

INDEPENDENT SCIENTIFIC REVIEW PANEL

# Review of Umbrella Habitat Restoration Projects

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Cover design by Eric Schrepel, Council staff

Cover photos clockwise from top left are from Willamette, Grande Ronde, Upper Columbia, Lower Columbia/Estuary, Tucannon, and John Day subbasins. The Lower Columbia/estuary canoe photo is courtesy of the Lower Columbia Estuary Partnership, the Grande Ronde photo is by Lynn Palensky (Council staff), and others are by Erik Merrill from ISRP site visits.



## **Independent Scientific Review Panel**

for the Northwest Power & Conservation Council

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# ISRP REVIEW OF UMBRELLA HABITAT RESTORATION PROJECTS

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# ISRP REVIEW OF UMBRELLA HABITAT RESTORATION PROJECTS

## I. EXECUTIVE SUMMARY

**Review Purpose and Process.** This Independent Scientific Review Panel (ISRP) review of umbrella projects follows the Northwest Power and Conservation Council’s recommendation from the 2013 Geographic Category Review to base funding decisions after 2016 on performance reviews every two to four years. Proponents of umbrella projects submitted progress reports that address the Council’s “tailored questions” regarding (1) purpose, objectives, and priorities; (2) administrative history; (3) project prioritization and selection; and (4) reporting, program progress, and adaptive management.

The ISRP used the progress reports to evaluate the performance and effectiveness of projects since the 2013 Geographic Review, paying particular attention to objectives, results to date, transparency of processes for project selection, and consistency of implementation among regions. The ISRP also used four basic criteria identified by the ISAB in their Landscape Restoration Report ([ISAB 2011-4](#)) to evaluate the collective success (both accomplishments and remaining challenges) of the umbrella projects in implementing a comprehensive landscape approach to habitat restoration. Presentations and face-to-face discussions with umbrella program proponents greatly improved the ISRP’s understanding of progress and challenges, and the overall effectiveness of this review.

**Project Evaluations.** The ISRP recommends that all six umbrella projects “Meet Scientific Review Criteria (Qualified).” All projects reflect improvement since the 2013 Geographic Review. To varying degrees, each project is incorporating basic landscape restoration components into their programs. Detailed comments on each of the six umbrella habitat restoration projects are provided in Section V.

**Programmatic Comments.** Overall, the umbrella projects have made significant progress toward a comprehensive landscape approach ([ISAB 2011-4](#)) to restoration. Most notable was progress in more effective public engagement and developing organizational structures that support collaboration, integration, and leadership. Umbrella projects have helped to increase collaboration, coordination, education, and outreach within local communities. Although there remains room for continued improvement, the ISRP acknowledges that habitat conservation and restoration on public and private lands are complex and sometimes contentious issues in the Columbia River Basin. Also, all umbrella projects have generally developed well-defined and transparent processes for project solicitation, prioritization, and selection and are providing a range of services that support participants and partners. Some of these include oversight and administration of the project solicitation and prioritization process, technical assistance, tracking and record keeping for project funding and accomplishment, partner coordination and development, grant writing, and Program accomplishment reporting.

Less progress was evident for program-scale adaptive management and in development and application of a strategic ecological approach for “ridgetop to valley bottom” whole watershed restoration. The progress reports all reveal that adaptive management has not yet been implemented using the formal approach needed to more fully evaluate and improve restoration activities at a landscape scale. Also,

none of the reports describe the status and trends of habitat or fish populations at a landscape scale in a way that could be linked to habitat restoration activities. Needed improvements in a whole watershed restoration approach include addressing upstream and upslope factors that can have major influences on meeting aquatic habitat restoration objectives.

The ISRP has identified several obstacles to evaluating progress through adaptive management. First, evaluation at a landscape scale requires quantitative objectives with explicit timelines that are expressed in terms of expected (hypothesized) improvements in habitat (outcomes) or Viable Salmonid Population (VSP) parameters. Second, evaluation at a landscape scale requires appropriate monitoring, access to monitoring data, and an explicit plan for evaluating and documenting outcomes. Such a plan will likely include collaboration with other groups in charge of monitoring, but a specific entity or partnership needs to be accountable for the overall plan to make sure monitoring adequately addresses the needs of the umbrella restoration efforts. The proponents of the umbrella projects and other large restoration projects may be best suited to do this. If monitoring is still not sufficient to meet the needs of the umbrella project, it should be noted in annual reports to the Council and Bonneville Power Administration. Third, monitoring and evaluation at a landscape scale may require an additional technical capacity beyond what currently exists for some umbrella projects. Fourth, reporting should be improved to document outcomes (not only the restoration actions but also changes to habitat and fish populations), identify lessons learned, and share knowledge via public engagements, targeted workshops, and peer-reviewed publications.

The umbrella projects include broad geographic areas and focus primarily on riparian and stream channel areas. For the most part, they follow ecological principles to increase effectiveness and efficiency of habitat protection and restoration work. However, a comprehensive, whole watershed/landscape scale approach for design of restoration programs is generally lacking. The ISRP urges refinement of strategies to more fully address important upstream and upslope processes and disturbance regimes (ridge top to valley bottom approach), influencing aquatic habitat quality and function (roads, vegetation, development, etc.). Also further elements, including expected changes in climate, human development, hatchery practices, colonization by non-native species, and density dependence, will need additional consideration in most projects.

**Proposal for a Workshop and Pilot Project.** Adopting a comprehensive landscape approach to habitat restoration is a new and complex undertaking requiring thoughtful leadership and active experiential learning. Accordingly, the ISRP suggests that a multi-day workshop is needed to resolve practical obstacles by bringing together restoration practitioners from all umbrella projects, other habitat restoration practitioners, research and monitoring teams, the ISRP, and the Council. The ISRP suggests that the workshop to develop an example of a rigorous landscape approach should focus on one umbrella project that has already made significant progress and could serve as a pilot for other projects to follow. The Tucannon umbrella project appears to be a good candidate as it already has many strong elements and is relatively manageable in size. Perhaps this workshop and pilot project approach could be the topic of a Council Science and Policy Forum in 2017 or 2018.

## II. BACKGROUND

The Northwest Power and Conservation Council's Fish and Wildlife Program supports landscape-level habitat projects that identify, rank, select, and fund habitat projects in specific geographic areas. A subset of these projects (listed below) solicit proposals and offer funding in the form of a targeted grant program for their area. The Council refers to these as *umbrella* projects. These umbrella projects do not take a uniform approach. They differ in the number of solicitations per year, the amount of funding available, geographic extent, and how projects are scored and selected.

Umbrella projects included in this review:

1. Grande Ronde Model Watershed (Project #1992-026-01)
2. Tucannon River Programmatic Habitat (2010-077-00)
3. Upper Columbia Programmatic Habitat (2010-001-00)
4. Columbia River Estuary Habitat Restoration (2003-011-00)
5. Willamette Bi-Op Habitat Restoration (2009-012-00)
6. John Day Habitat Flow and Habitat Enhancement (2007-397-00)

The [Columbia Basin Water Transaction Program](#) also is an umbrella project that functions much the same as a granting organization. The Water Transactions Program was reviewed in the RM&E Category Review.<sup>1</sup> Although not evaluated in this 2017 Umbrella Project Review, the proponents presented at the review meeting and described their process and results to add context on the variety of approaches used by umbrella projects.

## III. REVIEW CHARGE AND PROCESS

This Umbrella Project Review addresses the Council's 2013 Geographic Category Review recommendation: "Funding recommendations beyond 2016 will be based on a Council-facilitated performance/effectiveness review every two to four years using the tailored questions from the Geographic Review's proposal form for umbrella projects. The review also will include a workshop with presentations for sponsors and partners. The first review will take place early-mid 2016."

ISRP reviews are based on criteria provided in the 1996 amendment to the Northwest Power Act that directs the ISRP to review projects for consistency with the Council's Fish and Wildlife Program and to identify if projects are based on sound scientific principles, benefit fish and wildlife, have clearly defined objectives and outcomes, and contain provisions for monitoring and evaluation of results. All six of the umbrella projects reviewed are in progress, having previously received favorable ISRP scientific reviews—albeit with qualifications—and Council funding recommendations. Accordingly, the ISRP focused this review on results, approaching the review as an evaluation of the projects' performance and effectiveness since the 2013 Geographic Review. The ISRP's comments on individual projects are

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<sup>1</sup> For past ISRP reviews of the Water Transaction Program, see [2010-44a](#), p. 28; [2010-44b](#), p. 153; and [ISRP 2004-2](#).

organized to address the Council's "tailored questions"<sup>2</sup> covering (1) purpose, objectives, and priorities; (2) administrative history; (3) project prioritization and selection; and (4) reporting, program progress, and adaptive management.

The ISRP process to develop the recommendations and comments followed several steps.

1. **Council request and guidance.** The Council initiated the review process on November 23, 2016 with a [guidance letter](#) to the project proponents describing the review process and requesting project summaries by February 1, 2017. All summaries were received by the deadline.
2. **ISRP individual member reviews.** Each project was initially reviewed by a four-person team, whose members were selected based on expertise and previous experience reviewing the project. The four reviewers each provided a preliminary and independent written evaluation of the project, which was then shared for discussion prior to step 3. Individual reviewer's comments and records of discussions are confidential and not available outside the ISRP review teams.
3. **Project presentations and programmatic discussions.** On February 16, the project proponents presented their projects to the ISRP, Council members and staff, BPA staff, other proponents, and the public. The meeting concluded with open dialog on programmatic issues. The [presentations](#) and programmatic discussions were invaluable to the ISRP's understanding of the projects' progress, constraints, and contributions to the Fish and Wildlife Program.
4. **ISRP evaluation meeting and report completion.** On February 17, following the presentations, the full ISRP met to discuss individual comments, develop a consensus recommendation for each project, and ensure consistency across reviews. After the evaluation meeting, individual reviewer comments were synthesized into a consensus statement on each project. All members of the ISRP then evaluated and edited these draft consensus statements and developed programmatic comments to produce this final report. Pursuant to the 1996 amendment, the Council must fully consider ISRP recommendations when making its recommendations regarding funding and provide an explanation in writing where its recommendations diverge from those of the ISRP.

The ISRP recommends that all six umbrella projects "Meet Scientific Review Criteria (Qualified)." The ISRP recommends that qualifications for two of the projects be addressed on an agreed upon and expedited schedule, and that qualifications for the other four projects be addressed during project implementation, future reporting, and regularly scheduled reviews. Due to the complex and evolving nature of umbrella projects and the need for a more scientific adaptive management approach, the ISRP recommends that (1) these umbrella projects be reviewed on a regular basis, every three years, and (2) ISRP and ISAB representatives continue to participate in conferences and workshops organized by the umbrella projects' proponents to facilitate information sharing and tracking of progress. Detailed comments on each of the six umbrella habitat restoration projects are provided in Section V.

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<sup>2</sup> For the specific tailored questions, see the Council's November 2016 Umbrella Project Review [guidance document](#), pages 2-3.

In section IV, the ISRP provides “programmatic comments” on progress and challenges shared by most of the umbrella projects and that apply generally to habitat restoration at the landscape level. Our programmatic comments were also informed by the wide-ranging and frank discussion of programmatic issues among project proponents, Bonneville Power Administration staff, Council members and staff, and the ISRP at the February 16, 2017 Umbrella Project Review meeting. Both the ISRP and the project proponents believe this type of open discussion is productive and should occur regularly, including at future project review meetings.

## IV. PROGRAMMATIC COMMENTS

### NEED FOR A COMPREHENSIVE LANDSCAPE APPROACH TO HABITAT RESTORATION

In the Independent Scientific Advisory Board’s (ISAB) report, *Using a Comprehensive Landscape Approach for More Effective Conservation and Restoration*, the ISAB concluded that “Effective conservation and restoration of the Columbia River Basin **requires** a broader, more comprehensive, and more coordinated approach” ([ISAB 2011-4](#)). The ISAB also recommended four themes that could serve as criteria for evaluating any comprehensive approach to conservation and restoration:

1. Engage the public and diverse social groups associated with the landscape and build socioeconomic understanding (*public engagement*)
2. Incorporate a strategic approach with a foundation in the concepts of comprehensive landscape ecology (*strategic ecological approach*).
3. Develop organizations that support collaboration, integration, and effective governance and leadership (*organization across boundaries*).
4. Promote adaptive capacity based on active learning through assessment, monitoring, innovation, experimentation, and modeling, combined with a clear process to share new information and revise objectives, strategies, and actions in response to that information (*adaptive management*).

The ISRP used these four themes as fundamental criteria to evaluate progress by umbrella projects. Such evaluation seems appropriate because each umbrella project represents an effort to adopt the comprehensive landscape approach within a large region of the Basin. While each umbrella project faces similar challenges, individual approaches to solving these challenges have evolved somewhat independently among regions. We begin this programmatic comments section by highlighting some of the diverse solutions and accomplishments to date. We then conclude by prioritizing the challenges that remain, and suggesting some potential ways to address these challenges.

### NOTABLE ACCOMPLISHMENTS BY UMBRELLA PROJECTS

The ISRP concludes that overall, the umbrella projects have made substantial progress in all areas, particularly in activities associated with Criterion 1 (Public Engagement) and Criterion 3 (Organization across Boundaries). In the following discussion, we identify selected accomplishments in each of the four criteria, listed in order of relative priority. It should also be noted that there remains a need and

opportunity to continue these improvements in all areas.

A strength of the umbrella projects is their use of community-based approaches to meet a diversity of restoration challenges. The six umbrella projects extend from the Columbia River estuary to the Okanagan Basin in the upper Columbia River. From 2014-2016, the Council approved investment of more than \$15 million in restoration of fish and wildlife in these project areas. With this funding, the umbrella projects were able to lead the solicitation, prioritization, selection, design, implementation, collaborative monitoring, and community involvement for more than 78 restoration projects. See this report's Appendix for a summary of the processes and accomplishments of the six umbrella projects. Below, we summarize some notable accomplishments in each of the four criteria, listed in order of relative priority.

### *PRIORITIES AND OBJECTIVES (CRITERION 3)*

The ISAB's Landscape Report ([2011-4](#)), the ISRP's Geographic Review ([2013-11](#)), and the 2014 Fish and Wildlife Program ([NPCC 2014-12](#)) call for development of science-based restoration implementation strategies that include identification of regional priorities and quantifiable objectives at a landscape scale. All six umbrella projects used regional recovery plans and landscape assessments (e.g., Ecosystem Diagnosis and Treatment [EDT], Life Cycle Models [LCM]) to develop implementation strategies and general project priorities and objectives to guide project progress. However, only two of the projects (Tucannon River Programmatic Habitat Project and Columbia River Estuary Habitat Restoration) developed numeric, quantifiable objectives that could be used for evaluation of progress and resource conditions at a landscape scale. Additionally, only two incorporated an expected time frame for the anticipated accomplishment of desired outcomes. (Areas for future improvement are discussed in more detail below).

### *PROCESS FOR SOLICITATION AND PROJECT SELECTION (CRITERION 3)*

All umbrella projects have generally developed well-defined and transparent processes for project solicitation, prioritization and selection. Multi-agency review teams and pre-established criteria are used for evaluating project proposals and ranking them for implementation. In a number of cases, on site reviews of the potential projects are incorporated into the process.

### *SUPPORT SERVICES (CRITERION 3)*

The project proponents provide a range of services that support participants/partners. Some of these include oversight and administration of the project solicitation and prioritization process, technical assistance, tracking and record keeping for project funding and accomplishment, partner coordination and development, grant writing and Program accomplishment reporting. In the case of the Columbia River Estuary Habitat Restoration project, a geodatabase is used to track the location for all completed projects along with a variety of other resource information useful for all participants in project planning and reporting.

