



ISRP INDEPENDENT SCIENTIFIC REVIEW PANEL

FOR THE NORTHWEST POWER AND CONSERVATION COUNCIL

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Memorandum (ISRP 2026-3)

June 23, 2026

To: Mike Milburn, Chair, Northwest Power and Conservation Council

From: Pat Connolly and Tom Turner, ISRP Co-Chairs

Subject: ISRP Review of Spokane Tribe of Indians' New Proposal, *Inland Lakes & Streams Management Plan Development & Implementation* (BPA project #2024-003-00)
– Response Requested

Background

In response to the Northwest Power and Conservation Council's request on April 14, 2026, the ISRP reviewed a [new proposal](#) from the Spokane Tribe of Indians (STOI), titled *Inland Lakes & Streams Management Plan Development & Implementation* (BPA project #2024-003-00).¹ The project's intent is to develop an Inland Lakes and Streams Management Plan for watersheds within the Spokane Reservation to guide project implementation to enhance, protect, restore, and maintain lake and stream habitats. The plan will be updated periodically and serve as a framework and baseline for future reference to track progress and outcomes of completed projects. A complementary project objective is to assess the suitability of Reservation habitat for long-term beaver recolonization, and based on that assessment, refine the STOI plan to implement, monitor, and adaptively manage beaver-related habitat restoration projects.

The review materials provided to the Council by the STOI on April 9, 2026, include:

- [Proposal for Project #2024-003-00, *Inland Lakes & Streams Management Plan Development & Implementation*](#)
- [Spokane Tribe of Indians Reservation Inland Lakes and Streams Management Plan, December 2025](#)

¹ Attachment A of the [Memorandum of Agreement](#) between the Spokane Tribe of Indians (STOI) and the Bonneville Power Administration lists this as a project to be implemented and funded under the Agreement.

ISRP Recommendation: Response Requested

This proposal represents a complex and comprehensive plan to monitor aquatic resources of the Spokane Indian Tribes within or entering the Reservation. The plan includes standard protocols for sampling physical characteristics and biotic assemblages of streams and inland lakes. Sampling protocols are widely accepted by the scientific community and are most effective when coupled with a spatial and temporal sampling design to capture important sources of environmental variation. The plan is ambitious, targeting many features of the Reservation's aquatic resources. Information gathered through this plan clearly has the potential to inform restoration and enhancement actions and will lead to a richer understanding of inland lakes and streams on Tribal lands.

To help us reach a final recommendation on this new proposal, we request a point-by-point response to the following items:

1. **Clarify watershed goals and sustainability.** What are the proponent's specific goals for each watershed, and how is sustainability defined for project purposes?
2. **Develop SMART objectives.** What quantitative metrics will be measured, and how do they reflect system condition? Where, when, and how many samples will be taken for each metric? How can these metrics be integrated into objectives and subobjectives to make it clearer how (and when) objectives will be achieved? How will changes in metrics be interpreted to track success of management actions?
3. **Provide rationale for types of data collected.** What are the drivers for collecting all the types of data described in the proposal, and how will each data type be used to support decision-making?
4. **Identify causes of impairment.** How will collected data be evaluated to identify causes of impairment and what other data might be used?
5. **Address confounding factors.** How will confounding factors be evaluated (e.g., anthropogenic land uses and changing climate)?
6. **Clarify elements of the sampling design.** Does the proposed timeline for action represent a feasible progression of activities over five years? Over what spatial units will sampling occur, how will different types of data be linked spatially, and over what spatial units will management actions be applied? What is the methodology and modeling strategy that will be used for the beaver habitat feasibility assessment?

More details on these response request items are described in our comments below.

ISRP Review Comments

1. Clearly defined objectives and outcomes

Clarify project timeline and sequence of actions. An outcome of the project is development of scientifically sound management plans for inland lakes and streams, as well as a beaver habitat feasibility assessment to identify beaver habitat restoration projects using monitoring data collected in the course of the project. At the same time, the final one-to-three project years described in the proposal indicate implementation of restoration and enhancement projects as specific tasks under the overarching objectives. The five-year timeline focusing on implementation of tasks may not be realistic. Efforts to clarify initial goals and to quantify results could be beneficial to developing a more suitable timeline. Additional comments related to timing are provided in sections below.

