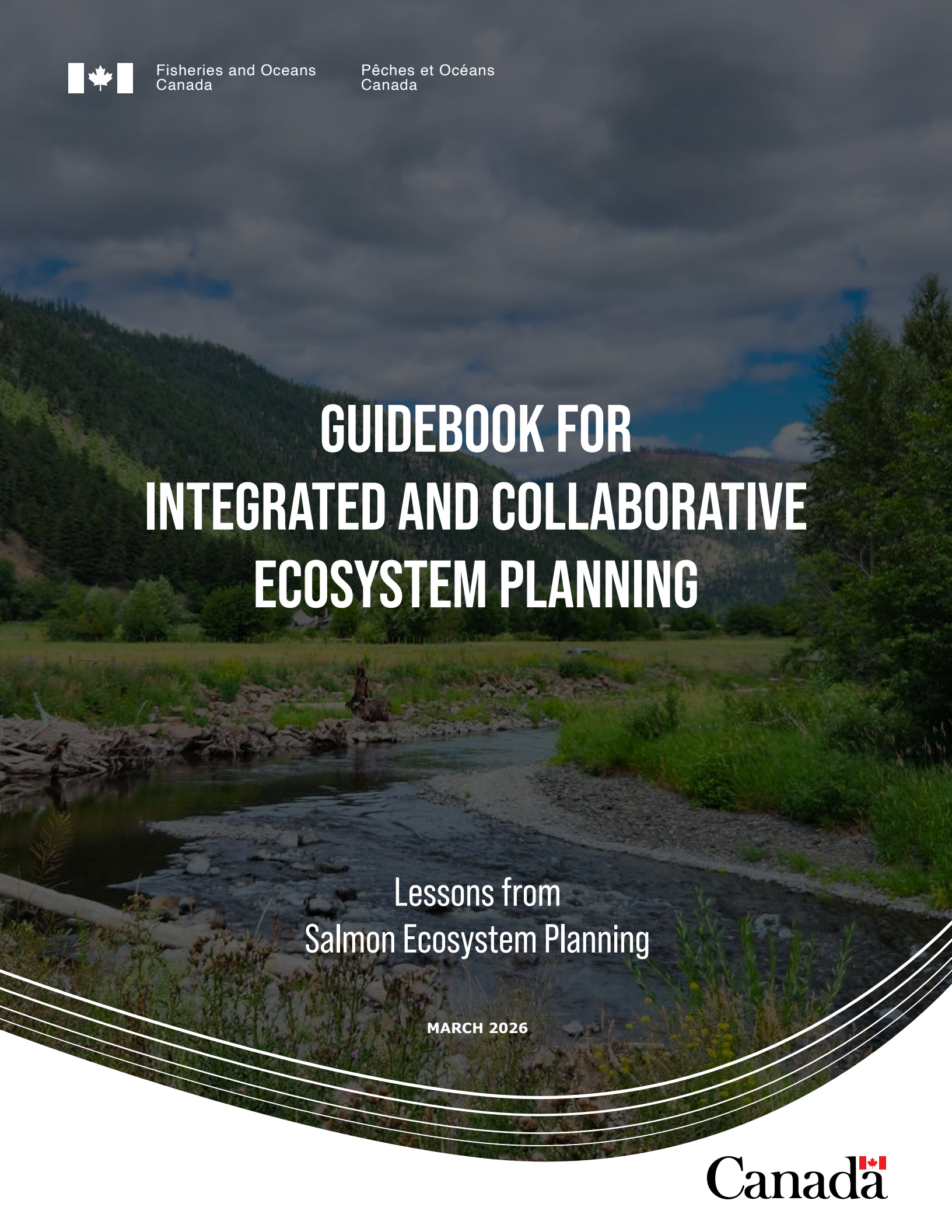

Fisheries and Oceans Canada

Pêches et Océans Canada

GUIDEBOOK FOR INTEGRATED AND COLLABORATIVE ECOSYSTEM PLANNING

Lessons from Salmon Ecosystem Planning

MARCH 2026

Canada

Acknowledgements

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We commit to continuing to learn about and from First Nations, and fostering relationships grounded in respect and reciprocity, to uphold our shared responsibility to steward the lands and waters we all rely on.

THANK YOU

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Acroynyms

AHI	Aquatic Habitat Index
B.C.	British Columbia
DFO	Fisheries and Oceans Canada
FHSI	Foreshore Habitat Sensitivity Index
FIM	Foreshore Inventory and Mapping
GIS	Geographic Information Systems
ICEP	Integrated and Collaborative Ecosystem Planning
IPSE	Integrated Planning for Salmon Ecosystems
MCDA	Multicriteria Decision Analysis
PACT	Purposeful, Actionable, Trackable, and Continuous
PSSI	Pacific Salmon Strategy Initiative
RAMS	Risk Assessment Method for Salmon
RCOE	Habitat Restoration Centre of Expertise
RPP	Fish Habitat Restoration Priority Planning for the Pacific Region
SET	Salmon Ecosystem Table
SHIM	Sensitive Habitat Inventory and Mapping
SMART	Specific, Measurable, Achievable, Realistic, Time-Bound
ToR	Terms of Reference
TSSC	Thompson-Shuswap Salmon Collaborative
UN Declaration	United Nations Declaration on the Rights of Indigenous Peoples

Note on special text styles

Glossary terms (p.96) are printed in ***bold italic*** and linked to their definition the first time they appear within the text.

Key concepts and questions are printed in **bold blue** text.

Tools and resources are printed in **bold gold** text and marked by the tools icon.

Cross-references are printed in green text.

Hyperlinks within the document are printed with an underline.

Superscript Roman numerals link to corresponding endNotes (p. 72)

Superscript Arabic numerals link to corresponding References (p. 75)

1 INTRODUCTION

Tranquille Creek, B.C. Courtesy of DFO staff.

This Guidebook for ***Integrated and collaborative ecosystem planning (ICEP)*** was created to help ***champions*** of ***Pacific salmon*** identify, initiate, and proceed through successful ICEP to support Pacific salmon ***populations*** and ecosystems.

Wild Pacific salmon are threatened by human- and climate-caused pressures that can damage important spawning grounds and result in loss of river connectivity. These are most effectively addressed through integrated and collaborative action by First Nations, Crown governments, and other champions for salmon.[2] Fisheries and Oceans Canada's (DFO) ***Pacific Salmon Strategy Initiative*** was launched in June 2021 to curb the steep decline of Pacific salmon populations and to rebuild and protect salmon ***stocks***. PSSI's strategy relies on guiding strategic and coordinated long-term responses to the various challenges Pacific salmon face, including climate change, fishing pressures, and habitat loss.

Habitat Restoration Centre of Expertise (RCOE) and ***Integrated Planning for Salmon Ecosystems (IPSE)*** are two DFO programs that supported PSSI's conservation and stewardship work through collaborative and ***habitat***[i]-focused planning. The RCOE led the development of ***Fish Habitat Restoration Priority Planning for Pacific Region (RPP)*** for the Pacific Region by engaging with First Nations, Yukon and B.C. governments, and others in the restoration community. The RPP identifies broad habitat restoration goals and objectives across B.C. and the Yukon, as well as supports restoration planning at the ***watershed***-scale by making ***habitat restoration*** information transparent, accessible, and scalable. IPSE partnered with First Nations and provincial and territorial governments to develop sub-regional to watershed-scale Integrated Salmon Ecosystem Plans. These plans outlined shared goals, objectives, and actions to support salmon habitat rehabilitation, ***resilience***, and protection in three areas of B.C. and the Yukon. Each plan also identifies important salmon habitats and ***ecosystem processes***, human and climate-related pressures, and priority actions to support healthy habitat for salmon.

This Guidebook shares lessons learned by IPSE and the RCOE through these collaborative planning processes in B.C. and the Yukon. Although our reflections and recommendations are shaped by the context in which they were developed, we believe many can be scaled to suit a variety of planning contexts. Thus, we hope they will be useful for other practitioners and encourage strong, innovative approaches for ICEP.

1.1 Intent

DFO authored this Guidebook to share lessons learned from IPSE, the RCOE, and salmon ecosystem planning partners in B.C. and the Yukon. As new planning processes are progressed, partners may uncover new lessons that are not captured here. The Guidebook does not speak on behalf of any of our planning partners, and the recommendations should not be construed as mandatory measures for success.

We share this Guidebook to:

- Help practitioners craft successful ICEP processes that lead to the protection and rehabilitation of salmon habitats
- Identify possible ***project*** risks, strategies for success, tools, and resources for ICEP
- Share knowledge with organizations and staff who conduct ICEP for salmon

1.2 Scope

This Guidebook provides examples and advice for ICEP for salmon in B.C. and the Yukon. Pacific salmon are a ***keystone species*** facing steep population declines, and this Guidebook draws attention to the need to work together to save them. In many cases, improving salmon ecosystems will also benefit other species that share these watersheds.[3] Using an ICEP approach, governments, First Nations, scientists, and other stakeholders can come together to set shared ***goals / visions*** and coordinate actions for ecosystem resilience and recovery. ICEP can guide habitat restoration or other activities for salmon or other species (see concepts, p.3). Thus, readers can take away much of the information presented here and apply it to planning processes for other species and ecosystems in Canada.

1.3 Audience

This Guidebook is written for people and organizations who want to champion collaborative work to benefit salmon and their ecosystems and who are seeking information to help them decide if and how to prepare and proceed. It does not assume ICEP *must* include or be led by a specific organization or jurisdiction, and many of the ideas presented could help guide ICEP for species other than salmon. Everyone, from stewardship organizations to local, provincial, and federal governments, First Nations, industry proponents, and their staff, can benefit from this resource.

You may be reading this Guidebook because you are interested in identifying habitat restoration priorities and want to learn more about how to take an integrated and collaborative approach. Conversely, you may be embarking on ICEP with the intention of looking beyond habitat restoration to other solutions to address species declines. This may be mandatory[ii] or voluntary. In any case, the following section will highlight the benefits of ICEP and offer questions to help set up for success.

Habitat restoration: Helping an ecosystem recover by re-establishing its structure, species composition, and ecological processes.[4] This can be done through:

Active means: like planting riparian vegetation.

Passive means: like removing old infrastructure and allowing natural processes to recover.

Habitat restoration planning: The process of identifying where restoration should take place, what type of actions(s) will be most effective, what order they should occur in, and who will implement and monitor. It involves assessing watershed conditions, setting priorities, and working with key jurisdictions and stakeholders to gather information and resources, review the feasibility of proposed projects, and build support for implementation.[5]

Integrated and collaborative ecosystem planning (ICEP): A collaborative approach that brings together key governments, stakeholders, and knowledge holders to agree on shared goals and coordinated actions to support ecosystem resilience and recovery. It weaves expertise from scientists, stakeholders, local communities, and Indigenous groups, incorporates ecological and cultural values, and looks at short- to long-term ecosystem needs.[6] ICEP prioritizes and makes consensus-based decisions or recommendations for the broadest scope of activities that can support salmon productivity and survival in a watershed. Ideally, habitat restoration planning follows the ICEP approach, but ICEP can also influence other activities, like land conservation planning, invasive species management, regulatory change, or public education and outreach. To summarize, ICEP can create guidance for:

What actions and initiatives would most benefit the salmon populations of concern and address the root causes of decline.

Where, **When**, and **How** they should happen.

Who should be responsible for carrying them out.

Adams Lake, B.C. Courtesy of DFO staff.

2 SETTING UP FOR SUCCESSFUL INTEGRATED AND COLLABORATIVE ECOSYSTEM PLANNING

Deadman River Valley, B.C. Courtesy of DFO staff.

There are many potential benefits to an ICEP approach, whether it is initiated to identify habitat restoration priorities or used to find broader solutions to stem and reverse population declines.[7, 8] These can include:

- **Biological** – Identifying and prioritizing habitat restoration and other projects to improve fish population productivity and survival, including for rare and threatened species.
- **Economic** – Supporting efficient resource use among and within organizations. Facilitating training and leadership opportunities in First Nations communities.
- **Social and Cultural** – Increasing public awareness of habitat issues and commitment to environmental goals. Advancing reconciliation with First Nations.
- **Organizational** – Coordinating resources, skills, data, and knowledge within and among collaborating organizations.

To maximize these possible benefits and set up for successful ICEP, readers should understand and be able to communicate how ICEP can effectively support a given population or ecosystem to potential ***partners***, ***participants***, or funding bodies. In this section, readers are guided on how to confirm if population declines are being driven, in part, by habitat issues (2.1), and then how to prepare for ICEP by building in considerations for knowledge, scale, and organizational processes (2.2).

As you work through the questions and examples in this section, **discuss your answers with other stakeholders and knowledge holders to confirm that your reasons for pursuing ICEP are logical**.[9] Additionally, you may wish to reflect on your own ***positionality*** and how this influences your answers[iii]. The questions in Chapter 2 are not designed to serve as a decision chart. If answers to any given question are 'no' or 'uncertain', it does not indicate that ICEP is not appropriate. Rather, such a response invites reflection and discussion between potential partners on the ICEP design and scope.

2.1 Identifying drivers of salmon population decline

Collaborative, ecosystem-based approaches are key to protecting and recovering species at risk.[10] One way to initiate an ecosystem-based approach is to identify priority species and the threats affecting them[iv]. Using salmon as an example, identifying effective restoration and conservation approaches starts by asking: **What is/are the population(s) of concern? What are the root causes of their decline?**

For example, the implementation plan for *Canada's Policy for Conservation of Wild Pacific Salmon*[11] identifies several human and naturally induced pressures impacting salmon habitats at various scales and the corresponding jurisdictional authorities who manage them (as shown in Figure 1).

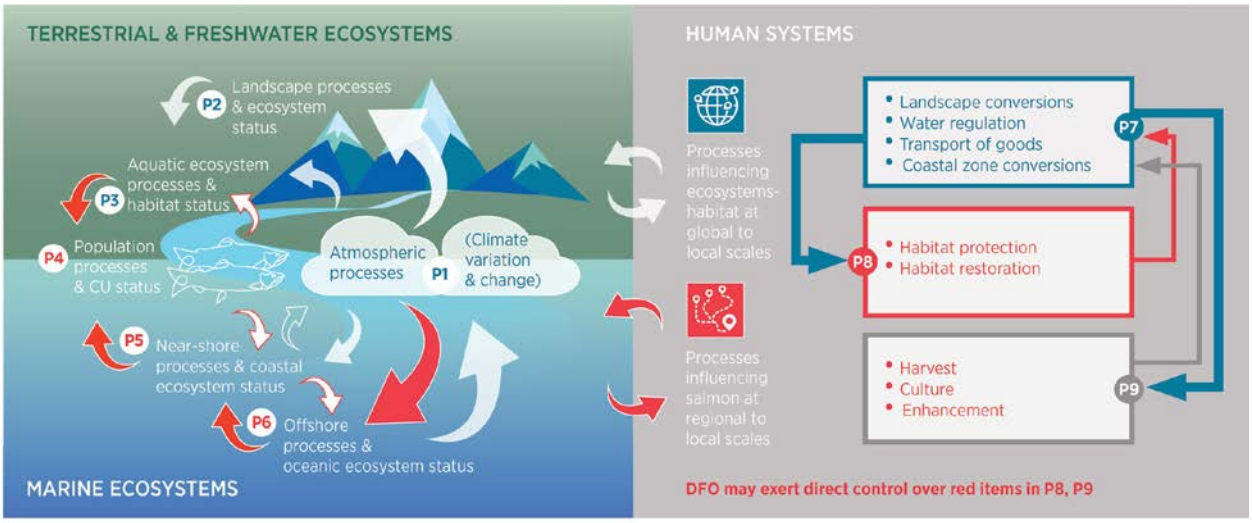


Figure 1. Natural and Human-induced Pressures (P) on Salmon Habitat. From the Wild Salmon Policy 2018 p. 13. (modified). DFO is principally responsible for dealing with P3, P4, P5, P6, P8, and P9. Other federal, provincial, and territorial agencies, and Indigenous governments, are responsible for P1, P2, P3, P7, and P8.

2.1.1 DISENTANGLING HABITAT (ECOSYSTEM) FROM HARVEST AND HATCHERIES

Restoring and maintaining healthy and diverse salmon populations can be supported by a full range of management actions focused on habitat, harvest, and hatcheries.[11] In this Guidebook, we isolate habitat (which we use interchangeably with '***ecosystem process***') to emphasize the importance and challenges of finding collaborative solutions to ***habitat pressure(s)***, degradation, and dysfunction. While it can be difficult to disentangle habitat from potential harvest and hatchery-related effects on salmon populations, we argue that this step is necessary to determine whether habitat-focused projects will effectively support population recovery and resilience (see p. 7).

Ecosystem and species health should be examined holistically. Readers should first identify whether ecosystem pressures, degradation, or dysfunction are partially or wholly driving population declines. In essence, **is habitat quality or quantity a *limiting factor* for the population of concern? Are there dysfunctional ecosystem processes that could be limiting the resilience and rebuilding of the population?** To help with this, look for resources that have a similar level of detail and rigour as the 'Risk Assessment Method for Salmon' (RAMS)[v] or 'Recovery Potential Assessments.'[12] That is, assessments that evaluate risks to specific fish populations and their life stages from harvest, invasive species, maladaptive genetics, and ecosystem modifications, among other pressures.[vi] The following questions can also help assess whether population declines are driven by ecosystem issues:

- **Have other processes, *local or Indigenous Knowledge* holders, or technical staff identified that the ecosystem is degraded or dysfunctional, and is the degradation or dysfunction linked to death or reduced productivity of the population(s) of concern?**
- **What are the root causes of ecosystem degradation? Could *current* or *anticipated* causes of degradation be mitigated or alleviated through human intervention?**
- **Is active restoration needed to recover the ecosystem to a more productive and functional state within the timeframe desired? Have other types of interventions[vii] been proposed by other processes, local or Indigenous Knowledge holders, or technical staff?**
- **Are there non-habitat-related drivers of population declines? Are these drivers being addressed by other projects or processes?**

2.1.2 CLIMATE CHANGE

When assessing whether to pursue ICEP for a given location, species, or population, readers should consider: **How could climate change impact the species' range or distribution, habitat uses, key pressures, or restoration potential?** Earth has warmed 1.34 to 1.41°C above the 1850 to 1900 average.[16] Continued warming in the 21st century is likely to result in increased frequency and intensity of droughts, heatwaves, fires, and floods.[17] Climate-driven ***stream*** flow and temperature changes continue to threaten freshwater ecosystems and undermine habitat restoration efforts (for example, recurring high stream flows that damage restored habitat).[17,18] As environmental conditions shift beyond their historic range, restoration becomes more important than ever.[19] Restoration projects must adapt to support salmon in these new conditions, rather than trying to restore them to a previously 'normal' state.[18] In extreme cases, it may not be effective to pursue ICEP if a population's survival is unlikely under predicted climate conditions, regardless of restoration and protection interventions.

It may not be effective to pursue only ICEP if the primary causes of population declines are not habitat-related. However, protecting and restoring freshwater habitats can help offset cumulative pressures on the population(s) by boosting reproduction and juvenile survival, increasing growth rates, and stabilizing year-to-year salmon production across a watershed.[13]

Consider: How can ICEP help minimize impacts on this population driven by ecosystem factors that contribute to *cumulative effects*?

Additionally, this Guidebook encourages readers to think about how integrated and collaborative approaches like those discussed here can also inform processes that focus on harvest or hatchery-related risks and management actions to support population recovery. Rebuilding Plans developed under the Fisheries (General) Regulations of the *Fisheries Act* include holistic suites of management actions needed to build up populations and rehabilitate habitats. Examples include the West Coast of Vancouver Island Chinook,[14] and Okanagan Chinook Salmon Rebuilding Plans.[15] In addition, the 'Canadian-Origin Yukon River Chinook Rebuilding Strategy' referenced later in this guide incorporates ICEP into broader rebuilding to address the full suite of limiting factors affecting Canadian-Origin Yukon River Chinook Salmon, from hatchery to harvest to habitat-related pressures and opportunities.

Nicola Lake, BC. Courtesy of DFO staff

2.2 Building in considerations for knowledge, scale, and organizational processes

An ICEP approach can add value when addressing ecosystem pressures, degradation, or dysfunction by building in considerations for:

- the level of knowledge about habitat pressures and their management
- the scale of the pressures and corresponding solutions
- opportunities to improve organizational processes[20]

Whether you are initiating ICEP to identify habitat restoration priorities or looking for broader solutions to ecosystem pressures, degradation or dysfunction, the following sections can help you set up for success by confirming a strong rationale for ICEP and helping to determine the appropriate design, scope, and governance for your process (discussed further in Chapter 4 — Planning Steps).

2.2.1 KNOWLEDGE

ICEP can help fill moderate to large knowledge gaps[20] and build capacity and coordination to continue generating and sharing knowledge, to improve governance and long-term management approaches.[21] When there are well-articulated goals and ample technical, ecological, and physical information on habitat pressures available, ***practitioners*** may not need ICEP to determine suitable habitat restoration actions to benefit the ecosystem.[22] However, additional insight into governance systems, regulatory practices, and human-environment relationships gained through ICEP can lead to more effective management of ecosystems and related pressures.[23,24] Aggregating, translating, or weaving knowledge (for example, bridging Indigenous and non-Indigenous data) is central to ICEP, and can help practitioners gain a holistic view of habitat pressures and the actions needed to address them. ***Hišukiš ċawaak***, '*everything is one*', a principle from *nuučaaʔuł* (Nuu-chah-nulth), articulates the reciprocal relationships that exist among species, habitats, ecosystem processes, and people, and is one example of ways to support an inclusive approach to ICEP.[viii] The questions below focus on understanding the level of knowledge and planning for the species and watersheds of concern, to build on, rather than duplicate, existing work:

1. **Are there already well-articulated goals or recommended actions to address habitat pressures?** Are they specific within the geography of interest, or is further work needed to determine where actions should take place?