### *PARTNERSHIPS AND PUBLIC ENGAGEMENT (CRITERION 1)*

A major benefit of umbrella projects is that they have helped to increase collaboration, coordination, education, and outreach within local communities. Habitat conservation and restoration on public and private lands are complex and sometimes contentious issues in the Columbia River Basin. Success in reaching out to partners to develop ownership and effective restoration actions with willing landowners and public land managers often overcomes many of the conflicts encountered extensively in our region. Simple education and outreach from centralized programs, such as BPA, state agencies, and universities, would likely not have the same effect as community-based restoration projects. Regularly scheduled conferences to share information, project outcomes, and future plans, such as the Annual Science Meeting of the Grande Ronde and the Upper Columbia Science Conference, serve as both community outreach and opportunities to evaluate progress and outcomes of restoration actions. The local ownership in the solicitation, design, and implementation has benefits far beyond the funded project. Informed and enthusiastic participants extend the stewardship perspectives and restoration approaches far beyond the immediate projects. Although no mechanism exists to track individual protection and restoration actions that are not supported by government or regional funding, there is no doubt that the whole is greater than the sum of the parts. The ISRP notes the success of the umbrella projects and encourages the Council to continue efforts to support continued improvement in outreach, community cooperation, and partnerships.

### *HABITAT RESTORATION (CRITERION 2)*

All umbrella projects are accomplishing a wide range of habitat restoration actions to improve fish abundance and survival, and aquatic habitat (water availability, channel structure, floodplain function, and riparian plant communities). Some umbrella projects, such as the Tucannon project, focus closely on incorporating the most limiting salmon life history stage into project design. All projects generally coordinate and collaborate with state agencies, federal agencies, regional monitoring programs in some way, and in some cases research scientists provide information on status and trends of species of concern. Some umbrella projects, such as the Grande Ronde Model Watershed, obtain information related to stream flow and water availability by funding gauging station networks. Restoration of in-channel habitat conditions and active channel complexity, fish passage, and floodplain-stream channel connectivity are included in all projects. The Upper Columbia River Programmatic Habitat and Tucannon Project are developing innovative approaches to actively restore floodplain function and connectivity to increase fish abundance and survival. Most restoration is focused on the stream channel and valley bottoms. For example, planting to recover riparian and floodplain forests is common in all umbrella projects. It is less clear to what extent the influences of upland conditions and processes are considered during prioritization and design of projects. Reporting of restoration activities to address these issues was very limited. (This concern is discussed further below).

### *HABITAT ACQUISITION (CRITERION 2)*

Habitat acquisition contributes to the protection and restoration of riparian and aquatic habitat. It is not a major component of most umbrella projects. But several projects reported the acquisition of high

quality habitats for critical species as part of their project conservation and restoration accomplishments. The Willamette and Columbia River Estuary projects, for instance, have used project objectives and prioritization criteria to identify and acquire lands with high value for fish and wildlife from willing owners. An example in the Willamette Basin is the acquisition and preservation of anchor habitats identified on the basis of landscape processes and patterns. Their protection has increased the potential for future success and provided a quantifiable basis for evaluation of progress and resource outcomes. These two umbrella projects and others have also used conservation easements to accomplish improved riparian and upslope conditions.

#### *FISH RESPONSES (CRITERION 4)*

Positive responses of fish abundance or preferential habitat use in response to restoration actions were reported for several projects (Upper Columbia River and Columbia River Estuary). However, effectiveness monitoring of fish and habitat responses within umbrella projects was typically constrained by a lack of expertise, insufficient staff support, and inadequate allocation of funds for monitoring. (This challenge is discussed further below.)

#### *EVALUATION AT LANDSCAPE SCALES (CRITERION 4)*

Landscape evaluation is an important component in tracking success of umbrella projects. It should include spatially explicit analysis of project implementation, habitat and fish responses, and status and trends. Even though much remains to be done (discussed below), progress is being achieved by specific projects. The Columbia River Estuary Project produces a State of the Estuary report every five years that describes the status of habitat and water quality for their region and has created a publicly available online geodatabase for spatially explicit synthesis of project and resource information. The Willamette Project uses a SLICES framework to track channel, complexity, floodplain forest, fish communities, and cold water refuges along the mainstem Willamette River and some tributaries. The Grande Ronde Model Watershed has developed a geographic Restoration Atlas for project identification and prioritization, but it has not been used for evaluation of progress or resource outcomes at a landscape scale. While none of these provide the comprehensive landscape evaluation of quantifiable goals with explicit timelines that the ISRP has recommended, they represent existing components of umbrella projects that could be strengthened and expanded to provide informative landscape evaluations for their programs.

#### **CHALLENGES THAT REMAIN**

The ISRP concludes that, overall, the umbrella projects have made significant progress when judged on both criterion 1 (public engagement) and criterion 3 (organization across boundaries), but less progress on the other two criteria of the comprehensive landscape approach. The greatest priority for further improvement relates to criterion 4 (adaptive management) and criterion 2 (Strategic Ecological Approach). In the remainder of Section IV, we identify deficiencies that remain in meeting each of the four criteria, listed in order of priority, and we suggest some potential remedies.

## *ADAPTIVE MANAGEMENT (CRITERION 4)*

The ISRP strongly believes that umbrella projects should adopt a formal adaptive management framework. An article published in the journal Fisheries, [A Comprehensive Approach for Habitat Restoration in the Columbia Basin](#), includes a succinct description of adaptive management as it applies in the Columbia Basin. The article is a synthesis of advice from the ISAB's Landscape Report (2011-4), the ISAB's Review of the 2009 Fish and Wildlife Program (2013-1), and the ISRP Geographic Review (2013-11):

Comprehensive restoration will require new and untried actions that must evolve with experience. Learning and using what is learned to modify future restoration actions are key. Adaptive management is a full-cycle process starting with the identification of quantitative objectives to fulfill agreements, policies, or laws. This is followed by an assessment of physical, biological, social, and economic conditions that need to be addressed to meet the objectives. Based on the assessment, actions are designed and implemented. Periodic monitoring and evaluation provide critical feedback (Reeve 2007; Runge 2011). The results are then used to gauge progress toward objectives and ultimately to support or modify actions.

Adaptive management ideally uses deliberate experiments to inform future decisions (Holling 1978; Lee 1993; McDonald et al. 2005; Armitage et al. 2008). It can still provide a useful path, however, where traditional scientific experimentation, replication, and intensive monitoring become difficult or impossible at very large scales (Runge 2011). For example, models can be used to explore restoration scenarios and help managers and the public visualize the response of complex systems (Holl et al. 2003). The models can be integrated in a structured approach to making decisions, and the results can be updated periodically to focus new work and limited financial resources (Runge 2011). Ultimately, learning and adaptation require sharing experience across watersheds, regions, and cultures so that each project becomes an observation for a larger collective evaluation of successes and failures. Active networking across groups with common interests must be part of the process. (Rieman et al. 2015, p. 127).

The progress reports for all umbrella projects include examples of lessons learned and associated adjustments to program operations and activities. However, these reports all reveal that adaptive management has not yet been implemented in the formal way needed to comprehensively evaluate and improve restoration activities at a landscape scale. None of the reports describe the status and trends of habitat or fish populations at a landscape scale in a way that could be linked to habitat restoration activities. Some restoration projects are too recent for such responses to be detectable, but other projects have been funded for 10 to 25 years.

The ISRP has identified several obstacles to evaluating progress through adaptive management. First, evaluation at a landscape scale requires objectives with explicit timelines that are expressed quantitatively in terms of expected (hypothesized) outcomes (improvements in habitat or VSP parameters). Only two projects (Columbia River Estuary, Willamette) include timelines for quantitative objectives. Quantifiable objectives do not need to be supported by complicated models, but they should identify expected responses in metrics linked to habitat and/or fish populations. For example, a project could develop quantitative objectives for the amount and quality of specific habitat types to be created

through restoration, the effect of restoration actions on processes such as stream flow and temperature, and the anticipated effect on species, such as salmon smolts produced per spawner and other indicators of viable salmon populations.

Second, evaluation at a landscape scale requires appropriate monitoring, access to monitoring data, and an explicit plan for evaluating and documenting outcomes. Such a plan will need to identify the schedule for collaboration with other groups in charge of monitoring (e.g., State and Tribal organizations, and interdisciplinary programs like CHaMP, ISEMP, and AEM). The burden of this coordination could be spread among the restoration practitioners and the research and monitoring teams. However, a specific entity or partnership needs to be accountable for the overall plan, and the proponents of the umbrella projects may be best suited to do this. Innovative approaches, such as dedicating funds to measure responses across multiple projects rather than each individual project within more rigorous experimental designs, should increase the ability to measure project effectiveness and integrate outcomes at landscape scales.

At the very least, project proponents should be accountable for explaining the full extent and scheduling of effectiveness monitoring and evaluation associated with their project (whether conducted by the proponents or their partners) and for reporting (or citing reports on) high level results to date at the full geographic extent of their project. These reports would clearly highlight those watersheds for which effectiveness monitoring programs such as CHaMP, ISEMP, and AEM will be unavailable or inadequate to fulfill expectations for evaluating ecological responses to habitat restoration activities. Proponents of several umbrella projects again mentioned challenges in obtaining data and results from the ISEMP, CHaMP, and AEM investigators in time for their own analyses. (Note that the ISRP heard and reported these concerns four years ago during visits to restoration sites as part of the Geographic Review in 2013.)

Third, evaluation at a landscape scale may require additional technical capacity than currently exists for some of the umbrella projects. Insufficient evaluation inhibits corrective actions that could be undertaken through adaptive management. Lack of evaluation wastes limited funds needed to restore habitats and target populations. To this end, it would also be useful for proponents to describe the total package of priority work (including planning, treatments, monitoring and evaluation) that they think will be necessary to meet stated objectives at the watershed and/or subbasin scale. Such plans would inform discussion about the kinds of landscape-scale analyses that are needed, opportunities for experiment-based adaptive management, and whether sufficient capacity is available or could be leveraged from other groups.

Fourth, essential to the adaptive management cycle are the steps to document outcomes, identify lessons learned, and share knowledge that is gained collectively. Proponents of umbrella projects should emphasize documentation of results and share knowledge from their restoration experience through

reports, meetings, conferences, and peer-reviewed publications.<sup>3</sup> Examples of cases in which umbrella projects might have done a better job of sharing information about lessons learned include the utility of Light Detection and Ranging (LiDAR) and tactics for placing Large Woody Debris (LWD). Although information appears to be exchanged regularly within umbrella projects (e.g., monthly meetings of technical teams), it is not clear that this information is adequately documented or available for use by other groups. The ISRP encourages BPA to provide proponents more specific instructions regarding expectations for reporting and outcomes in relation to quantitative objectives.

### *STRATEGIC ECOLOGICAL APPROACH (CRITERION 2)*

The umbrella projects, for the most part, follow ecological principles to increase effectiveness and efficiency of habitat protection and restoration work. A hierarchical approach is often used to assess conditions across streams and valley bottoms at a broad spatial scale before narrowing the focus to reach and site-specific scales within streams. Although most projects include broad geographic areas, they often do not incorporate important landscape-scale components such as dominant watershed processes and disturbance regimes, upslope conditions influencing riparian and aquatic habitat quality and function (e.g., roads, vegetation, and erosion), and human development. This “ridge top to valley bottom” approach is critical to long-term success of restoration. To fully incorporate this approach it will likely require involvement by a variety of disciplines including hydrologists, ecologists, geomorphologists, silviculturists, and engineers.

During their presentations, the proponents described how the Fish and Wildlife Program’s subbasin plans provide an overall framework for prioritization. However, significant new ecological knowledge has been acquired in some watersheds since the completion of the subbasin plans. The ISRP encourages proponents of umbrella projects to seek out new information being collected by other organizations and to use it to refine the prioritization and design of restoration projects. The ISRP also recognizes and commends efforts by some proponents to adjust objectives and priorities based on new information on limiting factors reported recently in salmon recovery plans and associated life cycle models. In most cases, proponents have relied on the Ecosystem Diagnosis and Treatment (EDT) model for assessment and planning purposes. A notable refinement is the Restoration Atlas being used as a planning tool in the Grande Ronde Model Watershed project.

### *ORGANIZATION ACROSS BOUNDARIES (CRITERION 3)*

Partnerships across boundaries are essential for the long-term success of umbrella projects. To date the projects have increased and enhanced collaboration and cooperation with a wide range of partners (Federal/ State/Local agencies, Tribal Governments, NGOs, and landowners). This collaboration has served to increase technical capacity and increase project funding through leveraging of resources.

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<sup>3</sup> A good example of information sharing is the recent publication Bouwes, N., S. Bennett, and J. Wheaton. 2016. Adapting adaptive management for testing the effectiveness of stream restoration: an Intensively Monitored Watershed example. *Fisheries* 41: 84-91. DOI: 10.1080/03632415.2015.1127806

Although there are many good examples of meaningful coordination and leveraging of restoration work, technical skills, and funding between umbrella projects and national forests, there is also room for substantial improvement. In many watersheds, federal lands administered by the U.S. Forest Service (Service) represent a major portion of total land ownership. Often these lands can play a disproportionate role in influencing downstream water quality and aquatic habitat. National forests can also be a source for the raw materials (large wood) needed for some restoration activities.

In many watersheds, the Service is itself restoring habitat both instream and upslope (e.g., improving roads, vegetation and fencing), in ways that may be parallel or complementary to activities conducted through the umbrella projects. It is clear that restoration activities undertaken by the two organizations could be better coordinated or integrated. Perhaps interdisciplinary technical skills in the Service could be applied to umbrella projects to enhance project design, planning, implementation, and monitoring. The Service also has programmatic agreements for environmental analysis and/or consultation that might be used increase the efficiency of restoration by umbrella projects. More cooperation and integration of efforts between the Service and umbrella projects, together with greater leveraging of resources, could lead to more efficient and effective restoration at the landscape scale.

#### *PUBLIC ENGAGEMENT (CRITERION 1)*

Umbrella projects have made significant progress in engaging landowners and local communities both formally and informally. This engagement has served to improve communications and general community support for conservation and restoration activities. It also has enabled greater implementation of restoration projects on private lands. Accordingly, the ISRP encourages a continued, and perhaps greater, emphasis on community engagement. Most umbrella projects support a variety of activities related to public engagement, but comprehensive public/community outreach programs are often lacking. Further discussion is needed on the degree to which such programs are viewed as a primary component of umbrella project activities. The ISRP recognizes that this topic was not explicitly requested as a component of the 2017 progress report; however, in future reports, we would like to see summaries of progress toward encouraging and sustaining effective community involvement.

#### *CLIMATE CHANGE AND HUMAN DEVELOPMENT (CRITERION 2)*

Few umbrella projects incorporate specific criteria to screen projects relative to their expected benefits based on predictions about changes in climate (e.g., [ISAB 2007-2](#)) and human population impacts (e.g., [ISAB 2007-3](#)). An important concern is that future climate change, urban expansion, and/or increasing demands for food and water may diminish or eliminate some habitat restoration benefits. The locations and magnitude of predicted changes in land use, critical aquatic habitats, water availability, and water quality should be considered in selecting the location and design of restoration projects.

#### *CONTAMINANTS (CRITERION 2)*

Some umbrella projects employ remedial strategies to reduce the potential impact of contaminants on aquatic resources. However, none has assessed the relative importance of contaminants or described

specific actions for addressing contaminants as part of overall project activities. In its review of the 2009 Fish and Wildlife Program, the ISAB concluded that anthropogenic chemical proliferation in the Basin is a priority for resolution ([ISAB 2013-1](#))<sup>4</sup> and the ISRP ([2013-11](#)) concurred with this conclusion after reviewing and visiting restoration projects throughout the Basin. Chemical inputs into the watershed are ubiquitous with treated agricultural fields abutting streams, weed management, mine tailing removal, mines operating and new mines proposed, roads adjacent to rivers, sewage treatment plants, and chemically intensive industries operating in urban areas. As recommended by the ISAB, there is an urgent need to quantify and map the spatial patterns of these chemicals; assess their transfer, accumulation, and persistence; and document their impact on Columbia River ecosystems. While the ISRP does not expect proponents of umbrella projects necessarily to investigate the sources, fate, and transport of contaminants, the ISRP encourages proponents to use existing resources (i.e. Oregon Department of Environmental Quality [ODEQ]) to identify and implement projects that reduce the impacts of chemicals, to identify where contaminants are likely to neutralize benefits from habitat restoration projects, and demonstrate shared leadership on addressing this issue.

