Fisheries and Oceans Canada
Pêches et Océans Canada

PRACTITIONERS GUIDE

TO THE RISK MANAGEMENT FRAMEWORK FOR DFO HABITAT MANAGEMENT STAFF

VERSION 1.0

HABITAT MANAGEMENT PROGRAM

FISHERIES AND OCEANS CANADA

Canada

The intent of this Practitioners Guide is to provide guidance to Fisheries and Oceans Canada (DFO) Habitat Management Program (HMP) staff. This Guide is part of a series of Practitioners Guides that support the Habitat Management Program in making transparent and consistent decisions during the regulatory review of works or undertakings that affect fish and fish habitat across Canada. These Guides are intended for internal use by HMP staff.

Cette publication est également disponible en français.

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1.0 PREFACE

This document provides broad guidance to Habitat Management practitioners (Practitioners) within the Habitat Management Program (HMP) of Fisheries and Oceans Canada on applying a risk management approach to decision-making under the habitat protection provisions of the *Fisheries Act*.

The Risk Management Framework is a structured approach to decision-making using a common set of tools. Some of these tools are new, such as the Pathways of Effects, and will require further refinement as they are tested and evaluated by Practitioners. Other elements, such as regional habitat classification schemes which identify fish and fish habitat sensitivities, have been in existence for some time in different regions of Canada. Regional examples are referred to throughout the document to encourage information-sharing and the application of successful approaches across regions.

The application of a risk-based approach supports a strategic shift in management efforts so more energy can be directed towards such things as monitoring and integrated resource planning. It is essential that habitat protection is linked closely with meeting fisheries management objectives in the areas where development is proposed. This will require close collaboration with provincial, territorial and aboriginal fisheries managers to ensure these objectives are met. It also identifies the need to establish such objectives where they do not currently exist.

The information contained in this document was collected and presented during extensive consultations with Practitioners and external stakeholders across Canada throughout 2004 and 2005. As the tools that make up the Risk Management Framework evolve, continued consultation and open communication will be crucial to ensuring the effectiveness of the framework. We invite your feedback: please refer any comments on this and other guides to *your regional representative on the national Habitat Protection and Sustainable Development Sub-Committee*.

2.0 INTRODUCTION

2.1 Background

The long-term productivity of Canada's fisheries depends on wise management, not only of fish populations, but of fish habitats - areas of fresh and marine waters that fish need to reproduce, live and grow. More specifically, healthy and productive fish habitats require: a sufficient amount of clean water; an adequate supply of food; adequate structure and cover to avoid predation; rearing grounds and nursery areas for larval and juvenile fish; and clear migration routes so that adult fish can reach spawning areas to reproduce. Wise management of fish and fish habitat also involves maintaining natural ecological functions and processes.

Fish and fish habitats can be adversely affected by a range of activities

that occur in or near water. These can result in changes that can harm fish and their habitat in ways that are both obvious and subtle; the results can have profound effects on the productive capacity of fish habitat.

In the past, the Habitat Management Program (HMP) has focused its efforts on reviewing development proposals forwarded to the department (commonly known as referrals) on a case-by-case basis. The emphasis on responding to referrals resulted in Practitioners being reactive and unable to focus sufficient attention to other elements of the HMP, such as integrated resource planning, guideline development, monitoring compliance with mitigation measures and evaluating the effectiveness of[1] habitat compensation arrangements.

As a result, the HMP is refocusing its efforts in order to improve the overall effectiveness of the program. The Environmental Process Modernization Plan (EPMP) is a multiyear continuous improvement plan for the HMP. The Risk Management Framework is one element the EPMP [See text box].

Elements of the *Environmental Process Modernization Plan* (EPMP) (2005):

- **Risk Management Framework** - a framework to categorize risks to fish and fish habitat associated with development proposals, to communicate these risks to proponents and to identify appropriate management options to reduce risks to acceptable levels.
- **Streamlining the referral process** - improved administrative efficiency and communication with proponents on means to avoid harming fish habitat.
- **Predictability and coherence** - improved predictability and coherence in decision-making, to achieve administrative fairness and program credibility through the development of national operating policies, training and governance measures.
- **Major projects and *environmental assessments*** - evolution of a new process for reviewing major projects to increase consistency in the application of the *Canadian Environmental Assessment Act* and other federal environmental legislation.
- **Partnerships** - enhanced emphasis on partnering arrangements with provinces, territories, industry, Aboriginal groups, non-governmental organizations, municipalities and others.
- ***Habitat Compliance Modernization*** - strengthened capacity to promote compliance with the habitat provisions of the *Fisheries Act*. Increased emphasis on education, training and stewardship, monitoring for compliance and auditing effectiveness.

[1] Policy for the Management of Fish Habitat (1986) - Privy Council Office (Canada). 2003. A Framework for the Application of Precaution in Science-based Decision Making about Risk. Privy Council Office (Canada), Ottawa. 13 p.

2.2 Purpose

The purpose of this document is to provide guidance to Habitat Management practitioners (Practitioners) within the Habitat Management Program in applying a risk management approach to decision-making under the habitat protection provisions of the *Fisheries Act*. For the purposes of this framework, risk is a term used to represent the expected impact of a development proposal on the productive capacity of fish habitat.

The Risk Management Framework is intended to provide a structured approach to decision-making that takes into account the concepts of risk, uncertainty and precaution. Practitioners can use this approach to:

- analyze development proposals and apply mitigation to minimize residual effects;
- assess residual effects and characterize the risk they pose to fish and fish habitat;
- use the risk characterization process to support management deci sions; and
- communicate the rationale for their decisions.

The framework provides a foundation for discussions with proponents and partners. By outlining the decision-making process and the potential outcomes of the department's review, the goal is to have higher quality development proposals submitted to the department that address the habitat requirements of fish and ultimately lead to a more effective and efficient review process. For those routine development proposals where the effects are well understood and readily mitigable using standard measures, the framework also supports the development of streamlining tools such as Operational Statements or standardized advice on approved work practices.