2. **Are there technical, ecological, physical, or social knowledge gaps for the population or ecosystem?** Are there knowledge gaps at a specific scale—for example, basin, watershed, or stream?

3. **Are there opportunities to bring local and Indigenous Knowledge alongside *Western science*** to address knowledge gaps or support a new understanding of habitat pressures?

2.2.2 SCALE

ICEP provides a framework to address complex problems and identify solutions across the multiple scales at which human and ecosystem processes interact.[25,26]

These include:

- **Spatial**: The geographic extent of an ecological process or interaction, an issue, or an intervention (for example, a stream reach, sub-basin, or watershed).
- **Temporal**: The duration over which an ecological process occurs, or impacts manifest (for example, seasonal, annual, or decadal).
- **Jurisdictional**: The administrative or governance boundaries in which management decisions are made (such as federal, provincial, local, and First Nation governments), which define authority, policy scope, and resource management responsibilities.

ICEP is particularly effective for addressing complex, multi-faceted issues where ecological stressors operate across different spatial and temporal scales, and where responsibility for managing and mitigating ***habitat degradation*** is distributed among multiple jurisdictions. The questions below focus on the first 2 scales. Jurisdictional scale is covered in 2.2.3 – Organizational Processes.

- **Which populations or ecosystems does the pressure affect?** Is the pressure affecting these populations or ecosystems in the same way? At the same magnitude?
- **At what geographic scales are the habitat pressures being measured and observed** (for example, is the problem observed in a single stream or watershed)?
- **What is the temporal scale of the pressure on the population or ecosystem?** What is the corresponding rate and magnitude of change for the population or ecosystem, compared to when the population was last considered healthy?

Coldwater River, BC. Courtesy of DFO staff.

2.2.3 ORGANIZATIONAL PROCESSES

A benefit of ICEP is the opportunity to improve organizational processes. Especially when there are multiple organizations managing or stewarding the population or ecosystem. This can include improved coordination and communication, more efficient use of resources, streamlined and cohesive goals, improved response time to environmental change, and more effective policies.[1,20] The questions below focus on four specific organizational challenges: jurisdictional complexity, mismatches in management and ecological scales, communication gaps, and institutional support. Identifying and working through these issues will help define the appropriate scope and governance for your ICEP process. This supports a successful approach that enhances decision-making, improves organizational efficiency and structure, and advances ecosystem goals.

1. **How many different levels of government or organizations are involved in managing the population or pressure(s)?**
2. **Do the goals, actions, or decisions of managing organizations align with the ecological scale of the pressure? Is there agreement on the goals, actions, or decisions, and how they will be achieved?**
3. **Is communication about managing the pressure clear, coordinated, and consistent among authorities and with stakeholders?**
4. **Are the managing agencies committed to implementing recommendations within their area of authority?**

2.3 Conclusion

Answering the questions in this section should lead readers to a well-articulated rationale for ICEP. The purpose should be built on a strong understanding of how knowledge, scale, and organizational processes can be considered during ICEP, in addition to the drivers of salmon population decline and climate change impacts. Practitioners should be able to communicate why ICEP is needed to potential planning partners, stakeholders, and knowledge holders, to ensure the rationale is logical and unbiased.

Nicola River, BC. Courtesy of DFO staff.

3 GUIDING PRINCIPLES FOR PARTNERSHIP AND COLLABORATION

Deadman River, B.C. Courtesy of DFO staff.

This section of the Guidebook highlights four key principles that apply across all planning stages to strengthen partnerships and collaboration. These ideas have been identified by DFO and partners and are supported by broader findings in ecosystem restoration, planning, and governance. They are to: work adaptively with partners to improve processes over time; prioritize relationships as the foundation to success; build capacity and harmonize work; and work together on pathways to reconciliation. These principles form the backbone of a sustainable and successful restoration planning process. Return to them as you read through Chapter 4 – Planning Steps, and consider how to build them into your own work.

3.1 Learn and adapt with partners

There is no 'blueprint' or single correct approach for ICEP.[27] Practitioners can expect unforeseen challenges during the course of any planning process. Addressing this effectively and ethically requires a supportive planning environment. This means creating a collaborative space where partners can reflect, share, and learn from what is working or not working, and iterate and adapt approaches to align with their priorities.[1] Documenting the planning roadmap and critical activities, and setting time aside to discuss progress, challenges, and opportunities at regular intervals, can help partners identify and prioritize ways of working that build on the successes of previous project steps.[28]

3.2 Prioritize relationships as the foundation to success

Strong relationships underpin successful biodiversity and conservation projects that lead to flourishing ecological and social networks.[22,29] Cooperation, partnership, and collaboration are essential.[27] They ensure actions and recommendations stemming from ICEP have built-in support for implementation and monitoring, which is a key condition for successful planning.[3] Strong relationships are critical to understand how best to support each partner to engage meaningfully with their staff or community members in the planning process.[2] Facilitating trust and common meaning is key to building strong and supportive relationships with people and organizations.[30]

3.3 Build capacity and harmonize work

Building capacity and harmonizing work are critical to address complex, multi-scale pressures on salmon habitat health.[7] While full participation in all planning steps is ideal (for example, work planning, gathering data, and writing the plan),[1] it's often unrealistic given partners' differing resources (including time, funding, and equipment). Communicating openly with partners about resource constraints and working together to find solutions through task-sharing can help alleviate this. Pooling resources, aligning planning roles and responsibilities with organizational strengths, and providing flexibility for those roles to shift during planning helps bridge differences in capacity and overcome mismatches in scale at which pressures and management actions occur.[20] Investing in both short- and long-term capacity where it aligns with planning goals, helps meet both current and future needs, such as monitoring, maintenance, and adaptive management.

3.4 Work together on pathways to reconciliation

The United Nations Declaration on the Rights of Indigenous Peoples (the UN Declaration) provides a roadmap to advance lasting reconciliation with Indigenous Peoples. Planning can and must uphold the UN Declaration, especially articles 29 and 32, which emphasize Indigenous Peoples' right to conserve, protect, and establish priorities and strategies for their lands and territories.[31] Federal, provincial, and territorial staff who lead or participate in ICEP should identify ways for planning to support actions outlined in the UN Declaration, the federal *UN Declaration Act*[32] and its Action Plan,[33] the B.C. *Declaration on the Rights of Indigenous Peoples Act*[34] and its Action Plan,[35] Together Today for Our Children Tomorrow,[36] and final and self-government agreements, modern treaties, and other constructive arrangements.

A strong and durable ICEP process will be led by or include First Nations management approaches, cultural values, and place-based understandings of the lands and waters.[2,7] It is supported by strong partnerships with Indigenous peoples built on shared cultural awareness, flexible timelines, and cohesive engagement efforts.[1,2,27] However, there is no one-size-fits-all approach. Partnership agreements and plan documents can explicitly recognize the history, values, and language(s) of First Nations, bands, or organizations that initiate or participate in planning, to demonstrate commitment to reconciliation.[27] Importantly, working with each First Nation government, Indigenous organization, or community on pathways to reconciliation must be approached with respect, reciprocity, relationality, and responsibility.[28] This could mean supporting ICEP that is initiated or led by First Nations, bands, or organizations; or it could mean respecting their choice not to lead, partner, or participate in an ICEP process.

4 PLANNING STEPS

Nicola Lake, B.C. Courtesy of DFO staff.

This section of the Guidebook breaks down the ICEP process into steps based on experiences and advice from RCOE, IPSE, and our partners. Each step includes **reflections** based on lessons learned and **recommendations** to help with planning future work. These insights are not meant to assign responsibility or commit any party to specific actions. They are shared in the spirit of learning and improvement. The full list of all recommendations from this section is included in Appendix 2: Recommendations.

Look for the icon for **tools** or **resources** to support planning. Further information on tools and resources can be found in Appendix 3 Tools and Resources.

Not all planning or projects will require or benefit from each step described below. Many of the steps can be scaled depending on the objectives, complexity of the project, the number of partners or participants involved, the project timeline, and available resources. Steps may be iterative or adapted as information, resources, or capacity change (see Figure 2). For example, activities such as gathering data on limiting factors and key habitat pressures, setting watershed goals, engaging with communities, and co-developing documents could be completed simultaneously. Planners can get creative with how they tackle the various steps, and simplify, combine, or reorder steps as needed to adapt to resources and capacity available, without compromising shared objectives.

Other resources to help brainstorm a sequence of steps for ICEP include:

- Handbook for Water Champions[37]
- A Guide for the Development & Implementation of Biocultural Indicator Frameworks[28]
- Watershed-based Fish Sustainability Planning: Conserving B.C. Fish Populations and Their Habitats[38]
- Ecological Restoration Guidelines for B.C.[5]
- Principles and Guidelines for Ecological Restoration in Canada's Protected Natural Areas[7]

Figure 2. Steps in Integrated and Collaborative Ecosystem Planning: an organized, but organic and iterative process that often requires repeating and improving in cycles as planning activities are moved forward collaboratively.

4.1 Initiation

4.1.1 BUILD TRUST AND INVEST IN RELATIONSHIPS

Multiple jurisdictions, including the federal government, the Province of B.C., the Yukon Government, First Nations, and local governments, are responsible for stewarding Pacific salmon populations and their habitats, and managing the human and climate pressures that impact them.[3] Building and sustaining strong relationships among these groups, and others who can lead or participate in ICEP, is critical to initiate ICEP and ensure ***engagement*** through to implementation, monitoring, and adaptation. However, this can be challenged by geographic distance, time constraints, different priorities, past conflicts, or unilateral decision-making.

Each step begins with a Summary, followed by more detailed Reflections and Recommendations. To quickly review all planning steps, refer to Appendix 2: Recommendations

Reflections

Effective planning and restoration depend on sustained institutional support for collaboration and strong relationships among stakeholders, planners, and decision-makers.[20] **Confirming all parties have a shared interest in planning (whether mandatory or voluntary) is only the first step in ICEP. Lasting collaboration requires continued investment in building strong working relationships.** These relationships can be shaped and sometimes strained by internal dynamics, such as trust between staff and leadership, or external pressures, such as political priorities.[39,40]

First Nations and other jurisdictions must often work together to achieve their interests regarding salmon, creating ***interdependency***. Strong relationships and trust are essential to understand the priorities, worldviews, and interests of First Nations; however, building trust can be difficult where there is a history of unilateral decision-making or conflicts.[1,28,41] In cases where First Nations choose not to lead ICEP, there could be hesitancy to partner or participate, especially if a federal or provincial government is 'holding the pen' due to concerns that the resulting plan will not reflect their priorities or could limit cultural, social, or economic opportunities.

Geographic distance can further complicate relationship-building, potentially creating a sense of detachment from the planning area and making it difficult for partners to know they share the same ***objectives***[1] Despite logistical challenges, in-person events like workshops, meetings, and cooperative field work can help build connections, trust, and understanding.[1] Connection can also be fostered virtually, where there are logistical or financial constraints to meeting in person (also discussed in 4.1.4 – Create a communications plan).

Recommendations

1 **Embed relationship-building into the planning process from the outset.** Take time to learn about current and past relationships and lessons potential partners can share, to foster strong working relationships. Acknowledge that building relationships and trust may move slowly, and that the initiating organizations should be prepared to collaborate rather than lead.[1] Consider whether any groups have existing conflicts that could affect their ability to work together effectively and gain and maintain support from broader participants. Before workshops, ask participants: **Who else needs to be involved in planning? Are there challenges to us working together?**

2 **Partner with local organizations that can recruit volunteers and staff in the planning region.** When planning across multiple watersheds, work with organizations that serve local communities at larger scales (for example, First Nations Tribal Councils) and leverage their existing networks and resources to incentivize participation and engagement with communities. Discuss opportunities to build local staff and volunteer capacity by leveraging any funding available for planning. Work with local partners to identify place-based tasks (like data collection and watershed assessments) for their staff or volunteers to complete.

3 **Seek out diverse knowledge and experiences with organizations that have relevant decision-making and management authority in the area:** These could be potential partners or participants (for example, local governments). A shared **contact list** can help keep track of key individuals and organizations you reach out to, ways to contact them, and their communication preferences.

4 **Engage a neutral, trusted third-party early in the process** to support difficult conversations and help parties explore whether and how they can work together. Skilled ***facilitators*** or other trusted third-party representatives may be contracted or accessed from within one of the partnering organizations. Importantly, they should be tasked with working on behalf of *all* partners to enhance the commitment to co-developing the plans. They can be brought into processes as needed to help uncover shared interests, diffuse tension, and support the creation of a shared roadmap forward, even if deeper issues remain unresolved.[1] They can help build trust by ensuring that all perspectives are heard, that parties continue to engage with the process of their own volition, and that they can self-determine the planning outcomes.[ix] A project manager or coordinator (discussed in 4.3.1 – Create a work plan and track progress) may also take on a facilitator role, if appropriate and agreed upon by partners, and different stages of the process may call for different strategies.

5 **Embed Indigenous Knowledge, leadership, and shared decision-making throughout ICEP**, depending on the interest of the First Nation, band, or organization. They may choose to initiate, lead, partner, or participate in ICEP, and this choice, as well as any established community protocols they have, should be respected. This includes understanding how existing agreements with other Nations, governments, or groups should be acknowledged and respected[1] and ensuring there is enough funding for First Nations to lead, partner, or participate fully and engage with their communities.[1] Demonstrating this commitment early and consistently may help improve trust and increase collaboration.[1]

4.1.2 ACQUIRE AND DELIVER FUNDING FOR PLANNING ACTIVITIES

ICEP processes can proceed under a range of funding scenarios. This section focuses on cases where one or more parties have funding, or will apply for funding, to support planning activities. Regardless of the amount of funding available, partners should identify a realistic strategy early for how that funding will be obtained, distributed, and used efficiently, as this is critical to ensure planning can proceed on schedule and all partners can fully utilize available resources. Partners should also consider how much funding will be available to implement actions and build long-term capacity (discussed in 4.2.2 – Set and maintain a planning scope and 4.5.3 – Identify champions and funding for implementation) to help make realistic recommendations.[3,7]

Reflections

Partnering with groups that can share investment in the planning process is ideal, either by contributing funds or by applying for funding together.[x] Partners who contribute funding may be incentivized to collaborate more deeply or invest more time and capacity toward the project. However, joint funding applications and shared reporting requirements can be confusing or time-intensive, causing frustration.[1]

Accessing funding sources that can be delivered and distributed in a timely and predictable way is ideal. Delays in funding can significantly impact project quality and progress. It can result in rushed or incomplete work, missed deadlines, reduced planning scope, and, in some cases, the return of unspent funds to the funder. This can be particularly problematic if funds are used to hire dedicated planning staff, purchase essential software for timely data analysis, or to stand up time-sensitive field programs.[1]

Field tour with workshop participants. Courtesy of DFO staff.

Recommendations

6 **Discuss funding early with partners.** Discuss and confirm realistic timelines for how and when funding will be obtained, distributed, and used with project partners and funders.[1,3] Clearly document roles and responsibilities regardless of whether they are tied to funding, to ensure all partners have a sense of ownership and accountability for the project. Ideally, this happens at the same time as setting up a ***partnership agreement*** (see 4.1.3 – Establish partnerships).

7 **Discuss potential challenges to using all funding** and have realistic conversations early on about managing limited capacity (for example, revisit project scope or timelines).[1] Schedule quarterly[xi] budget review meetings with partners to assess spending to date, identify potential overspend or underutilized funds, and make adjustments to fully leverage all available funding within the funding window.

8 **Seek funding sources and develop funding arrangements that increase stability and improve flexibility for partners to shift funding towards priorities.**[1] Though they can require more upfront discussion, arrangements that span longer lengths of the project, or even beyond, give partners more opportunity to utilize funds and invest in long-term capacity (discussed in 4.3.2 – Manage capacity to ensure all partners are present), which benefits current and future activities. This includes building capacity to implement and monitor planning recommendations.

9 **Assign dedicated personnel to navigate the funding process**. For partners who take on the role of obtaining and distributing funding, dedicated personnel can help navigate funding opportunities, application processes and reporting, as well as support and track changes to funding arrangements.[1] Being available to answer questions in real time and provide advice can help each partner feel supported through lengthy or confusing application and administrative processes. **Project management software or spreadsheets** can also help to track important dates and deliverables tied to each funding source.

Chinook salmon. Courtesy of Shane Kalyn | 4 Elements Photo.

4.1.3 ESTABLISH PARTNERSHIPS

Engaging early with potential partners helps to shape the plan's goals and roadmap around local priorities and the voices of those involved. This facilitates realistic roles for everyone involved in the planning process, aligns collaborative efforts, and allows for productive partnerships even amid differing organizational directives or values.[1] Creating partnership agreements early in the planning process helps clarify roles and responsibilities and establish a structure for planning. These agreements can formalize commitments, improve coordination, and support long-term relationship stability.

Reflections

Partnership agreements offer an opportunity to document expectations and clarify how partners communicate, share resources, allocate responsibilities, make decisions, resolve disputes, and evaluate progress (see how we describe 'partners' on p.21). For example, the Thompson-Shuswap Salmon Collaborative (TSSC) outlines processes for communication, partner roles, consensus decision-making, and dispute resolution in their Terms of Reference.

Selecting the right type of agreement depends on the purpose, complexity, timeline, funding arrangement, and level of formality needed. From least to most complex, these can include:

- **Statements of work** outline how specific deliverables will be completed for simple projects and are usually informal and quick to approve.
- **Terms of Reference** (ToR) clarify governance structures and decision-making processes for more complex projects, and are usually more formal and require longer lead times to approve.
- **Letters of intent**, which can affirm mutual interest and commitment to long-term relationship building over many projects, and are typically formal and require substantial time to approve.

Related to the partnership agreement is the need to create a clear governance structure for planning. This can include ***steering committees*** and sub-committees, which can be excellent for brainstorming and gathering advice, making decisions, and co-developing documents.[xii] For larger or more complex ICEP initiatives, establishing committees can increase efficiency while enhancing coordination and accountability; however, they are not always necessary.

Recommendations

10 **Define the purpose of partnership agreements early.** Decide whether the purpose is to coordinate shared tasks, establish governance and decision making, or build long-term alignment and commitment. Identify partner mandates, governance constraints, and determine the level of commitment or legal authority the agreement is intended to grant. Choose the simplest agreement type that fulfils the purpose, considering any constraints.

11 **Discuss each partner's values, principles, and requirements and how these will guide collaboration.** Discuss key values upfront[xiii] and invite partners to share their own program requirements to promote alignment.[7] Include expectations for decision-making processes, how organizations will align differing goals or directives, dispute resolution, and change management processes. Federal agencies should incorporate the *UN Declaration Act Action Plan*[33] measures where appropriate.[xiv] Failure to consider values can prevent project implementation.[42] Therefore, they should be discussed early and reflected in the partnership agreement and roadmap (discussed in 4.2.1 – Create a shared roadmap and goals). See Spotlight 1 for an example.

12 **Use interim partnership agreements or flexible formats when possible** or when formal agreements are impractical. Flexible approaches require more trust but allow partners to kickstart planning activities like scoping discussions, background research, and early outreach, while providing a 'temperature check' for readiness to formalize commitments.[1] It's crucial to ensure that establishing a partnership agreement does not distract from other planning activities. Instead, refining the partnership agreement can be built into 'checkpoint' meetings, which are discussed in 4.3.1 – Create a work plan and track progress.

13 **Establish steering committees and sub-committees** to support critical planning functions. Form sub-committees (also discussed in 4.3.1) if needed to support critical planning functions like work-planning and project management, external communications, and tracking deliverables and managing reviews and approvals from steering committees. Set clear expectations around the funding, scope of work, functions and deliverables for committees.

Rebuilding and ecosystem strategy workshop presentations. Courtesy of DFO staff.

Partners: Organizations or individuals who make decisions about the planning methods, timelines, and outputs based on their own needs, needs identified by the planning Steering committees, and input from participants in the process. They typically commit higher resources and time, which may be documented in funding and partnership agreements, and have jurisdiction, decision-making, and/or implementation authority in the region, or for the species. They are responsible for leading engagement with participants and ensuring the planning process is collaborative.

Participants: Organizations or individuals who contribute time, knowledge, perspectives, or materials to shape the planning process and outcomes. These could be any individual or organization with subject matter expertise to share, who has a vested interest in the outcomes of the planning process, or who might champion recommended actions. Participants are not usually included in partnership agreements, but they might receive funding from partners. They may participate in one or many aspects of planning (for example, in a single workshop or in a committee), depending on their level of interest, time, and knowledge.

Any of the following could choose to be a **partner** or a **participant**:

- First Nations
- Indigenous organizations
- Crown governments
- Stewardship groups
- First Nations
- Indigenous organizations
- Local knowledge holders
- Land owners
- Industry representatives
- Subject matter experts
- Others with an interest in planning outcomes or who might champion recommended actions.

Dawson Falls, B.C. Courtesy of DFO staff.