### *DENSITY DEPENDENCE (CRITERION 2)*

The ISAB ([2015-1](#)) reported surprisingly strong evidence for density-dependence in salmonid populations in the Columbia Basin in nearly all regions where density effects were examined. That ISAB report describes how monitoring for density dependence and appropriate responses by habitat practitioners can improve the efficiency and cost effectiveness of restoration actions. Examination of density dependent relationships can 1) identify life stages requiring habitat restoration and 2) set the baseline for current salmon capacity and productivity in river and estuarine habitats. Mechanisms leading to density dependent responses include limitations in spawning habitat, rearing habitat, food supply, competition with other fishes, and predator-prey interactions. Furthermore, when evaluating the response of fishes to restoration actions, density dependence should be considered because density affects growth of juveniles, dispersal from natal habitats, survival, and pre-spawning mortality of adult salmon. For example, high spawning densities can lead to reduced growth and productivity (relatively few smolts produced per spawner). Key metrics for evaluating density dependence and habitat capacity to support salmonid populations include spawner abundance, smolt abundance and size by age, pre-smolt emigrant abundance and size, and adult returns by age.

The ISRP recognizes that umbrella projects may have limited funds for monitoring fish responses to habitat conditions, including density dependence. In this situation, the proponents of umbrella projects should develop a close working relationship with other groups in the region that are monitoring habitat and the response of fish populations to habitat and environmental conditions (e.g., CHaMP, ISEMP, AEM, and State and Tribal organizations). Ideally, these collaborations would facilitate identification of projects needed to increase productivity and capacity of salmonid populations and facilitate evaluation of habitat restoration on those populations.

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<sup>4</sup> This recommendation follows from the ISAB's Food Web Report ([2011-1](#)) and PNAS article ([Naiman et al. 2012](#)).

## PROPOSAL FOR A WORKSHOP AND PILOT PROJECT

The ISRP recognizes that adopting a comprehensive landscape approach to habitat restoration is a new and complex undertaking. It will require thoughtful leadership for diverse program components to come together synergistically to produce desired outcomes. Accordingly, the ISRP suggests that a workshop involving restoration practitioners, research and monitoring teams, the ISRP, and the Council is needed to resolve some of the practical obstacles to implementing a comprehensive landscape approach. The ISRP suggests that the multi-day workshop should focus on one umbrella project that has already made significant progress and that could serve as a pilot for other projects to follow. Representatives from all umbrella projects should participate to enhance active experiential learning and diffusion of innovations. The Tucannon umbrella project appears to be a good candidate as it already has many strong elements and is relatively manageable in size. Perhaps this workshop and pilot project approach could be the topic of a Council Science and Policy Forum in 2017 or 2018.

## OTHER PROGRAMMATIC COMMENTS

**Project Review Group Composition and Conflicts of Interest.** The ISRP remains concerned about the potential for conflicts of interests to arise during the selection of projects and contracting of groups to implement restoration projects. We recognize that some umbrella projects may have access to a limited number of experts who inevitably may be involved both in prioritizing and implementing projects. For this reason, specific policies are needed to help avoid such conflicts, as have already been adopted in some umbrella projects. Future progress reports for all umbrella projects should describe how potential conflicts of interest are avoided.

**Long-term Maintenance of Restoration Projects.** The ISRP recommends robust consideration of, and planning for, long-term maintenance of restoration treatments. Many restoration treatments have been in place for 10-15 years or more and will likely require maintenance in the near future, especially following major flood events or other disturbances such as windstorms and fire. Currently, it does not appear that the funding or time required for future maintenance of completed projects is anticipated in the work plans of umbrella projects. A systematic approach to ensure periodic maintenance could help to avoid a budgetary bottleneck in years when many projects suddenly need to be repaired and maintained. This ISRP recommendation is consistent with the 2014 Fish and Wildlife Program priority to fund long-term maintenance of assets created by prior Program investments and the Council's [Operation and Maintenance Strategic Plan](#), which is currently focused on artificial production programs, fish screens, and lands (also see [IEAB 2015-1](#)).

**Geodatabase and Information Storage and Sharing.** Most umbrella projects would benefit from having a geodatabase for data/information storage and reporting/mapping. Such a database would be useful, especially for umbrella project lead entities and oversight organizations, for tracking the location and important details of various restoration and management activities. A good example of this is the Resource Inventory operated by the Columbia Estuary Partnership.

## V. ISRP RECOMMENDATIONS AND COMMENTS ON EACH UMBRELLA PROJECT

### COLUMBIA RIVER ESTUARY HABITAT RESTORATION (200301100)

- [Umbrella review progress report](#)
- Background info in Taurus: [Project overview](#) | [Reports](#) | [Past reviews](#)
- Lower Columbia Estuary Partnership [website](#)

#### *QUALIFICATIONS*

This is a model umbrella project. There are, however, some qualifications that need further attention. They should be addressed during project implementation, future reporting, and regularly scheduled reviews. Although the ISRP expects the project proponents to begin work on these qualifications immediately, the ISRP is not seeking an immediate response, but will evaluate, in future reviews, the extent to which these qualifications were addressed.

1. The use of species-area curves to help establish how much habitat needs to be restored to protect commonly occurring species is a promising approach. There is a need, however, to define what is meant by common species and explain how species presence will be determined. Given that species assemblages differ due to habitat attributes, will the acreage needing protection be split out by habitat type, e.g. upland forest, tidal marsh, etc.? Additionally, a brief explanation of how expected species preservation will be assessed after restoration is needed.
2. Consider conducting evaluations that (a) assess major upslope watershed conditions that may affect estuary conditions and (b) appraise the contributions of current projects to overall restoration effectiveness at the landscape scale. These assessments would support the completion of a comprehensive prioritization of restoration actions in the estuary. The present approach seems to rely on partners to bring forward potential projects. These are then reviewed for salmon Survival Benefit Unit (SBU) scores and feasibility. A comprehensive evaluation and prioritization of potential restoration actions might lead to greater, long-term efficiency. We suggest, at least initially, that land ownership not be considered in this prioritization process. Clearly though, land ownership and feasibility will eventually be needed to determine the ultimate priorities and extent to which the project goals and objectives might be best achieved.
3. More fully describe to what extent the current SBU process for selecting priority projects contributes to general goals for biodiversity and ecosystem restoration under revised, 2016 acre targets for the restoration of priority habitats.

## COMMENT

### 1. Overall comment and ISRP review history

The Partnership is an outstanding project. It continues to provide a wide assortment of services to partners and leverages a variety of funding and other resources to enhance its ability to restore and protect estuary and lower river habitats.

Since 2002, the ISRP has evaluated this project in four distinct review processes. In addition, the ISRP and ISAB have also been involved with reviews of other restoration and RME plans and projects related to this project. A significant portion of monitoring for this project and for work in the estuary is conducted under a separate project that is managed by the Partnership: Lower Columbia River Estuary Ecosystem Monitoring, [200300700](#).

### 2. Purpose, objectives, and priorities

This Umbrella Project has a clearly articulated purpose, quantitative objectives, and well-defined priorities, and it is rooted in solid scientific concepts. It has excellent leadership and, as a result, the program is well-poised to meet contemporary and future environmental challenges. The purpose, objectives, and priorities of the Lower Columbia Estuary Partnership (Partnership) are presented in the Partnership's progress report and numerous supplemental appendices and reports. There does not, however, appear to be an overarching "whole watershed" strategy to prioritize and integrate its wide-ranging activities over the extensive geographic area of the project.

The lower Columbia River, from Bonneville to the plume was designated an "estuary of national significance" by the U.S. Environmental Protection Agency. The ultimate goal of the Columbia River's National Estuary Program is identified as "restoring biological integrity of the lower Columbia River ecosystem." When first established in 1995, project objectives were to produce a conservation management plan, develop a network of partners that could implement actions contained in the plan, and serve as an administrative center for habitat restoration for the lower Columbia River and its estuary. The completed Management Plan identified acreage targets and time frames for restoration and protection of native habitats, e.g., 19,000 acres by 2014 and 25,000 acres by 2025 to address the goal of biological integrity. In 2016, additional voluntary target habitat coverage targets were identified, e.g., "recover 30% by river reach of historic extent for priority habitats by 2030 (restore 10,382 acres)." This was one of the few projects that identified quantifiable objectives with explicit time lines. Since 2010, there have been major changes in overall program focus and operation with substantially increased focus on implementing the Action Agencies' Columbia Estuary Ecosystem Restoration Program (CEERP) objectives and contributing to meet the goals listed in the FCRPS BiOp. Additionally, starting in 2010, BPA began direct funding of work through contracts with five of the primary restoration entities in the Lower River, instead of funding going to the Partnership for distribution.

The decision by BPA to directly fund projects diminished the administrative responsibilities of the Partnership. However, it still acts as the focal entity for habitat restoration in the lower Columbia River and estuary and delivers a wide range of other services. These include overseeing solicitations for

projects, making refinements to the project review and prioritization processes, and maintaining a “Resource Inventory” geodatabase that is a repository for data associated with all the recovery and restoration actions occurring in the lower river and estuary. The Partnership also provides technical assistance for project concepts, design, and tools for landscape assessment including the Columbia River Estuarine Ecosystem Classification and Lower Columbia Terrain Model. It facilitates comprehensive fish passage assessments, lends equipment, and also acts as lead for implementation of the Action Effectiveness Monitoring and Research Program (AEMR) which is directly funded by BPA.

During the Geographic Review in 2013, the ISRP asked the Partnership to provide scientific justifications for its goals of habitat acres needing protection and restoration. The Partnership’s Science Work Group recently addressed this request and developed an approach that uses “species-area curves.” An explanation of the process, originally used by The Nature Conservancy, was provided in Appendix B. This is an important step and an improvement over how acreage targets were established in the past. In this same review the ISRP also asked how the 51 reference locations were chosen and justified. It was explained that regional experts identified relatively untouched areas representing a comprehensive array of habitat types. These sites are being used as baseline locations to help evaluate restoration effectiveness and trends in overall ecosystem function.

The progress report would have been more complete if additional information on how the project has organized and integrated its partners’ activities to achieve project goals and objectives had been provided. For example, what is the relationship between the National Estuary Program administered by EPA, this umbrella project, and the FCRPS BiOp goals and objectives? Additionally, it was not clear which organizations received most of the subcontracts. Some of this information is explained in the background section of Question 3 but could be expanded.

From a science perspective, the Partnership’s 51 habitat baseline locations, AEMR program, Restoration Inventory, GIS maps, habitat inventories, status and trends monitoring of fish communities, food webs, and ecosystem conditions, identification of toxic contaminants and subsequent clean-up efforts, and project selection and prioritization protocols all contribute to estuary and lower river restoration. Additionally, the Partnership is making an effort to anticipate how restoration actions can help alleviate some of the impacts of climate change, such as sea level rise, elevated water temperatures, severe and dynamic weather events on coastal landscapes, ocean acidification, and decreasing levels of dissolved oxygen.

### **3. Administrative history**

Current roles and responsibilities of the Partnership are multi-faceted. Consequently, a summary chart or table showing the Partnership, its key players and their respective roles would be useful. As noted in Section 1 of the progress report, there have been substantial changes to the role and primary focus of the Partnership since 2010. The changes are primarily related to completion of the FCRPS BiOp and meeting associated goals and SBU recovery objectives. (See discussion in Item 1). Currently the Partnership plays a major role in coordinating solicitation, project review, and recommending projects for funding to BPA. It also selects and funds projects that are outside the scope of direct BPA funded

projects and recently has begun to implement projects in the Columbia River, upstream of Portland, particularly dealing with cold water refuges supported by an EPA grant.

As noted, the administrative activities of the Partnership have evolved over time. An initial emphasis was on administering funds from BPA and the USACE to regional partners engaged in work for prioritized restoration actions. Over time, contract administration became less important and the Partnership has put more emphasis on other functions. It now has staff dedicated to community relationships, education, volunteer opportunities, and a restoration science team. Its science team is also directly involved with the design and application of restoration actions. This expansion into new areas of service is intended to (a) increase public support for restoration actions in the estuary, (b) educate school children and others on the vital functions that the Columbia estuary and its accompanying uplands provide to multiple species, and (c) illustrate where and how restoration is occurring. These efforts at public outreach are vitally important, but often neglected elements, that need to be incorporated into all conservation and restoration programs.

The progress report describes a program that is continually evaluating itself and evolving accordingly. It describes this process as adaptive management, but it is passive rather than active adaptive management. The proponents describes general ways in which the program has evolved, but for clarity it would have been useful to provide specific examples of project changes that led to substantial improvements in subcontracting projects and overall program efficiency.

#### **4. Project prioritization and selection process**

The project prioritization and selection processes are well-vetted and tested with regard to solicitation, review, and selection. They appear to be systematic and carefully designed with multiple steps for project review and modification. There are three periods during each calendar year when the Partnership initiates solicitation and reviews for proposed projects. These opportunities are posted on the Partnership's webpage which also includes directions on how to apply, how much funding is available, restoration priorities, and so forth.

All estuary restoration actions are reviewed by the Estuary Partnership's Science Work Group, undergo a second technical review, and are then assigned a mitigation credit score, the salmon Survival Benefit Unit (SBU) by the Action Agencies' Expert Regional Technical Group. BPA makes funding decisions based on the SBU score and the overall project cost. The actual process for comparing biological benefits to implementation cost was not described and appears to be primarily a subjective evaluation.

Given the current focus on meeting the goals of the FCRPS BiOp, project prioritization and selection ultimately depends on the adequacy of the SBU approach and the ability of partners to independently identify the most productive projects. The SBU approach is critical and was previously reviewed by ISRP and ISAB. Details of this approach were not described in this report; however, the ISAB reviewed how SBU scores were produced ([ISAB 2014-1](#)) and concluded that the extant SBU calculator provided a systematic method for ranking projects by taking into account their scale and likelihood of success. The procedure, did however, possess flaws that are common to all "expert opinion" assessments. It is

uncertain whether a more quantitative method can be developed to replace the current method of SBU calculation.

The general project-wide implementation approach used by the Partnership seems to rely on specific ideas/project proposals, developed individually by the five major partner groups, rather than being a product of a comprehensive evaluation of the estuary and prioritization of all potential actions needed to achieve established goals and objectives. Considerable monitoring has been conducted in the estuary, and it is possible that restoration ideas have been developed and prioritized elsewhere. The Tucannon River Umbrella Project conducts comprehensive evaluations of what is needed across the landscape and then finds partners to implement specific projects in priority areas. This type of comprehensive approach may be more efficient in the long term for this project and should be considered for use. Additionally, this type of comprehensive approach was identified in the ISAB/ISRP Critical Uncertainties report ([ISAB/ISRP 2016-1](#)): "What are the highest priority estuarine habitat types and ecological functions for protection and restoration."

Given the large number of participants and the shifting roles and responsibilities for the Partnership, there is a risk of confusion regarding potential conflict of interest (COI). The Partnership, however, has provided detailed information and direction on avoiding potential conflict of interest in the Partnership's Personnel Handbook. There is also a policy paper "Principles of Review" which directly addresses guidelines for non-Partnership employees and helps to ensure project selection is done in fair manner.

## **5. Reporting, Program Progress and Adaptive Management**

A list of projects accomplished for the time period October 2013- 2016 is included in Appendix A. All projects were selected for implementation using the process and criteria explained in the report. During 2013 through 2016, 542 acres were restored compared with the NEP objectives of 25,000 acres by 2025. From the time period 1999 to 2016, however, 22,685 acres were protected or restored. The report notes that annual and cumulative results for protection and restoration accomplishments are described in the annual "Year in Review" that is distributed to partners and made available on the website. Since the inception of the Columbia River Estuary Habitat Restoration project (2003-011-00), 19 Annual progress reports and 85 status reports have been produced.<sup>5</sup> The Partnership's [website](#) indicates that since its inception, 99 reports have been produced by the Partnership and its collaborators.

