



2025 Upper Columbia Adaptive Management Evaluation

Summary Report

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Summary

The 2025 Upper Columbia Adaptive Management Evaluation was initiated by the Upper Columbia Salmon Recovery Board (UCSRB) to identify challenges and opportunities for improving salmon recovery implementation in the Upper Columbia region. Although more than 900 habitat restoration and protection projects have been completed over the past 25 years, ESA-listed salmon and steelhead populations remain below recovery goals, highlighting the need to better understand factors limiting progress.

The evaluation used a community-driven approach centered on the experiences of regional salmon recovery practitioners. The process included interviews, a regional workshop, and Advisory Committee meetings involving tribal, federal, state, local, nonprofit, and utility partners.

Several consistent themes emerged, including the need for improved coordination across habitat, hydropower, hatchery, and harvest sectors (“All-H integration”), better regional coordination and governance, improved planning and monitoring tools, and more efficient permitting and funding processes. Participants also highlighted growing climate-related challenges, increasing restoration project complexity, and the need for expanded outreach and education to build and maintain support for salmon recovery.

The primary outcome of the effort was the development of an adaptive management action menu focused on improving project planning, coordination, and outreach to support more efficient habitat restoration efforts in the Upper Columbia.

Introduction

Salmon recovery in the Upper Columbia is a complex, long-term effort that requires coordination across multiple entities and management sectors. Over the past two decades, the region has made substantial investments in habitat restoration and has developed strong scientific and technical foundations to guide that work. More than 900 restoration and protection projects have been successfully implemented across the four subbasins in the Upper Columbia over a 25-year period, however, natural-origin abundance and productivity of ESA-listed Upper Columbia spring Chinook Salmon (*Oncorhynchus tshawytscha*), Upper Columbia steelhead (*O. mykiss*), and Columbia River Bull Trout (*Salvelinus confluentus*) remain well below delisting status. The status of ESA listed salmonids in the Upper Columbia highlights the need to better understand why recovery goals are not being met and what additional actions could be considered to address factors limiting progress.

Adaptive management is an important component of salmon recovery because it provides a structured approach for evaluating outcomes, incorporating new information, and

refining actions over time. [Appendix Q](#) of the [Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan](#) (hereafter; Recovery Plan) outlines an adaptive management framework that includes “learning by doing” and adjusting implementation iteratively over time based on emerging information and changing conditions. The framework relies on multiple monitoring inputs to track if projects are implemented as planned in relation to the implementation schedule, including:

- effectiveness monitoring to assess whether actions are producing the desired environmental and biological outcomes at the project, reach, and habitat scale; and
- status and trend monitoring to evaluate changes in fish populations and habitat conditions using established indicators.

In addition, research on critical uncertainties is used to address knowledge gaps and improve decision-making.

Together, these monitoring inputs are intended to support a continuous feedback loop between implementation, evaluation, and management. The feedback loop requires the involvement and collaboration of multiple entities, including the Regional Technical Team (RTT), Implementation Team (IT), Watershed Action Teams (WATs), Monitoring and Data Management Committee (MaDMC), sponsors, co-managers, Lead Entities, and the public.

The status and trend monitoring is intended to answer two questions to determine if the Recovery Plan is working:

(1) Is the status of the population/ESU/DPS improving?

(2) Are the effects of the primary factors that limit the status of the population/ESU/DPS increasing, decreasing, or remaining stable?

Regarding the second question, Appendix Q of the Recovery Plan only considers the status of key habitat limiting factors. The Adaptive Management framework states that “evaluating progress will be based on answering the general question: *are the limiting factors associated with habitat being ameliorated such that they do not limit the desired status of the population?*”

While Upper Columbia restoration projects have shown localized positive responses in habitat conditions and fish status, linking these efforts to population-level outcomes remains inherently challenging in a complex system influenced by multiple interacting factors. Moreover, apart from the [Okanogan Basin Monitoring and Evaluation Program](#), the lack of consistent long-term habitat status and trend monitoring in the Upper Columbia makes it difficult to determine whether habitat limiting factors are improving at the population scale.