Spotlight 1

Values Reflected in the Salmon Ecosystem Table Terms of Reference

Nicola watershed First Nations, the Scw'exmx Tribal Council (STC), B.C. Ministry of Water, Land and Resource Stewardship, and DFO's IPSE came together in 2024 to form the ***Salmon Ecosystem Table (SET)***. The SET agreed to work together to develop a Nicola Watershed Integrated Salmon Ecosystem Strategy ('the Strategy'). To achieve this, the SET created a shared ToR, where they outlined 'Guiding Principles' for all members to reflect on and incorporate when developing the Strategy. All SET members were guided by the:

- **Nlaka'pamux Grandmother Teachings:**
  - Takemshooknooqua - Knowing we are connected: land, animals, plants, and people
  - ChaaChawoowh - Celebrating people and land joyously
  - Huckpestes – Developing lifelong learning and wisdom
  - Huztowaahh – Giving lovingly to family and community
  - Choownensh – Succeeding in endeavours
  - Choowaachoots – Utilizing nlaka'pamux vision-seeking methods
  - Nmeenlth coynchoots – Incorporating nlaka'pamux knowledge
  - Peteenushem – Reflecting on learning and relearning lifelong lessons
- **Syilx Four Food Chiefs:**
  - Chief skəmx̌íst (Black Bear) – Culture and history
  - Chief síyaʔ (Saskatoon) – Innovation and creativity
  - Chief spítləm (Bitterroot) – Relationships and interconnectedness
  - Chief n'tyx̌tx̌ĭ (Salmon) – Action and progress

In addition, the B.C. and DFO members were guided by the Draft Principles that Guide the Province of British Columbia's Relationship with Indigenous People and Principles respecting the Government of Canada's relationship with Indigenous peoples, respectively, and the Government of Canada's and Province of B.C.'s commitments to advance reconciliation through principles rooted in Section 35 of the *Constitution Act* and the UN Declaration on the Rights of Indigenous Peoples; specifically Articles 15(2), 18, and 19.

Together, these principles set the stage for respectful and inclusive collaboration and enabled the SET to integrate First Nations, Provincial, and Federal values.

4.1.4 CREATE A COMMUNICATIONS PLAN

Engaging with participants helps identify shared goals, improve coordination and information sharing, and sets up for successful implementation.[7,20,27] Engagement can occur at multiple phases and depths, from setting goals and objectives to ***action prioritization*** and implementation, but requires thoughtful coordination to ensure that First Nations, other levels of government, stewardship groups, and other stakeholders are included.[3,27] Creating a shared ***communications plan*** reduces the risk of mixed messaging or missing or duplicating engagement opportunities. Furthermore, a strong communications plan will include strategies to inform local communities and build support for eventual project implementation (discussed in 4.7 – Implementation).

Reflections

Agreeing on who, how, and when to engage can be challenging when working collaboratively. Coordinating outreach and engagement is needed to minimize duplication and respect participant capacity.[1] However, partners may disagree about the benefits of broad versus targeted engagement approaches, especially if there is a high potential for conflicts.[1] Planning processes that do not include diverse perspectives, particularly local voices, can feel exclusionary and disconnected from community priorities, which leads to disinterest when it comes time to implement recommendations.[1] Asking, "**Who will support the final plan? And who will implement the plan's actions?**" can help identify key participants to generate information for planning and to gain support for the final plan.

Selecting appropriate tools and methods based on what is consistently working for the audience, rather than defaulting to generic approaches, can make communication more impactful and reduce unnecessary workload.[1] Online platforms provide accessible, scalable ways to share information and gather input, particularly for geographically dispersed or time-limited participants. Tools like websites, newsletters, informational webinars, online polls, and data portals allow individuals to engage at their own pace and depth.[1] However, some online tools can be costly, take more time, and require more technical skill to set up and maintain. A mix of online and in-person communication methods, including direct calls, targeted emails, one-on-one meetings, and workshops, can be used depending on the complexity of the topic and the participants involved.

Recommendations

14 **Discuss communication responsibilities early.** Talk about how information will be shared, who will lead communication, what messages need to be coordinated, and identify key audiences and when they need to be engaged. Identify any organizational policies or protocols that must be followed.

15 **Develop a shared communications plan with clear priorities, roles, and timelines**. Include the purpose of communicating with different audiences, the method of communication, frequency, and responsibilities for drafting and approving communications materials (for example, newsletters). Whether the communication plan is represented in a table, figure, or document, it should include these elements. See Spotlight 2 for an example.

16 **Match the communication tool to the audience's needs and capacity**. Where possible, prioritize tools that are simple and have the highest quality and rate of responses.[1] Operate according to each organization's communication preferences and track which method works best for each partner or participant (for example, send requests to a central inbox rather than specific representatives). Adjust your strategy over time to reflect changing needs or capacities. For example, **workshops and community engagement meetings** are spaces for participants to co-create the planning process, share knowledge, and build consensus, while one-on-one meetings may be more effective to get targeted feedback from specific individuals or organizations. **Facilitators** can help uncover these patterns and suggest communication methods well-suited to particular audiences. This is also a good time to identify opportunities for First Nations to lead activities, including on-the-land or on-the-water events to connect people to the ecosystem.[1]

17 **Use online platforms to expand outreach**. Consider tools like **newsletters, virtual information sessions, surveys, and websites** to provide updates, share materials, and gather input. These can also supplement in-person engagement to reach a broader audience or seek confirmation on information (for example, by publishing 'what we heard' reports following engagement sessions and asking for comments back). These tools support low-barrier participation and broad reach,[1] but may require more specific technical skills to set up and maintain. For example, the Yukon Salmon Sub-Committee set up a webpage to provide information on the Canadian-Origin Yukon River Chinook Salmon Rebuilding Strategy being co-developed with partners (also discussed in Spotlight 4).

18 Use more resource-intensive tools to gather location-specific input when there is clear value, funding, and people to manage them.[1] These tools can include **geographic information systems (GIS) tools and other data analysis and modelling tools**, as discussed in 4.4.3 – Choose effective data analysis and modelling tools. For example, the TSSC launched two online tools to collect information on salmon habitat features and recommended actions. They were announced via email, virtual information sessions, and newsletters, and accessed via the TSSC website.

19 **Leverage each partner's network to identify and reach out to a broad suite of participants** to build a sense of ownership and shared motivation to implement actions.[3,7] The Handbook for Water Champions (2019) outlines key considerations and strategies for engaging different authorities and 'players' in watershed planning.

20 **Share back what you heard**. Maintain transparency and incentivize participant input by sharing how feedback is shaping decisions at each stage of the process.[3] Facilitators can share meeting minutes, **'what-we-heard' or progress reports**, or summaries of workshop discussions to recognize the value of contributions and ask for corrections or additions.[1] Clarify how information will be stored, used, and shared, so participants can make informed decisions about the information they provide.[1] This also applies to 4.4.1 – Gather and bridge knowledge and data.

Winter surveys. Lemieux Creek, B.C. Courtesy of DFO staff.

Spotlight 2

The Thompson-Shuswap Salmon Collaborative ToR and Communications Plan

The Thompson-Shuswap Salmon Collaborative (TSSC) is a partnership between Secwépemc Fisheries Commission, Fisheries & Oceans Canada, and B.C. Ministry of Water, Land & Resource Stewardship. In 2021, the TSSC signed a Terms of Reference (ToR) to establish a non-political, innovative, watershed-based collaborative process to meaningfully work towards salmonid conservation and restoration in the Thompson-Shuswap. The ToR acts as a guide for the TSSC's collaboration and outlines the scope of work, operating principles, structure, and decision-making processes. In 2024, the TSSC renewed the **ToR**, which is available on their website. They also developed a shared communications plan to support timely, effective, and coordinated communications with their key audiences.

The TSSC communications plan includes goals, objectives, roles and responsibilities, and timelines for communication to support the development of the *Thompson-Shuswap Salmon Ecosystem Action Plan*. The document is succinctly scoped to the capacity and roles of TSSC parties at the time that it was approved by the steering committee. It was used to focus work on core communication objectives and collectively determine if/when communications were straying out of scope. The document contains the following sections:

1. **Introduction**
   - **1.1** Purpose and Intent
   - **1.2** Alignment with TSSC Terms of Reference
   - **1.3** Goal and Scope
   - **1.4** Communication Objectives
2. **Internal Communication Processes**
   - **2.1** TSSC Meetings
   - **2.2** Other Communication Between Parties
   - **2.3** Collaborative Materials and SharePoint
3. **External Communication Processes**
   - **3.1** Underlying Messaging for External Communication
   - **3.2** The Salmon Community (a.k.a. TSSC's Key Audiences)
   - **3.3** Communication Modes
   - **3.4** Supporting Materials for Communication
   - **3.5** Accessibility
   - **3.6** TSSC Branding
4. **Communication Schedule**
5. **Appendices**
   - **5.1** TSSC Plan Review Process
   - **5.2** Salmon Community and Communication Intent
   - **5.3** TSSC Additional Messaging

4.2 Vision and scope

4.2.1 CREATE A SHARED ROADMAP AND GOALS

Partners and participants should work together to co-create a shared ***roadmap***, goals, and objectives for the planning process (see concepts on p.29).[1] This will help direct the planning steps and final products. If the goals and the pathway to achieve these are unclear, the planning processes may struggle to launch and risk losing participant support. The roadmap will depend on factors such as the knowledge, relationships, and the capacity of partners and participants, as well as the project scope, funding, timeframe, and speed of the planning process (discussed in Spotlight 3). By engaging partners and participants early to co-create goals and a roadmap, you can focus efforts on work that directly contributes to agreed-upon outputs.

Spotlight 3

Timeframe and speed of the planning process

A sufficient and practical **timeframe** is needed for ICEP.[3] A shared deadline to complete the plan can make working together easier because it focuses effort on steps that are achievable and needed, and carries momentum towards implementation.

The timeframe for completing the plan should be discussed alongside scope and vision, and documented in the roadmap.[1] Partners should consider funding arrangements and timelines, organizational requirements, and competing demands on people's time and resources.[1]

Longer timeframes can provide more flexibility when working with partners to ensure the process is accessible and inclusive. However, extended timeframes can also signal a lack of urgency or momentum that discourages participation. Longer planning timeframes can also be challenging because they may be harder to align with funding windows, which can disrupt continuity.[1]

Shorter timeframes may align with the urgency related to the magnitude or rate of population decline or ecosystem degradation.[1] However, shorter timeframes can also make it hard to build trust and coordinate work with partners and participants, resulting in setbacks and rushed decisions.[1] Planners must weigh these benefits and costs when designing their planning processes and aim to mitigate these issues to the extent possible, given project constraints.

Reflections

Creating a roadmap with partners provides clarity around planning goals and objectives and the process to achieve them, which is especially important for long-term, multi-year, multi-partner efforts. In IPSE's experience, roadmaps were the most useful when they included key milestones and deliverables, defined what success looks like, and clarified how goals would be reflected in recommendations. Additionally, they can be used to align expectations and planning processes when partners have different timelines, priorities, and goals for planning or ways to achieve them.[1]

Recommendations

1 **Use the roadmap to provide clear direction for governance and decision-making processes throughout planning.**[1,3] A roadmap that clearly describes shared goals, roles and responsibilities, milestones, and key dates can motivate partners and participants to find intersections with their own work and help them communicate about the process to others in their organization. A robust roadmap reduces silos, avoids duplication, streamlines orientation for new participants to the planning process, and builds on and links to existing plans to gain implementation support. Use **infographic tools** (for example, Visio and Canva) to create and present visual narratives of the roadmap to partners and participants. For example, Spotlight 4 shows a roadmap for a salmon rebuilding strategy in the Yukon.

2 **Access** strong facilitators or another neutral, **trusted third-party** where possible, who understand the watershed context and can navigate differing views and challenging discussions. They can advise on effective and context-appropriate roadmaps, governance structures, and support partners to identify or delegate roles.

3 **Ask about related work** with the aim of building on, rather than duplicating or replacing existing or past projects. This can also be an opportunity to integrate and align existing plans or processes (particularly at different scales). Workshops can be a good place to ask about existing work and uncover opportunities to leverage resources (see Appendix 1 – Additional Questions).

Male coho salmon. Courtesy of Shane Kalyn | 4 Elements Photo.

Roadmap: A co-developed document or diagram that outlines high-level goals and ***milestones*** for the planning process, who is involved in each step, and their roles. More intricate roadmaps might also indicate information sources or knowledge being generated or used at each step.

Goals/Vision: Two types of goals can be included in a plan.

1. Goals focused on the planning process, the future state of the plan itself, or the partnerships built to support it. These are the foundation for an ecosystem plan's ***acceptance criteria***, and are used to identify objectives for how planning will occur. For example:
    - *Collaboration goals* such as 'the plan is implemented by all parties who helped develop it, and who are identified as champions for recommended actions'.
    - *Process goals* such as 'the plan incorporates feedback and interests of First Nations in the area who steward the population(s) of concern.'

2. Goals focused on an achievable and desired future state or condition for a species, area, or ecosystem process (or enabling condition). Goals are designed to be broad and long-term to account for large spatial scales and slow recovery of natural systems. These ecosystem and implementation-oriented goals should be broken down into specific objectives and recommended actions within the plan. For example:
    - *Habitat goals* such as 'sufficient and reliable water supplies are available for salmon through all their life stages'.
    - *Communication goals* such as 'champions for salmon advocate for salmon habitat needs at all levels, and are empowered with tools and strategies to do so'.

Objective: Specific and measurable outcomes that contribute to achieving a goal. Many methods can be used to create clear objectives. One method is 'SMART' (Specific, Measurable, Achievable, Relevant, and Time-bound). Another method is 'PACT' (Purposeful, Actionable, Continuous, and Trackable). The latter focuses on continuous output as opposed to final benchmarks and outcomes. PACT can be useful for setting objectives for goals oriented toward ongoing collaboration and stewardship.[43]

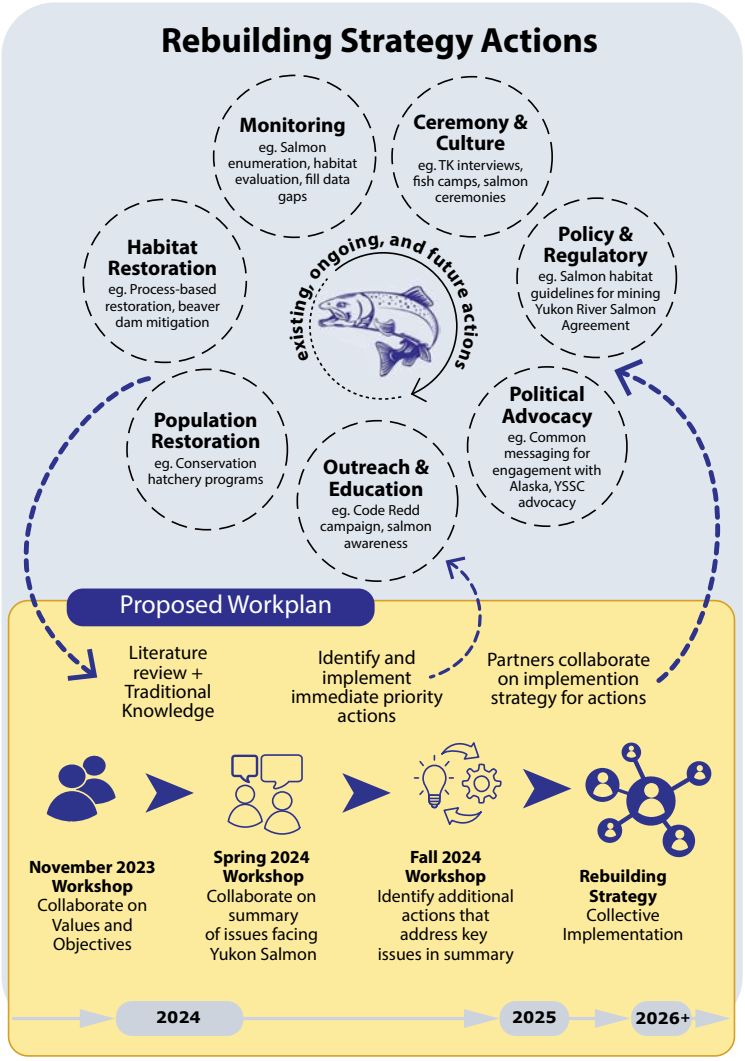
A roadmap can include objectives focused on the planning process. To build on the process goal example above, this might include a PACT objective such as 'share a what-we-heard report or meeting summary after each event'. Objectives for the desired future state of the species, area, or ecosystem can be formed later, as information is gathered, and actions are identified and prioritized (discussed in 4.5.1 – Identifying and prioritizing actions). For example, building on the habitat goal above, a SMART objective could be to 'install X number of engineered log jams within 5 years in the upper reaches of River Y to improve water storage in the headwaters'.

Spotlight 4

Example Roadmap from the Canadian-Origin Yukon River Chinook Salmon Rebuilding Strategy

The roadmap below illustrates the planning vision, milestones, and roles and responsibilities for the Canadian-Origin Yukon River Chinook Salmon Rebuilding Strategy ('the strategy'). Creating the strategy was a collaborative effort between several First Nations and federal and territorial governments, First Nations organizations, and local stakeholders. A third-party coordinator provided project management, logistical support, facilitation, and advice to partners for the planning process. The figure and description below was prepared by the third-party coordinator and sent to participants to reflect feedback received at the first workshop.

The diagram shows a high-level roadmap of some of the work that may form and inform the Canadian-Origin Yukon River Chinook Salmon Rebuilding Strategy. The circles towards the top of the diagram outline the broad vision for how various activities may fit together and to help participants understand how the planning process may inform their existing work. The bottom timeline highlights key known events, such as workshops, and how those fit into the broader strategy planning process. The figure was developed early in the process before details about work in 2025 or later were fully formed. To reflect this, the roadmap has more detail in the near term and implies process flexibility later. The figure was also designed to help participants understand how the planning process could fit with their existing work, and revealed opportunities for work to change and improve during planning and eventually with the resulting strategy.



4.2.2 SET AND MAINTAIN A PLANNING SCOPE

Setting and maintaining a planning scope that is grounded in local needs ensures that resources are used effectively during planning and outcomes are relevant, achievable, and supported by those who will implement them. Scoping the process early makes it easy to connect to the goals for the planning process, but it can make it challenging to ensure enough flexibility to adapt to new insights, priorities, and constraints.

Reflections

Setting a scope early and sticking to it can reduce project delays, missed deadlines, and miscommunication between partners. The dynamic nature of integrated planning requires an ***agile approach***[xv] that has the flexibility to respond to evolving priorities, insights, and capacity.[1] Strong collaborative planning revisits scope throughout the process and makes adjustments as needed in agreement with partners, without expanding beyond what is feasible.

A key challenge is incorporating the scale of human impact. As the level of human influence increases, effective ecosystem strategies require more coordination and investment, favouring ***watershed***-scale over small-scale fragmented approaches.[13] However, expanding the geographic scale can also make the project scope harder to manage, as planners must balance a larger range of human and ecological priorities.[3]

Incorporating both short and long-term actions into the plan and defining this 'temporal scope' can also be challenging. Urgent restoration actions can mitigate negative impacts from recent and drastic habitat change and contribute to overall ecosystem resilience. However, deeper or longer-term solutions that require policy or regulatory reforms and coordinated watershed-scale restoration may be more impactful in remediating the root causes of population declines. Integrating short- and long-term actions into the plan is therefore crucial, but can make it more difficult to evaluate actions against one another.

Recommendations

4 **Set a realistic scope early and define acceptance criteria.** Collaboratively establish a tight scope based on current resources (especially if bound by funding and/or timelines). Discuss the trade-offs of a narrow versus a broad scope with partners and assess the feasibility of integrating expansive and multi-timeframe actions in a single plan. Keep in mind that as the scope increases, it will be harder to 'solve' all identified problems in a single plan. Document clear acceptance criteria for the final planning deliverable(s) that reflect the scope.

5 **Create a change management process to avoid scope creep.** Co-developed change management processes (for example, approval by a steering committee) can help adjust scope when needed. Define this process, including how out-of-scope issues will be tracked and revisited if conditions, such as funding or resourcing, change. Seek consensus with partners on factors to consider when adjusting the scope, such as local relevance, feasibility, and urgency.[1]

6 **Use off-ramps or parking lots during workshops or meetings** for ideas that fall outside the current scope. This can help maintain openness with partners and participants, avoid shutting down conversations, and bridge complementary work that would otherwise be missed.[1] Facilitators or coordinators can circle back to ideas to make connections or offer 'offline' conversations to follow up on important questions or concerns.

7 **Use mapping software to present and get feedback on the geographic** scope and help **visualize options** to organize the planning area using social or ecological units like watershed boundaries.

8 **Ensure the scope is relevant and supported by local stakeholders and groups.** Discuss known pressures, limiting factors, and human impacts with those who know the area and are likely to support action implementation, to understand how to reflect these in the scope.[3] Use **community engagement meetings and workshops** to gather feedback. Ask: **What are some of the key issues for freshwater salmon ecosystems in the watershed of interest, and at what scale are they occurring?**

9 **Assess gaps while scoping the plan.** Identify immediate data needs[xvi] versus 'nice to have' information that can be pursued later if funding, resources, or capacity increase. Consider how to structure the planning process to incorporate additional data on a rolling basis.[1] For example, focus on creating recommendations for a single data-rich area first, while other areas of the watershed are assessed. Or use initial information to make broad recommendations and refine them later if more specific data is available. Data sources, metadata, and data gaps can be tracked using **spreadsheets or watershed profiles**, which can help partners confirm whether the scope addresses all key habitat pressures and limiting factors.

4.3 Work planning

4.3.1 CREATE A WORK PLAN AND TRACK PROGRESS

Transparent and flexible work planning helps partners coordinate, track tasks, and ensure efforts remain focused and adaptive to evolving needs. Finding a balance between coordination and dedicated work time is essential, as too many check-ins can lead to delays and burnout, while too few check-ins risk misalignment, missed opportunities, and a process that feels less transparent and collaborative.

