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Canada

FRAMEWORK TO IDENTIFY FISH HABITAT RESTORATION PRIORITIES

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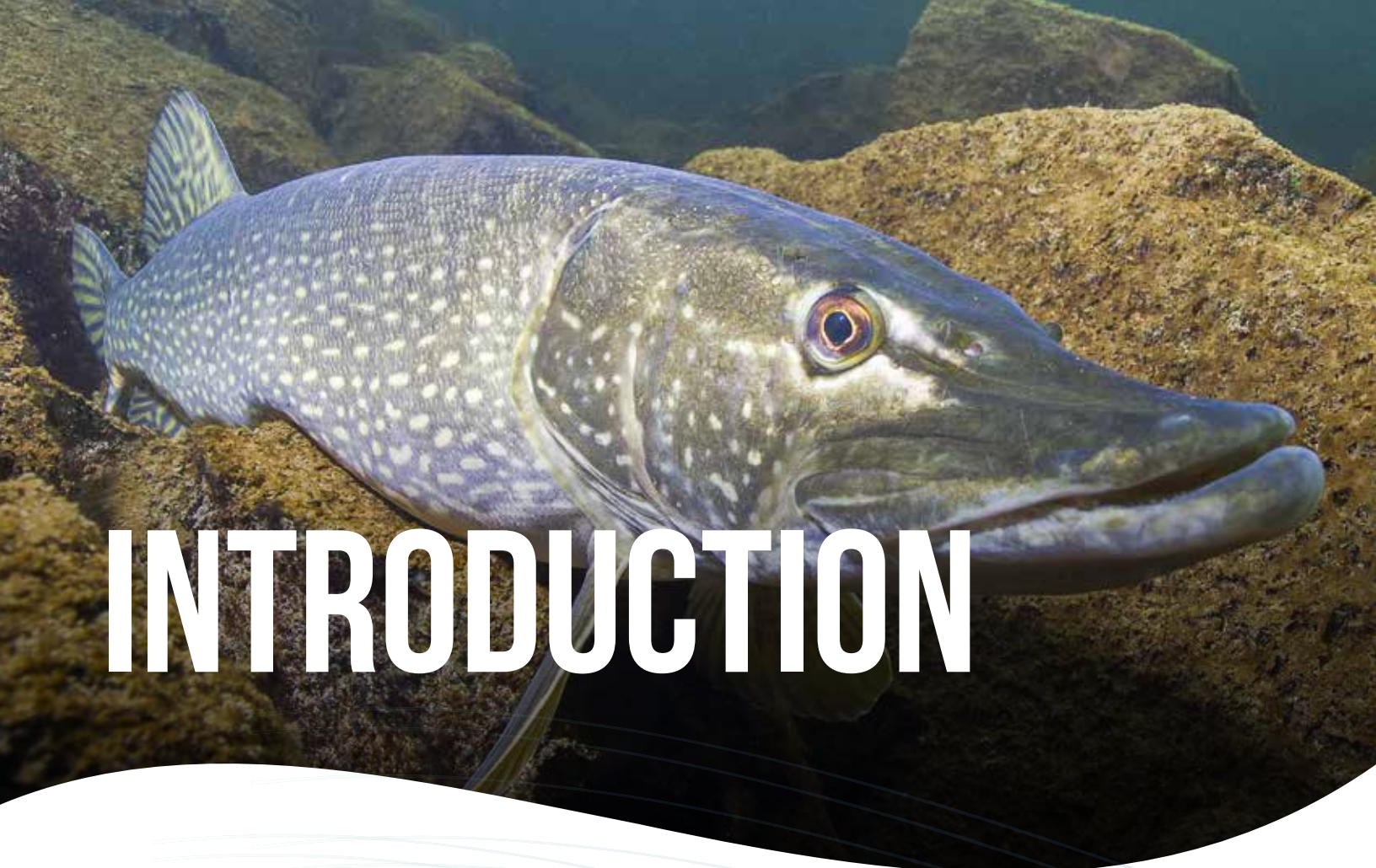
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DISCLAIMER

The “Framework to Identify Fish Habitat Restoration Priorities” is not a substitute for the *Fisheries Act* or its Regulations. In the event of an inconsistency between the Framework and the *Fisheries Act* or its Regulations, the legislation will prevail.