Within this context, the objective of this effort was to use a community-driven approach to identify adaptive management needs based on the experience of salmon recovery practitioners working in the region. Specifically, this work focused on identifying contemporary challenges related to the processes and organizational structures that support habitat restoration and developing actionable strategies to address those challenges. In addition, this effort sought to identify where components of the Recovery Plan's implementation framework are not functioning as intended and provide suggestions for improvement.

The adaptive management evaluation was initiated in 2025 by the Upper Columbia Salmon Recovery Board (UCSRB). A consultant, Lichen Land and Water Inc., was engaged to lead the adaptive management evaluation and deliver a [synthesis report](#) that compiled findings, data gaps, and adaptive management recommendations. The final report delivered by Lichen Land and Water Inc. provided a comprehensive overview of potential adaptive management considerations but also extended beyond the topics addressed through the engagement process, and some of the recommendations were more conceptual than actionable. This abbreviated report summarizes key themes identified through the 2025 regional engagement process and translates them into more direct actions.

Approach

UCSRB originally envisioned that this effort would be centered on the key management questions in the [Adaptive Management Framework for the Upper Columbia Spring Chinook and Steelhead Recovery Plan](#), with the goal of developing management recommendations (or recovery plan adjustments) based on those questions. The UCSRB staff began the evaluation by reviewing and summarizing information on fish and habitat status and trends, limiting factors and threats, restoration effectiveness, and data gaps and research needs, drawing from peer-reviewed publications, agency reports, regional monitoring programs, and past synthesis efforts.

However, despite advancements in our understanding of fish populations, limiting factors, and restoration effectiveness, we do not enough pertinent information available to answer the fundamental question: *Are the limiting factors associated with habitat being ameliorated such that they do not limit the desired status of the ESU-listed populations?* This question is complicated by out of basin effects, as well as the influence of limiting factors across the hydropower, hatchery, and harvest sectors. Moreover, evaluating progress toward recovery criteria solely through a habitat lens, and using that alone to guide adjustments to the implementation of the Recovery Plan, overlooks multiple other factors influencing Upper Columbia fish populations. These considerations led the focus away from the key management questions to a community-driven approach.

As part of the engagement efforts, we conducted one-on-one interviews with regional experts to gather individual perspectives on priorities, challenges, and opportunities. In addition, we hosted a full-day workshop that brought together 48 participants from across the recovery community to reflect on progress over the past decade and identify challenges and opportunities for improvements.

The workshop included short presentations on climate change, habitat restoration techniques and biological interactions, and regional processes and coordination, which served as a foundation for facilitated group discussions. Across all components of engagement, the emphasis was on capturing practitioner experience and identifying actionable opportunities for improvement.

We also convened a 20-member Advisory Committee representing tribal, federal, state, local, nonprofit, and utility partners to help refine our understanding of the recovery challenges in the Upper Columbia and provide input on potential adaptive management actions.

Key Themes

Across interviews, workshop discussions, and Advisory Committee input, a consistent set of themes emerged that point to both systemic challenges and inefficiencies faced by habitat restoration practitioners and broader issues related to implementation of the Recovery Plan¹.

One recurring and significant theme was the need for improved coordination across the habitat, harvest, hydropower, and hatchery sectors (All-H integration). Participants emphasized that salmon recovery cannot be achieved by any one sector acting independently, yet current decision-making processes remain largely siloed and lack a forum for developing alignment around shared goals.