Reflections

Co-developing work plans requires transparency, trust, and open communication about the ability to share data, resources, and tasks.[1] Each partner must assess capacity, set realistic timelines and deliverables, identify resource constraints and training gaps, and determine if other partners or third parties can support them to meet deadlines. Shifting priorities and timelines can make it challenging for staff to complete tasks efficiently, especially if communication is delayed or fragmented.[1]

Openly sharing work plans, identifying shared needs, and tracking progress across teams helps make the best use of time and resources, which is especially important when staff are balancing ICEP alongside other responsibilities.[1] Project management software can help draft work plans, track milestones and key dates, identify ***critical paths***, and share progress updates with partners; though, the time required to learn and manage the tool can affect how widely and consistently it is used.[1] Partners can also use regular ***'progression' meetings*** and targeted conversations to coordinate work and align upcoming deliverables, research, and engagements.

Allow for extra time for planning and approvals. Partners are likely committed to many other projects and engagements, which can limit their time to develop or review materials before meetings, which can also be challenging to schedule around field seasons and deadlines.[1] This can lead to delayed input and approvals, making it difficult to co-develop documents and determine next steps, hindering overall planning progress.

Recommendations

1 **Establish the project management approach from the outset**, including identifying a project manager. Appoint a ***Project Manager/coordinator*** to provide advice and help partners set up a simple and effective project management approach.[xvii] This person can be found within a partner organization or be a third party. They can help coordinate reviews and approvals, hold parties accountable to tasks and deadlines, as well as set up and utilize work planning tools to track activities, timelines, and deliverables. Clearly communicate the role of all partners and the project manager's scope and accountability, including a preference for shared decision-making where possible (based on the partnership agreement developed in 4.1.3 – Establish partnerships).

2 **Co-create a work plan with partners and the project manager**. Use the established scope and roadmap to break down work into activities and tasks. Order the tasks, set deadlines, and identify dependencies. Assign tasks based on capacity and resource availability. Significant events (for example, holding an inaugural workshop) can be used as milestones to track progress. Where possible, build in flexibility to adjust timelines as partners' capacity or resources shift.[1] Use critical paths to identify activities that cannot be delayed and document any changes to these activities using a pre-defined change management process. This work plan can be tracked in **project management software or spreadsheets** overseen by the project manager.

3 **Identify tasks that can be actioned while planning** to support key deliverables and build momentum towards implementation. Immediate actions, like initiating a habitat monitoring program to help fill knowledge gaps, can support the species or ecosystem while longer-term actions are identified. The project manager, in collaboration with partners, should ensure these 'actions while planning' are identified as early as possible and incorporated into the work plan. The funding strategy (discussed in 4.1.2 – Acquire and deliver funding for planning activities) should identify funds set aside for these actions and how they can be accessed.

4 **Delegate work to sub-committees or working groups which have roles and priorities that are directly and clearly tied to the needs of the planning process**. When done effectively, delegation of tasks to sub-committees and working groups by the steering committee (or other coordinating body) should result in the steering committee concentrating on strategic direction, reviewing and approving deliverables, and spending minimal time collecting information, analyzing, and writing.

5 **Schedule regular checkpoints to review the work plan, track progress, and identify constraints or bottlenecks.** Check-ins help maintain project momentum and ensure mutual accountability. Choose a meeting frequency that you can maintain for the length of the ICEP initiative (for example, monthly). Check in after completing each major milestone to help determine if any changes to the work plan are needed for the next project stage. Share **progress reports through emails, newsletters, or information sessions** when major milestones are completed so partners and participants can stay informed at their own pace and level of engagement.[1]

6 **Regularly assess the value and frequency of meetings.** Reduce meeting frequency if materials are consistently not reviewed or input is lacking.[1] Instead, use emails, surveys, or phone calls to share materials, gather feedback, affirm timelines, and follow up on action items. Where possible, provide extended timelines and stagger meeting times, emails, or reviews to accommodate existing commitments and manage workloads. A facilitator or dedicated meeting coordinator can help manage expectations for meeting preparation and participation, create agendas to ensure productive use of time, and help maintain momentum and accountability if meeting frequency slows.

4.3.2 MANAGE CAPACITY TO ENSURE ALL PARTNERS ARE PRESENT

Successful ICEP must manage the differing capacities and constraints of partners, including organizational directives, staffing, and funding timelines. This impacts many steps throughout the planning process, but is most prevalent during work planning when partners and the project manager are assigning tasks and deadlines. Transparent communication, flexible roles, and long-term capacity investments help ensure sustained and equitable participation. Without this, contributions feel uneven and critical insights from under-resourced partners may not be included.

Reflections

Effective collaboration requires partners who contribute equitably but not always equally. Partners need to assess what they can realistically offer in terms of staff or volunteer time and knowledge, and adapt the work plan over time to evolving capacity. Assessment and adaptation allow partners to advance work and minimize burnout caused by over-allocation of taskings to any one partner. However, it also requires ongoing communication, trust, and coordination for partners to accept and track the distribution of tasks.

Despite strong leadership-level commitments to collaboration, actual participation in planning can be limited by capacity constraints.[1] Even if funding is acquired, partner organizations might not have personnel who can contribute to key tasks like organizing meetings and working groups, data analysis, or writing and revising documents, issues which may be exacerbated by short planning timelines (noted in Spotlight 3).

First Nations Fisheries Legacy Fund and others have noted these challenges can be particularly acute for First Nations, who may have less capacity to allocate additional tasks to existing staff or hire new and local staff.[2] This work often ends up contracted to external consultants or agencies. This means less project funding is being spent on staff development, community-based training, and youth engagement, missing opportunities to build leadership and knowledge and support lasting watershed stewardship.[1,2]

Side channel restoration. Raft River, BC. Courtesy of DFO staff.

Recommendations

7 **Invite partners and participants to identify their level of involvement** based on capacity, not just organizational directives. Have these conversations early when exploring partnership opportunities and continue checking in along the way.[1] When setting up partnerships, be clear about the availability and experience needed to fulfill various roles. For example, whether all partners are expected to review key materials, provide feedback and/or attend all committee meetings. Lead by example and make space for partners to acknowledge limitations and request support. Emphasize that successful collaboration does not require equal workloads, but rather a collective commitment to shared outcomes.[1] For example, ask partners and participants: **What role do you see for your community, yourself, or your organization in this planning process? Is there work that your community or organization is already undertaking to support salmon and their habitats?**

8 **Break work into manageable tasks for shorter timelines, different funding amounts, or remote or in-person work**, to enable progress regardless of capacity. For example, desktop research, online engagement, or drafting documents can work well for remote staff. Other tasks, like in-person engagement or habitat condition assessments, may be more effectively led by local partners who have existing responsibilities, knowledge, and relationships that align with these needs.[1]

9 **Invest in long-term local capacity**. Direct funding, where available, toward longer-term staffing to encourage building and retaining local stewardship capacity over time (including for implementation, monitoring, and maintenance).[1] Use funding to hire new staff and support staff training and upskilling, and youth engagement within First Nations communities.[2]

10 **Assign personnel to functions supporting multiple teams** where feasible. For example, assign someone to support multiple project teams by helping them access or distribute funding while maintaining strong coordination, high service standards, and reducing repetitive tasks.[1]

Lemieux Creek, B.C. Courtesy of DFO staff.

4.4 Gathering information

4.4.1 GATHER AND BRIDGE KNOWLEDGE AND DATA

The success of ICEP depends on effectively gathering and weaving information across disciplines, organizations, and knowledge systems. Partners must identify critical data needs early and intentionally include diverse and local knowledge systems to lay the groundwork for effective and culturally respectful planning. Identifying and addressing knowledge gaps is crucial, as real or perceived knowledge gaps may discourage people from making recommendations. These gaps may not reflect a genuine lack of information but rather opportunities to bridge data formats or viewpoints, or improve information sharing and coordination.

Reflections

It can be challenging to obtain all the desired information to identify and prioritize actions that will address key pressures on the ecosystem or population. Ideally, knowledge gaps in watershed and fish population status, primary habitat pressures, and implications for the broader ecosystem should be identified early.[3] However, there is little consensus on broadly applicable knowledge 'needs' for each step of ICEP (see Spotlight 3).[xviii] The breadth and scale of information collected in this step impacts how comprehensively the watershed conditions are assessed, and ultimately influences the specificity of objectives and recommended actions (as noted in 4.5.1 – Identifying and prioritizing actions). Depending on the size and structure of participating or partnering organizations, information about ecosystem and population status, projects, or community engagement might be held by teams that do not regularly coordinate, resulting in isolated 'silos' of knowledge that can be challenging to bridge.[1]

Bridging silos includes weaving local and Indigenous Knowledge alongside Western science, with teachings such as ***Hišukiš ċawaak***, looking at everything as one, to build a collective understanding of the ecosystem, its pressures, and potential management actions. Western science-based approaches to ecosystem management cannot fully understand or address the complex and interrelated pressures on fish and their ecosystems without incorporating Indigenous and local knowledge.[1,2,27] However, it can be difficult for First Nations to participate in building a collective understanding of the ecosystem if data analysis and synthesis methods neglect cultural and social contributors to ecological-human processes.[1]

Recommendations

1 **Identify knowledge gaps and project needs early.** Fill in information for current priorities first and refocus work as needs evolve.[1] Approach knowledge gaps with a holistic view, such as Hišukiš ċawaak, and explore the interconnected and reciprocal nature between people and processes. If there are many knowledge gaps but limited time and resources, use a simple matrix to prioritize knowledge gaps based on their impact and the effort needed to fill them. Ask participants and partners: **What information are we missing? What information should be gathered as a priority? Are there any existing processes, collaborations, and/or projects that have alignment with this planning process? How can we best incorporate information from other processes and work toward better integration?** A **watershed profile** may help to synthesize population and habitat information for a specific geographic area and can describe data limitations or gaps for the species or habitat pressures in the watershed.

2 **Link knowledge generation to planning outcomes.** Consider how information generated during planning will support continuous learning, improve conservation and restoration actions, or potentially improve management approaches.[21] If working groups are formed to fill knowledge gaps during planning, ensure their scope of work and deliverables are clearly tied to planning needs and tracked in the work plan. When seeking knowledge and expertise from participants, share how their data will inform planning recommendations. In the spirit of continuous learning, also consider: **How will knowledge or learning generated from the planning process inform future projects?**

3 **Communicate clearly about data sharing limitations** or legal requirements around privacy, ownership, or access restrictions, and whether raw or summarized data can be used. This includes consistently applying data sharing policies within organizations to improve internal coordination and give personnel greater confidence when responding to data sharing requests.[1]

4 **Diversify information sources and draw on existing expertise** from academics, First Nations, Indigenous organizations, local stewardship groups, landowners, governments, or independent consultants.[7] Respect the time and effort of contributors by reciprocating with completed data products. Emphasize the mutual benefits of sharing information and coordinating, without adding to existing workloads. Use methods appropriate to the audience to seek knowledge during each planning phase (like surveys or interviews).[xix]

5 **Consider using geographic information systems (GIS)** to compile spatial information from partners and participants. **Online interactive mapping tools** like GeoYukon, iMapB.C. and the Pacific Salmon Foundation Pacfic Salmon Explorer data tool can help locate and visualize habitat, land use, and salmon population data. Other programs, like ArcGIS-Survey123, allow users to submit their own data points, such as locations of key habitat features, fish observations, problematic areas, or localized habitat pressures.[xx] For an example of how geospatial tools have been used to compile and gather spatial data, see the Salmon Habitat Mapper and Recommended Actions Survey information in the TSSC Resource Library.

6 **Work with First Nations to understand and include Indigenous Knowledge Systems** following established protocols and community-led processes**.** Talk to local knowledge holders and First Nations about opportunities for Western science to complement local and Indigenous Knowledge, to strengthen the collective understanding of places, habitats, pressures on the population, and mitigation options.[xxi] Tools like the Kitasoo/Xai'xais Stewardship Authority's Research Guide (2021) offer questions and considerations for ethical and respectful research collaborations with First Nations in B.C. Yukon University also shares resources for ethical engagement with Indigenous communities on their Truth and Reconciliation: Respectful Research page.

Winter surveys. Lemieux Creek, B.C. Courtesy of DFO staff.

Spotlight 5

Data and information needs for ICEP

Identifying necessary information will depend on the scope and objectives of the planning process (4.2.2 – Set and maintain a planning scope)**.** One strategy is to focus initial research on focal watersheds or waterbodies and expand into other areas if there is time and interest.

The following are key data and information needs across biological, cultural, conservation, and land-use dimensions to support ICEP for salmon conservation and restoration. The list is not exhaustive and local context is important. It reflects information needs identified by partners and participants within a specific geographic scope. The *Fish Habitat Restoration Priority Planning* (RPP) for the Pacific Region[44] and the Desktop Watershed Characterization Resources and Methods for B.C.[45] are supplemental resources to help readers identify and source data for watershed characterization and habitat restoration.

Additional resources can be identified through comprehensive desktop reviews and by auditing for expertise and knowledge within each partner's organization.[20] 'Snowball' sampling can be a useful method to build networks of knowledge and data holders. These 'experts' can come from a variety of backgrounds. Those with experience in the following could be important sources of information and advice:

- Biological research
- Communications and engagement
- Conflict management
- Facilitation
- Forestry/vegetation management
- Geomorphology
- Geospatial analysis
- Grant writing and reporting
- Graphic design and/or web design
- Habitat restoration techniques, maintenance, and monitoring
- Hydrology
- Urban, strategic, or environmental planning
- Writing and editing

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Spotlight 5

Data and information needs for ICEP

Biological and ecological conditions

Understanding the current and historical state of fish populations and habitats is the foundation of effective restoration and management planning. This includes assessing what is limiting their productivity and recovery potential.

Key questions and data needs

- Where are fish found in the system?
- Where are key habitat features located?
- What is the condition of fish habitat across the watershed – from mountain headwaters to lake bottoms and river outlets?
- What is the status of aquatic and terrestrial habitats in the surrounding watersheds?
- What are the historical and baseline conditions of fish and fish habitat?
- Are ecosystem processes (for example, sediment movement, large wood recruitment, water storage) intact, degraded, disrupted, or eliminated?
- Can fish access the habitat they need, or are there barriers (physical, thermal, or sound) restricting movement and habitat use?
- What are the main limiting factors for fish populations?
- What does fine-scale data reveal about localized pressures and vulnerabilities? Are these different than pressures and vulnerabilities at broad scales?
- Are fish populations experiencing density-dependent constraints or nearing carrying capacity?
- How could habitat restoration affect population status? Are there projections linking habitat improvements to improved survival and productivity?

Data sources

- Habitat assessments, such as the Foreshore Inventory and Mapping (FIM), Aquatic Habitat Index (AHI)/Foreshore Habitat Sensitivity Index (FHSI), and Sensitive Habitat Inventory and Mapping (SHIM) reports for streams and fish-bearing areas [xxii]
- Pacific Salmon Explorer (species-focused data)
- iMapB.C., GeoYukon
- Area-based or species-based population and/or risk assessment

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Spotlight 5

Data and information needs for ICEP

Indigenous Knowledge and cultural values

Understanding and integrating Indigenous Knowledge systems, values, and governance is critical for ICEP. First Nations bring millennia of knowledge on landscapes, species, and stewardship priorities and practices.

Key questions and data needs

- What are the cultural values and historical connections to the watershed?
- Does the species or population have food, social, ceremonial, or cultural significance to Indigenous communities?
- Is there a need for an Archaeological Overview Assessment?
- What Indigenous Knowledge and perspectives are available regarding fish, habitat, and landscape change?
- Are there shared territories or other governance considerations?
- What Indigenous-led plans, assessments, or stewardship strategies exist?

Data Sources

- Knowledge shared by community members
- Indigenous governments and stewardship offices
- Indigenous-led monitoring, restoration, or planning documents

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Spotlight 5

Data and information needs for ICEP

Conservation, protection, and policy context

Species and habitat protections, regulatory frameworks, and land designations influence where and how restoration and development occur. Understanding these mechanisms can help align projects with legal requirements and conservation priorities.

Key questions and data needs

- Is the fish species or population identified as a conservation priority or concern by First Nations, local, provincial, territorial, or federal authorities?
- Are there Recovery Plans, Action Plans, or Watershed Plans in place?
- Is any part of the watershed designated as a protected area, for example:
  - Provincial, Territorial, or National park
  - Ecologically Sensitive Area
  - Marine Protected Area
  - Salmon Park
  - ***Indigenous Protected and Conserved Area***
  - Local government development permitting area
  - Other protected area as designated by a First Nation, local, provincial, territorial, or federal government
- How do these designations influence where habitat restoration can or should occur?
- What are the existing policies that regulate activities affecting fish habitat (like riparian buffers or stormwater controls)?
- Are any policies that regulate activities affecting fish habitat currently under review? Could changes affect restoration or conservation priorities or activities?

Data Sources

- Local, provincial, and federal environmental legislation and species-at-risk registries
- Indigenous governance documents
- Municipal and regional planning bylaws
- Government websites and data catalogues

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Spotlight 5

Data and information needs for ICEP

Habitat pressures and land use impacts

Restoration efforts should consider and understand current and emerging pressures. This includes development, infrastructure, climate change, and cumulative land use impacts that can degrade habitat quality or disrupt ecological function.

Key questions and data needs

- What are the known and anticipated impacts of climate change on fish populations and their habitats?
- What are the past and current land-use activities in the watershed (like logging, mining, or urban development)?
- Are there cumulative effects from overlapping activities and pressures?
- How is ongoing development impacting the landscape, particularly riparian zones and stream networks?
- Are there failing or outdated infrastructure elements (like roads or culverts) near areas of concern? Who owns these structures, and are they responsible for removal, repair, or upgrades?
- What are the future or planned land uses provincially, territorially, or locally?
- Can you estimate the combined impact of disturbances on habitat availability and species viability?

Data Sources

- Environmental assessments
- Infrastructure maps and asset management plans
- Local and regional development plans
- Climate vulnerability assessments
- Cumulative effects studies

4.4.2 ESTABLISH A SHARED DATA PLATFORM

Accessing key datasets and documents is critical for effective collaboration, but can be complicated by ownership, privacy, and security requirements. Clear systems for data sharing and long-term storage are needed to avoid duplicating work or losing information. Setting up secure, well-managed platforms and hosting arrangements from the outset supports transparency and ensures the plan and supporting materials remain accessible and useful over time.

Reflections

Accessing stream-level habitat assessments or species distribution data can be complicated due to ownership, privacy, or confidentiality restrictions. In some cases, the inability to access existing information creates duplicate work to collect and organize data, which is time- and resource-intensive, and risks frustrating partners and participants who feel existing knowledge is being overlooked or withheld.[1]

Finding a platform to house shared files can also be challenging. Geospatial information and other large datasets require ample space, but must also be stored according to privacy and security requirements for all partners. **Cloud-based storage** like SharePoint, Dropbox, Google Drive, or ArcGIS can facilitate secure file and data sharing between many partners, but also requires upfront coordination, paid licenses, and sustained maintenance.[1]

Finally, the plan itself (and supporting documents) needs to be easily accessible by those who will use it. Finding a platform to house the plan long-term is paramount.

Recommendations

7 **Use data storage platforms with clearly defined, shared responsibilities.** In most cases, this will be a cloud-based site. Choose one that meets all partners' security requirements and designate someone to manage permissions, file organization, and version control.[1] Discuss and/or document how the site will be used, to ensure everyone who can access it is aware of their shared responsibilities for securing and updating files.[1] For example, platforms such as ArcGIS can provide secure access to geospatial files hosted by partners, which can later be compiled and published (see the interactive TSSC Data Explorer as an example).

8 **Implement protocols for safeguarding Indigenous Knowledge and data, or other sensitive information.** Additional security measures may be required for sensitive information that requires specific protocols for collection, handling, or storage, for example, Indigenous Knowledge and data. Ensure the data sharing platform or tool reflects Indigenous Knowledge principles.[46] For example, websites like the Indigenous Protected and Conserved

Areas Knowledge Basket ask users to reflect on the commitments of reciprocity, respect, and responsibility when using the platform to share and gather information. The First Nations Information Governance Centre provides resources to learn more about the principles of ownership, control, access, and possession (OCAP) when working with Indigenous Knowledge.

9 **Compile key datasets, references, and background materials in a shared master spreadsheet** or database. Create clear usage guidelines to preserve the spreadsheet's integrity for current and future projects. Label and organize data and data sources to clearly distinguish peer-reviewed research, anecdotal or unverified information, local or Indigenous Knowledge, along with any applicable intellectual property, sharing restrictions, data sharing agreements, or other caveats for use.[1]

10 **Identify a platform to host the finished plan.** The location should be easily indexed online, permanent, and readily accessible by those who will use it. When developing the plan document, ensure it meets the size, design, language, and accessibility requirements for the host.

11 **Develop a data management plan for larger or longer-term projects.** This should address access restrictions, records management, data migration, and file metadata standards for sharing across organizations.[7]

4.4.3 CHOOSE EFFECTIVE DATA ANALYSIS AND MODELLING TOOLS

Geospatial data and analysis provide a scientific foundation to identify and prioritize plan actions (4.5.1 and 4.5.2). As a result, the **analysis and modelling tools** that are used will influence the planning outcomes. The benefits of different tools must be weighed against constraints like licensing or administrative costs, learning curves, and shareability.