Clarify watershed goals and sustainability to the degree possible along with an approach for refining goals over time. The goal statement emphasizes the protection, restoration, and enhancement of water bodies within or entering the reservation to meet cultural and subsistence needs of the Tribe. While it is clear that this project will clarify baseline conditions for water bodies and that those conditions should be understood before cultural and subsistence needs may be fully described, providing some initial context for needs is important. As one example, the Confederated Tribes of the Umatilla Indian Reservation use a “First Foods” framework that the proponents may wish to explore (see Quaempts et al. 2018² and CTUIR presentation to the Council, [memo](#) and [video](#)). Additionally, the terms “sustainable ecosystem” and “sustainable ecological function” are used at points in the proposal. The proponents should consider clarifying what those terms mean to the degree possible. Ideally, specifying quantitative metrics/indicators and thresholds might assist in describing desired future conditions/outcomes, along with detailing more specific and quantitative monitoring, implementation, and ecological objectives. Additional recommendations for doing this are emphasized below.

Ultimately, multiple years of sampling are needed to establish benchmarks for conditions as well as understanding how those conditions vary over time. This information is the foundation for tracking success of restoration actions. Because of this, watershed goals and sustainability may change and become more specific over time due to knowledge gained about the water bodies. The proponents should describe an approach for revisiting goals and refining them as more knowledge about the system accumulates, perhaps every five years, as part of future efforts.

Develop SMART objectives. The proposal outlines two overarching objectives to protect, restore, and enhance tribal lakes and streams, and subobjectives aim to develop and implement monitoring strategies for these waters focused on water quality, habitat quality,

² Quaempts, E.J., K.L. Jones, S.J. O’Daniel, T.J. Beechie, and G.C. Poole. 2018. Aligning environmental management with ecosystem resilience: a First Foods example from the Confederated Tribes of the Umatilla Indian Reservation, Oregon, USA. *Ecology and Society* 23(2):29. <https://doi.org/10.5751/ES-10080-230229>

fish populations, zooplankton (lakes), and macroinvertebrates (streams). The proponents plan to use monitoring data to develop management plans and, in turn, use management plans to implement projects to achieve the overarching objectives. A third overarching objective is to protect, restore, and enhance beaver habitat on the reservation, with subobjectives to develop and implement a beaver habitat feasibility assessment, inform implementation projects in priority areas to improve beaver recolonization, and thereby maintain and improve habitat conditions in the reservation's watersheds.

While objectives and associated subobjectives are reasonably structured (Figure 3), they are broad and qualitative. They are not quantified either in terms of habitat quantities to be inventoried or environmental thresholds to be attained. The Management Plan (2025) also notes general (but not quantitative) objectives for individual watersheds that are described as narrative actions. This results in unclear targets. However, as noted above, the purpose of this project is to collect baseline data that can be used to establish quantitative objectives. At this early stage in the project and given the breadth and complexity of the targeted aquatic resources, the proponents should describe how the monitoring data will be used (analyzed) to set priorities and achievable, time-bound targets among the large suite of possible management actions. Those quantitative objectives should be initially described in year five of this project. The response should also clarify how proposed metrics will be interpreted as indicators of system condition, what amount or direction of change would represent progress, and how those interpretations will inform future decisions about restoration, enhancement, or protection actions. Those quantitative objectives and associated decision criteria should be initially described by year five of this project.

Provide rationale for types of data collected, identify causes of impairment, and address confounding factors. The proponents explain that water quality and quantity, habitat condition, and biological data will be collected and used for the management plan to characterize the ecological condition and current and potential use of each watershed. While the assessments will undoubtedly capture a wide range of information about waterbodies, they will not directly answer questions about specific causes of impairment or landscape-scale stressors in the watershed. Instead, they will reflect those factors that are responding to impairment. The 2025 management plan summarizes what is known about each watershed and lake, and it also describes management concerns and management objectives, but this knowledge will not be sufficient for prescribing actions that will lead to changes in metrics. Related to this, the proponents explain that goals and objectives will be developed from the information collected from the assessments with future projects identified based on findings; however, the assessments may not be effective for capturing the full set of stressors to the waterbodies, but instead just reflect outcomes (e.g., degraded habitat and water quality, impaired biological assemblages, etc.). The proponents should describe how they will use the monitoring data to develop actions. One example of where this could be refined is in Objective 1.2a, which states that monitoring data will be used to identify ecological stressors for each tribal lake. This

objective, as written, seems to gloss over some of the work needed to isolate the causes of impairment that should be addressed.