NOTE TO READERS

It is recommended that the [Fish and Fish Habitat Protection Policy Statement, August 2019](#) be read prior to the “Framework to Identify Fish Habitat Restoration Priorities” to understand how Fisheries and Oceans Canada interprets and applies the regulatory and non-regulatory tools available to support the conservation, protection and restoration of fish habitat.



INTRODUCTION

Habitat loss and degradation, modification to fish passage and flow, and other threats contribute to the decline of freshwater and marine ecosystems in Canada. Restoration provides an opportunity to address past impacts to habitats and ecosystems. The Government of Canada has recognized the importance of restoration to improve ecosystem health, support climate change mitigation and adaptation strategies, conserve biodiversity, and protect species at risk.¹ Fisheries and Oceans Canada (DFO) contributes to meeting Canada's international commitments to ecological restoration, such as through the United Nations (UN) Convention on Biological Diversity Aichi Targets and the 2030 UN Sustainable Development Goals.

FISH HABITAT RESTORATION INVOLVES ACTIONS TO MODIFY DEGRADED HABITAT TO IMPROVE ITS CAPACITY TO PRODUCE AND SUSTAIN FISH AND TO IMPROVE ECOSYSTEM FUNCTIONS.

Fish habitat restoration occurs across Canada through a range of initiatives. It is supported and carried out by federal, provincial, territorial and local governments, as well as Indigenous Peoples, non-profit organizations, community organizations, academia, and others through partnerships and collaborative work (hereafter, the restoration community). Conserving, protecting, and restoring aquatic habitat is a shared responsibility.

DFO is publishing this Framework to Identify Fish Habitat Restoration Priorities (hereafter, the Framework) to encourage the strategic use of resources to target restoration activities for maximum benefit to fish habitat. The Framework provides a consistent national approach that allows for regional flexibility to identify fish habitat restoration priorities. Following the approach outlined in the Framework, DFO's Regions² will develop restoration priorities, representing the diverse and unique freshwater and coastal ecosystems across Canada.

ROLE OF FISHERIES AND OCEANS CANADA IN FISH HABITAT RESTORATION

DFO plays a critical role in supporting and promoting restoration. DFO participates in fish habitat restoration in several ways:

- Funding organizations to undertake restoration through grants and contributions programs (e.g., Aquatic Ecosystems Restoration Fund, Canada Nature Fund for Aquatic Species at Risk);
- Authorizing habitat offsetting plans and establishing fish habitat banks to counterbalance negative impacts to fish and fish habitat under the *Fisheries Act*;
- Restoring Pacific salmon habitat in British Columbia and Yukon Territory;
- Controlling and managing aquatic invasive species and authorizing deleterious substance use (i.e., pesticides) to eradicate or control aquatic invasive species under the *Aquatic Invasive Species Regulations* of the *Fisheries Act*;
- Including restoration activities on federal aquatic contaminated sites that are remediated through the Federal Contaminated Sites Action Plan;
- Participating in resource planning and management led by others (e.g., watershed management plans); and,
- Developing fish habitat restoration plans following the designation of an Ecologically Significant Area (ESA), if habitat restoration is required to meet the ESA's conservation and protection objectives.³

¹ Office of the Prime Minister, 2021. Minister of Fisheries, Oceans and the Canadian Coast Guard Mandate Letter. December 16, 2021. Online: <https://pm.gc.ca/en/mandate-letters/2021/12/16/minister-fisheries-oceans-and-canadian-coast-guard-mandate-letter>

² Information on DFO Regions is available online: <https://www.dfo-mpo.gc.ca/regions/index-eng.htm>
A map is available online: <https://www.dfo-mpo.gc.ca/about-notre-sujet/organisation-eng.htm>

³ Note: At the time of writing (2022), no Ecologically Significant Areas have been identified.

PURPOSE

OF IDENTIFYING FISH HABITAT RESTORATION PRIORITIES

DFO is establishing fish habitat restoration priorities to improve aquatic restoration coordination and inform resource management decisions across Canada. Improved information sharing across the restoration community will help foster strategic action toward shared restoration goals and address the growing challenges of habitat loss and degradation.