Reflections

Geospatial data is critical for understanding key habitat pressures across space and time, and potential actions to address them. Assessing the cumulative anthropogenic and climate change impacts on fish habitat within a given watershed is critical for identifying and prioritizing actions that will have the greatest benefits for the population in the immediate and long term. Thus, finding the right tools to organize, analyze, and model geospatial data is key. A few of these tools are captured below.

Licensed tools like ArcGIS Pro and NetMap offer expanded analysis and modelling capabilities. Users can create 'virtual watersheds' to assess the relative benefit of different types, scales, and locations of habitat restoration or conservation actions.[xxiii] For example, a recent case study estimated threats to fish and fish habitat in the Thompson-Nicola (Spotlight 6) and informed two salmon ecosystem planning processes in that region.[xxiv] However, license cost, accessibility, and user skill level can be prohibitive. Open-source programs like QGIS offer low-cost or free alternatives to licensed tools.

They can improve access and the shareability of data and outputs, but open-source tools generally come with reduced analysis or mapping functionality. Analysts may need more time to familiarize themselves with the available functions and limitations.

Online interactive maps (such as ArcGIS Online) can offer shared access to data and modelling outputs, but may not be appropriate for sensitive information and may require additional time to set up and maintain.[1] Nonetheless, they offer an easy way to share publicly available data and maps, and can streamline data gathering and engagement.

Recommendations

12 **Clarify the purpose and expected outputs of tools in advance** so they can be accessed on an as-needed basis.[1] Have early conversations with partners about what types of analysis and outputs are needed to support the planning process. Choose tools based on capabilities and limitations,[7] required skillsets and/or licenses, intended uses, and how and when outputs will be available or useful to partners. Focus on using tools that enable users to import and export various types of data, so teams can use what works best for the task at hand, regardless of the software other analysts are using.[1]

13 **Weigh trade-offs for cost and ease of use.** Where cost or licensing barriers exist, open-source tools such as QGIS can be useful, but require time for training and may yield uneven uptake or confidence among users. Explore shared licenses for paid tools to reduce costs and avoid redundant analysis. Make sure partners are clear on how to access shared analysis tools and where to go for support.[1]

14 **Use tools strategically to support, but not complicate, collaboration.** Tools should be chosen that help partners work more efficiently and achieve better results with existing resources. Where possible, avoid investing time and money in tools that will have minimal incremental returns. Regularly check in on which tools are contributing to better coordination, communication, and data analysis and modelling, and which tools are not functioning as intended.

15 **Consider qualitative or interpretive analysis to support technical reviews** and build a holistic picture of watershed and fish population status and pressures. The Handbook of Creative Data Analysis (2024), for example, is one resource that shares how to integrate multiple types and sources of data while maintaining integrity and rigour.

Spotlight 6

Geospatial indicators and metrics for threats to fish habitat in the Fraser River basin, with the Thompson-Nicola as a case study

In 2025, researchers at DFO published a report estimating the cumulative and intersecting anthropogenic and climate change impacts to salmon ecosystems in the Fraser Basin, with a more detailed case study for the Thompson-Nicola Ecological Drainage Unit.[47] This work was prompted by ICEP in two areas: the Thompson-Shuswap and the Nicola. Authors present methods for estimating 9 human-mediated and 4 climate-change-based threats to fish habitat.

The results from the model were used to identify actions to mitigate and respond to key impacts on salmon and informed priority setting for restoration and conservation actions. It also provides a baseline (along with sources of uncertainty and future considerations for analysis) that practitioners in the region can use to continue monitoring the state of pressures on fish and fish habitat.

The research objectives, results, and model itself[xxv] can be referenced by practitioners in B.C. or the Yukon to inform data collection and modelling for salmon or other freshwater fish. Practitioners can also use the results and model to understand how climate change could impact different populations or areas of a watershed, and use this knowledge to identify and prioritize actions in ecosystem plans.

Nicola River, B.C. Courtesy of DFO staff

4.5 Identifying and prioritizing actions

4.5.1 IDENTIFY ACTIONS

This step is where the results of information gathering, modelling, and analysis are combined with planning goals, objectives, and scope to generate a list of potential actions to restore and maintain healthy ecosystems and populations. Actions can occur over both extensive spatial and temporal scales: upland activities all the way to river deltas, triage actions to alleviate immediate pressures, and long-term actions to stabilize a watershed. Actions can also be preconditions for subsequent actions. They can include research and assessments, community engagement, policy and regulatory changes, and habitat restoration or conservation measures.[7] Identifying appropriate actions requires careful attention to the current state of knowledge, the voices of those involved, the condition of the watershed and reaches and populations, as well as the scope of the plan.

Reflections

Conservation actions can range significantly in cost and complexity, can address both immediate needs and/or support long-term ecosystem recovery and must consider current and future climate conditions, and human activity impacts.[13] Planners must navigate trade-offs between breadth and depth of actions, complexity and cost, and the scope of the plan.[48,49] The following questions can help critically assess potential shortfalls to counter when identifying actions:[48,49,50,51]

- **Do the actions address localized symptoms or the underlying causes of habitat dysfunction or degradation?** Planners and participants should connect identified actions to the underlying processes resulting in habitat decline. For restoration, actions should integrate limiting factors analysis with process-based approaches to ensure restoration is sustainable and contributes to population-scale habitat improvements.
- **Does the temporal scale of actions align with that of expected recovery?** While short-term actions may be needed to counter imminent decline, recommendations might overemphasize addressing immediate needs, favouring low-cost or convenient actions. However, where watersheds are highly impacted, a variety of short to long-term actions should be considered.
- **Are actions limited to what the participants consider politically, economically, or logistically feasible?** While more immediate and low-cost actions with widespread agreement can effectively support root cause issues, they need to be balanced with more complex, costly, and potentially less widely agreed-upon projects focused on longer-term recovery objectives.
- **Is there broad spatial consideration in the list of actions?** It can be common that the majority of actions proposed are situated close to the organization's office or home base.
- **Do the actions include monitoring new works or revisiting older initiatives to determine if work needs to be done to improve efficacy?** Ensure that longer-term adaptive management is enabled by supporting legacy projects as well as identifying new actions.

It is ideal to select participants with a diverse knowledge base,[xxvi] such as Indigenous ways of knowing, hydrologists, policy experts, biologists, and restoration technicians, as well as those with deep local watershed and salmon population knowledge.[52] Purposive sampling ensures that individuals with relevant expertise or local knowledge and experience contribute, while snowball (reference-based) or quota approaches (threshold-based) can help achieve representation across sectors or organizations. It is also important to continue looking for ways to thoughtfully bridge Indigenous and Western knowledge and sciences, as discussed in 4.4.1 — Gather and bridge knowledge and data.

What methods are there to identify actions?

A variety of methods can help generate a list of possible actions.[50,53,54,55] These may include:

- Collating recommended actions from existing research, regional or watershed plans, recovery plans, or habitat assessments based on the identified limiting factors.
- **Variants of the Delphi method**[xvii] to iteratively identify and refine actions in semi-structured workshops, interviews, stream-walks, or mapping sessions.[xxviii]
- **Spatial analysis**, GIS, cumulative effects,[xxix] and life-cycle modelling to locate populations or areas with high ecological value, or that are more vulnerable to climate change, or face more concentrated ecosystem pressures or degradation.[xxx]
- Reviewing past restoration and monitoring to identify actions with demonstrated ecological benefit to bolster or implement.
- Reviewing regulatory and policy frameworks to identify how to improve permitting processes, align operational procedures, or reform policies.

Once identified, actions can be organized by:

- Species or life stage affected
- Location (for example, stream)
- Ecosystem process addressed (such as floodplain connectivity)
- Type of action (for example, outreach)
- Responsible actors or organizations
- Timescale over which the results could be expected
- Intensity (as in density, or frequency) of the action needed to be effective
- Goals or objectives of the plan that the action supports

How do you know when you have identified enough actions?

It can be challenging to know when the list of potential actions is sufficient to move to prioritization (the following step). Compare the following indicators with the scope of the plan to know when you have identified enough actions:[50,53]

- Reaching data saturation, where no new or relevant actions emerge, verified through iterative review and triangulation of multiple methods (like surveys, interviews, workshops).
- Identified actions cover all relevant habitat limiting factors and ecosystem processes at the watershed scale.
- A target number of identified actions has been reached.[xxxi]

If actions continue to be identified, you will need to explore whether you have reached saturation or if the additional proposed actions are out of scope. You may need to revisit the scope (see 4.2.2 — Set and maintain a planning scope) with partners and participants before completing this step.

Recommendations

1 **Build on relevant action recommendations from previous work.** Rather than starting from scratch, bring forward relevant recommendations from existing reports. Make a note of which actions have already been completed, and actions of interest that have not been evaluated yet. Expert elicitation, through **meetings and surveys** (such as Survey123 or Microsoft Forms)[xxxii] can help validate collated actions from literature and bring forward new actions.[54] For example, the Salmon Ecosystem Table (SET) collated recommendations from previous research conducted in their planning areas, then distributed a survey to respondents asking them to confirm needed actions, indicate where those actions would be most beneficial to salmon habitat in the Nicola watershed, and identify new actions that had not been documented in previous work. For more information on how the SET collected information on potential actions, see Spotlight 7.

2 **Use diverse and structured input methods.** Use more than one method to gather input, for example, workshops, interviews, Delphi approaches, mapping exercises, and GIS tools. Seek a diversity of voices to help identify actions. Compare responses iteratively to ensure you capture a breadth of knowledge and to check for consistency, data saturation, or gaps.[53] Structure each input method, and have a clear way to compare them. This builds confidence that actions reflect ecological needs and diverse perspectives.[55,56]

3 **Ensure actions address limiting factors and the underlying ecological processes that sustain them.** Actions should be scoped to the plan and specifically respond to limiting factors and ecological needs identified in the data and information gathering steps. You may need to purposefully exclude actions that tend to have low ecological benefit, even if they are repeatedly proposed in other reports.[47] Additionally, site-specific interventions must be linked to broader ecosystem processes to maximize long-term benefits.[49,50] For example, if large woody debris is a limiting factor for juvenile salmon habitat quality, is the installation of log jams enough to address the long-term process that is reducing the input of woody debris into the system? Or do process-based actions, like replanting riparian forests and allowing channel migration, need to be identified to ensure both short-term and long-term benefits are achieved?[49]

4 **Organize actions to support next steps.** Structure the list of actions by species, location, ecosystem process, responsible actors, intensity, or timing. Doing so helps track when the list is comprehensive enough to move to subsequent action prioritization, and ensures that identified actions are implementable and linked to planning goals and ecological needs.[49]

5 **Define saturation criteria and endpoint for when the action identification step is complete**, such as: repeating themes, plateauing depth and richness of input, triangulation across methods, and coverage of all critical processes and limiting factors.[50,53,55] Document what will happen if the data saturation threshold is not met, and discuss this ahead of time with partners and participants.

4.5.2 PRIORITIZE ACTIONS

Action prioritization (see concept below) enables partners to build agreement around critical activities to recover or enhance salmon habitat and determine the order in which they should occur to leverage the most impact. **Prioritization goes beyond setting goals for the watershed; it evaluates, ranks, and sequences actions to achieve these goals.** Prioritization can be challenging when there is limited funding or capacity. It can also be challenging to weave different perspectives and balance cultural and other values to determine what can and should be done.

action prioritization: Evaluating, ranking, and/or sequencing potential actions that will benefit populations and their ecosystems. An action prioritization 'framework' is the method used for this.

Reflections

Why is prioritizing actions important for integrated and collaborative ecosystem planning?

In many planning processes, there may be more actions identified than can be carried out, given the expected amount of capacity and funding for implementation. It is important to prioritize actions with the greatest ecological benefits while trying to reduce risks and costs.[57]

There may be many partners involved in planning, managing, and implementing identified actions. A structured prioritization framework helps them agree on the importance of each potential ecosystem action and helps ensure actions are chosen based on their ecological value.[1] It also supports ***adaptive management*** by using a repeatable framework to reprioritize actions as they are completed, when conditions change, or as new information is available.

What is a prioritization framework and how is it used?

A prioritization 'framework' is the method used to evaluate, rank, and/or sequence potential actions (see example in Spotlight 7). It should be co-developed by partners to suit the unique context of a specific watershed(s) or population(s). It includes criteria used to weigh potential actions, and a structured process to 'score' actions according to those criteria. When used effectively, it results in a list of actions that are ranked from high to low and/or listed by order of occurrence.

The framework and criteria chosen should suit the experience, knowledge, and capacity of partners and participants. It must also match the types, scale, and amount of data available (for example, modelled data vs expert elicited input).[xxxiii] The timeliness and accuracy of information used to score actions can limit which criteria are used and whether actions can be prioritized or sequenced.

Separate criteria, or even frameworks, may be required for different types of actions, such as habitat restoration or outreach. For example, "the number or severity of stressors or pressures addressed by an action" may be a suitable criterion for scoring a ***riparian*** replanting project, but inappropriate for scoring a public-awareness campaign about the importance of riparian habitat. Questions might include: **What types of criteria should be used? What is the relative importance/weight of each criterion? Do all actions need to be prioritized using the same framework?**

Applying a prioritization method requires skilled facilitation, carefully planned activities, and open communication to match the size of the planning process and relationships between participants. Even skilled facilitators can have trouble managing larger participant groups and complex scoring methods and criteria,[1] especially if participants are asked to rank the relative importance of actions.[57]

Recommendations

6 **Reflect on SMART or PACT goals and objectives to reduce subjective scoring.** Revisit ICEP goals (in 4.2.1 – Create a shared roadmap and goals) and make sure they have associated SMART or PACT objectives. Action prioritization is value-driven and subjective, but explicit goals and objectives, such as "conserve X km of riparian habitat adjacent to known spawning locations", allow for more objective scoring compared to an action such as: "conserve maximum viable habitat".[56] Whether you can assign target thresholds (X%) at the watershed level may be limited by the level of detailed knowledge on the watershed condition and habitat pressures (see 4.4.1 – Gather and bridge knowledge and data).

7 **Use geospatial applications and other assessment tools to understand the potential ecological benefit of actions.** **Geospatial modelling applications**, such as NetMap[xxxiv] and Raven[xxxv] can simulate ecosystem processes. They help assess how land cover, climate, anthropogenic disturbances, and management actions influence ecosystem components and functions such as hydrology or sedimentation. Partners can use this information to identify locations for restoration actions. For example, specific reach segments that would benefit from riparian planting to increase shade and reduce thermal loading. These tools rely on specific and complete geospatial data sets. Other assessment tools, such as the **Risk Assessment Methodology for Salmon (RAMS)**, allow practitioners to identify limiting factors for salmon productivity and rank pressures using a rigorous and participatory approach, which can also account for incomplete data.[xxxvi] This can form the basis for prioritizing actions. The Pacific Salmon Foundation hosts an interactive map that shows locations and results of habitat status and risk assessments conducted in B.C. using the RAMS approach. Eliciting local or Indigenous Knowledge, other subject matter expertise can also bolster data to enable prioritization without relying solely on geospatial tools.

8 **Consider testing the prioritization framework on a smaller geographic area to start.** If the planning area is large, choose a pilot area or waterbody to test the prioritization method and invite partners and other local knowledge holders to provide feedback. Ask questions like: **Did the criteria that were selected work in this watershed? Do the relative importance/ weight of the criteria need to be modified to more effectively rank actions? Could all actions identified be prioritized using the framework, or would some actions require a different prioritization mechanism? Were there criteria or actions that could not be evaluated or ranked due to incomplete information?** Answers to these questions can be used to revise the framework and then applied across the broader planning area.

9 **Consult other planning processes and those with experience creating prioritization frameworks to understand potential criteria and methods for scoring actions.**
Facilitators with experience in prioritization can also advise on the best ways to gather input from participants. Simple prioritization frameworks, including criteria, their weights, and scores for each action, can be developed using readily available functions in spreadsheets. Practical examples and advice for drafting and using action prioritization frameworks for regional-scale projects can be found in:

- Priority Threat Management[58] & xxxvii
- Klamath Basin Integrated Fisheries Restoration and Monitoring Plan[59]
- B.C. Central Coast: Prioritizing Strategies for Pacific Salmon Recovery and Persistence54
- Ecological risk assessment for the effects of fishing[60]
- Fish Passage Strategic Approach: Protocol for Prioritizing Sites for Fish Passage Remediation[61]
- Mitigation Guide for the Protection of Fishes and Fish Habitat to Accompany the Species at Risk Recovery Potential Assessments Conducted by Fisheries and Oceans Canada (DFO) in Central and Arctic Region[62]
- Cowichan Watershed Health and Chinook Initiative - Establishing Conditions for Success in the Cowichan[63]
- Lower Columbia River and Estuary Habitat Restoration Prioritization Framework[64]

Workshop participants discuss mapping. Courtesy of DFO staff.

Spotlight 7

Prioritization Method for the Nicola Watershed Integrated Salmon Ecosystem Strategy

Habitat stressors, threats, and cumulative effects will require both broad-scale and location-specific actions to support Nicola watershed salmon and steelhead trout. The Salmon Ecosystem Table (SET), in collaboration with an independent contractor, developed a Nicola Watershed action prioritization framework to guide the selection of location-specific restoration actions.

The framework is based on multi-criteria decision analysis (MCDA), a widely used and flexible approach that evaluates actions across multiple criteria and generates a combined score to rank actions. MCDA is easy to interpret, accommodates qualitative and quantitative inputs, and allows those inputs to be refined over time. For the Nicola framework, criteria were selected through a combination of literature review, group discussions, and survey feedback, focusing on factors such as benefits to fish, contributions to human connection and broader ecosystem values, feasibility, and time to implementation. The final set of criteria is presented below, and is written up in the Nicola strategy.

Benefits to Fish

ECOLOGICAL IMPORTANCE OF SITE TO FISH

- # salmonid species at project location
- Salmon life stage(s) benefiting (# life stages or specific life stage)
- Conservation/stock status of populations using the area

HABITAT STATUS/INTEGRITY

- Considering cumulative pressures from invasive species, flow alterations, habitat modification, habitat destruction, fragmentation, riparian disturbance, water quality, climate-related vulnerability (flood risk, low/high stream flow and temperature)

LIKELY CONSERVATION BENEFIT

- Number/severity of stressors/pressures at site addressed

SPATIAL AND TEMPORAL EXTENT OF PROJECT BENEFITS

- High spatial extent of intended project benefits expected; confers significant long-term benefits that directly address underlying problems

continues next page

Spotlight 7

Prioritization Method for the Nicola Watershed Integrated Salmon Ecosystem Strategy

Human Connection & Broader Benefits

CULTURAL USE AND CONTEXT

- Considers site/species importance to subsistence and broader cultural uses and context
- Contributions to maintaining Indigenous connections to land and culture

OPPORTUNITIES FOR PUBLIC EDUCATION AND INVOLVEMENT – place-based education/field trips and ongoing maintenance of restoration sites

- Accessibility of site location
- Perceived level of public interest
- Risk level of activities
- Suitability for public involvement (safety concerns or requirements for specialized training)

CLIMATE CHANGE BENEFITS

- Disaster risk reduction (flood, fire, landslides)
- Climate change mitigation/adaptation

BROADER ECOSYSTEM BENEFITS

- To non-salmonid species/biodiversity, species at risk, ecosystem function

Feasibility

COMMUNITY ENDORSEMENT

- Agreement from First Nations governments and other jurisdictions
- Agreement on the goal

TECHNICAL FEASIBILITY

- Technique, site access, estimated effort, resources, availability of research and data to support action

PERMANENCE AND RESILIENCE OF BENEFITS

- Risk of disturbance after restoration
- Resilience of the restoration action itself to climate change/extreme events (flood, fire, landslide risk)

Time to Implementation

- Stage of action (pre-planning, in progress)
- Availability of permits and financial & human resources

4.5.3 IDENTIFY CHAMPIONS AND FUNDING FOR IMPLEMENTATION

Implementing prioritized actions requires committed champions and sustained resources. Establishing durable collaboration and funding systems increases the likelihood that actions are endorsed, carried out, adapted, and supported over the long term.

Reflections

Action prioritization is not worthwhile without support for implementation and monitoring.[3] Identifying 'champions'—those with the interest, organizational directive, funding, or capacity to implement recommendations—is critical to establishing and maintaining support. Long-term success depends not only on early engagement but also on creating durable systems for funding the prioritized actions and sustaining collaboration. These systems are based on the partnerships (4.1.3), engagement and communication (4.1.4) and funding strategies (4.1.2) established earlier in planning. However, prioritizing actions is an excellent catalyst for further conversations about whether and how these systems will continue to function during implementation, monitoring, and adaptation. For example, partnership agreements should outline how partners will endorse and/or implement actions. Discussing these considerations as part of prioritization, or even including them in the prioritization framework (for example, as feasibility criteria), increases the likelihood that the plan will be actionable, applied, and adapted over time.

Recommendations

10 **Include potential champions during action prioritization to help score and to build support for actions.** Working with potential implementation champions to identify and prioritize actions can build awareness and support for actions, increasing the likelihood that actions will be adopted and successfully implemented. Champions can also bring in-depth knowledge on specific types of actions and can help planning teams more accurately score criteria such as capacity, funding, and feasibility of implementation. Champion inclusion also gives organizations and individuals greater agency over planning outcomes and sets the implementation phase up to be more collaborative.

11 **Identify funding to implement actions and support future collaboration.** Planning partners and participants, including potential champions, may be hesitant to prioritize longer-term actions when funding for their implementation is not guaranteed. It is prudent to discuss and identify funding sources for implementation as part of your funding strategy (4.1.2 — Acquire and deliver funding for planning activities) and again during action prioritization, when discussing the feasibility of each action. This can help identify funding gaps early and help champions commit to actions over longer timeframes.