Risk management is not a new concept to the HMP. Practitioners routinely take into consideration such things as the sensitivity of fish and fish habitats and the effectiveness of mitigation measures, when determining the significance of impacts on fish and fish habitat. The framework described in this document formalizes the steps involved and provides a more transparent structure for communicating how decisions are made.

2.3 Legal and Policy Context

The habitat protection provisions of the *Fisheries Act* form the regulatory context in which Practitioners review development proposals. Section 35(1), which prohibits the "harmful alteration, disruption or destruction of fish habitat", tends to have the broadest application; however, the concepts contained in this guide can also be applied to decision-making under other habitat protection provisions of the *Fisheries Act* as well. Other relevant issues addressed by the habitat protection provisions include: fish passage around obstructions (Section 20), flow requirements below obstructions (Section 22), screening of intakes (Section 30) and killing of fish by means other than fishing (Section 32).

Additional guidance should be sought on applying other legislation and/or regulatory requirements, such as the *Canadian Environmental Assessment Act* (CEAA) and the *Species at Risk Act* (SARA).

3.0 RISK MANAGEMENT FRAMEWORK

The Risk Management Framework is made up of three components which include Aquatic Effects Assessment (Section 3.1) Risk Assessment (Section 3.2) and Risk Management (Section 3.3). These components can be represented as a series of discreet steps embedded into the overall process applied by Practitioners to review development proposals (see Figure 1). An overarching principle which applies to all components of the Risk Management Framework is **risk communication**. Effective communication enables proponents and other stakeholders to understand the potential risks development activities pose to fish and fish habitat and the methods to avoid or minimize the risk to acceptable levels.

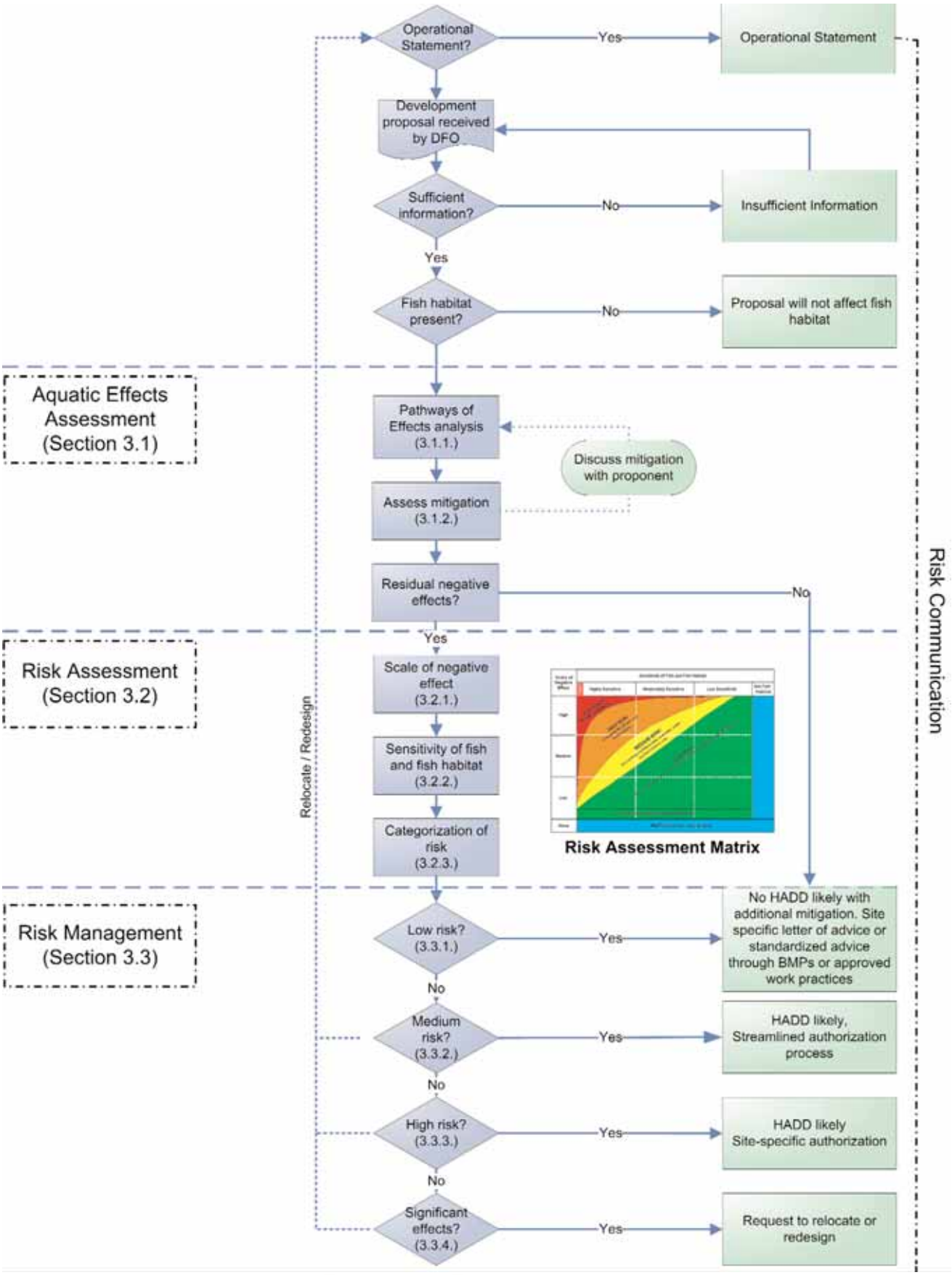
The initial steps to be considered before the Risk Management Framework can be applied include:

- **Operational Statement**: Operational Statements define specific criteria and mitigation measures required to ensure development proposals can proceed without resulting in the harmful alteration, disruption or destruction (HADD) of fish habitat. Where necessary, Operational Statements have been regionalized to account for local environmental conditions and regulatory requirements. Where an Operational Statement can be applied, no further assessment is required.

- **Sufficient Information:** There must be sufficient information to understand the nature of the development proposal in order to determine whether the habitat protection provisions of the *Fisheries Act* apply. Identification of information gaps early in the design and planning stages helps to ensure appropriate studies are conducted that ultimately support a well informed decision.