Fish habitat restoration priorities may be used by:

- Restoration practitioners undertaking restoration projects;
- Organizations or individuals funding restoration to inform restoration planning and project selection;
- Resource managers and decision-makers to consider impacts on fish habitat in planning and development (e.g., land use planning, watershed management plans, fisheries management plans, marine spatial planning, and fish stock rebuilding plans);
- Proponents proposing works, undertakings, or activities that could result in the death of fish or the harmful alteration, disruption or destruction of fish habitat, in developing offsetting or habitat banks; and,
- DFO to support decision-making related to conservation and protection of fish and fish habitat (e.g., during the regulatory review of project applications for authorization of works, undertakings, or activities under the *Fisheries Act*).





RESTORATION PRINCIPLES

The seven principles outlined below orient the restoration community to overarching best practices in restoration to achieve the greatest benefits ecologically, culturally, and socioeconomically. The principles are not prescriptive, but provide the foundation for what restoration should aim for in planning, design, and implementation. These principles are adapted from the United Nations Decade on Ecosystem Restoration (2021-30),⁴ the Society for Ecological Restoration *International Principles and Standards*,⁵ Parks Canada's *Principles and Guidelines for Ecological Restoration in Canada's Protected Areas*,⁶ and DFO's *Fish and Fish Habitat Protection Policy Statement*.⁷

- 1. Restoration activities should address the root causes of degradation.** Identifying the direct and indirect sources of habitat degradation and eliminating them is essential for effective restoration. If the root causes are not addressed, restoration may fail over the long term. Restoration planning should consider the scale of restoration relative to the scale of habitat degradation. Known pathways of effects in aquatic ecosystems, and their duration, must be understood to inform effective restoration design and achieve restoration success.
- 2. Restoration activities should result in self-sustaining improvement to habitat.** Restoration should aim to assist natural processes of recovery and consider the processes that influence landscape and habitat formation. Nature-based solutions minimize the need for continuous maintenance of a restored site, and are more cost-effective than habitat modifications that require ongoing maintenance. Self-sustaining restoration supports an ecosystem's resilience and ability to adapt to ongoing environmental changes.

⁴ United Nations, 2020. Principles for ecosystem restoration to guide the United Nations Decade on Ecosystem Restoration 2021-2030.

Online: <https://www.fao.org/3/cb6591en/cb6591en.pdf>

⁵ Gann G.D., McDonald T., Walder B., Aronson J., Nelson C.R., Jonson J., Hallett J.G., Eisenberg C., Guariguata M.R., Liu J., Hua F., Echeverria C., Gonzales E.K., Shaw N., Declerck K., Dixon K.W., 2019. International principles and standards for the practice of ecological restoration. Second edition. Restoration Ecology S1-S46.

⁶ Parks Canada, 2008. Principles and guidelines for ecological restoration in Canada's protected natural areas. ISBN 978-0-662-48575-9. Cat. No. R62-401/2008E.

Online: <https://www.pc.gc.ca/en/nature/science/conservation/ie-ei/re-er/pag-pel>

⁷ DFO, 2019. Fish and fish habitat protection policy statement, August 2019. Online: <https://www.dfo-mpo.gc.ca/pnw-ppe/policy-politique-eng.html>