4.6 Writing the plan

4.6.1 CO-DEVELOP PLAN DOCUMENTS

Co-developing documents is a key activity in planning. Partners need to work together to create an outline for each document and establish a clear and streamlined review process that leads to the efficient development of collaborative materials. Writing drafts of the plan, including sequencing the writing of individual sections or chapters, creates opportunities to solicit and incorporate feedback and provides space for adjustments. Building flexibility and time into review cycles helps manage capacity constraints and ensures meaningful input from all partners when co-developing plan documents

Reflections

Partners need adequate time to write, review, and provide feedback on materials that will be shared with planning participants or the public, including plan documents.[xxxviii] Reviewing documents together, for example, during committee meetings, may lengthen the review process, but it may be needed for partners to be comfortable approving or endorsing materials.[1]

For projects with multiple planning documents, having a single author can delay drafting or review. Conversely, working with many authors can pose challenges for accessing and editing materials, tracking document versions, and ensuring accountability and consistent quality.[1] Instead, use an organized but flexible approach where planning processes are decentralized and collaborative, but one person is delegated to communicate deadlines, maintain document control, and manage feedback.

1 **Create a shared outline for the plan based on the scope** (4.2.2 — Set and maintain a planning scope). The format and outline of the final plan should meet all partner requirements, but also resonate with the intended audience. Look to other processes for inspiration, but do not assume the plan will follow a standard layout—all ICEP processes are different; thus, their plan outlines are different. For example, the Nicola Watershed Integrated Salmon Ecosystem Strategy, Thompson-Shuswap Salmon Ecosystem Action Plan, and Canadian-Origin Yukon River Chinook Salmon Rebuilding Strategy all have DFO-IPSE as a co-author, but differ significantly, reflecting the diverse partnerships, goals, and audiences for each plan. Spotlight 8 provides generic sections that may be included in a final ICEP product.

2 **Build the writing process and review cycles into work plans.** Clarify who is responsible for drafting, reviewing, and approving content for co-developed materials. Build time into the work plan for each step, leaving buffers to accommodate extra time to review materials before meetings or when seeking approvals. Identify review stages and potential bottlenecks early so teams can allocate time and resources accordingly and reduce last-minute delays.[1] This is discussed more generally in 4.3.1 — Create a work plan and track progress.

3 **Strategically delegate drafting and review processes to streamline document development.** Share responsibility for drafting and reviewing materials among working groups, partner organization staff, or contractors, so steering committees and decision makers can focus on approvals rather than detailed revisions.[1] Delegate tasks such as grammar and accessibility checks to support staff when subject matter expertise is not necessary. Track document versions carefully using document titles or built-in version control functions in **writing software**. Simplify the final plan by containing background information and supplementary materials in stand-alone appendices. Stagger the review for the plan and/or supplementary materials. While this won't reduce the total reading time, it can help make the process more manageable and support a staged approach that can speed up completion.

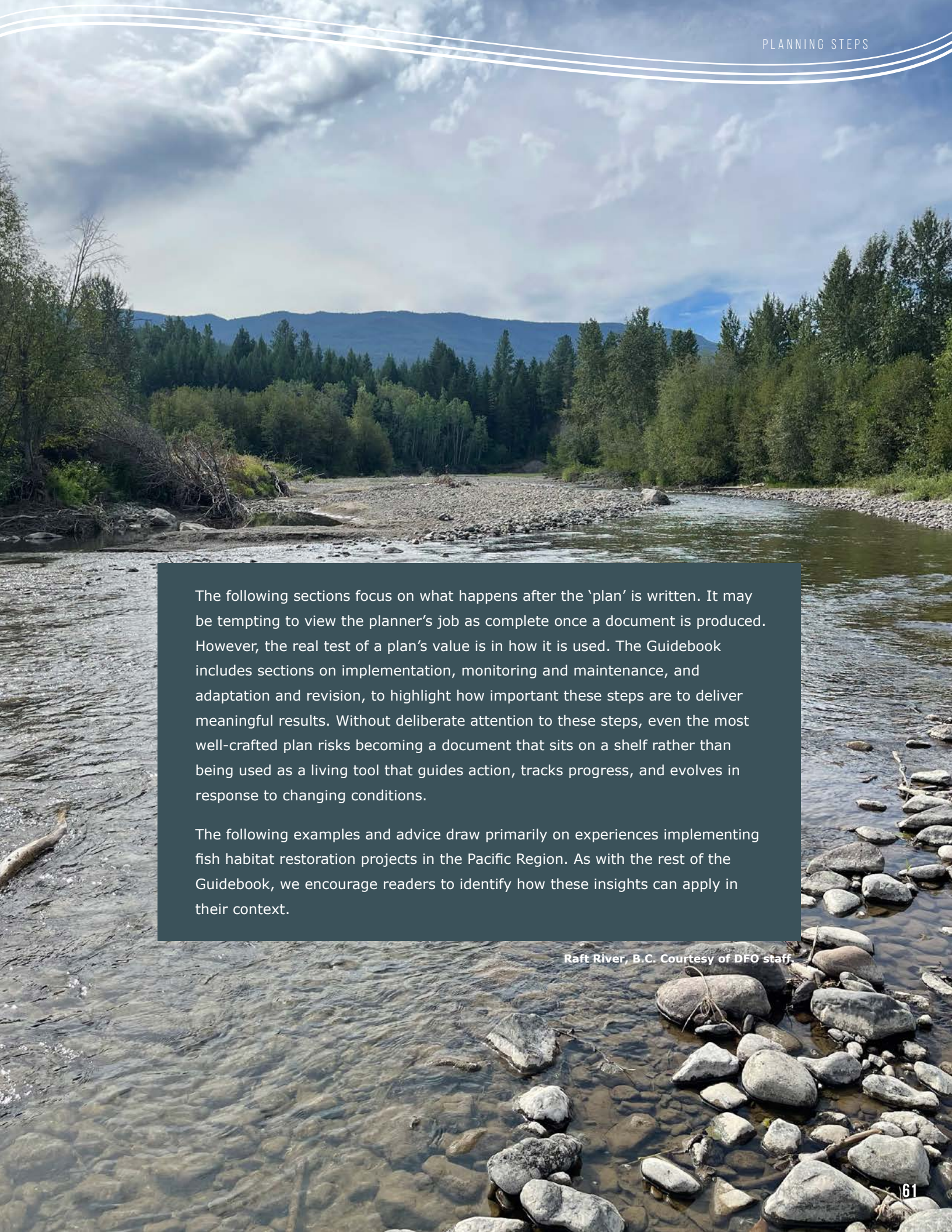
4 **Assign a dedicated coordinator to manage feedback, track edits, and maintain document integrity.** This role should be held by, or work closely with, the lead author(s) to ensure deadlines are manageable and that work is progressing. The coordinator should also ensure that the next person or group in the review or approval process is prepared, understands their role and responsibilities, and knows when to expect the materials.[1] Keep track of the order that reviewers will receive chapters or documents, and their deadline for completing reviews or revisions in the **project management software or spreadsheet**. The coordinator can also track progress using pre-determined acceptance criteria (as discussed in 4.2.2 — Set and maintain a planning scope).

Spotlight 8

Example outline for an Integrated and Collaborative Ecosystem Plan

The following is a general overview of components that could be included in an integrated ecosystem plan. Planners can pick from and organize these components according to the scope, requirements, and audience. This list is non-exhaustive. Components may include:

- Rationale and scope for ICEP and the plan.
- Vision, goals, and objectives for the area or populations based on the desired future condition.
- Baseline description of the area, such as physical, biological, and cultural/social elements: geography, hydrology, climate and climate change, human activities, population status, trends, and major pressures.
- Methods for developing the plan, including a summary of engagement.
- Methods and results from action prioritization, including location-specific and non-location-specific (overarching or enabling) actions.
- Plans that outline roles and responsibilities, funding, and a schedule for implementing actions.
- Plans for monitoring the effectiveness of plan actions, including indicators and metrics.
- Process or schedule for reviewing and revising the plan and/or action prioritization.



The following sections focus on what happens after the 'plan' is written. It may be tempting to view the planner's job as complete once a document is produced. However, the real test of a plan's value is in how it is used. The Guidebook includes sections on implementation, monitoring and maintenance, and adaptation and revision, to highlight how important these steps are to deliver meaningful results. Without deliberate attention to these steps, even the most well-crafted plan risks becoming a document that sits on a shelf rather than being used as a living tool that guides action, tracks progress, and evolves in response to changing conditions.

The following examples and advice draw primarily on experiences implementing fish habitat restoration projects in the Pacific Region. As with the rest of the Guidebook, we encourage readers to identify how these insights can apply in their context.

Raft River, B.C. Courtesy of DFO staff.

4.7 Implementation

ICEP implementation involves coordinating numerous project actions, defining project sequencing and timelines, managing risk to scope, schedule, and budget, and effectively communicating with partners and participants. Implementation will become more complex as the number of project actions increases. In this section, the Guidebook focuses on restoration actions, one possible outcome of planning, to discuss key considerations when going from planning to action. When developing an implementation strategy specifically for restoration actions, project managers need to consider labour, material resources, timelines, environmental features, and regulatory notifications and approvals.

Reflections

The implementation phase of a project is often the most exciting. It is frequently where 'hands-on' work begins, and results from planning start to show. Successful implementation is contingent on thoughtfully making decisions in previous planning steps and carefully considering project design and managing actions.

The following recommendations start with project work planning and design. These are the first steps to move from identifying and prioritizing actions to implementation. These steps will be repeated (depending on capacity and resources) for each action, or project, in order of priority determined in 4.5.2 — Prioritize actions.

Recommendations

Planning and design

1 **Advance project design for feasible actions.** It is important to assess whether a project plan can be realistically executed within budget, in the allotted time frame, and with the technical expertise available. It can be useful to revisit the feasibility of project actions, if not previously discussed when prioritizing actions (4.5.2), to adapt to unexpected challenges and, if applicable, create ***contingency plans*** (Spotlight 9).

2 **Engage with regulators early and apply for permits and approvals with sufficient lead time.** Regulators may be able to advise on project design and key mitigation measures. It is important to identify and apply for any permits and approvals that are required for your project. The level of detail and lead time of permits and approvals varies with project action and regulatory agency.

3 **Identify and plan for key avoidance and mitigation measures where project actions overlap with sensitive environmental features.** The length and extent of operational plans to manage environmental risks posed by the project will be dependent on project actions and the types of sensitive features likely to be encountered. For example, restoration projects require specific plans and scheduling to protect fish habitat and riparian vegetation, and must adhere to least risk windows to avoid particularly sensitive times of year (for example, spawning and migration). Field work should follow measures to protect fish and fish habitat, standards and codes of practices, and natural resource best management practices where applicable, consider erosion and sediment control measures, fuel and oil management, and include spill response and wildfire response measures.

4 **Create a project schedule to avoid delays and coordinate project resources.** Obtaining funding, permits, and necessary authorizations, and conducting work within the least risk windows for sensitive environmental features, can be challenging to balance, as these aspects of the project may not line up. However, finding a balance is critical to project success. **Project management software and Gantt charts** are useful to visualize schedules and critical paths.

5 **Develop a budget and expenses tracking system, if not already completed as part of funding applications.** In the planning and design phase, get updated quotes for all services and materials to ensure the project remains feasible within the budget, or to confirm that it requires modification. Before any expenses are incurred, develop a system and identify staff who will track those project expenses, such as labour and material costs. A robust budget system includes original estimates, actual costs, dates, and vendors. Budgets should be reviewed at regularly scheduled intervals to identify cost overruns early (as discussed in 4.1.2 — acquire and deliver funding for planning activities).

6 **Develop project-specific communication plans to share progress and successes.** This can help inform and engage partners and stakeholders throughout the implementation phase. Communication plans (see 4.1.4 — Create a communications plan), focused on public outreach, can include regularly scheduled updates on a project website or through social media channels. Communication plans can also provide project information and build local awareness to maintain a safe and secure project site during construction. For example, you may need to install signage around the project site, build a social media presence, seek local media coverage, and offer site tours where applicable.

7 **Define roles and responsibilities.** Project teams can be comprised of paid staff, volunteers, contractors, and stakeholders with a range of experience. It is important to have designated leads that are experienced with feasibility, design, and, if applicable, construction that can direct project actions on site and provide 'field fit' solutions. To aid the implementation stage, an experienced project manager should be able to assess capacity realistically, hold check-in meetings at regular intervals, and keep tasks on track (as noted in 4.3.1 — Create a work plan and track progress).

8 **Identify, analyze, and strategically address risks to your project.** It is common for risks to be identified during implementation that were not considered during planning or included in contingency plans (Spotlight 9). For example, in the context of habitat restoration, during an atypically hot and dry year when riparian vegetation is scheduled to be planted, supplemental watering systems may need to be added to ensure survival past the first growing season. Use tools like a risk matrix to organize risks based on the probability of occurrence and severity of impact. Then, develop strategies for risks with a high impact and probability.

Spotlight 9 Contingency plans

As implementation of specific actions gets underway, it is important to develop contingency plans for each project. This builds on work planning (discussed in 4.3.1 — Create a work plan and track progress) but focuses on addressing unforeseen events, unintended consequences, or risks that could disrupt action implementation. It includes anticipating what may happen and allocating resources, equipment, tasks, responsibilities, and decision-making processes ahead of time to adapt to changing conditions in real time.[65] For example, part of a restoration project may involve placing large wood to create deep pools in a stream channel. When developing a contingency plan for this project, helpful questions to ask include: **What if the large wood does not help form or maintain deep pools over time?** Or, more simply, **what if the large wood does not fit into the site selected along the stream? What type of monitoring would be required to assess these challenges over time?**

Outlining contingencies ahead of time makes it easier for partners and champions to successfully implement and adapt as needed in later stages.

9 **Incorporate volunteers and the local community into project implementation to build project support and reduce costs.** Effective volunteer recruitment, training, and management can take time, but the benefits outweigh the risks. This is true particularly when capacity, funding, and resources are limited and/or when project objectives include community participation and engagement.

Procurement

10 **Source materials from reputable vendors.** Create a detailed list of materials and equipment needed based on project requirements. Identify and evaluate potential vendors based on quality, timelines, track record, and cost. When it comes to sourcing natural materials, local availability is often a key factor. Pay attention to how materials will need to be transported to sites, moved around while at the site, and stored. Once a vendor is selected, formalize the agreement, including payment terms, timeline, and delivery. Pay attention to payment terms and establish clear communication with the person accountable for the financial aspects of the project.

11 **Outsource staff and expertise where necessary.** Hiring labour or sub contractors to assist with project implementation can add expertise and capacity to a project while assessing longer-term opportunities to build capacity in-house (see 4.3.2 — Manage capacity to ensure all partners are present). Similar to sourcing materials, it is imperative to clearly outline the requirements of a sub contractor and the scope of their expected work. It can be helpful to reach out to contacts within your network who have completed similar work in the past for reference. A well-defined scope of work for sub contractors is an important part of defined roles and responsibilities when working within a team.

Hands-on work

12 **Create project-specific safety plans for workers.** Before project mobilization, prepare a plan for how crews will communicate with each other, offsite project management, and with emergency services. Decide on communication devices, which can include hand-held radios, cellular phones, satellite communicators, and satellite phones. Additionally, develop a safety plan that outlines the risks and mitigative measures. Ensure all workers are trained for the work environment and tasks, and that they review task-specific hazards daily. The level and type of training will be dependent on the tasks and may range from peer instruction to formal learning. Plan to provide, or ensure sub contractors are equipped with, personal protective equipment that is suited for the task. The Workers' Safety and Compensation Board Yukon and WorkSafe B.C. have resources to understand safety requirements and best practices.

Post-implementation

13 **Compare the completed project action(s) to planned action(s) using 'as-built diagrams'.** This step helps capture lessons learned that can be applied to future projects, and will also support the next steps of effectiveness monitoring and maintenance (4.8) and adaptive management (4.9).

4.8 Effectiveness monitoring and maintenance

Effectiveness monitoring evaluates whether a project was implemented as designed and whether it is achieving its intended outcomes. Monitoring actively assesses project performance, impacts, and changes to physical, chemical, or biological parameters in response to project actions, which are essential for determining if restoration resources are being used effectively and efficiently.[55] Monitoring programs often track all or some of the following metrics:[66]

- The project scope, goals, and objectives
- Project-specific measures of success
- Performance of specific methods, techniques, or materials
- Relevant funding criteria
- Relevant permit requirements
- Timelines

Effectiveness monitoring should be guided by the project's goals to ensure appropriate metrics, ***indicators***, and spatial scales are selected, thus allowing project managers to track progress, support adaptive management, and inform maintenance as needed. Effectiveness monitoring should occur throughout the lifecycle of a project[55] and should include:

- Baseline monitoring conducted before project planning to assess current conditions and inform project design and implementation.
- Monitoring during implementation to assess progress, help make informed decisions, and adjust efforts as needed.
- Post-implementation monitoring.

In addition to effectiveness monitoring, post-implementation monitoring is a critical component of ICEP. It offers important insights into whether and how (1) a restoration site is changing in response to restoration actions, (2) ecological processes are returning to desired or natural conditions, and (3) target populations are responding as expected. Post-implementation monitoring also supports adaptive management, including the early detection of unintended effects such as erosion, invasive species, or passage blockages. This allows for timely interventions to improve outcomes and support continuous learning.

Reflections

Monitoring and maintenance plans, performance measures, and data collection methods should be developed during the planning phase and refined as needed, with dedicated time, resources, and funding built into plans and applications. Identifying practical levels of precision, monitoring frequency, and duration are essential to ensure data is consistent, reliable, and able to detect changes or trends over time.[66] Additionally, understanding the effectiveness of specific monitoring and maintenance techniques may require testing, as methods are not universally applicable across different projects, areas, and contexts.

While implementation is often well-funded, long-term monitoring is frequently under-resourced and not planned at the forefront alongside project design and implementation. Without adequate funding for long-term monitoring, it is difficult to determine whether restoration actions performed as intended or delivered positive outcomes.[55] Practitioners must allocate budget to monitoring and design streamlined, cost-effective monitoring programs that balance meaningful data collection with cost, deliver actionable insights, and reliably detect site or population-level changes. Ultimately, monitoring results are critical for informing adaptive management, refining future project efforts, and supporting long-term project success.[66]

Recommendations

1 **Establish a schedule to regularly review the monitoring plan and results**. Create a project timeline with a detailed monitoring and revision schedule, based on funding, capacity, and access to resources such as equipment and personnel. Follow the schedule as closely as possible. Simple **Gantt charts** can be developed in **spreadsheets** or other **project management software** to help keep track of project details.

2 **Tailor the monitoring plan to specific sites, conditions, and spatial scales.** No single approach fits all projects. The selection of monitoring methods depends on the unique ecological, social, and economic context, as well as the project's goals. Multiple approaches may be appropriate and can be combined to effectively address different objectives within the project.

3 **Use consistent, reliable, and repeatable methods** to ensure that the data accurately reflects changes over time and can be confidently used to evaluate project success. Inconsistent data collection can drive misleading conclusions, reducing the effectiveness of management decisions. To maintain consistency, it is important to coordinate with knowledge holders and experts during the planning and implementation of monitoring efforts. Their guidance helps ensure that data collection methods are practical, standardized, and scientifically sound, especially when statistical analyses are required to detect trends, evaluate outcomes, and communicate results. This approach strengthens the credibility and usefulness of the monitoring program and supports long-term restoration success.

4 **Incorporate volunteers and the local community into effectiveness monitoring and maintenance** to support projects over the long term, especially when resources are limited. It is ideal, although not always feasible, to have the same individuals collect monitoring data throughout the project to maintain consistency. When volunteers are involved on an inconsistent basis, standardized workshops or training sessions can help maintain data collection integrity. Developing a detailed manual that explains the monitoring rationale, site location and information, and sampling methods can also help guide new and returning volunteers through standardized procedures. This approach improves data quality while also fostering and strengthening community engagement and stewardship towards project efforts.

5 **Maintain clear and organized monitoring and maintenance notes** to track project progress. All data should be documented in a consistent format that is dated, stored in a centralized location, and regularly updated as new data is collected. This ensures that the information is accessible and understandable to those reviewing it. Well-maintained records also streamline the process of preparing reports, publications, or presentations, and support transparency and accountability throughout the project.

Field tour with workshop participants. Courtesy of DFO staff.

4.9 Adaptation and revision

A key part of ICEP is continuing to develop and refine the plan. It is difficult to predict how populations or ecosystems will respond to the implementation of various prioritized actions, particularly in a period where 'normal' no longer exists, given the increasing frequency and severity of climate-related events.[67] Additionally, the plan may need to adapt as capacity, funding, and technology change and as new information becomes available from partners, participants, or through monitoring.

Reflections

Monitoring should not only assess if the plan or individual projects are achieving their intended goals, but it should also assess one or more of the identified threats or sources of degradation.[50] There may be several reasons why a project or plan is not achieving its intended benefits, including:

- The goals, objectives, or actions may not be linked to the threats or root cause(s) of degradation.
- The goals may be too broad.
- Not enough time has passed for changes to be detected.
- Ecological or climate variation may have exceeded the design threshold for the implemented projects (for example, an episodic flood that breaches the banks of a restored floodplain).
- Ongoing habitat destruction or degradation is offsetting the benefits of actions.
- The monitoring plan does not evaluate appropriate metrics or indicators to detect change.