- **Fish Habitat Present:** Under the *Fisheries Act*, "fish" includes parts of fish, shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals. The *Fisheries Act* defines 'fish habitat' as spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes. If there is no fish habitat present within the area of the develop proposal then no assessment is required.

Figure 1: Applying the Risk Management Framework to Decision-making under the Habitat Protection Provisions of the *Fisheries Act*



Although the PoE diagrams may appear complex at first glance, they are actually quite simple to use, and by selecting the appropriate activities for a given development proposal they offer a clear picture of the overall potential effects of the proposed development on fish and fish habitat. It is important to note that the pathways are highly generalized and require Practitioners to apply expert judgment in determining with pathways apply in the geographic location of the proposed development activity. The purpose of the pathways is to enable Practitioners to have a common reference tool to explain to proponents which aquatic effects are of specific concern [see text box above].

3.1.1 Identify Relevant Activities (PoEs)

A proposed development may involve one or more of the activities shown in Table 1. Typically, the more complex the proposal, the more activities (and hence PoEs) are involved.

Example
Table 2 offers a few examples of how various stream crossing projects can be described by breaking them into their respective activities.

Table 2: Potential Pathways of Effects (PoEs) for Three Stream Crossing Proposals

Proposed Development	Potential Pathways of Effect	
	In- water	Land-based
1. New stream crossing involving excavation of the channel for installation of the structure	Industrial Equipment Placement of Material Flow Management Fish Passage Water Extraction Structure Removal Explosives Dredging Debris Management Wastewater	Vegetation Clearing Excavation Industrial Equipment Riparian Planting Grading Explosives
2. New open-bottom stream crossing with no excavation of the channel and footings placed outside the natural channel width	Debris management	Vegetation Clearing Excavation Industrial Equipment Riparian Planting Grading Explosives
3. Replacement of bridge decking	Debris management	Industrial Equipment Cleaning or Maintenance (of bridges or other structures)

3.1.2 Assess Mitigation Measures

It is the proponent's responsibility to develop a mitigation plan and to demonstrate how the plan addresses potential effects on fish and fish habitat. Proponents can use the PoE diagrams to determine for themselves where mitigation is required, or conversely to summarize what residual effects are likely to result from the proposed development. In many instances, the Practitioner need only review the information to confirm its accuracy. PoE diagrams offer an effective way of itemizing potential stressors to ensure none are overlooked. This step in the process often requires interaction between the Practitioner and the proponent to clarify aspects of the proposed development or to offer advice on additional or alternative mitigation measures that may not have been considered.

Figure 2 shows the PoE diagram that has been developed for Vegetation Clearing.

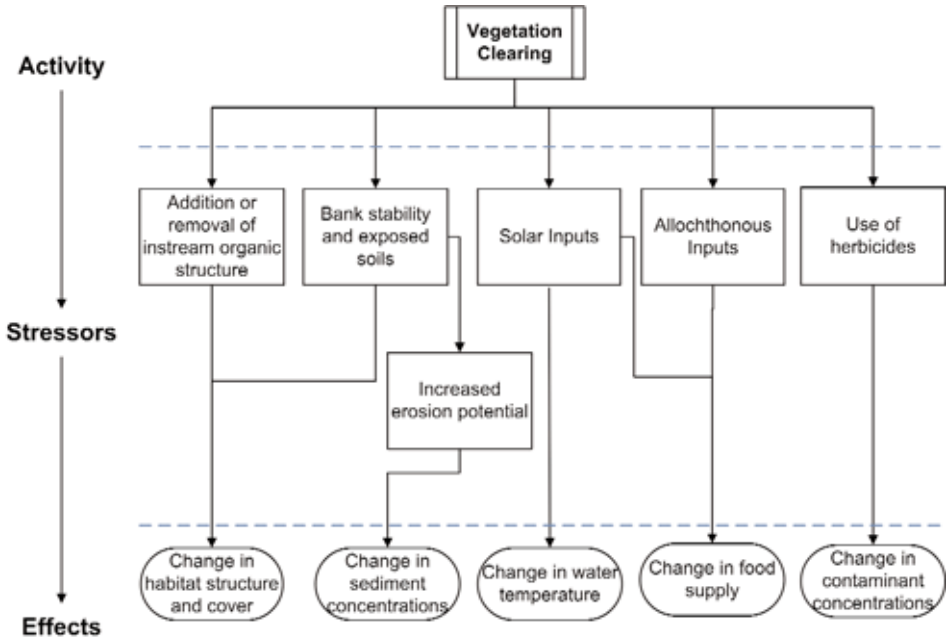


Figure 2: Pathway of Effects Diagram for Vegetation Clearing

Example

Additional information is provided to allow for a PoE analysis to be conducted for one of the examples presented in Table 2.

New open-bottom stream crossing with no excavation of the channel and footings placed outside the natural channel width

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-The crossing structure will measure 15 metres in length
-The development will involve the clearing of trees and shrubs on both sides of the stream channel for a distance of 20 metres upstream and downstream of the proposed crossing

- Larger trees are to be cut by hand.
- A bulldozer will clear remaining stumps and shrubs.
- Trees attached to the streambank will be cut, but no in-water structures will be removed unless found within the footprint of the new culvert.

-Silt fences to be installed along the edges of the watercourse.
-Stream banks to be stabilized with rock rip rap.
-Work to take place in the summer and expected to take 3 weeks to complete.

Using the PoE for Vegetation Clearing, a list of stressors and mitigation measures was developed (Table 3).