Participants also highlighted the difficulty of linking habitat restoration actions to population-level outcomes. While there is evidence that projects, particularly in the Entiat River, are effective at improving habitat capacity at a local scale, with corresponding

¹ Please note that the information summarized in this report reflects input gathered from individuals in the salmon recovery community in the Upper Columbia. While consistent themes emerged across interviews, workshops, and Advisory Committee discussions, some participants expressed differing perspectives on certain topics. In addition, we sought to engage a broad range of individuals; however, participation in the process was voluntary, and this summary does not capture all views, perspectives, or opinions present across the region. Additionally, the input reflects individual perspectives and should not be interpreted as representing the official positions of any organization.

increases in fish density and growth, linking project or reach scale responses to population level trends remains challenging. This linkage is complicated by the influence of factors across multiple sectors, as well as out of basin effects. This underscores the need for region-wide habitat status and trends monitoring and a clearer understanding of whether habitat limiting factors are improving at the population scale.

On a related note, participants noted the lack of a comprehensive regional system to track restoration progress, including which project areas, reaches, and watersheds still have unmet restoration needs. They suggested that the UCSRB could create an accessible database and spatial layer of completed projects, overlaid on the prioritization map, to summarize these data and support improved project planning and coordination.

Another discussion point was the increasing pressure of climate change, including reduced snowpack and streamflow, higher stream temperatures, and more frequent disturbance events. Participants also discussed the importance of restoration strategies that support the full range of life history strategies to support population resilience, including improving and maintaining lower river overwintering habitat, seasonally dynamic habitats, and upstream areas outside of anadromy that contribute to water storage and food webs. Floodplain and process-based restoration approaches were discussed as important tools for improving water storage, increasing habitat complexity and food availability, and buffering stream temperature. However, participants also noted the challenges of implementing process-based approaches in developed floodplain areas.

Related to this, restoration projects are becoming more complex in some cases. Sponsors are increasingly working in floodplains where they are navigating infrastructure constraints, and managing risk, liability, and rising costs. These challenges are compounded by permitting complexities, funding structures that do not always align with project timelines, and limited capacity within key government agencies involved in moving projects forward, particularly the U.S. Forest Service.

Participants also discussed the need to refine the prioritization framework. While the current framework provides a strong foundation for identifying priority areas and restoration actions, it is influenced by uneven data availability and may be too complicated to allow for frequent updates. Some participants noted concerns about the accuracy of reach rankings and recommended modifying or simplifying the tool (e.g., removing correlated metrics) and incorporating more up-to-date data.

Concerns were also raised regarding the RTT project scoring criteria. Specifically, there were suggestions to refine the criteria to better account for risk of inaction, address data gaps and other concerns regarding the prioritization framework (e.g., protection vs.

restoration ranks, methods used to determine ranks), incorporate climate change resilience to a greater extent, and better reflect the needs of diverse life history strategies. Participants acknowledged that life history diversity is critical for population persistence, and that restoration should support all juvenile life history pathways to achieve recovery. However, there are currently data gaps in life history bottlenecks as well as differences in fitness among different life history strategies.

Coordination among project sponsors and the general breakdown or ineffectiveness of our regional organizational structure and roles also emerged as areas for improvement. While there are strong examples of collaboration in the region, some participants identified opportunities to strengthen coordination and trust among sponsors, as well as improve efficiency and effectiveness throughout the regional organizational structure (i.e. IT, WATs, MaDMC, and RTT).

Finally, participants emphasized the importance of public support, policy, and landowner willingness, noting that the human dimension plays a critical role in salmon recovery. They highlighted opportunities to improve outreach and advocacy efforts to build broader support for habitat restoration and salmon recovery.

Outcomes

The primary outcome of this effort was the identification of a set of challenges and a corresponding menu of adaptive management actions designed to address them (**Table 1**). The [*Synthesis of the 2025 Upper Columbia Region's Adaptive Management Process*](#), developed by Lichen Land and Water Inc., provides a comprehensive synthesis of the findings and recommendations, including workshop and meeting notes, as well as a summary of the literature review.