Recommendations

1 **Establish a schedule or triggers** to review the ICEP and report on progress. Schedule reviews of the full plan and all prioritized actions at specific intervals (like once every five years) and/or identify conditions which will trigger a review and update to the plan. For example, trigger conditions could include:

- Changes in habitat threats, risks, or limiting factors
- New or revised data from climate models
- New or revised data from monitoring

Use this review period to fine-tune action recommendations and prioritization using updated information from monitoring and to report on successes and challenges.

2 **Rely on evidence from monitoring to determine whether the project(s) meet the goals and objectives of the plan.** Review the effects of the project actions with your planning committee, or seek an independent review, to plan your next steps.

- If the evidence indicates that projects are not making progress towards specific goals or objectives, revisit the monitoring plan to ensure the appropriate metrics or indicators are being measured.
- If the monitoring plan is accurate, analyze which projects are not functioning as intended and why. Ask: **Are new conditions changing how effective this project is at meeting the goals or objectives? Does the change in conditions affect how any other actions/projects are prioritized moving forward?**

This confirms the importance of a well-developed monitoring plan (as discussed in 4.8 — Effectiveness monitoring and maintenance) for each project/action to inform these questions.

Bessette Creek, B.C. Courtesy of DFO staff.

5 CONCLUSION

Nicola Lake, B.C. Courtesy of DFO staff.

Wild Pacific salmon and other aquatic species across the Yukon and B.C. are threatened by human and naturally induced habitat pressures, which happen at various scales and under various jurisdictional authorities.[3] These pressures require coordinated and strategic action from salmon champions to address the root causes of ecosystem and population decline.[2] ICEP supports those working to benefit salmon (or other species) by fostering consensus-based decisions that are grounded in local and Indigenous Knowledge alongside Western science, while honouring ecological, cultural, and economic values. This Guidebook contributes to a growing body of resources on how to plan collaboratively across complex, multi-jurisdictional systems.

Many reports have explored what enables effective integrated and collaborative planning; these have been framed as 'assumptions', 'winning conditions', 'factors', or 'best practices and tools'. This Guidebook adds to those reports by documenting when and why parties may choose to initiate ICEP, providing principles to guide partnership and collaboration, and offering reflections and recommendations for each planning step. The tools, resources, and problem-solving approaches highlighted throughout the Guidebook are suited to helping readers with a broad range of planning contexts.

By sharing insights, challenges, and advice, we hope this Guidebook helps readers prepare and proceed with successful ICEP processes to support Pacific salmon ecosystems. These processes are meant to empower individuals and organizations to take coordinated and strategic action to protect and restore salmon habitats, thus laying a foundation for salmon population and habitat recovery. Ultimately, we hope this Guidebook contributes to a legacy of shared knowledge and collaboration among those working to safeguard salmon and the interconnected ecosystems they depend on.

NOTES

i Habitat and ecosystem are used interchangeably in this guidebook to describe the spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly to carry out their life processes.[68]

ii Salmon population rebuilding plans are mandatory for "prescribed major fish stocks" to meet the requirements of the Fish Stock Provisions in the 2019 *Fisheries Act*.[69] Other jurisdictions may also be required to conduct ecosystem planning.

iii Related to 'intersectionality' as described by Kimberlé Crenshaw in 1989: Positionality focuses on how our identities and experiences create explicit or implicit biases in our work. Andrea Reid and Robin Wall Kimmerer are two authors who provide guidance and questions for readers to reflect on and incorporate into their work.

iv The Pan-Canadian approach to transforming Species at Risk (2018)[10] also highlights a 'priority-places' approach, which asks: Where are there high biodiversity values? What is the optimal location for conservation actions to take place?

v The RAMS process has been used to support Recovery Potential Assessments for stocks being considered for listing under the *Species At Risk Act*[70] and Rebuilding Plans under the *Fisheries Act*.[69]

vi See the Nicola Basin Chinook Risk Assessment Final Report[71] or Summary of issues facing Canadian-origin Yukon River Chinook Salmon review of limiting ecosystem and habitat factors[72] as an example RAMS with the level of detail needed to understand drivers of population decline.

vii For example, other types of interventions may include reducing water extraction from drought-prone streams through educational campaigns or seasonal watering restrictions.

viii The teaching on Hišukiš c̓awaak was shared during engagement for RPP. Hišukiš c̓awaak or Hišuk ma c̓awak: "Everything is one", in Nuu-chah-nulth-aht is a sacred principle for several Nations on the west coast of Vancouver Island. Concepts practiced by other Nations, such as 'Two-Eyed Seeing' (*Etuaptmumk* in Mi'kmaw), which adopts teachings, strengths, and ways of knowing from both Indigenous Knowledges and mainstream knowledges,[44] can also help to bridge knowledge.

ix Further conditions and principles for successful facilitation can be found in resources like Collaborative Governance: Principles, Processes, and Practical Tools[73] and Getting to yes: Negotiating agreement without giving in.[74]

x Examples of cost-sharing to fund conservation projects and environmental education include the Habitat Conservation Trust Fund: A non-profit agency that redistributes surcharges collected on Province of B.C. and DFO hunting and fishing licenses toward conservation work.

xi Schedule budget review meetings based on the funding timeline. For example, multi-year funding may only require one annual budget review meeting.

xii IPSE steering committees typically met between bi-weekly and monthly.[1]

xiii The Cowichan Watershed Board Pathways and Partnerships: A Framework for Collaboration and Reconciliation in the Cowichan Watershed[27] highlights the importance of energy, innovation, respect, collaboration, cooperation, and knowledge in achieving success through a comprehensive watershed approach.

xiv Action Plan measures that may be relevant for salmon ecosystem planning include (but are not limited to) measures 36, and 37 to 42.

xv The Project Management Institute and Agile Alliance both provide resources and in-depth guidance on applying the agile project management techniques.

xvi Examples of data 'needs' for habitat restoration and integrated and collaborative planning are listed in Buxton et al.[22] and Anderson et al.[24]

xvii The project manager/coordinator may also take on a facilitation role if they have the qualifications to do so and if it is desired by the partners.

xviii Information gathering priorities for ICEP could include, for example, identifying successful Indigenous-led stewardship programs (like Indigenous Protected and Conserved Areas), and unrealized opportunities to use these programs to conserve, restore, and protect biodiversity in the planning area.[22]

xix Engagement summaries from past projects, or research papers like Baijius,[75] can help generate ideas about knowledge gathering or co-developing activities for each planning step.

xx Questions that can be asked in a survey and mapped using geospatial tools include: What problems for salmon and their habitats are you aware of at this location? List potential actions to address the problems. What is the urgency of acting? What barriers exist for addressing the problems identified?

xxi The Elements of Indigenous Style: A Guide for Writing By and About Indigenous Peoples by Gregory Younging provides further principles for centring Indigenous voices in writing.

xxii FIM, FHSI, and SHIM reports can be found on B.C. Ministry of Environment's EcoCat system and the Community Mapping Network. First Nations, consultants, local governments, and others may also have access to habitat assessments that are not publicly available.

xxiii Planners must also consider the approximations and assumptions that any 'pre-made' model is making, and determine if these apply to their geographic context.

xxiv These are the Thompson-Shuswap Salmon Ecosystem Action Plan and the Nicola Watershed Integrated Salmon Ecosystem Strategy.

xxv The full report with detailed methods and outputs can be found on the DFO website. Reach out to DFO.PacificCSA-CASPacifique.MPO@dfo-mpo.gc.ca for information about the model or report.

xxvi The SHaRP process in California emphasizes the importance of community and tribal input to identify highly specific river restoration actions and priorities.[51]

xxvii Delphi is a type of structured assessment method used to help groups reach consensus, especially when there is a large degree of uncertainty about how a given system will respond to the chosen management action, and when the system is more complex. More information on the Delphi method and variants can be found in Using the Delphi Method to Establish Expert Consensus.[76]

xxviii For a more detailed account on applying a Delphi method to action identification and prioritization, see Walsh et al.,[53] Prioritizing conservation actions for Pacific salmon in Canada. General steps include: 1) experts provide initial strategies and action recommendations individually; 2) planners collate strategies and action recommendations; 3) experts review and revise their input based on the collated list of strategies and actions from other experts.

xxix The Cumulative Effects Model for Priority of Recovery Actions (CEMPRA) is a modelling framework that allows users to link populations to their key habitat stressors and better understand the concentration of pressures affecting a given population in a particular location, or across their range. It is available as an open source coding package and interactive web application.[77]

xxx Roni et al.[54] list life-cycle and habitat assessment models, watershed, and reach assessment tools, to help identify (and prioritize) Pacific salmon and steelhead habitat restoration actions.

xxxi Bibly et al.[44] recommend reviewing intensively monitored watersheds to estimate the number and intensity of restoration actions needed.

xxxii Roni et al.[54] also recommend using watershed scale assessments to identify a broad category of challenges to be addressed (for example, roads in a sub-basin that contribute a larger than normal volume of sediment to streams), and following up with field assessments to provide more detail (like determining which road crossings, or segments to improve, restore, or remove).

xxxiii IPSE partners emphasized spatially extensive quantitative information on the quality of fish habitat and the most pressing limiting factors for populations as critical data needs for scientifically rigorous prioritization. Updated site conditions were also crucial to accurately score potential actions.[1]

xxxiv An example of how NetMap was used in B.C. to identify and recommend salmon habitat restoration actions is included in the Thompson-Shuswap Salmon Ecosystem Action Plan.

xxxv The 'Raven' modelling framework can be used to estimate the effects of land cover change (for example, replanting forests) on a watershed's hydrology (such as water quantity).[78]

xxxvi An example of a comprehensive RAMs process is the West Coast Vancouver Island Chinook Freshwater Risk Assessment Area 24 (2023) prepared by Redd Fish Restoration Society, DFO, M.C. Wright & Associates, and West Coast Aquatic.

xxxvii For further examples of how to apply the Priority Threat Management approach for Pacific salmon, see works by Lia Chalifour, Tara G Martin and others, such as Identifying a pathway towards recovery for depleted wild Pacific salmon populations in a large watershed under multiple stressors.[79]

xxxviii This also applies to developing communications and engagement materials such as presentations, event invitations, or even website or newsletter content.

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APPENDIX 1 ADDITIONAL QUESTIONS

This section of the Guidebook offers additional questions and prompts to consider when establishing shared vision, goals, and creating a roadmap during Integrated and Collaborative Ecosystem Planning (ICEP) processes.

PART 1 QUESTIONS:

- **Is a collaborative, 'big picture' strategy needed? What should the scope of such a 'big picture' strategy be?**
- **What values must be incorporated in a rebuilding strategy? What are some objectives for a 'big picture' rebuilding strategy?**
- **What meaningful immediate and longer-term action would you like to see as an outcome of this strategy? How do you see using this strategy?**

PART 1 CONTEXT

For one planning process, these questions were asked in participant interviews before the first workshop. The questions were used to get an advanced sense of what people thought about the need for, and opportunities related to, salmon and ecosystem rebuilding. The facilitator summarized the answers, used them to design the workshop agenda, and to prompt further discussion during the workshop.

During the workshop, facilitators asked participants to imagine a scenario fifteen years in the future and describe what had been accomplished because of the potential Strategy. Participants were asked to share what they were seeing, changes that had been made, who was working with whom, and the impacts of actions and mitigations that had been taken.

PART 2 QUESTIONS:

- **How could resource limitations (for example labour, funding, or equipment) be contributing to challenges meeting an organization's goals and objectives?**
- **How are resources allocated between organizations that are completing similar work?**
- **Is there perceived or real exhaustion of resources within or among organizations (for example, limited grant funding available per year)?**

PART 2 CONTEXT

Identifying and exploring solutions to possible resource limitations can help shape the roadmap and proactively resolve allocation issues. These questions help consider other issues at play; For example, resource limitation can manifest as a high rate of staff turnover, which can be attributed to several factors such as low levels of trust, short funding cycles, or the nature of the work (such as field-based work). High rates of staff turnover or difficulty hiring or retaining staff can be attributed to a lack of leadership continuity, which poses challenges for collaborative planning and long-term stability.

APPENDIX 2 RECOMMENDATIONS

The following list includes recommendations for each planning step outlined in Chapter 4 and connects them to related guiding principles (gp) from Chapter 3.

STEP 1: INITIATION [PP.14-26]

Build trust and invest in relationships

1. Embed relationship-building into the planning process from the outset. p.15 | gp: 3.2
2. Partner with local organizations that can place staff in the planning region. p.16 | gp: 3.3, 3.4
3. Seek out diverse knowledge and experiences with organizations that have relevant decision-making and management authority in the area. p.16 | gp: 3.3
4. Engage a neutral, trusted third-party early in the process. p.16 | gp: 3.2
5. Embed Indigenous Knowledge, leadership, and, wherever possible, shared decision-making throughout ICEP. p.16 | gp: 3.4

Acquire and deliver funding for planning activities

6. Discuss funding early with partners. p.18 | gp: 3.1, 3.2
7. Discuss potential challenges to using all funding. p.18 | gp: 3.3
8. Seek funding sources and develop funding arrangements that increase stability and improve flexibility. p.18 | gp: 3.3
9. Assign dedicated personnel to navigate the funding process. p.18 | gp: 3.3

Establish partnerships

10. Define the purpose of partnership agreements early. p.20 | gp: 3.1
11. Discuss each partner's values, principles, and requirements and how these will guide collaboration. p.20 | g.p. 3.1, 3.3, 3.4
12. Use interim partnership agreements or flexible formats. p.20 | gp: 3.3
13. Establish steering committees and sub-committees to support critical planning functions. p.20 | gp: 3.2

Create a communications plan

14 Discuss communication responsibilities early. p.24 | gp: 3.2

15 Develop a shared communications plan with clear priorities, roles, and timelines. p.24 | gp: 3.1

16 Match the communication tool to audience needs and capacity. p.24 | gp: 3.2, 3.3

17 Use online platforms to expand outreach. p.24 | gp: 3.1, 3.3

18 Use more resource-intensive tools to gather location-specific input. p.25 | gp: 3.3

19 Leverage each partner's network to identify and reach out to broader participants. p.25 | gp: 3.2

20 Share back what you heard. p.25 | gp: 3.2, 3.3

STEP 2: VISION AND SCOPE (PP. 27-32)

Create a shared roadmap and goals

1 Use the roadmap to provide clear direction for governance and decision-making processes. p.28 | gp: 3.1

2 Access strong facilitators. p.28 | gp: 3.2, 3.3

3 Ask about related work. p.28 | gp: 3.3

Set and maintain a planning scope

4 Set a realistic scope early and define acceptance criteria. p.31 | gp: 3.1

5 Create a change management process to avoid scope creep. p.32 | gp: 3.2

6 Use off-ramps or parking lots. p.32 | gp: 3.2

7 Use mapping software to present and get feedback on the geographic scope. p.32 | gp: 3.1

8 Ensure the scope is relevant and supported by local stakeholders and groups. p.32 | gp: 3.1

9 Assess gaps while scoping the plan. p.32 | gp: 3.3

STEP 3: WORK PLANNING (PP. 33-36)

Create a work plan and track progress

1 Establish the project management approach from the outset, including identifying a project manager. p.33 | gp: 3.1

2 Co-create a work plan with partners and the project manager. p.34 | gp: 3.1

3 Identify tasks that can be actioned while planning. p.34 | gp: 3.3

4 Delegate work to sub-committees or working groups. p.34 | gp: 3.3

5 Schedule regular checkpoints to review the work plan, track progress, and identify constraints or bottlenecks. p.34 | gp: 3.1, 3.3

6 Regularly assess the value and frequency of meetings. p.34 | gp: 3.3

Manage capacity to ensure all partners are present

7 Invite partners and participants to identify their level of involvement. p.36 | gp: 3.2, 3.3

8 Break work into manageable tasks for shorter timelines, different funding amounts, or remote or in-person work. p.36 | gp: 3.3

9 Invest in long-term local capacity. p.36 | gp: 3.4

10 Assign personnel to functions supporting multiple teams. p.36 | gp: 3.3

STEP 4: GATHERING INFORMATION (PP.37-48)

Gather and bridge knowledge and data

1 Identify knowledge gaps and project needs early. p.38 | gp: 3.1, 3.3, 3.4

2 Link knowledge generation to planning outcomes. p.38 | gp: 3.3

3 Communicate clearly about data sharing limitations. p.38 | gp: 3.1

4 Diversify information sources and draw on existing expertise. p.38 | gp: 3.2, 3.4

5 Consider using geographic information systems to compile spatial information from partners and participants. p.39 | gp: 3.3

6 Work with First Nations to understand and include Indigenous Knowledge Systems. p.39 | gp: 3.4

Establish a shared data platform

7 Use data storage platforms with clearly defined, shared responsibilities. p.45 | gp: 3.3

8 Implement protocols for safeguarding Indigenous Knowledge and data, or other sensitive information. p.45 | gp: 3.4

9 Compile key datasets, references, and background materials in a shared master spreadsheet. p.46 | gp: 3.1

10 Identify a partner or platform to host the finished plan. p.46 | gp: 3.1

11 Develop a data management plan. p.46 | gp: 3.1, 3.3

Choose effective data analysis and modelling tools

12 Clarify the purpose and expected outputs of tools in advance. p.47 | gp: 3.1

13 Weigh trade-offs for cost and ease of use. p.47 | gp: 3.3

14 Use tools strategically to support but not complicate collaboration. p.47 | gp: 3.3

15 Consider qualitative or interpretive analysis to support technical reviews. p.47 | gp: 3.3

STEP 5: IDENTIFYING AND PRIORITIZING ACTIONS (PP.49-58)

Identify actions

1 Build on relevant action recommendations from previous work. p.51 | g.p. 3.1, 3.3

2 Use diverse and structured input methods. p.51 | g.p. 3.2, 3.4

3 Use geospatial applications and other assessment tools to understand the potential ecological benefit of actions. p.52 | g.p. 3.3

4 Organize actions to support next steps. p.52 | g.p. 3.1, 3.3

5 Define saturation criteria and endpoint for when the action identification step is complete. p.52 | g.p. 3.1, 3.3

Prioritize actions

6 Reflect on SMART or PACT goals and objectives to reduce subjective scoring. p.54 | g.p. 3.1

7 Use geospatial applications and rigorous assessment tools to identify actions that could have higher ecological benefits. p.54 | g.p. 3.3

8 Consider testing the prioritization framework on a smaller geographic area to start. p.54 | g.p. 3.2

9 Consult other planning efforts and those with experience creating prioritization frameworks. p.55 | g.p. 3.2, 3.3

Identify champions and funding for implementation

10 Include potential champions during action prioritization to help score and to build support for actions. p.58 | g.p. 3.2

11 Identify funding to implement actions and support future collaboration. p.58 | g.p. 3.3

STEP 6: WRITING THE PLAN (PP.59-60)

Co-develop plan documents

1 Create a shared outline for the plan. p.59 | g.p. 3.1

2 Build the writing process and review cycles into work plans. p.59 | g.p. 3.3

3 Strategically delegate drafting and review processes p.60 | g.p. 3.1, 3.3

4 Assign a dedicated coordinator to manage feedback, track edits, and maintain document integrity. p.60 | g.p. 3.2, 3.3

STEP 7: IMPLEMENTATION (PP.62-66)

Planning and design

1 Advance project design for feasible actions. p.62 | g.p. 3.1, 3.3

2 Engage with regulators early and apply for permits and approvals with sufficient lead time. p.62 | g.p. 3.2

3 Identify and plan for key avoidance and mitigation measures. p.63 | g.p. 3.3

4 Create a project schedule. p.63 | g.p. 3.1

5 Develop a budget and expenses tracking system. p.63 | g.p. 3.3

6 Develop project-specific communication plans to share progress and successes. p.63 | g.p. 3.1

7 Define roles and responsibilities. p.64 | g.p. 3.1

8 Identify, analyze, and strategically address risks to your project. p.64 | g.p. 3.1, 3.3

9 Incorporate volunteers and the local community into project implementation. p.65 | g.p. 3.2

Procurement

10 Source materials from reputable vendors. p.65 | g.p. 3.1, 3.3

11 Outsource staff and expertise where necessary. p.65 | g.p. 3.3

Hands-on work

12 Create project-specific safety plans for workers. p.65 | g.p. 3.1, 3.3

Post-implementation

13 Compare the completed project action(s) to planned action(s). p.66 | g.p. 3.3

STEP 8: EFFECTIVENESS MONITORING AND MAINTENANCE (PP.66-68)

1. Establish a schedule to regularly review the monitoring plan and results. p.67 | g.p. 3.1
2. Tailor the monitoring plan to specific sites, conditions, and spatial scales. p.67 | g.p. 3.1
3. Use consistent, reliable, and repeatable methods. p.67 | g.p. 3.1
4. Incorporate volunteers and the local community into effectiveness monitoring and maintenance. p.68 | g.p. 3.2
5. Maintain clear and organized monitoring and maintenance notes. p.68 | g.p. 3.1, 3.3

STEP 9: ADAPTATION AND REVISION (PP.69-70)

1. Establish a schedule or triggers to review the ICEP and report on progress. p.69 | g.p. 3.1
2. Rely on evidence from monitoring to determine whether the project(s) meet the goals and objectives of the plan. p.70 | g.p. 3.1, 3.3

Pit tagging coho. Deadman River, B.C. Courtesy of DFO staff.

APPENDIX 3 TOOLS AND RESOURCES

The following tables list tools (T) and resources (R) mentioned for each planning step in Chapter 4. There were no tools or resources identified for managing capacity (Chapter 4.3.2), or identifying champions (Chapter 4.5.3).