Table 3: Example of a Proponent's Mitigation Plan for Vegetation Clearing Adjacent to a Water Body

Stressor		Cause and Effect Relationship	Mitigation Measures	Residual Effects
Use of Herbicides		The introduction of contaminants into the environment may lead to a variety of effects on fish and other aquatic organisms.	Herbicides not required for this project.	None
Addition or Removal of instream organic Structure		Removal of woody material from the stream channel may result in loss of cover/structure.	Trees attached to bank will be cut, but no in-water structures to be removed unless found within the footprint of the new culvert.	Possible removal of instream woody material within the areas occupied by the water crossing structure (15 meters).
Solar Inputs		The alteration of riparian vegetation may result in the loss of shade.	No mitigation measures proposed.	Potential increase in solar inputs for 40 meters of stream channel. Will be partially offset as new vegetative growth re-colonizes.
Bank Stability and exposed soils		Loss of vegetation can lead to bank instability and exposed soils.	No Mitigation measures proposed.	Soils will be exposed within those areas cleared of vegetation - follow pathway to next level.
Bank Stability and exposed soils	Increased Erosion Potential	Exposed soils can lead to erosion and sediment entering the water. Loss of root material could lead to bank slumping.	Silt fence installed along water course. Application of rock rip-rap on banks.	No change in erosion potential.
Bank Stability and exposed soils	Change in Habitat Cover and Structure	Removal of undercut banks and overhanging woody material used as cover/structure for fish.	Rock rip rap may provide some function as cover/structure.	Change in stream bank composition from vegetation to rock rip rap along 40 meters of stream channel.
Allocthanous Inputs		Potential reduction in allocthanous inputs such as leaf matter and terrestrial insects.	No mitigation measures proposed, although effect will be partially offset as native vegetation (grasses/shrubs) re-colonizes.	Loss in allocthanous inputs within those areas affected by streamside vegetative clearing. Will be partially offset as new vegetative growth re-colonizes.

Based on the analysis presented in Table 3, the potential residual effects could be reported as follows:

- Removal of instream woody material, streambank vegetation and allochthanous inputs within the footprint of the new culvert. (i.e. 15 meters).
- Potential increase in solar inputs and loss of allochthanous inputs along 40 meters of stream. This will be partially offset as vegetation re-colonizes.
- Change in streambank composition from vegetation to rock rip rap along 40 metres of stream.

Additional mitigation measures can reduce the residual effects even further:

- The re-colonization of vegetation could be expedited through seeding or planting of shrubs.
- Solar inputs could be reduced by retaining vegetation on the shade producing side of the stream.
- The impact to streambank vegetation could be reduced by limiting the amount of rip rap, or preventing vegetation removal at the waters edge.

It is important to recognize that all residual effects are not necessarily negative. In this example, increased solar radiation could increase primary production.

While this example looked at the activity of vegetation clearing, a complete assessment would be required for all the activities identified in Table 2.

The analysis of potential residual effects is an important step in the assessment of a development proposal, but it is not until the residual effects are put into context (Section 3.2) that a level of risk can be determined.

Sources of uncertainty [1]

There is always some level of uncertainty associated with predicting the residual effects that may result from a proposed development. Uncertainty can arise due to a lack of information, or in predicting the effectiveness of new or innovative mitigation measures. In addition, there may be synergistic effects whereby two or more effects in combination express an effect greater than they would have been expressed individually. These are difficult to identify and hence have the potential of being overlooked or underestimated.

The application of the precautionary principle within the federal government is described in detail in the document entitled *A Framework for the Application of Precaution in Science-based Decision Making about Risk* .[2]

1 Uncertainty relative to this Risk Management Framework should not be considered to be the same as the term "uncertain" used under Section 20 of the *Canadian Environmental Assessment Act* (CEAA). Uncertainty under CEAA relates to uncertainty surrounding the determination of the significance of adverse environmental effects, after the consideration of appropriate mitigation measures. Uncertainty under this Risk Management Framework is considered more broadly.

2 Privy Council Office (Canada). 2003. A Framework for the Application of Precaution in Science-based Decision Making about Risk. Privy Council Office (Canada), Ottawa. 13 p.

The application of the precautionary principle is widely accepted and applied within the federal government. Emphasis is placed on providing a sound and credible case that a risk exists, hence the need to refer to the Pathways of Effect as a source of information on the type of effects that commonly occur as a result of a development activity.

Acknowledging uncertainty does not preclude making sound management decisions, the uncertainty simply needs to be described and taken into consideration at the risk assessment stage.

3.2 Risk Assessment

Risk Assessment is the process used by Practitioners to determine the level of risk that residual effects pose to fish and fish habitat. To assess risk, one must consider the outcome of the aquatic effects assessment (i.e. the **Scale of Negative Effect**) in the context of the fish and fish habitat being effected (i.e. the **Sensitivity of Fish and Fish Habitat**). The Risk Assessment Matrix incorporates these two factors in order to characterize the level of risk the development proposal poses to the productive capacity of fish habitat. The rationale used to locate the residual effects on the matrix forms the basis for decision-making.

3.2.1 Determine Scale of Negative Effect

Attributes are used to scale residual effects on the y-axis of the risk assessment matrix. General qualifiers used to describe the attributes are described in Table 4.

Table 4: Attributes used to describe the scale of negative effects

Attribute	Description	Examples of scales used qualify the attributes (in increasing order)
1. Extent	Refers to the direct "footprint" of the development proposal, as well as areas indirectly affected, such as downstream or down-current areas.	Site or segment - localized effect Channel reach or lake region Entire watershed or lake
2. Duration	The amount of time that a residual effect will persist.	Short term (days) Medium term (weeks-months) Long term (multiple years - permanent)
3. Intensity	The expected amount of change from the baseline condition. Intensity is a way of describing the degree of change, such as changes in water temperature, salinity, flow, suspended sediment etc. The timing of works may have a major influence on intensity. Effects such as sediment release occurring during critical spawning periods will have a higher intensity.	Habitat still suitable but not as productive Habitat quality significantly reduced Habitat quality unusable

Example
Attributes can be used to describe the vegetation clearing example developed in Section 3.1.2.

Extent:	40 metres of stream channel affected by increased solar inputs. 55 metres of stream channel affected by reduced input of allocthanous materials, and change in cover/structure.
Duration:	Reduction in allochthanous inputs and increased solar inputs to be reduced as natural vegetation re-establishes. Change in cover/structure due to placement of culvert and application of rock rip rap to persist indefinitely.
Intensity:	The degree of change in solar and allocthanous inputs is unknown, lending to some degree of uncertainty in the prediction of Scale of Negative Effect.

