categories and to five macro categories, based on the relative ease of converting cover to riparian or wetland vegetation. However, what factors were considered in determining the ease of conversion? It would be interesting to see what kind of information on potential vegetation is available from existing soil maps. Existing land cover represents current conditions and reflects the results of past manipulation and disturbance.

Page 27 - Why are there so many sites (and substantial acreages) near the river with low to moderate potential for reconnection? Additional explanation on this would be helpful in understanding the utility and limitations of the Framework.

Page 29 - How much consideration is given to the likelihood that specific levees can be removed? Are there situations where levees must remain due to legal, ownership, historical, or other considerations? If so, how many are there and how will they influence the potential for reconnections in the future?

- It says in section 4.1 that projects will be focused on restoring “normative” rates of physical, chemical, and biological processes. More discussion on the meaning of “normative” would be useful. How are “...normative rates and magnitudes of physical, chemical and biological processes” determined, particularly in a system whose hydrology has been substantially modified? In addition, which processes are included?

Page 30 - Item 3 of the Beechie et al. guidance on restoration includes matching the scale of restoration to the scale of the problem. Given the daunting magnitude and scale of the “problem” that is presented, it would be useful, if possible, to include some thoughtful discussion of how much restoration/mitigation (acres) will need to occur, and where, in order to provide meaningful benefits to fish and wildlife and make a measurable ecological difference over the project area. Such information could be included in Goals and Objectives (near and long-term) established for the broad area being treated.

- While it is important to be explicit about expected outcomes, details are needed on an Adaptive Management process and how it might be specifically applied in this situation.

Page 33 - The sponsors state that “... projects greater than 100 acres in size are likely to require significant design criteria and may extend beyond the scope of the prioritization tool.” It is not clear why this should be so, including the physical relevance of the 100-acre limit.

- Project area footprint - It appears that the physical area planned for treatment is the unit of measure for this component. In many cases, treatment of a given area can have substantial benefits beyond the actual treated area. Was the total area likely to be affected by the treatment ever considered?

- Limiting factors and their influence on quality and availability of fish and wildlife habitat are discussed, and three limiting factors—hydrologic regime, key plant communities/seral stages and wetland area—are selected for use in the model. More discussion on the effectiveness of these variables to ensure benefits to fish and wildlife, and the rationale for their inclusion, would be useful.

Page 35 - With the tool being used, “... projects that restore greater than 50 percent of the flood inundation extent are considered to have the best reasonable outcome. Below the 50 percent level, restoration percentages are binned in 10 percent increments.” If feasible, the sponsors should provide some ecological rationale for using these increments.

- The ISRP had difficulty reconciling the text and Equation 1 on Page 35. It appears that Equation 1 is used to calculate % Uplift, but it was difficult to determine how % Uplift related to Hydrologic Regime. The text on this page seems directed at why the Index of Fluvial

Floodplain Inundation (IFFA) was not practical, at the expense of not clearly outlining the substitute proposed for use at the project level. At a minimum, % Uplift should be clearly identified and defined in text.

Page 36 - The presence of key plant and animal communities and seral stages are important in the project. Toward that end, please clarify how browsers (and herbivores in general) are managed in the long-term process of re-establishing vegetation.

- Regarding key communities, more discussion is needed on how it was determined that riparian broadleaf stands were the only “Key community and Seral Stage” to be evaluated. It seems that, for achieving and maintaining diverse habitat, more than one potential community/seral stage needs to be considered.

- Sponsors mentioned that several large, wetland mitigation projects have been completed in the past, but the benefits and outcomes of these projects were not discussed. Retroactively rating these projects seems critical for validating some of the model assumptions and to refine/validate model prioritization scoring.

- We suggest that consideration be given for a more descriptive term than “Gatekeeper.”

Page 37 - Standardized cost per EVS is an interesting approach to view project cost efficiency. More validation of actual vs. planned benefits and costs would strengthen the meaningfulness of this indicator.

- It is stated that, in some cases, the TRT will utilize intangibles as “gatekeeper” criteria. More information is needed on the rules and sideboards for this approach and how it will be applied in a relatively objective manner.

- Equations should clearly identify the item being calculated. For instance, on page 37, rather than “Equation 2,” some identifying name such as “benefit/cost of EVS” would clearly indicate what was being calculated.

Page 38 - In Figure 15, representing benefit/cost of EVS by a continuous line could be misleading or confusing. A table showing the five values for each of the sites would be a better approach for these data. It would be helpful to place projects as column headings and each of the values in a row so that readers can more easily compare benefit/cost across projects. In general, more discussion is needed regarding results and how they would be used in project prioritization and selection, using the proposed prioritization process.

Page 39, References - The Literature cited section (a more appropriate term than “references”) used many different citation formats. There are also some errors between citations in text and literature cited (e.g., Bock, Salski should be Bock and Salski; Bayley is misspelled Bayly on Page 34).

Page 44 - A list of TRT members is provided. Do these people also work on the project or are they connected in some financial way? If so, an explanation is required about how conflicts of interest are avoided within the overall project.

Page 50 - Appendix C. Test cases, using the model, are critical. It would be useful to know if the sample projects are past projects for which it is possible to determine actual costs and benefits

or whether they are current proposals for which cost and benefits are estimated. A discussion is needed about the value of the model in selecting the highest priorities and how closely predicted costs and estimated benefits matched actual values. Using a sample that includes a mix of past, completed projects is important.

- In addition, the test cases in Appendix C could be stronger if the sponsors used figures for each of the sites to complement the written descriptions. Figures should “zoom in” on the individual projects to show the distribution of the four features used in the prioritization process.

- Uniform, clearly defined terms would be helpful. Benefit/Cost (Page 30) and Cost/Benefit (Page 6) are both used. Figures 2 and 13 have slightly differing terminology (Total Ecological value, Ecological value score; Floodplain reconnection potential, reconnection potential quality score) that can be confusing. Standardization of terms would reduce confusion and increase readability.