STEP 1: INITIATION

Build trust and invest in relationships

T1. Use a shared contact list to keep track of key individuals and organizations you reach out to, ways to contact them, and their communication preferences.

Acquire and deliver funding for planning activities

T2. Project management software or spreadsheets (like Excel) can be used to track important dates and deliverables tied to each funding source.

Establish partnerships

T3. Workshops and community engagement meetings are spaces for participants to co-create the planning process, share knowledge, and build consensus. One-on-one meetings may be more effective for getting targeted feedback from specific individuals or organizations.

T4. Facilitators can suggest communication methods well-suited to particular audiences. After engagements, facilitators can prepare and share meeting minutes, 'what-we-heard' or progress reports, or summaries of workshop discussions to recognize the value of contributions and allow for corrections or additions.

T5. Consider tools like newsletters, virtual info sessions, surveys, and websites to provide updates, share materials, and gather input. These can also supplement in-person engagement to reach participants who cannot travel to in-person sessions, or confirm information that was collected (like a mini/interim 'what-we-heard').

R1. The Handbook for Water Champions[37] outlines key considerations and strategies for engaging different authorities and 'players' in watershed work.

STEP 2: VISION AND SCOPE

Create a shared roadmap and goals

T6. Use infographic tools like Visio and Canva to create and present visual narratives of the roadmap to partners and participants.

T7. Access strong facilitators who understand the watershed context and can navigate differing views and challenging discussions. The facilitator can also work with the project manager/ coordinator to advise on effective project management, roadmaps and governance structure, identifying or delegating roles, and holding partners accountable for addressing their actions, completing tasks, and making progress.

Set and maintain a planning scope

T8. Use community engagement meetings and workshops to gather feedback.

T9. Data sources, metadata, and data gaps can be tracked using spreadsheet software or watershed profiles, which can help partners confirm whether the scope addresses all key habitat pressures and limiting factors.

STEP 3: WORK PLANNING

Create a work plan and track progress

T10. Use critical paths to identify activities that cannot be delayed and document any changes to these activities using a pre-defined change management process. This work plan can be tracked in project management software or spreadsheets overseen by the project manager.

T11. Share progress reports through emails, newsletters, or information sessions when major milestones are completed to allow partners and participants to stay informed at their own pace and level of engagement.

STEP 4: GATHERING INFORMATION

Gather and bridge knowledge and data

T12. A watershed profile can synthesize population and habitat information for a specific geographic area and can describe data limitations or gaps for the species or habitat pressures in the watershed.

T13. Online interactive mapping tools like GeoYukon, iMapB.C. and the Pacific Salmon Foundation Data Tool can help find and visualize habitat, land use, and salmon population data. Others, like ArcGIS Survey123, allow users to submit their own data points, such as locations of key habitat features or fish observations.

R2. Tools, like the Kitasoo/Xai'xais Stewardship Authority's Research Guide,[80] offer questions and considerations for ethical and respectful research collaborations with First Nations in B.C.

R3. Yukon University have shared resources for ethical engagement with Indigenous communities on their Truth and Reconciliation: Respectful Research page.

R4. Fish Habitat Restoration Priority Planning (RPP) for the Pacific Region[44] and the Desktop Watershed Characterization Resources and Methods for B.C.[45] are supplemental resources to help readers identify and source data for watershed characterization and habitat restoration.

Establish a shared data platform

T14. Cloud-based storage like SharePoint, Dropbox, or Google Drive can facilitate secure file and data sharing between many partners, but also requires upfront coordination, paid licenses, and sustained maintenance.

T15. Licensed tools like ArcGIS Pro and NetMap offer expanded analysis and modelling capabilities. Users can create 'virtual watersheds' to assess the relative benefit of different types, scales, and locations of habitat restoration or conservation actions. Online interactive maps (such as ArcGIS Online) can offer shared access to data and modelling outputs. Open-source programs like QGIS offer low-cost or free alternatives to licensed tools

R5. The First Nations Information Governance Centre provides resources to learn more about the principles of ownership, control, access, and possession when working with Indigenous Knowledge.

Choose effective data analysis and modelling tools

R6. The Handbook of Creative Data Analysis,[81] for example, is one of many resources that can help analysts integrate multiple types and sources of data while maintaining integrity and rigour.

R7. Reference the 2025 report Geospatial indicators and metrics for threats to fish habitat in the Fraser River basin with Thompson-Nicola as a case study[47] to inform data collection and modelling for salmon or other freshwater fish. Particularly, to understand how climate change could impact different populations or areas of a watershed, and use this knowledge to inform which actions are prioritized in the plan.

STEP 5: IDENTIFYING & PRIORITIZING ACTIONS

Identify actions

T16. Purposive sampling ensures that individuals with relevant expertise or local knowledge and experience contribute, while snowball (reference-based) or quota approaches (threshold-based) can help achieve representation across sectors or organizations.

T17. Use variants of the Delphi method to iteratively identify and refine actions in semi-structured workshops, interviews, stream-walks, or mapping sessions. Expert elicitation, through meetings and surveys (such as Survey123 or Microsoft Forms) can help validate collated actions from literature and bring forward new actions.

T18. Spatial analysis, GIS, cumulative effects, and life-cycle modelling to locate populations or areas with high ecological value, or that are more vulnerable to climate change, or face more concentrated ecosystem pressures or degradation.

Prioritize actions

T19. Literature reviews and expert elicitation, through meetings and/or surveys (such as Survey123 or MS Forms) can help validate actions that have previously been identified and bring forward new actions.

T20. Geospatial modelling applications such as NetMap can analyze watersheds using a variety of tools to support understanding of ecosystem components and processes (for example, fluvial processes, identifying aquatic, riparian, and floodplain habitat, erosion/sedimentation sources, and wildfire and climate change predictions). Planners can use these virtual watersheds to identify and recommend locations for restoration actions; for example, to identify specific reach segments that would most benefit from riparian planting to increase shade and reduce thermal loading into streams.

T21. The 'Raven' modelling framework is another tool that can be used to estimate the effects of land cover change (for example, replanting forests) on a watershed's hydrology (such as water quantity).[78]

T22. Risk Assessment Methods for Salmon (RAMS) is another method to identify limiting factors for salmon productivity and rank pressures using a rigorous and participatory approach. The Pacific Salmon Foundation hosts an interactive map that shows locations and results of habitat status and risk assessments conducted in B.C. using the RAMS approach.

T23. Spreadsheets such as Excel or Google Sheets include functions to help fill in and share simple prioritization frameworks, including criteria, weights, and scores.

Practical examples and advice for drafting and using action prioritization frameworks for regional-scale projects can be found in:

R8. Priority Threat Management[58]

R9. Klamath Basin Integrated Fisheries Restoration and Monitoring Plan[59]

R10. B.C. Central Coast: Prioritizing Strategies for Pacific Salmon Recovery and Persistence[54]

R11. Ecological risk assessment for the effects of fishing[60]

R12. Fish Passage Strategic Approach: Protocol for Prioritizing Sites for Fish Passage Remediation[61]

R13. Mitigation Guide for the Protection of Fishes and Fish Habitat to Accompany the Species at Risk Recovery Potential Assessments Conducted by Fisheries and Oceans Canada (DFO) in Central and Arctic Region[62]

R14. Cowichan Watershed Health and Chinook Initiative - Establishing Conditions for Success in the Cowichan[63]

STEP 6: WRITING THE PLAN

6.1 Co-develop plan documents

T24. Track document versions carefully using document titles or version control in writing software like MS Word or Google Docs.

T25. Keep track of the order that reviewers will receive chapters or documents, and their deadline for completing reviews or revisions in the project management tool or spreadsheet. The coordinator can also track progress using pre-determined acceptance criteria.

STEP 7: IMPLEMENTATION

T26. Project management software and Gantt charts are useful to visualize schedules and critical paths.

STEP 8: EFFECTIVENESS MONITORING AND MAINTENANCE

T27. Simple Gantt charts can be developed in spreadsheets or other project management software to help keep track of project details. These can be readily updated should things change.

STEP 9: ADAPTATION AND REVISION

T28. Simple Gantt charts can be developed in spreadsheets or other project management software to help keep track of project details. These can be readily updated should things change.

GLOSSARY

Acceptance criteria: A shared standard for deliverables that must be met for approval. These are clear guidelines for teams that define what 'done' means. This is explicitly tied to scope and timelines and is only altered through a change management process. Good acceptance criteria are unambiguous, realistic, and achievable, and have clear pass/fail conditions.[82]

Action prioritization: The process of evaluating, ranking, and/or sequencing potential actions that will benefit populations and their ecosystems while considering available funding, expertise, and other constraints. An action prioritization 'framework' is the method used to do this.

Adaptive management: An integrated, multidisciplinary, and systematic approach to improving natural resource management. Management methods (in this Guidebook 'actions' or 'projects') are updated based on the outcomes of implemented management policies, practices, and monitoring protocols.[84]

Agile approach: A flexible, iterative method for managing projects that emphasizes collaboration and partner feedback while prioritizing adaptability and continuous improvement throughout the development process.

Champions: In this Guidebook, we used 'champion' to refer to any individual or organization that has an interest, mandate, funding, or capacity to implement planning recommendations.

Checkpoints, Progression, or Retrospectives: Meetings that are scheduled at regular intervals, or following planning or project milestones, to discuss project tasks and timeline. Checkpoints and progression meetings tend to focus on what is coming next, confirming task assignments, scheduling, and possible risks to completing critical tasks. Retrospective meetings tend to focus on tasks or milestones that were recently completed, challenges or performance issues, and how to improve on these for upcoming work.

Communications plan: A communications plan shares project progress and success and includes timelines, goals, objectives, roles and responsibilities for communication associated with the development of the project that is being communicated about.

Conservation unit: A group of wild Pacific salmon sufficiently isolated from other groups that, if extirpated, is very unlikely to recolonize naturally within an acceptable timeframe, such as a human lifetime or a specified number of salmon generations.[85, 86]

Contingency plan: A strategic document to address unforeseen events, unintended consequences, or risks that could disrupt action implementation. It includes anticipating what may happen and allocating resources, equipment, tasks, responsibilities, and decision-making processes ahead of time to adapt to changing conditions in real time.[65]

Critical path: The continuous string of critical activities in the schedule between the start and finish of the project. The total amount of time it will take to complete all activities in the critical path is equal to the duration of the project. If any of these critical activities are delayed, it will delay the project completion date.[87]

Cumulative effects: Changes in environmental, social, economic, and cultural values and conditions caused by the combined effects of past, present, and reasonably foreseeable future human activities and natural processes.[88,89]

Ecosystem process: Also known as an ecosystem function. It is a suite of dynamic physical, chemical, and biological processes that sustain life for organisms. These include measures of productivity, energy flow, and nutrient cycling that are maintained by a diverse group of species.

Engagement: An ongoing, consistent dialogue that builds trust and respect between parties on issues of mutual interest and supports Canada's commitment to implement *UN Declaration on the Rights of Indigenous Peoples* (UN Declaration). Engagement approaches may include information sessions, meetings, workshops, and site visits.

Facilitator: A neutral third-party who supports collaboration, conflict resolution, and logistics. A facilitator may be contracted to support part of the planning process (for example, a single workshop or meeting series). Or if the project manager/coordinator has the necessary skills to fulfill both roles, this combined facilitator/coordinator/manager might provide broader guidance or project management support (for example, by tracking and holding partners accountable to project deadlines).

Goals / Vision: An achievable and desired future state or condition for a species, area, or ecosystem process. Goals are designed to be broad and long-term to account for the large-scale and slow recovery of natural systems. They can also focus on enabling conditions, the desired future state of the plan itself, or the partnerships built to support it.

Habitat (interchangeable with 'ecosystem'): Spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly to carry out their life processes.[68] In this Guidebook, we use 'habitat' interchangeably with 'ecosystem' to acknowledge the relationship between organisms that share habitats, and the way they shape and are shaped by their physical environment.

Habitat degradation: In the Guidebook, habitat degradation refers to the deterioration or destruction of an ecosystem.

Habitat Dysfunction: In the Guidebook, habitat dysfunction describes sub-optimal conditions or performance of an ecosystem.

Habitat pressure(s): Natural processes or human activities that can directly or indirectly induce qualitative or quantitative changes in environmental conditions,[90] or that have caused, are causing or may cause the destruction, degradation and/or impairment of biodiversity and natural processes. For example, a human-caused threat, such as a fire set by a match or even an increased intensity of fires due to forest management practices.[91]

Habitat restoration: Helping an ecosystem recover to a more resilient state by re-establishing its structure, species composition, and ecological processes.[42,83] This can be done through active means, like replanting riparian vegetation, or passive means, like removing old infrastructure and allowing natural processes to recover.[92]

Habitat Restoration Centre of Expertise (RCOE): A program supporting the Pacific Salmon Strategy Initiative's conservation and stewardship mandate. The RCOE led Fish Habitat Restoration Priority Planning[44] for the Pacific Region and supported habitat restoration planning at the watershed scale.

Fish Habitat Restoration Priority Planning for Pacific Region (RPP): A planning document for fish habitat restoration in B.C. and Yukon that integrates the collective fish habitat restoration knowledge and goals of the Restoration Community.[44]

Hišukiš ċawaak: "Everything is one" in Nuu-chah-nulth-aht, among species, habitats, ecosystem processes, and the people who share reciprocal relationships with them.

Indicator: Integrates information from various metrics or factors into a single value. Can include ecological indicators, indicator species, or biocultural indicators. Pacific salmon have been used as an **indicator species** because of their diverse habitat requirements, which are suitable for many other cold-water species. Other biological indicators consist of groups of species, such as a community of plants or fish.[44]

Indigenous Protected and Conserved Area: The Indigenous Circle of Experts has defined Indigenous Protected and Conserved Areas as lands and waters where Indigenous governments have the primary role of protecting and conserving ecosystems through Indigenous laws, governance and knowledge systems.[93]

Integrated and collaborative ecosystem planning (ICEP): A broad, collective approach that brings together key governments, stakeholders, and knowledge holders to agree on shared goals and coordinated actions to support ecosystem resilience and recovery. It weaves expertise from scientists, other stakeholders, and local and Indigenous groups, incorporates ecological and cultural values, and looks at short- to long-term ecosystem needs.[6,94]

Integrated Planning for Salmon Ecosystems (IPSE): A program supported by the Pacific Salmon Strategy Initiative's conservation and stewardship mandate, piloting collaborative planning processes in key watersheds in B.C. and the Yukon to improve the health of Pacific salmon ecosystems.

Interdependency: The acknowledgement that, in many cases, a single institution, organization, or individual cannot achieve the desired outcome for an ecosystem or species without cooperating or collaborating with another party. Interdependency can be a precursor for building trust and establishing partnerships.

Keystone species: A species that has a disproportionately large effect on its natural environment relative to its abundance. Keystone species play a critical role in maintaining the ecology and structure of a community. Salmon are an example of a keystone species. They alter and maintain the physical, chemical, and biological environment around them.

Limiting factor: A non-anthropogenic factor that limits the abundance, distribution, or growth rate of a species or a population. Examples of limiting factors for fish include: physical variables such as temperature, barriers to suitable habitat, habitat size or quality; chemical variables such as nutrient availability; or biological variables such as prey abundance, or mortality rate.[44,70]

Local and Indigenous Knowledge: In this Guidebook, we emphasize the need to bring together local and Indigenous Knowledge, and Western science and recognize that knowledge comes in many different forms. Here, local and Indigenous Knowledge describes knowledge developed by local communities and Indigenous Peoples over generations, based on lived experiences and close relationships with the natural environment. This knowledge is 'situated' and cannot be separated from the knowledge holders or environment in which it is embedded.[95]

Milestone: Specific points in a project cycle that can be used to measure progress. They can be large or small events or tasks that should occur during each project phase.[96] For example, a milestone for the Initiation phase of planning might be to have all partners sign a Terms of Reference or other agreement for the planning process.

Objective: Specific, short-term, measurable outcomes that contribute to achieving a goal. Many methods can be used to create clear objectives. One method is 'SMART' (Specific, Measurable, Achievable, Relevant and Time-bound). Another method is 'PACT' (Purposeful, Actionable, Continuous and Trackable).[43] The latter focuses on continuous output as opposed to final benchmarks and outcomes. It can be useful when goals include collaboration and stewardship.[44] An example of an objective for a habitat goal could be 'Increase slope stability at higher elevations to promote water infiltration, storage, and groundwater recharge (by increasing vegetative cover).' [97]

Pacific salmon: Pacific salmon are comprised of five species that are found across B.C. and the Yukon. These species are *Oncorhynchus nerka* (Sockeye), *O. kisutch* (coho), *O. tshawytscha* (chinook), *O. gorbuscha* (pink), and *O. keta* (chum) and form part of the larger classification of Pacific salmonids, which include steelhead and cutthroat trout. These can be described by population, stock, or 'conservation unit', which is a group of wild Pacific salmon sufficiently isolated from other groups that, if extirpated, is very unlikely to recolonize naturally within an acceptable timeframe, such as a human lifetime or a specified number of salmon generations.[96,97]

Pacific Salmon Strategy Initiative: A five-year program launched by DFO in June 2021 to curb the steep decline of Pacific salmon populations and to rebuild and protect salmon stocks by guiding strategic and coordinated long-term responses to the various challenges Pacific salmon face, including climate change, fishing pressures, and habitat loss.

Partners: Organizations or individuals who make decisions about the planning methods, timelines, and outputs based on input from participants. They are responsible for leading engagement with participants and ensuring the planning process is collaborative.

Partnership agreement: A document outlining expectations, communication methods, roles and responsibilities, data sharing, decision making, and how progress will be evaluated between partners.

Participants: Organizations or individuals who contribute time, knowledge, perspectives, or materials to shape the planning process and outcomes. Participants are not usually included in partnership agreements, but they might receive funding from partners. They may participate in one or many aspects of planning (for example, in a single workshop or in a committee), depending on their level of interest, time, and knowledge.

Population: A group of interbreeding organisms that is relatively isolated (i.e. demographically uncoupled) from other such groups and is likely adapted to the local habitat.

Positionality: A term related to 'intersectionality' as described by Kimberlé Crenshaw in 1989.[98] Positionality focuses on how our identities and experiences create explicit or implicit biases in our work. Visually, positionality is often described using the intersections on a 'wheel of power and privilege'[99] or other similar tool.

Practitioner: A professional who develops and implements plans and policies to guide land use, community growth, and urban development. They work with stakeholders to balance social, environmental, and economic factors in planning decisions.

Project Manager/coordinator: Someone who oversees projects that involve multiple stakeholders working together to manage ecosystems, ensuring that environmental, social, and economic goals are balanced throughout the planning process. The project manager is responsible for tracking deadlines, ensuring parties are held to account, and providing advice on planning steps. They may also take on facilitation roles if qualified and desired by partners.

Project: This is a term used in the implementation, effectiveness monitoring and maintenance, and adaptation sections of this Guidebook. 'Project' in these sections is used as an umbrella term for the planning, design, implementation, monitoring, and adaptation of actions that have a shared workplan based on location, equipment, or labour.

Resilience: The ability to respond and adapt to change. For example, habitat resilience could refer to the survival of riparian vegetation through long drought periods. Or, for a salmon population, resilience could mean having sufficient genetic diversity to allow for natural adaptation to changing conditions, such as the ability to withstand higher water temperatures. It could also refer to behavioural changes that allow a population to survive. For example, spawning in non-natal streams if they are easier to access or are in better physical condition.

Riparian: Areas located next to streams, rivers, lakes and wetlands that directly influence aquatic and wildlife habitat. Riparian areas or zones can broadly be described as the areas of the streambank, including side channels and associated banks, and they include upland areas not normally inundated during high water conditions.

Roadmap: A visual (diagram) or written document that outlines high-level goals and milestones for the planning process, who is involved in each step, and their roles.

Salmon Ecosystem Table (SET): Nicola watershed First Nations, the Scw'exmx Tribal Council (STC), B.C. Ministry of Water, Land and Resource Stewardship, and Fisheries and Oceans Canada's Integrated Planning for Salmon Ecosystems program (DFO-IPSE) came together in 2024 to form the Salmon Ecosystem Table. The SET worked together to develop a Nicola Watershed Integrated Salmon Ecosystem Strategy.

Steering Committee: Steering committees serve as spaces for brainstorming and gathering advice, making decisions, and co-developing documents.

Stock: Groups of the same species with a shared characteristic(s) of interest to managers. For salmon, stock management units are managed together with the objective of achieving a joint status.[68]

Stream: A seasonal or persistent flow of water from one point on the landscape to another. Streams flow from a headwater to a mouth located on either another stream or some other waterbody like a lake, wetland, or the ocean.[100]

Thompson Shuswap Salmon Collaboration (TSSC): Partnership between the Secwepemc Fisheries Commission, Department of Fisheries and oceans Canada, and the B.C. Ministry of Forests, Lands, natural Resource Operations and Rural development. This technical collaborative is dedicated to the strategic planning process for the conservation and restoration of salmon ecosystems in the Thompson-Shuswap watershed region. In 2026 they developed the Thompson-Shuswap Salmon Ecosystem Action Plan.

Watershed: The drainage area associated with a single stream or a stream system.[100]

Western science: In this Guidebook, we emphasize the need to bring together local and Indigenous Knowledge, and Western science and recognize that knowledge comes in many different forms. Western science refers to knowledge produced through research, experimentation, and analysis following established scientific methods. Indigenous Knowledge/Science can also be produced this way, but we make the distinction between Indigenous and non-Indigenous science to highlight how the collective understanding of freshwater habitats and fish populations is enhanced when Western science is included alongside and equal to local and Indigenous Knowledge.

THANK YOU