In addition to annual reporting, an estuary-wide conference is held every two years and a report on the status of habitat conditions and water quality is produced every five years in the State of the Estuary report. Reports are available online, but detailed results on progress to date were not provided in the progress report. An accounting of how many SBU units have been produced by estuary restoration projects would be of particular interest. Additionally, an investigation into the relationship between SBU values and observed salmon survival could validate their utility or lead to some refinements on how SBUs are estimated.

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<sup>5</sup> See [www.cbfish.org/Project.mvc/Display/200301100](http://www.cbfish.org/Project.mvc/Display/200301100)

The progress report also addressed a previous ISRP question about the development of an action effectiveness monitoring and research (AEMR) plan. The report notes that this Plan is evolving and a new report will be provided in 2017 that updates the 2013 draft report. Specifics of changes were not described in the progress report.

Other recent project accomplishments reported include completion of a GIS-based prioritization process that will be used to identify potential restoration locations. They also collaborated with the U.S. Geological Service (USGS) and University of Washington (UW) scientists to create an ecosystem classification system that will help with habitat restoration site selection. Additionally, the Partnership monitored restoration effectiveness by evaluating juvenile salmon use, diet, food web interactions, and water quality at a number of locations. They also completed a fish passage assessment and are assessing and reducing contaminants in the estuary and Lower Columbia River, all while maintaining and conducting a very active education and volunteer program. Additional details of these and related activities can be found on the Partnership's [website](#).

There is a discussion on the importance of adaptive management and generally how the application of lessons learned has helped to upgrade project designs, prioritize restoration actions, and enhance overall program processes and efficiency. Two examples of recent application of lessons learned from adaptive management were described. In the first, the Partnership identified cold water refuges to develop increased understanding of the importance of protecting, enhancing, and restoring cold water sources and pockets, particularly from Portland to Bonneville Dam. Initial actions to improve access to cooler water and potential locations and designs for future work are described. The proponents suggest that projects that address the need for cooler water will become a more frequent priority in the future with warming temperatures. The second example is a climate change assessment and modeling effort designed to adapt current management practices to probable future conditions. Efforts are underway to assess sea level rise, identify areas for future protection, identify and protect more inland areas behind existing habitats, and identify areas for strategic levee and dike modifications. Finally, the proponents have published several articles in the primary literature, maintain excellent databases, and widely disseminate results and lessons learned.

## WILLAMETTE BI-OP HABITAT RESTORATION (200901200)

- [Umbrella review progress report](#)
- Background info in Taurus: [Project overview](#) | [Reports](#) | [Past reviews](#)
- The Oregon Watershed Enhancement Board has a [website](#) and a webpage for the [Willamette Special Investment Partnership](#), but no website was found for the new Focused Investment Partnership.

### *QUALIFICATIONS*

These qualifications should be addressed during project implementation, future reporting, and regularly scheduled reviews. Although the ISRP<sup>6</sup> expects the project proponents to begin work on these qualifications immediately, the ISRP is not seeking an immediate response, but will evaluate, in future reviews, the extent to which these qualifications were addressed.

1. Proposed monitoring and evaluation plans should be finalized and implemented. The relationships between, and integration of, effectiveness and other monitoring needs to be described.
2. Objectives should be developed in the immediate future to describe quantitatively what desired outcomes are for the project, a projected time frame for accomplishing them, and how these outcomes relate to past accomplishments need to be stated.
3. The progress report should provide some results beyond a summary table of project titles, locations, and costs.
4. The progress report needs to address the ISRP's 2013 concern about contaminants. Are they monitored? Do contaminants affect the success of the project's restoration efforts?

### *COMMENT*

#### **1. Overall comment and ISRP review history**

Overall, the Willamette Program appears to be a good model for collaborative, deliberate, and science-based umbrella projects for basin-wide restoration.<sup>7</sup> It represents a broad-based cooperative effort with excellent leveraging of funding to achieve common goals. The report was well written and generally easy to follow, though the actual organization and its operations for the new Focused Investment Partnership

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<sup>6</sup> We disclose that one of the ISRP members, Stan Gregory, has developed tools and analyses that contribute to the Willamette project. He does not receive funding through the project, BPA, or ODFW, but to avoid the appearance of potential bias, he was not on the primary review team for this project.

<sup>7</sup> The ISRP recommended that this project met scientific review criteria in the Geographic Category Review (2013-11; also see ISRP 2010-29, 2010-22).

(FIP) could be more clearly communicated with a figure that describes the organization and individual roles and responsibilities of various participants.

The only major weakness is the lack of assessing Program progress. The progress report also provided no results except a table listing the project titles, locations, and implementation costs. While it appears that some monitoring is occurring (i.e., funded by Bonneville Environmental Foundation and Meyer Memorial Trust), a coherent description of the proposed and existing RM&E efforts, including a plan for rolling out future activities, and how those data will be applied in assessing the Program progress, should be provided. Substantial habitat restoration has occurred due to the partnership's project prioritization and selection processes. The Willamette Program will become even more effective once its compliance, effectiveness, and status and trends monitoring programs have been finalized. A timeline for this was not provided. Data collected from these monitoring efforts should lead to improvements in prioritizing what habitat needs to be protected and how best to reach its twin overarching goals of restoring ecological functions to impacted habitat and to reducing any further additional habitat losses.

## **2. Purpose, objectives, and priorities**

The goal of the current version of the Willamette Program is “to sustain and enhance seasonally important resources for native fish through floodplain reconnection, increased channel complexity and floodplain forest restoration.” It is a well-stated goal, and one that is likely to be successful through the partnerships', proposal review process, and potentially through the execution of a well-conceived monitoring and evaluation plan.

To accomplish the Program goal, the FIP identified two objectives, one to enhance the quality and extent of summer-fall habitats and other to do the same with winter-spring habitats for native fishes. Eight restoration actions were proposed by the FIP to accomplish these broad objectives. Additionally, the FIP indicated that a preference would be given to restoration/protection actions in Anchor Habitats located above Willamette Falls. Anchor Habitats are habitats with high conservation values along the river corridor and are located at major tributary confluences and river sections where there are opportunities to re-connect the river to its historic floodplain. Actions in the four Anchor Habitats located below Willamette Falls would, however, be considered. The ISRP generally supports this approach, however, we note that Program objectives should be quantitative and time bound so that success towards Program objectives can be evaluated.

The priorities for the Program align with the emphasis on anchor habitats at confluences between major tributaries and the mainstem Willamette and in reaches where floodplain connectivity can be achieved. Protecting and restoring Anchor Habitats has been a consistent long-term strategy of the Willamette Program. At these locations, the Program emphasizes habitat restoration and conservation for the following four fish species:

- Upper Willamette spring Chinook (*Oncorhynchus tshawytscha*)
- anadromous Upper Willamette steelhead (*Oncorhynchus mykiss*)
- non-anadromous bull trout (*Salvelinus confluentus*)
- Oregon chub (*Oregonichthys crameri*)

Strengths of this program are in the science-based approach to recovery through actions in reaches that prioritize restoring connectivity and the quality of anchor habitats. In addition, the strategy draws from the overlap in approach provided by the Anchor Habitat Strategy and the Subbasin Plan for recovery of the four fish species. It appears that the two mesh well.

### **3. Administrative history**

The Willamette Program has a strong history of partnerships, beginning back in 2008, when the Meyer Memorial Trust (MMT) and OWEB collaborated to implement the Willamette Special Investment Partnership (SIP) as an umbrella program. Simultaneously, the Willamette River Biological Opinions (BiOps) were released by NMFS and the USFWS. The BiOps led to the establishment of the Willamette Action Team for Ecosystem Restoration (WATER) which was created to coordinate the implementation of the BiOps. Collaboration between these programs (MMT, OWEB, NMFS, USFWS, WATER, and Action Agencies) eventually led to the Willamette Program. The recent creation of the Focused Investment Partnership (FIP) continued a trend of including more entities in the Willamette Program. As noted above, the original SIP had two partners. It was then expanded by the addition of BPA, WATER, and WATER's Habitat Technical Team and other technical teams. FIP has some 16 entities that include, among others, watershed councils, soil and water conservation districts, land trusts, Oregon state agencies, The Nature Conservancy, and the Bonneville Environmental Foundation. The ISRP commends the team in their ability to engage a broad network of partners and to leverage expertise and funding to accomplish priority work.

Although it is clear that the Habitat Technical Team is identified as the heart of the project, and that it provides strategic guidance and prioritizes projects, the ISRP found it difficult to fully understand the relationships among all of the project partners under the current FIP. A summary diagram would be extremely helpful to clarify current leadership, roles, and responsibilities within the FIP.

### **4. Project prioritization and selection process**

Under the FIP there is an annual solicitation for proposals which is announced on the internet by OWEB. Eligible applicants are organizations that are part of the FIP Working Group (i.e., one of the current 16 groups shown in Appendix I) or other entities doing work in Anchor Habitats. To obtain funding the project must take place in an Anchor Habitat area. Additionally, it must increase channel complexity and length, improve connectivity between the mainstem and the floodplain, or expand the extent and health of floodplain forests. Preference is given to projects that have been identified in Willamette recovery plans, those that occur in the two-year inundation zone, and those that connect contiguous acres.

All prospective projects move through a multi-step application and review process. The application materials produced are used by all three (OWEB, MMT, and BPA) funders. The submission process involves a pre-proposal, site visits, and project reviews by the TRT to recommend which projects should be invited to submit full proposals. Proposals are evaluated using the WATER/HTT project selection criteria shown in Appendix F of the progress report. Recommendations resulting from this review are shared with the three funding entities, who allocate their funding among the selected proposals. Each

funder enters into its own grant agreements with individual proponents and administers its own reporting and compliance agreements. A conflict of interest policy is in place.

The preference for restoring and protecting Anchor Habitat areas resulted from an analysis by The Nature Conservancy that showed areas of greatest conservation concern in the Willamette were located at tributary confluences with the mainstem. This initial assessment has been supported by a spatial database referred to as SLICES. The mainstem of the Willamette has been divided into 229, 1-km wide slices of floodplain that are set at 90° from the floodplain axis. Since 2000, data has been gathered and periodically entered into the database on each "slice." Using this information color coded maps were developed to show areas with high ecological benefits and low socioeconomic constraints. A high correlation between SLICES priorities and Anchor Habitats was found, providing an independent appraisal of the ecological importance of Anchor Habitats.

Projects are prioritized by their location (i.e. within an anchor habitat, on mainstem or at a major confluence, within the two-year inundation zone), their leveraging of previous program investments, and identification in existing recovery plans. Projects are expected to produce one or more of three measureable restoration benefits in anchor habitats:

- Increased channel complexity and length;
- Improved connectivity between the river and its floodplain; and/or,
- Expanded geographic extent and improved health of floodplain forests.

However, while the steps in the general project review process seem clear, the actual project prioritization and selection was not adequately described. For example, Appendix F in the progress report describes "project selection criteria" for the process overseen by the Habitat Technical Team. The criteria are uniformly qualitative, and there are no examples of how the process actually occurs. It was not clear how all these elements are integrated to reach a final project "score" for ranking. A summary table or diagram of project prioritization and scoring would be helpful, as would an example of it being applied to a sample project.

## **5. Reporting, program progress, and adaptive management**

Since 2009, at the beginning of the first SIP, the project has completed 13 annual reports and 86 status reports. From 2008 to 2015, OWEB, MMT, and BPA have awarded approximately 13 million dollars for ~40 restoration projects along with several research projects. Many of the restoration projects had multiple phases. Work was conducted by local, state, tribal, federal, and non-profit agencies as well as watershed councils, businesses, private citizens, and soil and water districts. Some major programmatic accomplishments were discussed during the project presentation to the ISRP, including restoration activities at Harkens Lake, which created an additional 21 days of floodplain inundation. In addition, the Oregon chub was a beneficiary of this work and is the first fish species to be de-listed under the ESA. Currently, a ~140 thousand Oregon Chub are estimated to inhabit a number of sites in the basin.

The weakest part of the Willamette Program is a lack of documentation on Program progress towards meeting quantitative, time sensitive objectives. A summary table of projects completed from 2010 to

2016 provides a brief description of year, project location, implementer, and cost. It reflects extensive leveraging of funding with totals for the reporting period at OWEB \$6.6M. Meyer Memorial Trust \$5.7M and BPA \$3.5M. However, there was no listing of accomplishments, such as acres or stream miles treated/improved or outcomes from this work needed to gauge the extent of completed work or overall program progress. ISRP members noted concerns that the Program objectives were not framed quantitatively enough within specific time frames for evaluating their accomplishment. The objectives should help frame the question of how much work and time it takes to actually make a measurable impact on recovering target species. It is noted that the current project contract will expire in 2023 so such objectives seem particularly important and should be developed in the immediate future. Given the complexity and broad geographic area of the program, quantifiable objectives are needed to ensure efficient operations.

The proposed monitoring and evaluation program, outlined in the progress report, is generally a well-conceived approach that addresses the typical three tiers of monitoring – implementation, effectiveness, and status and trends – and provides different and logical goals for those tiers. It is a strength of the program that it supports funding of the (applied) science needed to develop strong monitoring programs. Furthermore, the program does not aim to monitor everything everywhere, but instead proposes to measure those attributes in study reaches that represent either high-functioning anchor habitats or areas where limiting factors need to be addressed. This general approach is scientifically sound and likely to lead to an effective use of monitoring and restoration resources.

However, details on the implementation of the M&E program, as well as evaluation of Program progress, are missing. For example, regarding the M&E program, it was not clear who would be responsible for which monitoring activities or how the ongoing monitoring already conducted throughout the basin (i.e., status and trends on spring Chinook) would be used to assess individual projects or the Program more broadly. Further, clarity is needed on the actual RM&E plan, how and when it will be rolled out, and how data will be managed and shared.

Other details are also missing. For example, regarding the effectiveness and status/trends monitoring, the ISRP agrees with the approach to target sites where the ability to learn and making meaningful and rigorous measurements is highest. However, the details of the approach are missing. How many new and existing projects do the proponents expect to monitor each year? How will they be selected? It is also not clear how the collection of vegetation and structure data, discussed under implementation monitoring, will be conducted or how it will contribute to Program assessments.

It appeared that some status and trend monitoring is occurring at the basin scale, and that some monitoring is occurring or will occur at the project scale. How will these different levels of monitoring be integrated to assess Program progress?

It was clear that work toward measuring results is ongoing. The progress report suggests that considerable effort will be dedicated to establishing robust monitoring plans. Arrangements are in place to have a monitoring coordinator for the project. This individual will oversee the Program's implementation and effectiveness monitoring efforts. Additionally, the Bonneville Environmental

Foundation, USGS, The Nature Conservancy, plus other consultants and experts are scheduled to develop an effectiveness monitoring plan. This effort will be vetted by an external review team consisting of experts in fishery biology, geomorphology, and floodplain issues in the Willamette. A status and trends monitoring plan will be developed and conducted by University of Oregon and Oregon State University personnel.

As the RM&E plans come together, additional factors may be considered, including seasonal water temperature profiles at specific reference points, status of cold water refuges, and contaminant presence and concentrations in floodplain soils and mainstem waters.

Finally, the progress report did not include any discussion of lessons learned or of an adaptive management component to the Program, though it is clear that the Program has adapted. For example, priorities for habitat protection and restoration have changed over time with the growing emphasis on the two-year inundated floodplain habitats as conservation areas. There are likely more examples, but they were not presented in the progress report or its appendices.