Assuming there are no residual effects resulting from the other activities, this development proposal would generally be ranked Low on the Scale of Negative Effect. This decision is based on the fact that the footings will be located out of the wetted channel and that best management practices will be applied to avoid instream disturbance.

It is possible to use other attributes as well to describe effects. The purpose of this step is to identify the residual effects and to rank them on the y-axis of the risk assessment matrix.

3.2.2 Determine Sensitivity of Fish and Fish Habitat

The Sensitivity of Fish and Fish Habitat is represented by the x-axis of the Risk Assessment Matrix. Where available, regional fish and fish habitat classification systems may be used for the purposes of defining the x-axis of the risk assessment matrix. Of even greater value are watershed management plans that take fisheries management objectives into consideration and that integrate fish and fish habitat sensitivities into the plan. Where such plans are not available, additional information is required to determine the sensitivity of fish and fish habitat.

General qualifiers used to describe fish and fish habitat attributes are summarized in Table 5.

Table 5: Sensitivity of Fish and Fish Habitat

Attribute	Description	Scales for qualifying the attributes in freshwater ecosystems. These are ordered from low sensitivity to high sensitivity for each attribute.
1. Species Sensitivity	Sensitivity of species to changes in environmental conditions, such as suspended sediments, water temperature or salinity.	Species present are resilient to change and perturbation (e.g. many cyprinid species) Species present are moderately resilient to change and perturbation (e.g. pike, walleye and some cyprinids) Species present are highly sensitive to perturbations (e.g. many salmonidae)
2. Species' Dependence on Habitat	Use of habitat by fish species. Some species may be able to spawn in a wide range of habitats, while others may have very specific habitat requirements.	No use by fish Used as migratory corridor only; feeding, rearing Spawning habitat; habitat critical to survival of species
3. Rarity	The relative strength of a fish population or prevalence of a particular type of habitat.	Habitat/species is prevalent Habitat/Species is has limited distribution confined to small areas Habitat/Species is rare e.g. Listed species under SARA.
4. Habitat Resiliency	Habitat resiliency refers to the ability of an aquatic ecosystem to recover from changes in environment conditions. The flow and thermal regimes of the system as well as its physical characteristics are important considerations in describing freshwater ecosystems.	**Thermal regime** Thermal regime unsuitable for any fish species. Warm water thermal regime suitable for cyprinids. Cool water systems; coldwater systems that can buffer temperature changes Cold water systems that cannot easily buffer temperature changes. **Physical characteristics** System is stable and resilient to change and perturbation System is unstable and resilient to change and perturbation **Flow regime** Ephemeral - systems contain water only for short period after rain event Intermittent - system contains water periodically Permanent - system contains water year round

A red box labeled "Rare" located at the most highly sensitive end of the axis is meant to represent fish and fish habitats that are particularly rare and/or afforded special protection under the *Species at Risk Act* (SARA). The least sensitive extreme represents areas that are not considered fish habitat.

Example
Table 4 makes uses the above attributes for Sensitivity of Fish and Fish Habitat to develop two scenarios which are referred to in Section 3.2.3.

Table 6: Using Attributes to Describe Sensitivity of Fish and Fish Habitat

	Scenario A	Scenario B
Species Present	Cyrpinids and centrachids. Spring migration of northern pike and central mudminnow.	Migratory runs of atlantic salmon. Sea-run and resident populations of brook trout.
Habitat Resiliency	Area classified as a warmwater stream.	Area classified as a coldwater stream. Watershed plan identifies groundwater upwelling in the area; only two such sites found within the entire watershed.
Species' Dependence on Habitat	Habitat used to fulfill various life requirements of species present.	Brook trout require upwelling areas to spawn. Nearshore vegetation used as cover for juvenile salmon and trout.
Rarity	No rare species or habitat identified or expected.	While the fish species are considered abundant in the watershed, the upwelling area could be limiting to production and therefore could be classified as rare.

Regional fisheries management objectives may have a profound influence over the ranking of different species and their habitats. In this hypothetical example Scenario A is ranked as Low Sensitivity while Scenario B is ranked as Highly Sensitive, due in large part to the presence of limited spawning habitat.

3.2.3 Categorize Risk (Using Risk Assessment Matrix)

Categorizing risk involves using the analysis which was done for determining the Scale of Negative Effect (Section 3.2.1) and the Sensitivity of Fish and Fish Habitat (Section 3.2.2) to plot a point on the Risk Assessment Matrix. The Risk Assessment Matrix is divided into four categories of risk: Low Risk, Medium Risk, High Risk and Significant Negative Effects (Figure 3).