Following the workshop, UCSRB compiled the notes from the workshop and interviews and developed an initial list of challenges and a corresponding menu of adaptive management actions. These were further modified by the consultant team. The list was then refined based on feedback from the Advisory Committee in two follow-up meetings. Additional refinements were made after gathering input through one-on-one conversations with RTT members, engagement with partners not initially involved in the process, and discussions at RTT and MaDMC meetings. The purpose of these later modifications was to consolidate overlapping challenges and improve the clarity of the proposed actions, as many of the more specific issues identified during engagement reflected common underlying themes.

The actions in [Table 1](#) are organized into four topic areas:

1. **Improving implementation efficiency** - These actions address environmental compliance and permitting efficiency, funding issues, and engagement with

infrastructure owners, with the goal of making it easier to move projects from concept to construction.

2. **Project planning** - These actions focus on improving the region's ability to plan beneficial habitat projects, track habitat conditions, and incorporate climate considerations into restoration planning. This includes refining the prioritization framework, improving data and information accessibility, and expanding planning tools.
3. **Coordination and governance** - These actions are aimed at strengthening regional coordination and leadership structures, and refining project scoring processes to better account for the risk of inaction and a broader range of restoration benefits.
4. **Outreach and engagement** - These actions recognize that salmon recovery depends on landowner participation and support, and emphasize the need for clear communication, increased outreach, and broader use of landowner incentive programs that align with recovery objectives.

Together, these four areas represent a suite of potential actions that could improve how restoration is implemented in the Upper Columbia. Some of the actions identified are already being implemented by various groups in the region but could be expanded or better coordinated to increase their effectiveness. Others represent new or emerging opportunities that build on or refine existing efforts. The action menu is intended to be a living document that can be updated over time as new challenges and opportunities arise.

It is important to note that the Lead Actors assigned to each action do not always represent the organization that will implement the action, but rather the organization that will facilitate or initiate the action. For example, research on life history bottlenecks or comparative fitness among life history strategies is a research question that the UCSRB could pursue funding for, but the work could be led by another organization, such as a university or WDFW. In other cases, such as updating the prioritization framework, the UCSRB would serve as the lead, while incorporating input from other entities, such as the RTT.

All-H Coordination

A consistent theme that arose throughout the adaptive management process was the need for coordinated decision making and alignment of recovery goals across the habitat, harvest, hydropower, and hatchery sectors. While the Recovery Plan is primarily focused on habitat, there are references throughout the plan that recovery objectives cannot be met by implementing actions within only one sector (i.e., Habitat) and therefore

recommends recovery actions that address primary limiting factors within each sector (Harvest, Hatcheries, Hydro, and Habitat).

While the importance of All-H integration is widely recognized, it is also a complex and long-standing challenge that extends beyond the scope of this initial phase of work. Acknowledging the need for a more targeted and sustained effort to address cross-sector coordination, the UCSRB has teamed up with Trout Unlimited to pilot an All-H integration framework that has shown success in California's [Reorienting to Recovery](#) project. The pilot effort is designed to create a structured forum for aligning All-H perspectives around shared recovery goals for steelhead and to test approaches for improving coordination across sectors in the Methow River basin. The outcomes of the All-H integration pilot are intended to inform future efforts in other Upper Columbia subbasins.

Implementation Team

The Implementation Team, as described in the Recovery Plan, was intended to play a central role in coordinating implementation of the recovery plan, supporting adaptive management, and facilitating communication across partners and H-sectors. However, the IT has not functioned in that capacity in recent years and is not currently active. Certain processes have evolved since the development of the Recovery Plan, therefore some of the originally defined roles of the IT may no longer align with current regional needs. In addition, the UCSRB now has staff who have taken on some of the IT's initial responsibilities. Even so, the IT is still identified as one of the Lead Actors for several adaptive management actions in this report.

We have an opportunity to revisit and clarify the membership, purpose, roles, and responsibilities of the IT to better reflect today's context. Re-establishing the IT as an effective coordinating body will likely require dedicated capacity to support its function, including consistent leadership and facilitation to maintain focus, guide discussions, and ensure follow-through. This could involve designating a lead individual or team responsible for convening the group, organizing agendas, and tracking progress on initiatives.