## **6. Other concerns**

1. The 2013 ISRP review raised concerns about the lack of projects in the lower Willamette. The ISRP understands there are logistical and programmatic reasons associated with this, but request that this justification be provided.
2. The text in the progress report about who can participate in the proposal process was confusing and raised questions about the inclusiveness of the Program. The text should be clarified to indicate that everyone working on Anchor Habitats has an opportunity to submit and review proposals, rather than only members of the FIP.
3. It would help to have organizational diagrams of:
  - a. The new FIP program organization, including funding components, who are the partners on the working groups, etc.
  - b. Monitoring components to explain who is doing what with funding from where.
4. The progress report provides a list of key limiting factors; however, it did not include contaminants, as the ISRP requested in their 2013 review. The ISRP notes that contaminants were included in the Willamette EcoReport Card. Consequently, an analysis using existing data to ascertain whether contaminants impact the effectiveness of restoration actions is needed. Such an analysis would help determine if the Program needs to establish additional partnerships to address contaminants. Previous reports from the ISAB on Columbia River Basin Food Webs (ISAB 2011-1) and on Using a Comprehensive Landscape Approach for More Effective Conservation and Restoration (ISAB 2011-4) may be useful in such an analysis.

## JOHN DAY PASSAGE, FLOW AND HABITAT ENHANCEMENT (200739700)

- [Umbrella review progress report](#)
- Background info in Taurus: [Project overview](#) | [Reports](#) | [Past reviews](#)
- Confederated Tribes of the Warm Springs Reservation of Oregon's [website](#)

### *QUALIFICATIONS*

This Umbrella Project was recently reviewed by the ISRP ([2016-13](#)), and the project proponents are currently preparing a response to address the four qualifications listed below:

1. Provide a comprehensive discussion of monitoring and evaluation (M&E) linked to a more formal process for adaptive management.
2. Describe additional efforts supporting expanded information sharing and public involvement.
3. Modify Technical Advisory Committee (TAC) membership to increase the range of disciplines represented and the diversity and objectivity of its membership.
4. Comprehensively consider upslope conditions.

During the oral presentation, the Confederated Tribes of Warm Springs Reservation (CTWSR) indicated that they intend to increase multi-disciplinary representation on their technical team. The oral presentation also included a very brief introduction to a monitoring and adaptive management program, but the ISRP will need more detail to review and provide feedback on these concepts. Given that Objective #6 for the program is "Monitor and evaluate project effectiveness and compliance," the first qualification is especially relevant. The ISRP has requested on several occasions that the proponents provide information on the M&E plans for their program. This information is still needed, as is information on how upslope conditions will be addressed in their future restoration planning and implementation efforts.

The Program is still "qualified" and the ISRP expects to review a response from the CTWSR that addresses the above qualifications by April 2017. In the comments below, the ISRP offers feedback to the CTWSR in preparing their response to the qualifications.

### *COMMENT*

#### **1. Overall comment and ISRP review history**

Since its inception in 1998 (under a different name), the John Day Watershed Restoration Project (henceforth, the Project) has undergone eight reviews (under project 2007-397-00: ISRP 2016-13 and 2016-4, ISAB/ISRP CU 2016-1, and ISRP 2013-11; under project 199801800: ISRP 2006-6, 2001-8 and 6, 1999-2A, and 1998-1A). In addition, the ISRP and the proponents have engaged in an iterative discourse following the 2013 Geographic Review, which has resulted in positive progress towards addressing ISRP concerns and improving Project outcomes. However, most ISRP concerns and recommendations remain

only partially addressed, and the ISRP is eager to work towards a more productive dialogue with the proponents.

In this Umbrella Project Review, the proponents were expected to address, or indicate how the four qualifications raised in the most recent ISRP review [ISRP 2016-13](#) (listed above), would be resolved. These issues were also raised in the ISRP's initial review of the John Day Implementation Strategy ([ISRP 2016-4](#); response requested). In the Geographic Category Review ([ISRP 2013-11](#); [200739700](#)), we raised these issues and indicated that we would evaluate whether they were addressed in the Strategy.

The ISRP greatly values the CTWSR's contributions outside of the Tribal properties to achieve habitat restoration goals in the John Day subbasin. We encourage CTWSR to highlight this as a strength of their program. It is important to track and report the progress of these activities in order to demonstrate program benefits. Major improvements in the Program are associated with incorporating current science in the Implementation Strategy. This represents a significant departure from past opportunistic identification and funding of restoration activities.

Plainly, restoration is a complex undertaking. It requires thoughtful leadership for numerous program components to come together to produce necessary internal synergy as well as desired outcomes. This umbrella project has some of the necessary components, but it needs to address previous qualifications and document Program accomplishments. The progress report, for instance, lacked fundamental data on accomplishment tracking and reporting and overall Project data and information management. For gauging progress of the Program, quantitative objectives, linked to measurable metrics, need to be developed. This would allow the results and benefits of the Program to be rolled up and reported back to the Council and the public. The ISRP offers the following feedback to the CTWSR in preparing their response to the four qualifications listed above:

- A comprehensive discussion of monitoring and evaluation (M&E) linked to a more formal process for adaptive management.
  - An outline of an adaptive management approach was provided in the presentation made to the ISRP, but further and more technical content should be added to the report that provides quantitative objectives and measures of progress towards those objectives. For example, a table of metrics that link to quantitative Program objectives would help inform progress of the Program.
  - The progress report only reports what is being done and by whom (i.e., administration), and coordinating meetings. The presentation, however, included a table of metrics that documented among other things, acres and miles restored. This information would have been useful in the progress report. A holistic synthesis of the Program needs to go further than just reporting acres and miles. It needs to document how the Program is more than the just the sum its individual projects. How, for instance, are all of Programs actions affecting the landscape? Discussion with other umbrella proponents may prove beneficial in mapping out how a landscape scale synthesis can be conducted.

- Describe additional efforts supporting expanded information sharing and public involvement.
  - Plans for the integration, synthesis, and dissemination of data related to Program progress are an important qualification of this Program.
  - While the ISRP commends the proponents on the engagement of a range of representatives from management institutions and agencies in the basin, there was little discussion or analysis of the program’s social interactions with the communities and land owners, nor an evaluation of remaining social/cultural challenges. These interactions with the public may be occurring, but the progress report does not describe them, suggesting that more is needed to entice and sustain effective community involvement.
- Modify Technical Advisory Committee (TAC) membership to increase the range of disciplines represented and the diversity and objectivity of its membership.
  - The ISRP was encouraged to hear that the CTWSR would be adding technical expertise to the proposal review team and looks forward to hearing how this will be accomplished in the response.
- Comprehensively consider upslope conditions
  - The CTWSR reported during their presentation that they are looking at upland and upslope conditions and that this effort will be described in future reports. In describing their approach, the proponents should quantify the environmental conditions upstream of the sites and provide some justification that upstream land uses and conditions will not nullify the potential benefits of restoration actions. The ISRP is pleased that the CTWSR is working with the U.S. Forest Service to incorporate information from the Service’s restoration strategy, including watershed assessments into Tribal restoration planning.

In addition, the ISRP raised the following issues:

- Hatchery operations are not mentioned, nor are the release of non-native species. Are they taking place and, if so, how are they impacting restoration effectiveness and recovery of listed species?
- The ISRP encourages CTWSR consider a design team model, similar to the Upper Columbia Programmatic approach, to solicit broad and interdisciplinary feedback on project designs.

The ISRP notes that we share the goal of the CTWSR to improve habitat and fish conditions within the John Day River. Our intent is to help CTWSR achieve their goals by providing constructive reviews. To accomplish this, the frequency and quality of the Program’s reports need to improve. Comprehensive reporting will help explain the Program in a way that will allow the ISRP to provide constructive feedback and lead to an engaged and cooperative dialogue between the proponents and the ISRP.

## **2. Purpose, objectives, and priorities**

The goal of the Program *“is to protect, manage, and restore aquatic habitats in Reservation and ceded lands watersheds.”* Seven objectives toward meeting that goal are listed in the progress report. The goal represents a valid and commendable direction for a program. However, since the current objectives are not quantitative and lack timelines, it is not possible to evaluate progress in meeting them. The Program’s existing objectives are simple bullet statements that are not linked to quantitative measures. Additionally, they are not being assessed at a landscape scale, although some metrics (i.e. acres of habitat protected by easements/acquisition and fencing) were provided in the presentation to the ISRP.

The progress report also states that *“The primary goal of this project is to address limiting factors identified for anadromous fish and listed species in the John Day River Basin.”* From this statement, it appears that anadromous and ESA-listed fishes are the priority species for the Program. The project summary and presentation, however, do not explicitly state which focal species are prioritized. Thus, it would help to see a statement of exactly which fish species the Strategy is targeting for recovery. The Program also needs to clarify how the first goal of protecting and restoring aquatic habitat, relates to the second one, of addressing factors that limit anadromous and ESA-listed fishes.

In addition, the eight strategy objectives listed in the administrative history section of the progress report differ from the list of objectives listed under Purpose (from the 2013 Geographic Review Proposal). In their current stage of development, the strategy objectives are more of a plan for administrative process than objectives for restoration outcomes. They should be modified.

## **3. Administrative history**

This project was initiated in 1998 and has undergone several programmatic revisions. Perhaps most transformative was the development of the Implementation Strategy in 2012 *“to facilitate the allocation of funds to higher fish benefit actions and ensure a prioritized, restoration strategy for the use of Tribal funding in the basin.”*

The administrative structure of the John Day Watershed Restoration (JDWR) project is substantially different than other umbrella projects. The umbrella project provides funds for staff, in addition to existing Tribal staff, and also participates in the John Day Partnership. Administrative structure and decision making processes are blurred because of the complex nature of the overlapping institutional capacities and responsibilities with the CTWSR. Future reporting should provide greater clarity regarding the organizational and administrative responsibilities and accomplishments of this umbrella project compared to other CTWSR projects.

## **4. Project prioritization and selection process**

A formal project solicitation, review, prioritization, and ranking process is used, based on a scoring matrix developed from a Strategic Plan that, as reviewed by the ISRP ([ISRP 2016-13](#)), is scientifically defensible and operationally feasible. The Strategic Plan is directed toward multiple audiences including landowners. The overall process involves engaging a proposal review team, completing site visits for all

proposals, webinars on how to use the Strategy scoring matrix, and a two-day review team meeting during which projects are ranked for recommended funding by the CTWSR. The ISRP commends the CTWSR for the wide diversity of institutions engaged on the proposal review team (unnumbered Table, page 4). The Program's prioritization and selection process has only been fully applied once, in 2015. It resulted in a ranked list of projects for funding over a three year period, 2015 through 2017. A multi-agency review team comprised mostly of fisheries biologists and aquatic ecologists used a formal set of review criteria to evaluate prospective projects. Based upon past ISRP input, additional expertise in areas of hydrology and geomorphology will be added to the Review Team for the next solicitation.

Although a formal review and scoring process was used, it was concluded, as noted on page 5, that the scoring matrix did not adequately capture the value and benefit of the proposed projects. Consequently, the Review Team was asked to rank projects independently of the scoring matrix. The Project Summary did not explain this alternative ranking process. Some clarity was added during discussion with the ISRP, though it still was not clear how the alternative ranking affected project selection. The result is that the relationship between the scoring system and funding decisions were not clear. It is likely that this lack of clarity was also confusing to proposal submitters. Furthermore, it was not clear how projects were distributed geographically or to what extent they addressed upslope conditions that affect riparian and aquatic habitats.

The ISRP also found it confusing that there appears to be categories of project types that are prioritized and funded separately. In reviewing completed projects, it was noted that there are "Special Project" and "Program Support Project" categories where projects were funded in addition to actual restoration projects. Also, it was noted that juniper thinning projects were funded outside of the formal process but that in the future, an "upland" project category and a prioritization model would be used. These apparent departures from the formal process of review and selection could cause confusion among applicants. Future progress reports should provide additional information on how funding is distributed among the different project categories and how projects are prioritized when selected outside of the scoring matrix.

Following the presentation to the ISRP, there was a discussion of lessons learned from the initial solicitation and project review, which added substantial clarity beyond what was presented in the progress report. The ISRP supports the CTWSR's intention of making future improvements in the frequency and transparency of the process and requests that these lessons learned be communicated to the Council via future progress reports.

## **5. Reporting, program progress, and adaptive management**

The progress report provides a basic overview of the review process, a brief summary of project activities, and a table of funded projects. A list of more than 30 individual projects is included in the report. The projects and partners are described in the list of projects. In the 2015 solicitation, 47 projects were proposed, totaling \$6.4M in requests for a budget of \$3.4M. While not included in the report, a table describing an array of specific Program accomplishments, e.g., stream miles protected,

miles of fence installed, and other metrics was included in the presentation. The presentation also included a summary of project expenses and partners, demonstrating a greater than 1:1 cost-share.

The progress report needed more detail and reporting of progress. Information on the Strategy's prioritization of projects and characteristics of the actual review (i.e. number of proposals received and funded, metrics of expected habitat impacted, etc.) was missing. There was little or no description of links to the program objectives, timelines for completion and reporting, monitoring, and evaluation of progress toward objectives. In addition, there was no mechanism for evaluation of the trends in resource conditions and progress of the program at a landscape scale for the included properties. There was basically no discussion of data management, synthesis of the restoration actions, or scientific analyses of larger, complex issues. These should be a central activity of an umbrella project. The progress report should have also reported what was learned at the regional or landscape scale.

Neither the progress report nor presentation included a discussion of program progress relative to the strategic restoration plan. There is not a comprehensive list of projects that identifies what is needed to accomplish highest priority actions in target watersheds nor is there an indication of the scale of work and approximate costs needed to begin to make a difference at the watershed and subbasin scales. There was no mention of responsibility for reporting and data management.

There appears to be non-competitive funding for implementation and effectiveness monitoring as well as some degree of coordination with both CHAMP and ISEMP. Program funding is also supporting a streamflow gauging station, temperature and ground water monitoring, and additional pit tag arrays. In addition, ODFW is working on a Life Cycle Model (LCM) that could help estimate benefits to fish from specific actions, and data should be available from the Middle Fork John Day IMW. Furthermore, there are data from researchers working in the basin that could be used to evaluate progress towards goals. Based on a table included in the presentation, the Program appears to be tracking accomplishments toward basic restoration action metrics – stream miles fenced, riparian acres planted, etc. The key weakness is that there was no summary, synthesis, or dissemination of monitoring results or findings to track the progress of the program. Such information is likely to lead to further collaborative efforts among partners, local landowners, and the CTWSR. Thus, it should be summarized and reported back to the stakeholders in the basin.

There are some examples of identifying lessons learned and using them to make program adjustments. The report, however, did not describe a formal approach for sharing program-scale adaptive management findings or for revising objectives, strategies, and actions in response to experiences and data collected. A very brief discussion was provided on this theme during the oral presentation, including a figure that was presented. The figure suggests that an adaptive management process is being established. Details of the process should be expanded upon and included in a future progress report so that the ISRP can provide meaningful feedback.

## GRANDE RONDE MODEL WATERSHED (199202601)

- [Umbrella review progress report](#)
- Background info in Taurus: [Project overview](#) | [Reports](#) | [Past reviews](#)
- [website](#)

### QUALIFICATIONS

1. The ISRP recommends that the Council, ISRP, and proponents collectively develop a plan for specific elements of a near-term response. After 25 years of funding, a comprehensive and empirical evaluation of the effectiveness of restoration actions on fish populations and demonstrated progress at the landscape level is required. The ISRP has called for evaluation and synthesis at the landscape scale for over a decade (see [ISRP 2007-12](#)) as well as most recently during the 2013 Geographic Review ([ISRP 2013-11](#)). The ISRP feels that a joint meeting between the Council, ISRP, and project leaders is needed within four to six months to collectively agree on the nature of a landscape evaluation of restoration progress and outcomes, a timeline for completing the landscape analyses, and specific program deficiencies that need to be addressed before a renewal decision is made. The overall purpose of the joint meeting would be to identify the specific requirements and timeline of the response. Following that meeting, the ISRP requests the GRMW develop a synthesis report, within a mutually agreed upon deadline, describing measurable (quantifiable) objectives and linking these objectives to data showing restoration effectiveness. Products from the GRMW's State-of-the-Science Reviews possibly could be used to initially articulate progress related to habitat and fish rehabilitation, and the Restoration Atlas could be expanded to serve as a framework for evaluation of progress at a landscape scale.