- 3. Restoration should consider ecological, cultural, and socioeconomic contexts.** Habitat restoration aims to achieve and sustain the greatest net gain possible for biodiversity, ecological integrity, promotion of Indigenous rights, ecosystem goods and services, climate change mitigation, adaptation and resilience, and human health and well-being. Restoration objectives should consider expected ecological rates of recovery, historic conditions, natural biodiversity of the ecosystem, ongoing influences, and future trajectories for habitats, including projected impacts due to climate change. Setting realistic objectives considering the ecological, cultural, and socioeconomic conditions for restoration will inform effective design and evaluation of success.
- 4. Restoration decision-making should include the best available information from all sources.** Restoration decisions should strive to integrate the best available science, technical information, and Indigenous Knowledge. Best available information includes commonly-used, effective restoration techniques, as well as promising innovative restoration techniques. Restoration designs should also promote adaptation and resilience to climate change. Sharing information and knowledge on restoration is critical for effective and efficient restoration and for improving restoration practices over time.
- 5. Restoration effectiveness should be assessed through monitoring, and be subject to adaptive management.** Restoration results should be monitored to determine whether objectives and goals are being met. Effective monitoring should include baseline indicator measurements and assess the direction and magnitude of change over time. An ecosystem's response to restoration measures may require adaptive management to ensure intended outcomes are met.
- 6. Restoration should incorporate engagement and collaboration.** Engagement and partnering with Indigenous Peoples, provinces/territories, local communities, non-profit organizations, partners, and other stakeholders fosters inclusive and informed decision-making for restoration. Support from the restoration community improves a project's long-term success by leveraging interest, commitment, and partnerships in restoration.
- 7. Restoration should integrate policies and activities across programs or jurisdictions.** Relevant governance instruments (laws, regulations, policies, strategies, frameworks, and plans) should be mapped, aligned, adapted, and integrated in the planning and implementation phases of restoration. This will require cross-jurisdictional communication and collaboration and will help promote sound decision-making and enhance restoration outcomes.