The IT has the potential to fill an important role in supporting regional salmon recovery efforts by identifying shared priorities and co-benefits of habitat restoration, informing and supporting policy and funding needs, and providing a forum for discussions across organizations that do not typically participate in other regional forums. In addition, the IT could serve an important role in advancing and coordinating implementation of several of the actions identified in this report, particularly those that require engagement with large infrastructure owners, or engagement and advocacy at the state and federal levels. A clearly defined role, supported by consistent leadership, would help re-position the IT as a

functional and effective forum for coordination, advocacy, and adaptive management moving forward.

Early Progress

Even before completing the initial phase of the adaptive management process, steps to alleviate some of the current challenges are already evident. For example, some project designs are evolving to incorporate lower-risk, process-based elements that better align with natural river dynamics while reducing concerns related to infrastructure and long-term performance. Efforts are also underway to address capacity constraints within the U.S. Forest Service, including exploration of an agreement with the Forest Service to support environmental compliance and reduce NEPA-related bottlenecks for Programmatic projects.

In addition, improved coordination among sponsors is becoming established through increased communication and strategic planning. On a broader scale, the Methow Steelhead All-H Integration Pilot Project represents an important first step toward All-H integration.

More progress is planned to expand the functionality of the regional web map to better support project planning and decision-making. This will include development and integration of additional spatial data layers, such as basin-wide relative elevation models (REMs), landowner parcel maps, and completed project locations. In addition, the RTT will develop a plan for adaptive management of the prioritization framework and project scoring criteria through the summer of 2026.

However, the work required to address the challenges identified by the regional restoration practitioners will need to continue over the next several years.

Next Steps

The next phase of the adaptive management process will focus on moving from learning to implementation. Our plan is to continue engagement with regional partners to prioritize and sequence the actions identified through this process. Not all actions can be pursued simultaneously, and collaboration will be essential to determine where early efforts are likely to have the greatest impact.

These actions will also be integrated into UCSRB's strategic planning to ensure that adaptive management becomes embedded, and an ongoing component of how the organization operates. This will help ensure that the work conducted through this process is not a one-time effort, but a foundation for continuous improvement.

Finally, clear workflows for implementation will be established, including defining roles and responsibilities, identifying who will take the lead, and developing timelines for advancing individual actions.

Table 1. Adaptive management action menu organized by key challenges identified through the engagement process, associated actions, and lead actors. Actions with an asterisk (*) were not discussed through the Advisory Committee process but were later added to the menu after additional discussions in regional forums (WAT, RTT, etc.) and with funders, such as BPA.

Category 1 – Project Implementation Efficiency		
Primary Challenge(s)	Potential Action	Lead Actor(s)
Permitting	Develop guidance tools or regional expertise hubs for key permitting processes	UCSRB, WATs, Sponsors
Environmental Compliance	Alleviate capacity limitations at the U.S. Forest Service through MOUs with other federal agencies or contracted support	UCSRB, IT
Funding	Advocate for state and federal funding on behalf of the Upper Columbia region	UCSRB (including BOD), IT
Funding	Advocate for longer contracts and more flexible funding to support project planning and outreach	UCSRB, IT
Infrastructure	Increase engagement with large infrastructure owners (DOT, PUDs, BNSF) prior to project development	UCSRB (including BOD), IT
Risk and Liability	Leverage restoration actions (e.g., smaller wood structures, surface roughening, etc.) that carry lower risk from a liability and infrastructure perspective.	Sponsors
Category 2 – Project Planning: Information and Tools		
Primary Challenge(s)	Potential Action	Lead Actor(s)
*Climate Change	Expand stream temperature mapping (FLIR) and make the spatial data available as a layer on the prioritization or other web map so it can be used for project planning	UCSRB, Sponsors
*Climate Change	Identify thermal holding areas and advocate for periodically closing these areas to fishing	UCSRB, RTT, IT