This is one of the longest running habitat restoration projects funded by the Fish and Wildlife Program. It began in 1992 and was considered in the ISRP's first reviews twenty years ago. In total, the project has been considered in seven distinct reviews (ISRP 2013-11, 2007-12, 2006-6, 2001-12A, 1992-2A, and 1998-1A; and ISAB/ISRP CU 2016-1). As well, the ISRP has provided consistent guidance and recommendations for over a decade, many of which appear to be only partially addressed by the proponents.

2. Quantifiable objectives and explicit timelines for achieving those objectives are needed for each restoration action as well as for collective actions at the landscape scale. All objectives should be expressed quantitatively in terms of expected (hypothesized) improvements (outcomes) in habitat or VSP parameters. These clearly stated quantifiable objectives and explicit timelines should be used to track progress toward desired habitat conditions and resource outcomes.
3. A formal process for adaptive management is required and would lead to a more efficient and effective program. Previously, the GRMW has implemented projects and then modified them when problems were noticed. While this is normal and sensible, it is not a formal adaptive management approach. Scientifically sound adaptive management requires quantitative objectives that are actively evaluated and explicit hypotheses that can be refuted or refined. The proponents have made some recent significant progress with incorporation of the Atlas tool and the Step-wise Selection Process. The Atlas and results from several other RM&E efforts in the subbasin may be useful in developing quantifiable objectives and preparing a more comprehensive evaluation of progress at the landscape scale.

## COMMENTS

### 1. Overall comments

The ISRP has recommended specific actions and program improvements in a series of past reviews, but the Grande Ronde Umbrella Project has not adequately addressed previous program qualifications as well as shortcomings in restoration effectiveness. These issues remain after repeated requests for program development for more than a decade ([ISRP 2013-11](#), [2007-12](#)) and identification of critical issues as part of our Critical Uncertainties review ([ISAB/ISRP 2016-1](#)). The ISRP has called for comprehensive approaches and assessment of their landscape and resources to fully achieve effective restoration. We find little evidence of progress on several elements identified in previous reviews:

1. Landscape scale analyses to illustrate how past restoration actions have benefited fish
2. Interdisciplinary projects that provide diverse guidance on priorities, project, and restoration effectiveness
3. Considerations of emerging issues, such as climate change, toxic substances, and non-native fish species
4. Regional scale analyses and documentation that demonstrate that the project is on track to meet restoration goals and deliver an ecological system resilient to future landscape changes

Several recent publications, by other groups in the Grande Ronde basin, provide examples of analyses that directly inform the potential prioritization and design of restoration efforts for the Grande Ronde landscape (Justice et al. 2016 and White et al. 2017<sup>8</sup>). Such approaches could be readily incorporated and expanded by the GRMW project.

The GRMW progress report summarizes the programmatic oversight and coordination for the local restoration efforts. The progress report also provides an accounting of what is being done and by whom (i.e., administration and meeting coordination), but it includes little synthesis of its progress and ecological outcomes to demonstrate, after 25 years, restoration efforts are on track to successfully restore sufficient habitat and recover fish populations. The ISRP believes that fundamental changes are needed to allow the program to implement actions more comprehensively and to conduct the level of analyses needed to combat the broader issues facing regional restoration.

The Restoration Atlas tool – a positive development – may be useful in preparing a more comprehensive evaluation of progress at the landscape level. Additionally, CRITFC has done landscape-scale analyses in this basin that could be useful for prioritizing projects and serving as a model for landscape evaluation of potential outcomes (see Justice et al. 2017 and White et al. 2017). The proponents recognize the

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<sup>8</sup> Justice, C., S.M. White, D.A. McCullough, D.S. Graves, and M.R. Blanchard. 2017. Can stream and riparian restoration offset climate change impacts to salmon populations? *Journal of Environmental Management* 188: 212-227. <http://dx.doi.org/10.1016/j.jenvman.2016.12.005>.

White, S.M., C. Justice, D.A. Kelsey, D.A. McCullough, and T. Smith. 2017. Legacies of stream channel modification revealed using General Land Office surveys, with implications for water temperature and aquatic life. *Elementa Science of the Anthropocene*, 5:3, DOI: <https://doi.org/10.1525/elementa.192>.

importance of effectiveness monitoring and landscape scale evaluations. The GRMW should articulate the types of questions that need to be answered and show how they are going to use the data to provide insights into restoration of fish populations. Many tools and analyses are at their disposal and skilled researchers, with experience in the application of these tools, are available to participate in these landscape analyses. For example, the proponents have Forward Looking Infrared (FLIR) data on stream temperature and ODFW is doing a regional assessment of thermal refuges. Perhaps a more thorough understanding of limiting factors related to temperature across the basins would be a place to start.

Quantifiable objectives and explicit timelines are essential. They do not need to be supported by complicated models, but they should track metrics linked to habitat and fish responses. This could be done through use of the Atlas. The proponents could coordinate with OWEB or they could use information that they already have—and it could be done in a short amount of time. As well, most objectives should be linked to fish responses, especially if ODFW fish data are at their disposal.

The proponents have made progress with the development of a monitoring and evaluation program to address the three qualifications from the 2013 Geographic Review, but none of the qualifications are fully met. The qualifications included:

1. *An Objective and Deliverable pertaining to M&E should be included in future proposals. An M&E Objective signifies a commitment to monitoring, especially effectiveness monitoring.*
2. *In future proposals quantitative details should be provided on how past and current actions are influencing survival and growth of native fishes. This should include monitoring results and how the results have altered actions through the adaptive management process.*
3. *Plans and actions should be developed to fully integrate climate change, toxic chemicals, non-native species, and agricultural water demands into an effective program.*

The first qualification has been partly addressed through the development of a system for documenting and mapping projects and monitoring results at a landscape scale. Some monitoring efforts will eventually provide evaluation of effectiveness, but many remain descriptive or based on implementation success.

The second qualification remains incomplete, even after four years. Few quantitative results have been provided. However, the cooperation with ODFW on M&E seems like a good approach and could help address these first two qualifications. The ISRP encourages these types of partnerships. While the transparency for this project has improved with time, regular reporting should include results from previous M&E efforts as well as syntheses of the results at basin or landscape scales. The proponents need to demonstrate how they are using these results to inform their actions through an adaptive management process (including Structured Decision Making). Even if the project is allowed only 5% of the budget toward M&E (which is still a substantial amount in actual dollars), the proponents could leverage their M&E resources better toward meeting quantifiable objectives.

The third qualification also is incomplete. The description of efforts to address climate change is unfinished, and the narrative on non-native species only describes weed control or non-native plant removal; there is no mention of non-native fish species or projections on future water demands.

## 2. Comments specific to adaptive management

The Grande Ronde Model Watershed Umbrella Project needs a formal adaptive management process (or framework) at the core of its activities. The ISRP remains committed to seeing that adaptive management is a fundamental component of all restoration activities supported by the Fish and Wildlife program. The report of the GRMW described Catherine Creek as an example of adaptive management, but the problem exemplified the need for stronger coordination in initial project design rather than an effective adaptive management approach. Both the ISRP and ISAB have addressed adaptive management at length and consistently for 20 years (see [ISRP 1997-1](#), pages 10-11). Please see the programmatic comment on adaptive management in Section IV above. A 2015 Fisheries article “A Comprehensive Approach for Habitat Restoration in the Columbia Basin” ([Rieman et al. 2015<sup>9</sup>](#)) includes a succinct description of adaptive management as it applies in the Columbia Basin (page 127) drawing from the ISAB’s Landscape Report ([2011-4](#)), the ISAB’s Review of the 2009 Fish and Wildlife Program ([2013-1](#)), and the ISRP Geographic Review ([2013-11](#)) and provides relevant guidance.

Specifically, a comment from the ISRP’s 2007 Retrospective Report (see [ISRP 2008-4](#), page 1) applies here and, relative to Effectiveness M&E, states that:

*Habitat restoration projects should include some form of effectiveness monitoring in their plans. This is essential to demonstrating that the project is achieving desired habitat results. Effectiveness monitoring does not have to be costly; in fact, showing some evidence of a beneficial habitat trend is usually sufficient for the ISRP’s needs. We do not in most cases expect individual habitat project sponsors to demonstrate target population benefits. However, demonstrations of population benefits at the watershed scale using approaches such as intensively monitored watersheds are always helpful. We do not wish to place an unfair monitoring burden on individual project sponsors, and we encourage collaboration among habitat restoration participants in documenting physical habitat improvements and population benefits. The ISRP continues to emphasize that each project without an effectiveness monitoring plan represents a lost learning opportunity.*

As well, there is a Scientific Principle in the 2014 Fish and Wildlife Program ([NPCC 2014-12](#)) that the ISAB helped develop:

*Ecosystem management should be adaptive and experimental. Ecosystems are complex, they change constantly, and our understanding of them is limited. In response, natural resource managers must strive to improve their knowledge and be adaptable to include information as it is learned. Using a structured process of learning can contribute to new scientific knowledge that informs decisions.*

## 3. Two areas of progress

The ISRP notes that the Atlas and the Step-wise Selection Process are significant improvements in the program. The proponents have continued to make significant progress in developing transparent and

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<sup>9</sup> Rieman, B.E., C.L. Smith, R.J. Naiman, G.T. Ruggerson, C.C. Wood, N. Huntly, E.N. Merrill, J.R. Alldredge, P.A. Bisson, J. Congleton, Kurt D. Fausch, C. Levings, W. Pearcy, D. Scarnecchia & P. Smouse. 2015. A comprehensive approach for habitat restoration in the Columbia Basin. Fisheries. 40:124-135.

defensible procedures (the Step-wise Process) for prioritizing restoration actions. The Restoration Atlas captures important information from both the Subbasin and Recovery plans about the relative habitat capacity of each Biologically Significant Reach (BSR) and the degree to which the limiting factors are amenable to restoration. Semi-quantitative rankings (low, medium, high) for both BSR priority and feasibility of restoration then provide clear justification to all participants for decisions about where to work first, and what actions to implement in that specific area.

The procedures for soliciting, reviewing, and selecting individual project proposals also seem well designed to achieve consensus. Each step in the timeline of the authorization process is clearly described. Requiring the Atlas Implementation Team to designate an appropriate individual as the “Opportunity Lead” for each potential project during the solicitation phase seems like an effective way to maintain accountability and efficient coordination among collaborators. The process also provides for frequent meetings of the Implementation Team and appears to foster good communication among the collaborators.

The ISRP believes that the Atlas also could provide a context or framework for a landscape evaluation of restoration progress and trends in resources. The ISRP recognizes that the Atlas was designed as a portal for identifying, prioritizing, and implementing projects, but we also recommend that it be expanded to include landscape-level evaluation of progress and resource trends, analyses directed toward explicit objectives for future conditions.

The ISRP acknowledges that the Step-wise Selection process is a significant improvement. We also encourage the proponents to consider a process developed by the UCSRB Program. In that program the Executive Team interacts with the Project Team, in which is embedded a Design Team. Projects are reviewed by the Regional Technical Team (RTT) at the 30%, 60%, and 90% stages. The RTT actually scores all projects at the end. The ISRP believes that increased interaction with the RTT and more explicit assessment by the RTT could be considered as part of the Step-wise Selection process.

#### **4. Social aspects and interactions**

Sustained social interactions and responsibilities are vitally important for the long-term success of restoration efforts (see [Rieman et al. 2015](#)). The ISRP has been pleased to see that nearly all umbrella projects have encouraged communities and land owners to work together on contentious issues. This development of local understanding and substantial levels of cooperation are important contributions of these programs. Network analysis and additional development of the Atlas could document the strength of multi-partner cooperation.

The progress report of the GRMW included little discussion or analysis of social interactions with the communities and land owners and no evaluation of remaining social/cultural challenges. Given the long history of the GRMW and community involvement, the ISRP is aware of the considerable experience of the proponents in this arena, experience that could be shared with other umbrella projects. The contributions of the GRMW in public involvement and information sharing and effective tools like the State-of-the-Science annual meetings would inform the Council and serve as a model for other umbrella projects for community engagement.

## 5. Specific comments

1. The proponents state that “Field verification of project effectiveness by GRMW staff has also been added to our administrative contract to ensure every project is reviewed post implementation.” Details are needed as to how long after implementation the project is monitored. As well, what is meant by “effectiveness”? Does this refer to the construction of habitat-related structures or to fish population responses?
2. The proponents need to more clearly describe what actions are being implemented to evaluate that toxics are kept out of the water (e.g., agricultural chemicals applied to the land, wastewater treatment plants, and developed areas).
3. The proponents state that “the data needed to develop important fish habitat relationships, habitat-land use relationships, and to parameterize life cycle models to make projections in fish response to habitat objectives change will be available within the year. This habitat monitoring is already being used to guide project prioritization based on the Atlas and project implementation.” Where will this quantitative information be found and in what form (e.g., components of the Atlas, reports to the public and/or the Council, publications in the primary literature)?
4. It is not clear what is really being done with non-native species other than invasive weeds. Non-native fishes and their potential effects on restoration outcomes should be addressed explicitly and incorporated in the Atlas for planning and evaluation. The proponents need to address these issues related to both non-natives and toxic substances explicitly in their strategic plan and project prioritization process. Toxics and non-native species pose major threats to the restoration program, and these threats will become even more serious in the future.
5. Hatchery operations are not mentioned, nor are the release of non-native species. Are fish being released and, if so, how are they impacting restoration effectiveness?

## TUCANNON RIVER PROGRAMMATIC HABITAT PROJECT (201007700)

- [Umbrella review progress report](#)
- Background info in Taurus: [Project overview](#) | [Reports](#) | [Past reviews](#)
- Snake River Salmon Recovery Board [website](#)

### *QUALIFICATIONS*

This is a well-organized and effective project. The following qualifications should be addressed during project implementation, future reporting, and regularly scheduled reviews. Although the ISRP expects the project proponents to begin work on these qualifications immediately, the ISRP is not seeking an immediate response, but will evaluate, in future reviews, the extent to which these qualifications were addressed.

1. Complete further review and analysis of physical and biological monitoring data, particularly focused on the stream water temperature regime and summer stream flows. Given the large amount of data available, such an effort would provide valuable insights into the possible effects of restoration actions on water temperature and steam flow and may also provide a science-based rationale for extending the project area downstream in order to address suspected overwintering survival issues.
2. Describe a more formal adaptive management framework that actively identifies and documents lessons learned from project activities.
3. Identify monitoring group(s) and metrics that are being used to assess fish responses to the restoration efforts. This information is needed to show that the ultimate goal of restoring salmon population viability is being monitored and evaluated.
4. Describe the process used to avoid potential conflict of interests when selecting a subcontractor to conduct specific restoration projects. There appear to be potential, possible conflicts of interest with parties/organizations that are involved in both project selection for funding and also project implementation.
5. Incorporate additional discussion regarding current and long term plans/general timelines for addressing habitat factors affecting the three other non-target, listed fish species (fall Chinook, summer steelhead. and bull trout).

### *COMMENT*

#### **1. Overall Comments and ISRP Review History**

The Program is a well-organized and effective restoration effort that is making solid progress towards watershed scale restoration. Significant improvements have been made over the years. The proponents, and their partners, conducted landscape-scale evaluations of the watershed, identified the life stage

that is most limiting for spring Chinook salmon, developed priority objectives for restoring habitat that would most benefit Chinook salmon (egg-to-parr stage), identified 28 priority projects to achieve the objectives using a benefit/cost approach, and made progress in achieving those objectives. The proponents also describe interactions with monitoring programs such as CHaMP, AEM, and WDFW.