2. Methods (based on sound science principles)

The proponents provided a thorough and impressive compendium of protocols used to monitor a comprehensive set of lake and stream parameters that are standard descriptors of aquatic systems. These include measures of water quality, geomorphology, habitat, fish passage structures, fish populations, zooplankton, and macroinvertebrates. All protocols are posted to MonitoringResources.org and are well-described. We congratulate the proponents for this comprehensive list, although organizing such quantities of data is no small task and will require some attention to database development and management.

Clarify elements of the sampling design. As important as it is to choose robust protocols, crafting a sampling design that describes in detail the temporal and spatial components of sampling is equally important. To illustrate, for estimating fish abundance in a stream, a preferred design might be to use some sampling method (e.g., removal electrofishing) in a reach of specified length (e.g., 100 m) and to repeat that sampling throughout the portion of the stream occupied by fish (e.g., at either systematically chosen intervals or random intervals, although the former is more likely to avoid bias within an individual stream). In this example, subsequent sampling in later years might focus on a subset of these reaches (i.e., index reaches) to track temporal trends in abundance and community composition, whereas major disturbance events that re-organize stream habitat (such as post-fire debris torrents) may warrant repeat sampling of the entire basin. Again, this is an example of a sampling design, and the proponents are encouraged to develop a design that best meets their needs, keeping in mind that temporal and spatial components will likely vary by waterbody and by the variable measured. Some sampling may need to be continuous (e.g., for discharge), while other kinds of sampling may need to be tied more specifically to dates or to other targets. For example, given that water quality can vary substantially over a three-month window, sampling may need to be tied to a specific day or a specific event (e.g., in spring, immediately following snowmelt or in summer, after an extended period with no rain). Besides temporal considerations, a spatial framework that guides the scope of sampling efforts and the extent over which management actions are likely to be applied should be described. Questions that should be considered include determining whether an assessment of a stream network be based on a single sample in a reach or multiple samples from reaches throughout a network. Likewise, will single samples from a lake be used to represent conditions throughout the entire lake or be representative of different regions in the lake? Answering these types of questions translates to clarifying how different types of measurements will be related (e.g., how will water-quality measures be associated with habitat measures and biological samples?). Overall, careful consideration of the spatial and temporal elements can make monitoring more robust and lead to more efficient detection of spatial patterns or temporal trends.

Describe the priority of types of data collected. Given the substantial effort needed to collect all of the proposed types of data, the proponents should explain the utility of each of the proposed metrics. For example, while measures of water quality might be used to identify thresholds to target with management actions, how will zooplankton be used? Monitoring all of the proposed factors will require tremendous effort, and not everything that the proponents plan to measure may be useful from a decision-making standpoint that translates to action. Explicit linkage of metrics to adaptive management action and ultimately to progress toward desired ecological conditions can help prioritize the types of data needed and refine the sampling design.

Clarify elements of the beaver habitat assessment. For the Beaver Habitat Feasibility Assessment project component, the proponents indicate that they will use all or part of the methodology and modeling strategy piloted in the Blue Creek and Sand Creek Watersheds to develop beaver habitat management strategies for watersheds entering or within the Spokane Indian Reservation. That methodology and modeling strategy was not provided for review in the current proposal. As an additional point related to beaver restoration, it may also be worth noting why beaver are no longer present to understand the challenges that might hamper restoration.

3. Provisions for monitoring and evaluation of results and project adjustment process

The proposal acknowledges the need for evaluation and adaptive management to connect implementation objectives to project goals (Figure 3) and diagrams a general adaptive management cycle (Figure 4). The proponents identify internal collaboration and information sharing across STOI Department of Natural Resources programs and input from citizens of the Spokane Tribe to inform decision-making. Cooperation with external organizations is also identified as an important mechanism to ensure collective understanding of ecological conditions. While the project is still in the early stages, a structured decision-making process, timeframe for decision-making, and documentation of decision-making is not described, but is an important goal to work towards in future versions of the management plan.

4. Results: benefits to fish and wildlife

This proposal is for a new project and thus does not include information under the section “Progress to Date.” Consequently, the results portion of this section is not applicable. However, based on the information provided in the full proposal, this project has the potential to benefit fish and wildlife, but not through monitoring alone. Greater emphasis should be made on how the information collected will be analyzed and used to guide actions, and more detail should be provided on what the “priorities” for these systems are (refer to comments about the overall goal for the project).