*Climate Change	Create and maintain a dedicated webpage for climate change planning tools, data, and resources with regular updates to ensure information remains current	UCSRB
Climate Change	Expand the use of forest treatment/hydrologic planning tools (e.g., Snow2Flow) to increase water storage in uplands	North Central Washington Forest Health Collaborative
*Climate Change, Prioritization	Integrate thermal refugia potential and/or water storage potential into prioritization framework and barrier prioritization	UCSRB, RTT
*Climate Change, Information Gaps, Prioritization	Conduct behavioral studies or literature review to better understand how and where fish might move as stream temperatures continue to increase and incorporate this understanding into restoration planning	UCSRB, RTT
*Information Gaps, Prioritization	Develop basin-wide REMs and floodplain maps, make the spatial data available as a layer on the prioritization web map so it can be used for project planning and proposal scoring	UCSRB
Information Gaps	Develop a web map to track habitat status and trends using remote sensing and publicly available data, with regular updates to ensure information remains current	UCSRB
Information Gaps	Realign the regional data gaps list with the Recovery Plan to better support evaluation of progress toward recovery objectives (e.g., status and trends monitoring, effectiveness monitoring)	UCSRB, MaMDC
Prioritization	Update or modify the prioritization framework to lessen the influence of data gaps, reduce the number of	UCSRB, RTT

	variables (i.e., correlated ones), improve accuracy and clarity, allow for more frequent updates, and make it easier to QA/QC and maintain	
Information Gaps	Conduct research to compare fitness (<i>r</i>) among different life history characteristics (e.g., compare fitness among stayers and movers, e.g., Euler-Lotka model)	UCSRB, RTT
Information Gaps	Identify life history bottlenecks (e.g., life cycle modeling). This includes getting more information on what life stages are using which habitats and when (including the Columbia River), and including the information in restoration planning (i.e., prioritization framework)	UCSRB, RTT
Information Gaps	Create a framework for tracking restoration progress and remaining needs (e.g., map layer of completed projects on the prioritization web map)	UCSRB
Category 3 – Coordination, Organizational Roles, and Governance		
Primary Challenge(s)	Potential Action	Lead Actor(s)
RTT Project Scoring Criteria	Update the RTT scoring criteria to include projects outside of anadromy that benefit fish productivity (esp. for the Okanogan, will require RCO approval), address protection vs. restoration scoring on acquisition projects, consider the risk of inaction if waiting to fill data gaps	UCSRB, RTT
Regional Coordination	Evaluate possible barriers to coordination among sponsors and options to improve effectiveness of existing regional coordination/ collaboration forums (e.g. WATs)	UCSRB, WATs
Regional Coordination	Facilitate working groups with relevant sponsors centered on	UCSRB, WATs

	an area of interest (e.g., Okanogan, lower Wenatchee)	
Infrastructure, Regional Coordination	Increase collaboration among sponsors on projects involving large infrastructure (roads, powerlines, railroads, etc.)	IT, WATs
Regional Coordination, All-H Integration	Improve leadership of the Implementation Team by appointing and funding, if necessary, one or two people to lead and facilitate meetings	UCSRB, IT
All-H Integration, Regional Coordination	Develop and test a framework for All-H integration and designate a leader or co-leads for this effort	UCSRB
Category 4 – Outreach and Engagement		
Primary Challenge(s)	Potential Action	Lead Actor(s)
Landowner Outreach, Climate Change	Raise public awareness of existing flow restoration programs (e.g., Trust Water Rights , WA Water Trust) through increased outreach	UCSRB, Sponsors
Landowner Outreach	Raise public awareness of restoration incentives and easement mechanisms (e.g., channel migration easements) through increased outreach	UCSRB, Sponsors
Landowner Outreach	Develop plain language landowner communication and outreach materials about habitat restoration	UCSRB, Sponsors
Policy Support	Coordinate with regional partners to identify priority policy needs and develop a unified strategy for advocating for those policies at the state and federal level	UCSRB (including BOD), IT