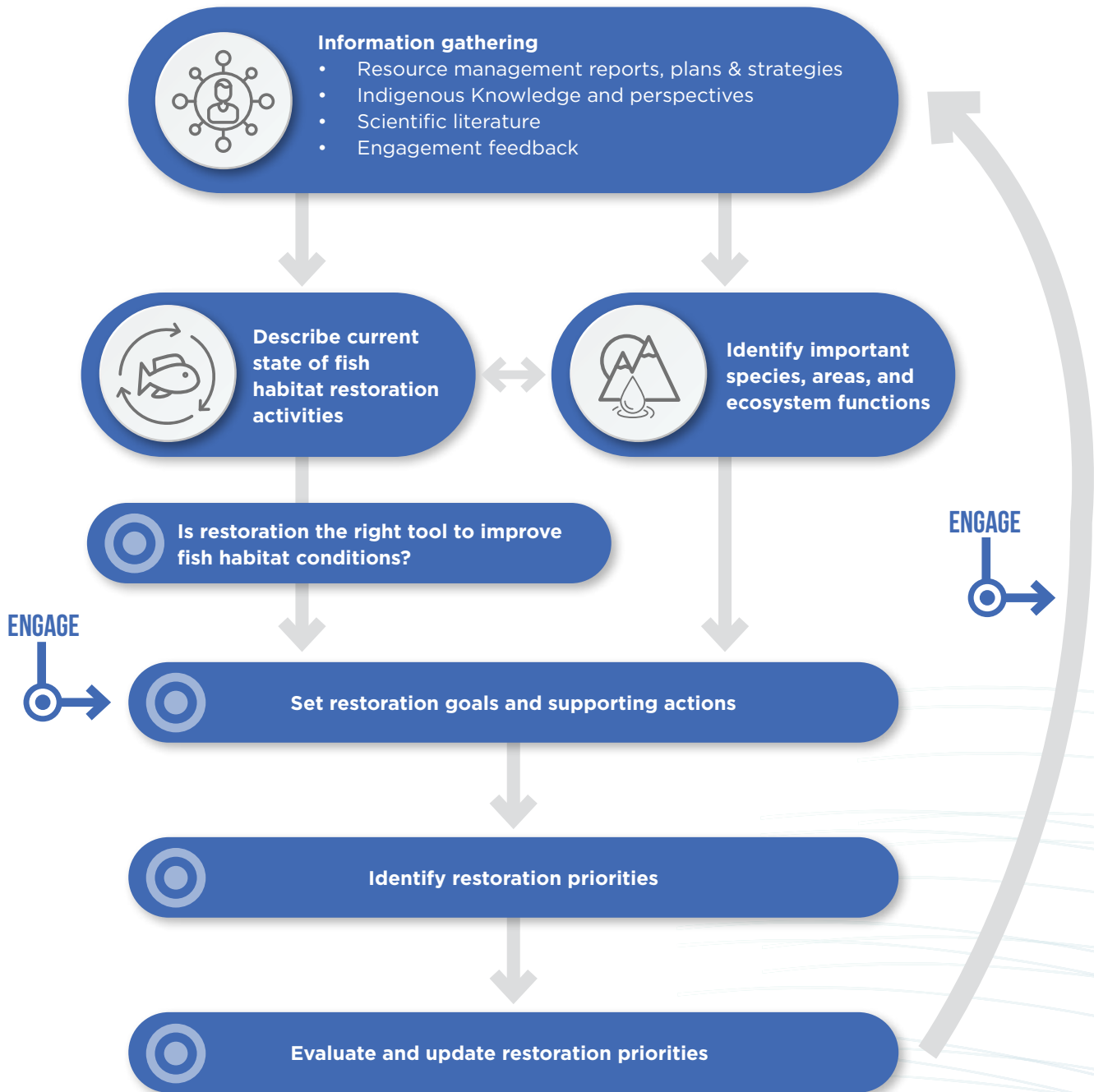


APPROACH TO IDENTIFYING RESTORATION PRIORITIES

Restoration priorities will be developed in regional companion documents to the Framework, and take into consideration the unique ecological, social, and cultural characteristics of the region. Each DFO Region will have its own process for assessing important species, areas, and threats as well as for identifying restoration priorities. DFO Regions will engage with the restoration community throughout the restoration priorities' development. The available information, scope, and specific outcomes will vary among Regions, but the overall approach will be consistent with this Framework.

The key steps to approaching the identification of restoration priorities are presented in the following sections.

Figure 1. Conceptual model of the process and outcomes to develop restoration priorities.



It is important to note the approach will be non-linear and iterative, as information is collected and analyzed.

The first two steps (below) of the approach to identify restoration priorities rely on gathering information from a range of sources. DFO will consider best available information to describe fish habitat degradation, the state of restoration activities, and important species, areas, and ecosystem functions.

1. DESCRIBE THE CURRENT STATE OF FISH HABITAT RESTORATION ACTIVITIES

This step describes who is involved in fish habitat restoration, where it is taking place, and what is being (or has been) restored. Compiling and describing planned, ongoing, and completed regional restoration activities will help establish a baseline for restoration initiatives in a given area and identify potential partners to leverage for future restoration projects. This step will also describe habitat pressures and historic degradation. Regional restoration priorities may describe the entire DFO Region, particularly in smaller geographies, or may scope the work to focus on a sub-region, watershed, or biogeographical area of interest.

2. IDENTIFY IMPORTANT SPECIES, AREAS AND ECOSYSTEM FUNCTIONS

The second step, which may be done concurrently with step 1, identifies important fish species, areas, and ecosystem functions in a particular region or biogeographical area of interest. Fish species may include species assemblages and/or stocks. This step will describe the particular sub-region(s), watershed(s), or area of focus within the DFO Region. A description of the pattern and history of habitat degradation will support the selection of the scoped area of interest. Areas may be of varying scale, such as a watershed, cross-watershed, or sub-watershed scale.

This step will place an emphasis on considering the priorities of Indigenous Nations and communities in the area regarding important species, habitats, ecosystem functions, and cultural values (see Indigenous Engagement in Restoration section below).

Defining important species, habitats, and ecosystem functions will aim to align with provincial and territorial fisheries management objectives, recovery plans, and restoration priorities.

Causes of habitat degradation are complex and interconnected. Efforts to identify relevant threats and the desired condition for important species, areas, and ecosystem functions should include an assessment of the primary drivers of habitat degradation and loss. Current ecological conditions in the region (e.g., the hydrogeomorphology, biodiversity, habitat types, and limiting habitat conditions for fish life cycle processes) and causes of habitat degradation should be understood to meaningfully establish priorities for fish habitat restoration.

EXAMPLE OF RESTORATION PRIORITIES IN DFO FUNDING PROGRAMS: COASTAL RESTORATION FUND

Active between 2017 and 2021 as part of the national Oceans Protection Plan, DFO's Coastal Restoration Fund (CRF) supported projects to restore coastal aquatic habitat and address threats to marine habitats and species on Canada's coasts. DFO worked with past funding program recipients, including Indigenous organizations, to develop restoration priority areas and activities for the CRF. Priority areas and activities for restoration identified under the CRF will be integrated and aligned to identify fish habitat restoration priorities for DFO.