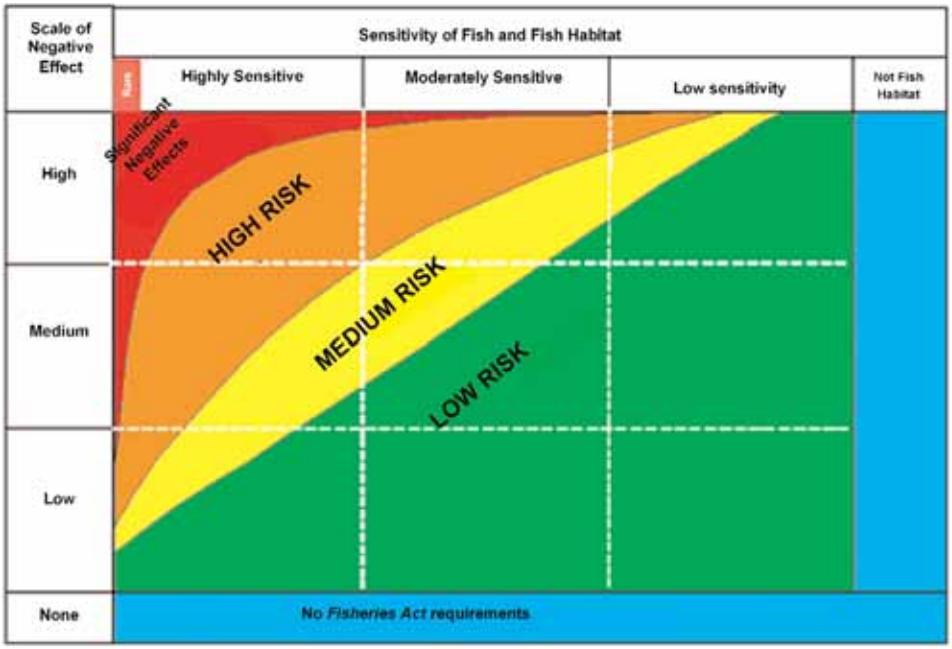


Figure 3: Risk Assessment Matrix Used to Illustrate Various Categories of Risk

Sources of Uncertainty

It is important again to acknowledge the various sources of uncertainty that may be associated with predicting both the Scale of Negative Effect and the Sensitivity of Fish and Fish Habitat. Figure 4 shows how uncertainty could be illustrated on the Risk Assessment Matrix and how it might alter management decisions. Scenario A is represented as a tight circle to illustrate a relatively low level of uncertainty associated with both the Scale of Negative Effect and the Sensitivity of Fish and Fish Habitat. Despite some uncertainty, it does not influence the risk ranking or the resulting management decision. Scenario B represents the same development proposal located in Highly Sensitive habitat. With the limited information provided in Table 2 there was a high level of uncertainty predicting the Scale of Negative Effect. This uncertainty is represented as an oval which overlaps several risk categories. The level of uncertainty was reduced through additional information relating to the development proposal and the mitigation being proposed.

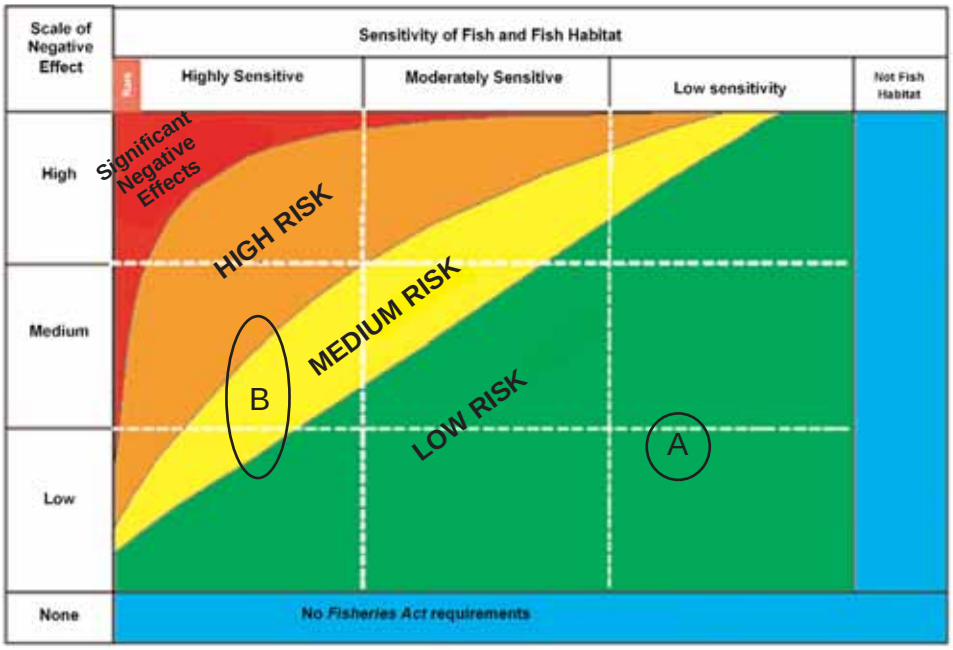


Figure 4: Risk Assessment Matrix Used to Illustrate Uncertainty
A. Low Risk project with little uncertainty associated with the risk assessment.
B. A high degree of uncertainty associated with predicting Scale of Negative Effect has led to an overlap of risk categories.

3.3 Risk Management

Once the risk to fish and fish habitat has been characterized, Practitioners can use the results to support and guide their decision on how to best manage the risk. The Risk Assessment Matrix provides an effective means through which to communicate those decisions to proponents and other stakeholders. The proponent always retains the option of considering additional mitigation measures including relocation and redesign as means of lowering the risk ranking (Figure 5). Figure 5 also describes the risk categories in terms of common management tools which Practitioners generally use to address the various levels of risk. The two most common risk management tools are: 1) letters advising proponents of their obligations to protect fish habitat and the means to do so, and 2) *Fisheries Act* authorizations[1], which also include conditions for monitoring, compensation and possibly even financial security. These conditions are generally commensurate with the level of risk associated with the proposed development.

[1]The potential issuance of an authorization under certain provisions of the Fisheries Act may require that an environmental assessement be conducted under the Canadian Environmental assessement Act (CEAA or other Federal environmental assessment regime. HMP Practitioners should ensure that federal environmental assessment responsibilities are met before proceeding with the potential issuance of any such authorization.