Finally, a particularly positive element of the Project is the ongoing community outreach and engagement effort and the clear indication of improved public support and willingness to participate in watershed scale restoration. Examples of this include the widespread adoption of minimum till agriculture (34,000 acres), planting of riparian buffers (54 stream miles), and conservation of stream flows (>10 cfs).

This project has undergone five review iterations since its inception in 2010 (ISAB/ISRP CU 2016-1; ISRP 2013-11, 2011-21, 2011-8, and 2010-40).

In the Geographic Review (2013-11), the ISRP included the following qualifications:

1. *What is the landscape strategy for implementing these restoration actions? If such a strategy has been developed, but is part of a different project, more information should be given on how the projects fit together and are coordinated.*
2. *The ISRP is pleased that the project sponsors will be conducting surveys using CHaMP protocols, but how will ISEMP's biological effectiveness monitoring take place, who will do the work, and how will results of fish response studies be incorporated into revised restoration actions?*
3. *Project-scale biological monitoring does not appear to be part of this project. Will ISEMP/IMW projects elsewhere provide an assessment of the project-scale effectiveness of the types of projects being implemented under this program? If not, this project should include some of project-scale biological assessment.*
4. *The project sponsors should consider some assessment of how factors such as climate change or increase in human population could compromise the effectiveness of the restoration effort.*

## **2. Purpose, objectives, and priorities**

The general organization, purpose, objectives, and priorities for the project are clearly described. Six quantitative objectives are identified, but no specific time frame is provided for their achievement. They form the basis for evaluating project success in terms of habitat conditions for fish. The report also describes the process used for developing these objectives and priorities.

There is a good discussion on the need for watershed scale restoration, and a description of the hierarchical process used for stepping down in scale from the subbasin to the stream section, to the priority reaches, and then to priority projects is useful and very understandable. The process included review of the subbasin plan and completion of a geomorphic assessment and conceptual restoration plan. The focus of the Project on Snake River ESU spring Chinook salmon is logical given the reported primary limiting factor during the egg-to-parr stage. It is not entirely clear why this species is the apparent exclusive target species for current protection and restoration. The Tucannon supports three other populations of ESA-listed species, including Snake River fall Chinook, Snake River ESU summer

steelhead, and Columbia River bull trout. It is assumed, but not stated that restoration habitat benefits for spring Chinook are also benefiting non-target species as well.

Restoration is focused on a 30-mile, priority section of stream and is designed primarily to increase habitat complexity and to reconnect the stream to the floodplain. Expected habitat results for this are described by the six quantitative habitat objectives, though timelines for achieving desired outcomes are not stated explicitly. It is not clear how fish passage restoration fits into the strategy. It is stated that “emerging and confirmed fish passage impediments will be reviewed by the Restoration Technical Team (RTT) and may be added to the work plan for funding consideration by the Snake River Salmon Restoration Board (SRSRB).” It would seem that a comprehensive assessment of fish passage impediments would be a key component of initial restoration planning that passage restoration would have been prioritized and integrated into the overall project.

### **3. Administrative History**

The Snake River Salmon Restoration Board (SRSRB) sponsors the Umbrella Project and funds 1.2 FTE's for Program Coordination. Its administrative history is clearly described. A diagram of the current organization and its major players and their primary roles would have been a useful addition to the report.

Administrative costs have increased as the program has grown over time. In 2016, the Program operated with 10% of the overall budget going toward administration (~\$150,000), 4% supporting project effectiveness monitoring and 86% going to the project proponents conducting project implementation. In 2016, there was a 25% match to BPAs investments in the Tucannon. With matching funds, the overall administration burden is estimated to be 8% in 2017. Non-BPA matching funds awarded to the project proponents have come from two major sources including the SRFB and the USFS. Additional administrative information on contracts was provided in the Programmatic Project Reporting section.

A more complete discussion regarding the "value added" provided by the project (SRSRB staff and Program Coordinator) would help to better understand the utility of the current organization. It is clear that the current organization works quite efficiently and effectively and puts a premium on communication, participation and focusing money to accomplish restoration work, within budget and on schedule.

### **4. Project Prioritization and Selection Process**

The Tucannon River Habitat Project considers a basin-scale approach to restoration in the Tucannon Basin, as recommended by past ISRP reviews. Overall, project prioritization and selection appears to be strategic and based on science.

The approach to project selection began with a geomorphic assessment of the entire watershed in 2010 utilizing LiDAR, high-resolution aerial imagery, and field surveys. The basin was delineated into 10 discrete reaches throughout 50 miles of the river. The reaches were prioritized based on the most

limiting life stage of spring Chinook salmon, which was reported to be egg to parr. Based on spawning and rearing characteristics, the priority reach was river mile 20 to 50. According to the report, 28 reach-scale restoration projects were identified and prioritized based on expected biological response, consistency with natural geomorphic processes, and benefit-cost ratio, largely following the watershed restoration framework recommended by Roni et al. (2002).

The project evaluation criteria for identifying potential restoration projects are reasonable: (1) expected biologic response, (2) consistency with natural geomorphic process, and (3) benefit-to-cost ratio. Biological and geomorphic criteria and benefit-to-cost were assigned qualitative values of high, moderate, or low values. The juvenile life history stage (egg to parr) was identified as critical to improving the spring Chinook salmon population in the Tucannon River. In particular, the lack of adequate juvenile rearing habitat, especially during winter and spring runoff (post-emergence to parr), bed scour during stochastic winter/spring flows, and summer water temperature were identified as limiting factors for juvenile populations. The expected biological response of each project was evaluated within the following categories: (1) project provides immediate habitat benefits for critical life history stages, (2) project reconnects isolated habitats or improves existing habitats and promotes floodplain connectivity, and (3) project provides diversity throughout the active channel and low-lying floodplain for all life history stages. The benefit-cost evaluation did not consider feasibility in terms of landowner willingness to participate.

It is not clear if the current project ranking is static or whether it is reviewed and revised as work progresses on other projects; does the current priority ranking also change? There does not appear to be a formal mechanism for reviewing the priority order for project funding and implementation. If the priority order is fixed, periodic review and revision, perhaps every 3 to 5 years, would provide an opportunity to apply lessons learned to the ranking process.

It does appear that representatives from some organizations are involved in both priority setting/project selection and project implementation. Although it seems that the current process is transparent and open for partner review and discussion, some direction from the project regarding potential conflict of interest would be useful.

## **5. Reporting, Program Progress and Adaptive Management**

Substantial information is provided in the progress report of individual and project-specific restoration accomplishments. This is provided in the progress report and also on the Program website. The presentation of information via text, tables, figures of site locations, and photo sequences is particularly useful for tracking progress.

Quantitative details about restoration habitat outcomes at each reach were also provided, and these provide solid evidence for project implementation. Measurements included pieces and density of LWD, pool counts, reconnection with side channels, etc. The proponents state that measurement of progress toward some restoration objectives is difficult to capture as a point in time because so little time has elapsed since implementation. Ultimately, the umbrella project depends on the physical habitat

measurements being conducted by CHaMP and AEM. It is anticipated that the LiDAR data set would be repeated in 2017-18, unless a significant flow has not occurred by the spring of 2017.

General progress towards each of six objectives was described. Regarding riparian habitat (Objective 1), they reported 55-60% of the valley bottom to be historically occupied; presently this is reduced to 28% due to roads, levees, and infrastructure. For the LWD objective, it was reported that 28% of the objective of 2 key pieces/bankfull width was achieved and that there was a projection of 44% by 2018. Pool frequency has increased significantly (Objective 3). Water temperature may be cooling over time as suggested by the proponents (Objective 5). However, a further review and analysis of physical and biological monitoring data, particularly focused on the stream water temperature regime and summer stream flows would be informative. Likewise, modeling might also be used to examine whether actions have led to increased water retention, as hypothesized. The WSU study is a good start. Given the large amount of data available, such an effort would likely provide valuable insights into overall indications of project success and would also likely provide a science-based rationale for extending the project area downstream in order to address suspected, overwintering survival issues.

The proponents indicate that they would like to extend the project area downstream an additional 20 miles due to surprisingly high overwintering use and very high mortality rates. It is felt that restoration in this area would provide substantial benefits in an area not originally felt to be a priority for treatment. The ISRP feels that a strong case for this modification can be made.

The Project has established links to monitoring by CHaMP, AEM, and WDFW. There appears to be good monitoring of habitat changes using CHaMP (p. 16 and elsewhere). AEM (page 40) is used at seven paired sites. WDFW measures "fish in and fish out" (p. 40) but these studies will not provide information until 2018. This is useful, but additional details about specific monitoring results would have been appropriate. Fish use and population response monitoring is more limited. For example, there was little information on salmon abundance and productivity other than limited information by WDFW. It was not clear how new EDT modeling will be used to evaluate treatment effects of restoration on Chinook salmon survival in the basin.

No specific adaptive management program or framework was discussed. There are, however, a number of places where general hypotheses are described and monitoring that is being pursued to help provide answers to them. There was limited discussion about lessons learned although there is also some limited discussion of modifications in design and placement of restoration projects based upon past observations, experience, and monitoring. Examples of additional information that would have been useful include lessons learned regarding what LiDAR could best do and could not do for monitoring in future passes? Also, much work was done in placing LWD and lessons learned from this activity could have been better described. Finally, there appears to be regular information exchanges within the project (monthly meeting with RTT), but it is not clear if results or findings from these meetings is documented anywhere. Such documentation may provide useful information on lessons learned that might benefit this and other restoration efforts.

Finally, the project proponents are not applying a formal adaptive management approach to address how factors such as climate change or increases in human population could compromise the effectiveness of their restoration efforts. This was noted in the 2013 ISRP review ([2013-11](#)), and these concerns should be addressed by the Program in its restoration plans and described in future progress reports.

## UPPER COLUMBIA PROGRAMMATIC HABITAT (201000100)

- [Umbrella review progress report](#)
- Background info in Taurus: [Project overview](#) | [Reports](#) | [Past reviews](#)
- Upper Columbia Salmon Recovery Board [website](#)

### *QUALIFICATIONS*

These qualifications should be addressed during project implementation, future reporting, and regularly scheduled reviews. Although the ISRP expects the project proponents to begin work on these qualifications immediately, the ISRP is not seeking an immediate response, but will evaluate, in future reviews, the extent to which these qualifications were addressed.

1. Assess progress towards meeting Fish and Wildlife Program, Biological Opinion, and Recovery Plan objectives by providing an evaluation of fish responses and examples of how project monitoring results are informing restoration actions. This qualification is repeated (with some rewording) from our previous review (ISRP 2014-10). Restoration objectives should also be given specific timelines and be expressed quantitatively in terms of expected (hypothesized) responses in habitat or VSP parameters so that the project's success can be evaluated.
2. Assess progress in encouraging and sustaining effective community involvement by describing social interactions with communities and landowners, and discussing the social/cultural challenges that remain. The ISRP recognizes that discussion on this topic was not explicitly requested as a component of the 2017 progress report, but we would like to see it included in future reports.
3. Consider developing a formal process to plan for the systematic collection of data relevant to limiting factors and project design before projects are selected. The proponents acknowledge under "lessons learned" that more data are needed to help prioritize and design projects before they are selected. Rather than continuing to rely on potentially questionable "rapid assessments," it might be advantageous to identify future priorities among the list of projects not funded this round and to plan for early collection of data that will be critical to their evaluation in the next round.
4. Consider whether benefits to fish populations at the landscape level might be increased by emphasizing more spatially distributed restoration actions that may be less expensive (per site). Intensive reach-scale projects target only a small proportion of habitat in the region and may not be fully effective in meeting the challenge of establishing self-sustaining fish populations. More spatially distributed, smaller-scale actions might include removing barriers, re-thinking riparian restoration strategies, providing better buffers between roads and streams, purchasing conservation easements, and so forth. It is important to note, however, the ISRP also recognizes that such "low hanging fruit" may have already been picked and that intensive restoration of

high priority reaches may in fact be the most appropriate next step. For example, some reaches were strategically selected for restoration as part of a watershed-scale experimental design.

## *COMMENT*

### **1. Overall comment and ISRP review history**

The Upper Columbia Programmatic Habitat project has enabled some impressive restoration work and is headed in the right direction. This umbrella project was created by combining and replacing 14 Biological Opinion (BiOp) non-Accord habitat projects from the FY07-09 solicitation cycle (representing approximately \$3.5 million in annual funding). The umbrella project has been reviewed five times since 2010 (ISRP 2014-10, 2014-5, 2013-11, 2010-28, 2010-12; see ISAB/ISRP CU 2016-1).

The ISRP believes that more emphasis on evaluating outcomes at the landscape level is needed to strengthen this project (qualifications 1 and 2). The proponents acknowledge this need, and have already identified some appropriate analytical tools, for example, Intensively Managed Watersheds (IMW), Ecosystem Diagnosis and Treatment (EDT), life-cycle models (LCM), and Viable Salmonid Population (VSP) metrics. The proponents are also looking for ways to improve project design and prioritization by expediting data collection and evaluation (qualification 3). It seems, however, that progress could be improved through greater sharing of information and closer collaboration among teams with different responsibilities (e.g., for habitat restoration versus effectiveness monitoring).

### **2. Purpose, objectives, and priorities**

The Upper Columbia Salmon Recovery Board (UCSRB) provides regional coordination for this Umbrella Project. The 2017 progress report indicates that goals and priorities for the project are appropriately and consistently based on the Recovery Plan (UCSRB 2007) and Biological Strategy (UCRTT 2013). Although objectives are not provided explicitly in the 2017 progress report, they are clearly summarized in the Integrated Recovery Report cited (UCSRB 2014). Those objectives are comprehensive and address both habitat and fish population status in the short and long terms, but they lack specific timelines and are not expressed quantitatively in terms of expected (hypothesized) responses in habitat or VSP parameters. This is critical to support evaluation of project effectiveness.

Direct links between objectives and actions are not stated clearly in the progress report. Reach-scale projects are a primary focus within the project, yet such projects are expensive and can target only a small proportion of habitat in the region. Although important, even as demonstration sites, reach-scale projects may not be fully effective in meeting the challenge of establishing self-sustaining fish populations. The ISRP encourages the proponents to consider whether landscape-level objectives could be better met by expanding the scope of the umbrella project to include spatially distributed restoration actions that may be less expensive (per site) and improve habitat over larger areas (qualification 4). These actions might include removing fish passage barriers, re-thinking riparian restoration strategies, providing better buffers between roads and streams, purchasing conservation easements, and so forth. However, the ISRP also recognizes that such “low hanging fruit” may have already been picked and that intensive restoration of high priority reaches may in fact be the most appropriate next step. For

example, some reaches were strategically selected for restoration as part of a watershed-scale experimental design.

The proponents have identified some problems in project administration (e.g., loss of multi-year contracts and ability to roll project funds forward across years) and designing restoration actions (e.g., insufficient fish data), but they are making steady progress in overcoming these difficulties. Additionally, they recognize that restoration actions should be measured and assessed in terms of fish population responses. For example, under lessons learned, the proponents acknowledge that “lack of information about fish use, habitat status, survival bottlenecks at the local population scale, and the root cause of those bottlenecks, has been a major challenge in developing restoration plans with robust goals and objectives.”<sup>10</sup>

### 3. Administrative history

The progress report provides a concise and useful summary of the program’s focus and administrative history since 2010, and includes details of changes since the last ISRP review in 2014. The administrative structure comprising Executive Teams, Project Teams, Design Teams and a Regional Technical Team appears to be working well and increasing the likelihood of successful projects.