CRF important species included Atlantic salmon, Atlantic cod, capelin, and Pacific salmon.

CRF important places included:

- Areas of historic development (e.g., Bay of Islands in Newfoundland and Labrador)
- High value habitats (e.g., eelgrass beds)
- Degraded nearshore coastal and estuarine areas in North and Central Coast of British Columbia

3. SET RESTORATION GOALS AND SUPPORTING ACTIONS

Restoration goals should target long-term outcomes for species, areas, or ecosystem functions. Restoration priorities will support the identified restoration goals. Specific restoration objectives and outcomes will be decided at the site level by the lead organization for a restoration project. Considerations that influence restoration goals and priorities development are listed in Appendix 1.

Restoration goals should consider predicted impacts of climate change and expected shifting ecological conditions to promote resilient fish habitat restoration projects. Restoration goals may be accompanied by more specific restoration actions set out in regional restoration priorities.

Examples of restoration goals with supporting actions

Goal: Increase quantity and quality of aquatic habitat

Actions:

- Reconnecting floodplain and/or wetland habitat to streams or lakes;
- Removing anthropogenic barriers to fish migration, where fish habitat upstream of the barrier is in good condition, and there is no risk of introducing undesirable or invasive species;
- Removing or improving tidal barriers (e.g., floodgates) to allow fish unimpeded access and restore function in estuarine ecosystems; and,
- Rebuilding estuarine marshes and wetlands to act as effective refugia in coastal areas for forage species (i.e., decrease the distance between estuary marshes and wetlands).

Goal: Improve or maintain hydrology and/or water temperature

Actions:

- Maintaining and improving conditions in cold-water streams by vegetating (shading); and,
- Stabilizing streambanks in the upper reaches of the watershed.

4. IDENTIFY RESTORATION PRIORITIES

Restoration priorities will be identified considering the characteristics in Appendix 1, and considering best available information. Restoration priorities may be specific to a species, area, or ecosystem function or may address habitat degradation affecting all three. Each set of regional restoration priorities will provide a rationale or criteria for the selection of restoration priorities.

5. EVALUATE AND UPDATE RESTORATION PRIORITIES

Regular review and updates to regional fish habitat restoration priorities will capture ongoing and/or changing conditions on the landscape and enable integration of best available information, as new data become available. Regional restoration priorities will be evergreen, with updates intended after five years.

PARTNERING

AND COLLABORATION OPPORTUNITIES

DFO recognizes the importance of the restoration community's role in addressing threats to fish and fish habitat. DFO supports and partners with the restoration community to foster multi-disciplinary approaches to restoring aquatic habitats. DFO funding programs encourage and build local community capacity for restoration.

Indigenous groups, provinces, and territories manage natural resources and make decisions that affect and influence fish habitat. DFO is committed to working with other governments and decision-makers in the restoration community to share information and increase long-term ecosystem improvements. Working with Indigenous groups, provinces, and territories enables use of the best available information and improves integration of strategic outcomes for habitat restoration.

INDIGENOUS ENGAGEMENT IN RESTORATION

DFO is committed to building renewed nation-to-nation, Inuit-Crown, and government-to-government relationships with First Nations, Inuit, and Métis Peoples based on recognition of rights, respect, co-operation, and partnership. Fisheries, aquatic habitat, and marine waterways are of great social, cultural, spiritual, and economic importance to many Indigenous Peoples.⁸ Restoration provides an opportunity to strengthen the relationship between DFO and Indigenous Peoples and to uphold the *United Nations Declaration on the Rights of Indigenous Peoples*, which Canada enshrined in law in 2021 in the *United Nations Declaration on the Rights of Indigenous Peoples Act*.

Restoration priorities will respect and promote the rights and interests of Indigenous Peoples, incorporate Indigenous Knowledge and cultural values, and support Aboriginal and treaty fishing rights. Regional restoration priorities will be developed and refined through engagement with Indigenous Peoples with an interest in the region through a range of methods, such as community meetings, workshops, online engagement materials, and review of draft regional restoration priorities.