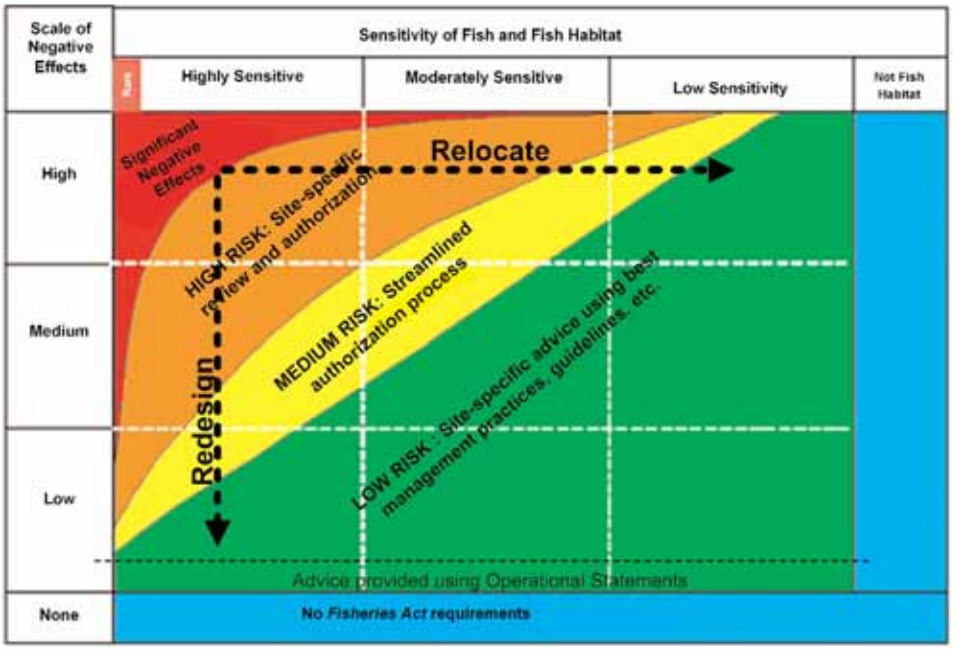


Figure 5: Risk Assessment Matrix showing Common Management Tools and the Concepts of Relocation and Redesign

3.3.1 Low Risk

Development proposals that are characterized as Low Risk are not likely to result in HADD, providing appropriate mitigation measures are applied. An appropriate management option in this case would be to issue a 'No HADD Likely as Proposed' letter (*see Practitioners Guide for Writing Letters Used in Fisheries Act Reviews for DFO Habitat Management Staff*). Letters should include a list of those mitigation measures that formed the basis of the decision, or direct proponents to the appropriate guidelines, or best management practices where applicable.

Development proposals where the effects are well understood and readily mitigable using standard measures, fit into this category. These are ideal candidates for developing streamlining tools such as Operational Statements or standardized advice on approved work practices.

Example

This would be an appropriate response for Scenario A as it was developed throughout this guide. The response letter would include:

- Confirmation of details of the work as described in the plans,
- Restating the proposed mitigation measures such as the sediment and erosion control plan,
- The inclusion of other relevant conditions, such as timing the work to avoid interference with the migration or spawning of resident fish.

Habitat Protection Guidelines

Numerous habitat protection guidelines exist across the country which provide valuable information to proponents on design and mitigation options to avoid potential negative effects on fish and fish habitat. However, when referring proponents to guidelines, Habitat Management practitioners must specify clearly which designs or mitigation measures are required for activities to be in compliance with subsection 35(1) of the *Fisheries Act*. Without this clarity, proponents may be unsure which parts of the guideline specifically relate to their development proposal.

3.3.2 Medium Risk

Development proposals characterized as Medium Risk are likely to result in HADD, and a *Fisheries Act* authorization will be required. The purpose of the Medium Risk category is to recognize that some activities result in HADDs that are small-scale and/or temporary in duration, and have predictable outcomes with a low level of uncertainty surrounding potential negative effects. These works are usually routine in nature, which lends itself to the application of a streamlined authorization process. An example of a streamlined authorization process is the Class Authorization developed in Ontario for agricultural drain maintenance and in the Yukon for placer mining. Template authorizations that contain standardised conditions may also be used here.

3.3.3 High Risk

Proposed developments that are High Risk will result in HADD over a long period of time and/or a broad geographic extent, and/or will take place in areas ranked high on the Sensitivity of Fish and Fish Habitat scale. Such development proposals will require a site-specific review and authorization under subsection 35(2) of the *Fisheries Act*. Within these authorizations, conditions concerning mitigation measures, compensation, monitoring, and financial securities should be commensurate with the level of impact associated with the project. For more information on conditions concerning financial security, including letters of credit and habitat compensation, refer to the Practitioners Guide to Habitat

4.0 APPENDICES

Appendix A: Definitions

Activity: Within the context of the Pathways of Effects diagrams, activities represent the component parts, or building blocks of development proposals.

Attribute: Specific, often measurable criteria or characteristics. In the context of Risk Assessment, attributes offer a systematic and consistent way of describing variables such as Scale of Negative Effect and Sensitivity of Fish and Fish Habitat.

Contingency Planning: Management planning utilizing alternative methods or strategies that enable the project to continue if known potential effects increase the risk of the project beyond that which was originally estimated.

Destruction: Any permanent change of fish habitat that renders it completely unsuitable for future production of fish, regardless of the means employed in causing the change (e.g. by removal, infilling, blockage etc).

Development Proposal(s): A description of an activity or activities related to a proposed development.

Disruption: Any change to fish habitat occurring for a limited period that reduces its capacity to support one or more life processes of fish.

Effect: A change brought about by a cause or agent. In the context of the Pathways of Effects diagrams, effects reflect a change in fish and fish habitat which has the potential to influence the productive capacity of fish habitat.

Environmental Process Modernization Plan (EPMP): Consistent with the Government of Canada's Smart Regulation agenda, Fisheries and Oceans Canada (DFO) is renewing its Habitat Management Program through its Environmental Process Modernization Plan. This Plan, approved by the Minister in February 2004, is among the top priorities of DFO and is part of a broader effort to ensure DFO programs reflect the current priorities of Canadians.

Habitat Compensation: The replacement of natural habitat, increase in the productivity of existing habitat, or maintenance of fish production by artificial means in circumstances dictated by social and economic conditions, where mitigation techniques and other measures are not adequate to maintain habitats for Canada's fisheries resources.

Harmful Alteration: Any change to fish habitat that reduces its long term capacity to support one or more life processes of fish but does not permanently eliminate the habitat.

Harmful Alteration, Disruption or Destruction of Fish Habitat (HADD): Any change in fish habitat that reduces its capacity to support one or more life processes of fish.

Integrated Resource Planning: The process whereby federal, provincial, territorial and municipal resource management agencies consult each other and private sector interests to plan for the future use of natural resources including forests, minerals, fish, land, water, wildlife and other resources.