In response to ISRP comments to better integrate biological goals and objectives into the design process, the UCSRB adopted (in late 2014) a new design framework for the ambitious, river reach-based actions based on data collection, modeling and analysis to inform project design. The UCSRB believes that this new framework has increased their participation in phases of project design that had previously been left to the proponents of individual projects and their engineer sub-contractors. However, the progress report also states under lessons learned, “although a wealth of information is being collected on fish and habitat across the region we have found that it is often not applicable to project development and implementation.” It seems that insufficient data are available from “reach assessment” or “rapid site assessment” in advance of proposals to inform the decision making process. This gap suggests the need for a strategy to gather or compile information relevant to evaluating future high priority projects *before* a call is made for proposals (qualification 3). For example, has there been a concerted effort using a standardized sampling approach (e.g., Generalized Random Tessellation Stratified [GRTS]) to study how target fish species use habitat near potential and completed restoration sites, with a view to providing information in advance of proposals to restore new sites? Such data would need to be updated on a regular basis (e.g., every 5 years) both to guide prioritization and to improve effectiveness monitoring over the long-term.

The need for Project maintenance will be increasing as time goes on, and it seems likely to become an important consideration for workforce planning and budgeting in the future. Is there a systematic approach for determining the design life of restoration projects and for scheduling when refurbishment

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<sup>10</sup> An ISAB review of Upper Columbia spring Chinook restoration analyses and strategies is currently be considered and, if approved, will examine these issues. This review would inform the UCSRB’s effort to update their Biological Strategy.

and replacement will likely be needed? A systematic approach to ensure periodic maintenance could help to avoid a budgetary bottleneck in years when many projects suddenly need to be fixed. Maintenance schedules could be updated regularly, every five years, for example. The progress report says (p. 23) that the project to restore channel structure and form in Upper Beaver Creek was adversely impacted by wildfire debris flow in 2014 and that infrastructure had to be replaced. How was this (unplanned) work funded?

#### **4. Project prioritization and selection process**

The UCSRB has developed a sophisticated system for solicitation, review, and project design that serves as a useful model for other Umbrella Projects. The formal coordination among the Executive Teams, Project Teams, Design Teams and Regional Technical Team (UCRTT) is commendable. Targeted Solicitations and Open Solicitations occur as separate processes, increasing their transparency and rigor. The procedures for soliciting, reviewing and selecting individual project proposals also seem well designed to achieve consensus. The scheduling provides for frequent meetings and appears to foster good communication among the collaborators. One weakness is the lack of landscape-level evaluation by the UCSRB as a basis for coordination and future program development in cooperation with the UCRTT.

Only minor changes to the project prioritization and selection process are reported since the 2014 review. These changes are based primarily on UCRTT updates to the Biological Strategy and the project scoring criteria. The updated Biological Strategy (UCRTT 2013) provides a list of priority areas within each subbasin and priority ecological concerns for each of the 58 assessment units (sub-watersheds or portions of sub-watersheds) within the four subbasins. For each assessment unit, UCRTT uses a sophisticated (and apparently effective) procedure to score both habitat priority (i.e., to determine where to work first) and likely effectiveness of alternative restoration actions (i.e., to determine the most appropriate sequence of actions to implement).

Presumably more high priority actions are proposed than can be funded in each round. The progress report does not indicate if a “master list” of high priority actions is maintained as a living document or if a new list of actions is generated every two years. It is also not clear whether the consequences of delaying action for each priority item are considered in a way that would affect reprioritization in the next review.

To better inform the design process, some sort of forward planning for data collection is needed to gather relevant data in advance of project selection. The proponents acknowledge the need for advance data in their excellent discussion of lessons learned about project design. The report notes that a “rapid assessment” of fish and habitat at the site scale was sometimes completed to guide project design (e.g., in the Middle Entiat Reach, p. 22), but the implication is that these assessments have been done hastily, rather than planned well in advance. The proponents hope to address this issue in the coming year as they revise the Biological Strategy.

Project design should also continue to take potential climate changes into account, as discussed in the report (p. 8). Hatchery operations and interactions with non-native species are not mentioned in the

progress report. Future reports should describe fish releases that are taking place and, consider how they are affecting the effectiveness of restoration activities. In particular, density dependence should be considered in the 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. High proportions of hatchery fish (pHOS) and density dependence have been described in Chinook salmon and steelhead populations in this area ([ISAB 2015-1](#), [2015-1A](#)).

## **5. Reporting, program progress, and adaptive management**

The 2017 progress report includes a concise and well-organized summary of all projects funded to date. All of the projects listed were selected for funding using specified criteria (as part of the targeted or open solicitation processes). Figure 3 shows that UCSRB programmatic funding is now largely directed at priority ecological concerns within targeted assessment units. This figure follows from a series of excellent analyses in the Integrated Recovery Program Habitat Report (UCSRB 2014), which were used to identify discrepancies between restoration needs and actions, and to recommend changes in the focus of future activities by watershed. Regrettably, the 2017 progress report does not explicitly follow up on those recommendations or discuss the degree to which the discrepancies have been addressed.

The table of projects identifies categories of Primary Ecological Concerns for 16 of the 25 subprojects funded from 2010-2017. Twelve of these 16 projects were designed for "Channel Structure and Form and Peripheral Transitional Habitats." This seems to be an overly broad description of more specific geomorphic, hydrologic, or riparian objectives or concerns.

Most of the projects focus on treating conditions in valley bottoms and stream reaches. As such, care is needed to quantify environmental conditions upstream of those reaches, especially for spatially restricted sites. Upstream and upslope land uses and conditions have the potential to compromise the otherwise positive aspects of many restoration actions. Incorporating knowledge about conditions upstream and upslope could help to mitigate these risk factors and produce more sustainable benefits from restoration. A major strength of this umbrella project and the 2017 progress report is that the proponents seem to have paid careful attention to the geographic subbasin context for identifying restoration actions. The quantitative descriptions of reach conditions, expected outcomes, and resource responses for the large projects could be extremely valuable in future evaluations seeking to link project-level trends with overall subbasin conditions.

Effectiveness monitoring indicates that short-term changes in juvenile salmonid abundance have been variable but mostly consistent with expectations that restoring stream complexity and adding side-channel habitat would increase abundance without a commensurate depletion of abundance in unrestored areas (e.g., Figure 4 in the progress report). Monitoring at Loup Loup Creek in the Okanagan watershed has revealed a range of fish responses to the restoration project that could be expected to improve VSP parameters for that population (Figures 7 and 8). On the other hand, it is disappointing to note that there is still no compelling evidence to indicate improvement in VSP parameters despite major restoration efforts in the Entiat and Methow rivers. The proponents acknowledge and discuss these

concerns in the “Progress Toward Recovery” section of the 2017 progress report and in more detail in the Integrated Recovery Report (UCSRB 2014).

The progress report did not clearly explain how monitoring activities by other groups (e.g., CHaMP, ISEMP, and AEM) are meeting effectiveness monitoring requirements for habitat restoration projects implemented under this umbrella project. Compliance monitoring (to determine if work was completed at sites) is coordinated by the UCSRB for all projects. Effectiveness monitoring based on simple metrics (e.g., sediment load, temperature, and fish density) also occurs at some sites. The ISRP realizes that it is difficult to detect or measure the contribution of small habitat projects to fish responses at the population level, because monitoring is required at both the project and population scale. Standard BACI designs will not be feasible for projects where true controls are unavailable. In such cases, trend monitoring can still be sufficient to demonstrate improvements if conditions prior to restoration were so poor that improvements are expected to be dramatic and unambiguous. The Loup Loup Creek project, on the other hand, is an example where extensive local monitoring has been sufficient to show compelling changes in fish responses at the local population (tributary) level (nice discussion on p. 29).

Several different groups collect data relevant to this umbrella project (p. 32). The data appear to be shared (but in separate databases) and appear to be readily available. Is there coordination among participating groups on which data should be collected and the standards for collection and reporting so that results can be compared among participants?

An adaptive management framework is evident at the core of this umbrella project and seems to be working. The 2017 progress report indicates that the adaptive management cycle has led to changes in project design, selection, and implementation but not in project types, prioritization, or assumptions. However, the proponents conclude, “Despite the immense volume of data that have been collected, there has generally been a lack of data to inform prioritization at this level. This is due, in part, to a disconnect between RM&E programs and recovery implementation. There are no methodologies or model results available to translate fish and habitat data into information for prioritization.” The proponents also express hope that EDT and a life-cycle model (LCM) might help to address this gap.

One important lesson learned is that, “Although a wealth of information is being collected on fish and habitat across the region we have found that it is often not applicable to project development and implementation. ... Habitat monitoring programs generally lack summary metrics for occupied habitat, and provide no clear connection between the habitat data and the ecological concerns being identified and targeted.”

Regarding the utility of data, the proponents point out, “While many datasets have a high level of availability, they are generally comprised of raw data, which is not readily usable. Furthermore, many data are not at the appropriate scale or are not comprised of appropriate metrics for use in answering questions or testing assumptions related to project prioritization, development, or design.”

The 2017 progress report includes a useful discussion about possible ways to address these challenges. While landscape-level improvements have not been identified, the UCSRB recognizes the value of considering future trajectories of watershed and habitat conditions at the landscape level. They

conceptually incorporate technical elements that may be used in regional assessments (such as the IMWs, EDT, LCM and VSP analyses).

The proponents acknowledge that restoration is a complex undertaking. It requires uncommon leadership to coordinate numerous components in a way that will generate internal synergy and lead to the desired outcomes. Fortunately, the leadership required to achieve effective restoration is apparent in the progress report and cited documents.

Discussion of data management and scientific analyses of larger, complex issues should be highlighted for all to see. The UCSRB participates in regional monitoring programs and databases, and provides a centralized depository of information and reports. This addition of centralized access to future syntheses of the program outcomes at a landscape scale will be an important contribution.

The progress report provides little discussion or analysis of social interactions with communities and land owners, and no evaluation of the social and cultural challenges that remain. The ISRP recognizes that this topic was not explicitly requested as a component of the 2017 progress report, but in future reports, we would like to see discussion of progress towards encouraging and sustaining effective community involvement.

## APPENDIX: SUMMARY TABLES OF THE PROCESSES AND ACCOMPLISHMENTS OF THE SIX UMBRELLA PROJECTS

The following six tables represent a summary of information presented by the project proponents for the Umbrella Project Review via progress reports, supporting documents, and presentations. Updated restoration estimates from the Fish and Wildlife Program’s project tracking databases Pisces and Taurus, input from the Council and BPA, and review by the project proponents would improve the tables. Color coding for different actions indicates their frequency of use in projects but does not represent the quality or effectiveness of the practices. These tables are intended to highlight accomplishments reported and opportunities for improvement. These tables can also serve as an example of information and graphics that the umbrella projects could provide in future progress reports.

TABLE 1. RESTORATION ACCOMPLISHMENTS OF THE UMBRELLA PROJECTS 2014-2016

Umbrella Project	Projects	Reported Acres Restored	Reported Miles Restored	Reported Miles Opened
Grande Ronde	13	-	23.2	22
Tucannon River	10	60	25.9	-
Upper Columbia	10	1,929	12.0	-
Columbia Estuary	11	542	-	-
Willamette	13	3,952	33.5	23.3
John Day	23	2,431	35.0	-
<b>TOTALS</b>	<b>80</b>	<b>8,914</b>	<b>129.6</b>	<b>45.3</b>

TABLE 2. PUBLIC OUTREACH

Umbrella Project	Use of Community Networking	Community Education
Grande Ronde	Extensive	<b>Regularly Held Conference</b> Public Education Activities Local Landowner Education & Info Sharing
Tucannon	Extensive	Public Education Activities Local Landowner Education & Info Sharing
Upper Columbia	Extensive	<b>Regularly Held Conference</b> Public Education Activities Local Landowner Education & Info Sharing
Columbia Estuary	Extensive	<b>Regularly Held Conference</b> Public Education Activities Local Landowner Education & Info Sharing
Willamette	Extensive	<b>Regularly Held Conference</b> Public Education Activities Local Landowner Education & Info Sharing
John Day	Extensive	Public Education Activities Local Landowner Education & Info Sharing

TABLE 3. ADAPTIVE MANAGEMENT UMBRELLA PROJECT OBJECTIVES

Umbrella Project	Scientifically-Based Ecological Objectives	Quantifiable Objectives	Timelines to Achieve Objectives
Grande Ronde	Non-Quantitative		No
Tucannon River	Quantitative	Floodplain, Riparian Vegetation, Channel Structure, Pool Frequency, LWD, Substrate Composition, Temperature	No
Upper Columbia	Non-Quantitative		No
Columbia Estuary	Quantitative	Natural and Priority Habitats	2025, 2040
Willamette	Partly Quantitative	Floodplain, Channel Structure, Riparian Vegetation	2050
John Day	Non-Quantitative		No

TABLE 4. ADAPTIVE MANAGEMENT PROJECT IMPLEMENTATION

Color coding for different actions indicates their frequency of use in projects but does not represent the quality or effectiveness of the practices.

Umbrella Project	Habitat Acquisition	Restoration Practices	River Connectivity
Grande Ronde	No	Floodplain, Riparian, Channel, Wood	Culvert, Levees, Riprap
Tucannon River	No	Floodplain, Riparian, Channel, Wood	Culvert, Levees, Riprap
Upper Columbia	Yes	Floodplain, Riparian, Channel, Wood	Culvert, Levees, Riprap
Columbia Estuary	Yes	Floodplain, Riparian, Channel, Wood	Culvert, Levees, Riprap
Willamette	Yes	Floodplain, Riparian, Channel, Wood	Culvert, Levees, Riprap
John Day	Yes	Floodplain, Riparian, Channel, Wood	Culvert, Levees, Riprap

Green = frequently; Blue = occasionally; Red = infrequent

TABLE 5. ADAPTIVE MANAGEMENT PROJECT SELECTION PROCESS

Umbrella Project	Priorities Based On Metrics	Formal Selection Process	Interactive Project Review
Grande Ronde	Watershed Information	Atlas: Spatial Planning Framework	Local Board
Tucannon River	Watershed Info, Regional Fish Priorities, BiOps	Multiple Local & Regional Interactive Teams	Local Board
Upper Columbia	Watershed Info, Regional Fish Priorities, BiOps	Multiple Local & Regional Interactive Teams	Regional
Columbia Estuary	Watershed Info, Regional Fish Priorities, BiOps	Multiple Local & Regional Interactive Teams	Regional
Willamette	Watershed Info, Regional Fish Priorities, BiOps	Multiple Local & Regional Interactive Teams	Regional
John Day	Watershed Information	Multi-Agency Team	Local Board

TABLE 6. ADAPTIVE MANAGEMENT PROJECT MONITORING

Monitoring activities represent both monitoring by the umbrella project and associated monitoring by collaborators or other groups in the region. Color coding for different actions indicates their frequency of use in projects but does not represent the quality or effectiveness of the practices. For example, as described in Section IV, proponents of several umbrella projects mentioned challenges in obtaining data and results from the ISEMP, CHaMP, and AEM investigators in time for their own analyses.

Umbrella Project	Project Monitoring	Regional Monitoring	Landscape Prioritization	Landscape Evaluation
Grande Ronde	Implementation, Geomorphic, Riparian Veg, Habitat, Fish, Temp	Fish Agencies, CHaMP, AEM, CRITFC	Yes	No
Tucannon River	Implementation, Geomorphic, Riparian Veg, Habitat, Fish, Temp	Fish Agencies, CHaMP, AEM, EDT	Yes	No
Upper Columbia	Implementation, Geomorphic, Riparian Veg, Habitat, Fish	Fish Agencies, CHaMP, ISEMP, AEM	Yes	No
Columbia Estuary	Implementation, Geomorphic, Riparian Veg, Habitat, Fish, Foodwebs, Temp, Water Quality	Fish Agencies, CHaMP, AEMR, EDT, Research	Yes	Partially
Willamette	Implementation, Geomorphic, Riparian Veg, Habitat, Fish, Temp	Fish Agencies, Research	Yes	Partially
John Day	Implementation, Geomorphic, Riparian Veg, Habitat, Fish, Temp	Fish Agencies, CHaMP, ISEMP, AEM, CRITFC	Yes	No

Green = frequently; Blue = occasionally; Red = infrequent