DFO will engage with Indigenous groups and ensure that their input, information, knowledge and perspectives on culturally-important species, areas, and ecosystem functions inform restoration priorities. Indigenous Knowledge will be considered alongside western scientific knowledge and other information.

ENGAGEMENT AND ALIGNMENT WITH PROVINCES AND TERRITORIES

The conservation and protection of fish and fish habitat is a shared responsibility among federal, provincial, and territorial governments. Restoration priorities should be aligned across governments, reflecting best available information. DFO will engage provinces and territories in the prioritization process, including consideration of provincial and territorial fisheries management objectives, watershed management plans, and other strategic initiatives led by provinces or territories relating to aquatic restoration.

⁸ Fisheries and Oceans Canada, 2019. DFO-Coast Guard Reconciliation Strategy. Evergreen guidance document. Online: <https://www.dfo-mpo.gc.ca/fisheries-peches/aboriginal-autochtones/reconciliation-eng.html>

APPENDIX 1.

CONSIDERATIONS FOR SELECTING FISH HABITAT RESTORATION PRIORITIES

Table 1 lists factors to consider when identifying restoration priorities. Restoration priorities selection is context-specific and depends on restoration goals. The considerations outlined below can aid in the identification of important areas and future identification of restoration opportunities. Note that some considerations may be difficult to assess because of information gaps.

Table 1. Considerations when selecting regional restoration priorities (not ranked or exhaustive).

RESTORATION GOAL	EXAMPLE
Biological and ecological considerations	
Improves conditions for aquatic species at risk	<ul style="list-style-type: none"> Improves habitat of species at risk Improves habitat where restoration is identified as a need in species at risk recovery documents
Addresses threat of aquatic invasive species	<ul style="list-style-type: none"> Removes or suppresses aquatic invasive species Restores degraded areas to improve natural resilience
Improves biodiversity	<ul style="list-style-type: none"> Improves degraded habitat in biodiversity hot spots, or areas that previously supported high biodiversity
Improves conditions in regionally important areas	<ul style="list-style-type: none"> Improves habitat in or adjacent to an existing or planned protected or conserved area Improves habitat in or adjacent to a unique, sensitive, and/or highly productive, or culturally significant area
Improves ecosystem functions	<ul style="list-style-type: none"> Improves connectivity (e.g., barrier removal) Improves climate change resilience (e.g., carbon storage, climate-induced stress mitigation) Improves natural processes (e.g., hydrodynamics and morphology) Repairs, reinstates or rebuilds degraded or impaired habitats Restores historic connectivity of a waterway for fish passage
Benefits regionally important species	<ul style="list-style-type: none"> Improves outcomes for species identified as important in a particular region Targets depleted or declining fish stocks



RESTORATION GOAL	EXAMPLE
Indigenous perspectives, rights and reconciliation	
Targets species supporting an Indigenous fishery	<ul style="list-style-type: none"> • Targets an established or planned Indigenous fishery
Priority identified by Indigenous Peoples	<ul style="list-style-type: none"> • Identified as a priority by Indigenous Peoples • Restores species and/or places of cultural significance identified by Indigenous Peoples
Targets culturally important species	<ul style="list-style-type: none"> • Improves conditions for a species of cultural significance for Indigenous Peoples
Partnerships and planning	
Provides opportunities for partnership	<ul style="list-style-type: none"> • Collaborates with organizations and/or local communities engaged in restoration and/or who have capacity for monitoring
Aligns with criteria or goals in plans or strategies	<ul style="list-style-type: none"> • Identified in watershed management plans or conservation objectives • Identified as a priority in restoration programs • Restores degraded habitat to support fisheries management objectives or stock rebuilding plans
Feasibility	<ul style="list-style-type: none"> • Is biologically and technically feasible (e.g., restoration site is accessible) • Has documented efficacy and predictable outcomes
Socioeconomic considerations	
Improves conditions for a commercial fishery	<ul style="list-style-type: none"> • Identified in fisheries management plans/objectives
Improves conditions in a recreational fishery	<ul style="list-style-type: none"> • Identified in fisheries management plans/objectives
Enhances tourism opportunities in the local community	<ul style="list-style-type: none"> • Promotes ecotourism through healthy, productive ecosystems