Mitigation: Actions taken during the planning, design, construction and operation of works and undertakings to alleviate potential adverse effects on the productive capacity of fish habitat.

Operational Statement: Documents developed by DFO for proponents that provide nationally consistent advice on standard measures to apply to
selected activities that are low risk to fish habitat.

Pathway: A line on a Pathways of Effects diagram used to represent a cause and effect relationship existing between activities, stressors and effects.

Pathways of Effects: Diagrams that describe development proposals in terms of the activities that are involved, the type of cause-effect relationship that are known to exist for that activity, and the mechanisms by which stressors ultimately lead to effects in the aquatic environment.

Precautionary Principle: Also referred to as the precautionary approach, recognizes that the absence of full scientific certainty shall not be used as a reason for postponing decisions where there is a risk of serious or irreversible harm.

Productive Capacity: The maximum natural capability of habitats to produce healthy fish, safe for human consumption, or to support or produce aquatic organisms upon which fish depend.

Proponent: A person, company or corporation that has submitted, or plans to submit, a development proposal.

Review Process: The process followed by Habitat Management practitioners to ensure proposed developments are in compliance with the habitat
protection provisions of the Fisheries Act.

Risk: For the purposes of this framework, risk is a term used to represent the expected impact of a development proposal on the productive capacity of fish habitat.

Risk Assessment: The process of identifying, measuring and predicting the likelihood of an unwanted event from occurring. Risk Assessment takes into account the probability of the event occurring, the consequences of the event, and the degree of uncertainty involved.

Risk Assessment Matrix: A two dimensional matrix which uses Scale of Negative Effect and Sensitivity of Fish and Fish Habitat to characterize the risk residual effects pose to the productive capacity of fish habitat.

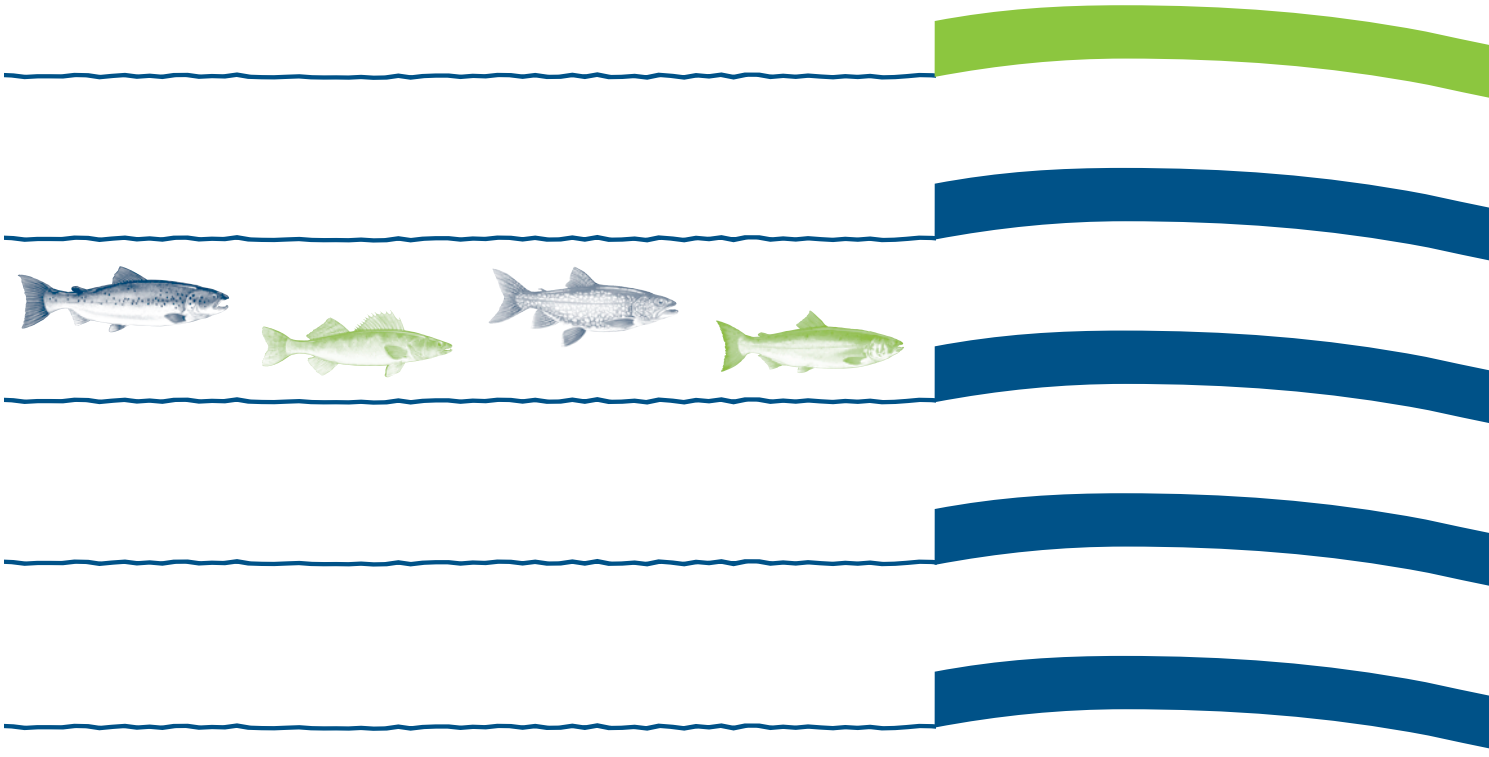
Risk Communication: Transfer or exchange of information for the purpose of explaining risk and the reasons associated with making decisions.

Risk Management: The identification and implementation of management options for addressing unwanted events in order to achieve an overall objective.

Risk Management Framework: A systematic approach to gathering, evaluating, recording and disseminating information leading to recommendations for a position or action in response to an identified event. A framework to enable Habitat Management practitioners and proponents to better
understand the nature of risk, and to manage it more systematically.

Stressors: An agent, condition, or other stimulus that causes stress to an organism.

Uncertainty: The amount that a predicted effect may differ from the true effect.



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