Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the *Fisheries Act*

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Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the Fisheries Act

Politique sur l'application de mesures visant à compenser les effets néfastes sur le poisson et son habitat en vertu de la Loi sur les pêches

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Purpose of this Policy

The 'Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the *Fisheries Act'* (hereafter this Policy) provides guidance on undertaking effective measures to offset death of fish and the harmful alteration, disruption or destruction of fish habitat, consistent with the fish and fish habitat protection provisions of Canada's *Fisheries Act*.

Works, undertakings or activities resulting in the death of fish or the harmful alteration, disruption or destruction of fish habitat are prohibited under the *Fisheries Act* unless otherwise authorized. Before approving works, undertakings or activities that will result in the death of fish and/or the harmful alteration, disruption or destruction of fish habitat, Fisheries and Oceans Canada (the Department), must consider if there are alternatives that avoid adverse effects on fish and fish habitat. If the adverse effects on fish and fish habitat are unavoidable, the Department must consider if there are measures to mitigate that would reduce or minimize those adverse effects. Finally, if there are any residual effects, then the Department must consider measures to offset to counterbalance the death of fish and the harmful alteration, disruption or destruction of fish habitat.

This Policy was prepared by the Department to assist proponents of existing and/or proposed 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 plans.

This Policy is part of a suite of guidance documents prepared by the Department in support of the implementation of the fish and fish habitat protection provisions of the *Fisheries Act*. It builds on the general policy guidance provided in the Fish and Fish Habitat Protection Policy Statement (2019) available on the Department's Projects Near Water website.

This Policy is organized into four parts:

Part 1 provides background information on the fish and fish habitat protection provisions of the *Fisheries Act*;

Part 2 provides an overview of how to apply measures to offset adverse effects on fish and fish habitat to support the conservation and protection of fish and fish habitat, including objectives, guiding principles and types of measures;

Part 3 describes step-by-step procedures for developing an offsetting plan under the *Authorizations Concerning Fish and Fish Habitat Protection Regulations*, including selecting the appropriate measures, determining the geographic extent of measures needed, and ensuring monitoring and reporting; and

Part 4 provides contact information and links for more information on key topics.

Context

Canada's fish and fish habitat are a shared resource that provide social, economic and ecological benefits but they are also limited and vulnerable. They should therefore be conserved and protected to maintain these benefits for present and future generations.

The *Fisheries Act* provides a framework for the conservation and protection of fish and fish habitat. Specifically, the fish and fish habitat protection provisions include:

- a prohibition against works, undertakings or activities resulting in the death of fish, by means other than fishing (subsection 34.4(1));
- a prohibition against works, undertakings or activities resulting in the harmful alteration, disruption or destruction of fish habitat (subsection 35(1));
- factors to consider to guide the Minister's regulatory decision making (subsection 34.1(1)); and
- ministerial powers to ensure free fish passage, sufficient water flows, and to manage or control obstructions for the protection of fish or fish habitat (section 34.3).

When applying these provisions, the Department will be informed by the best available science, technical information and Indigenous knowledge when making decisions; and will also be guided by the application of a precautionary approach[1] and a risk-based approach to decision-making.

Disclaimer

The Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the *Fisheries Act* is not a substitute for the *Fisheries Act* or its Regulations. In the event of an inconsistency between this Policy and the *Fisheries Act* or its Regulations, the legislation will prevail.

Approval Authority, Effective Date and Review Date

The Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the *Fisheries Act* was approved by Fisheries and Oceans Canada and it is in effect as of December 2019. It will be reviewed at least every five years or more frequently, if required.

[1] See the Sustainable Fisheries Framework for the Department's perspective on the precautionary approach.

Part 1: The Fish and Fish Habitat Protection Provisions of the *Fisheries Act*

Prohibition Against Works, Undertakings or Activities Resulting in Death of Fish or Harmful Alteration, Disruption or Destruction of Fish Habitat

The fish and fish habitat protection provisions of the *Fisheries Act* support the effective and efficient conservation and protection of fish and fish habitat. The key provisions include:

> 34.4(1) No person shall carry on any work, undertaking or activity, other than fishing, that results in the death of fish.
>
> 35(1) No person shall carry on any work, undertaking or activity that results in the harmful alteration, disruption or destruction of fish habitat.

Fisheries Act Authorization

Proponents of works, undertakings or activities have an important role to play in the conservation and protection of fish and fish habitat. They are responsible for ensuring compliance with the *Fisheries Act* by ensuring that their works, undertakings or activities do not result in the death of fish or the harmful alteration, destruction or disruption of fish habitat.

When proponents are unable to avoid the death of fish and/or the harmful alteration, disruption or destruction of fish habitat, these adverse effects should be mitigated. If, after considering the application of measures to avoid and mitigate, the proponent's works, undertakings, or activities will result in residual effects on fish or fish habitat, they will need an exception under one of the authorities listed, respectively, in subsections 34.4(2) or 35(2) of the *Fisheries Act* in order for the proposed work, undertaking, or activity to proceed without contravening the *Fisheries Act*.

The information requirements and documentation that proponents must submit in order to apply for an authorization under paragraphs 34.4(2)(b) or 35(2)(b) are set out in the *Authorizations Concerning Fish and Fish Habitat Protection Regulations*[2]. These regulations include a requirement for proponents to submit an offsetting plan with their application (see Part 3 of this Policy).

Under subsection 34.1(1) of the *Fisheries Act*, the Minister of Fisheries, Oceans and the Canadian Coast Guard must take into account several factors in reviewing an application for an authorization prior to issuing it pursuant to paragraphs 34.4(2)(b) and/or 35(2)(b). Part 3 of this Policy outlines how these factors can be used to guide the development of an offsetting plan.

[2] Additional guidance on these regulations may be found in the Applicant's guide in support of *Authorizations Concerning Fish and Fish Habitat Protection Regulations*.

Hierarchy of Measures for the Conservation and Protection of Fish and Fish Habitat

The concepts of "avoid, mitigate and offset" together establish a hierarchy known as the 'hierarchy of measures' that is based on an internationally recognized best practice for reducing risks to biodiversity[3]. This hierarchy of measures emphasizes that efforts should be made to first prevent (measures to avoid) the occurrence of adverse effects. When avoidance is not possible, then efforts should be made to minimize (measures to mitigate) the extent of the death of fish and adverse effects on fish habitat resulting from the proposed work, undertaking, or activity in question. Finally, as a last resort, any residual adverse effects should then be addressed by efforts to counterbalance this loss of fish and fish habitat through positive contributions to the aquatic ecosystems (measures to offset).

A conceptual diagram of the hierarchy measures is provided in Figure 1.

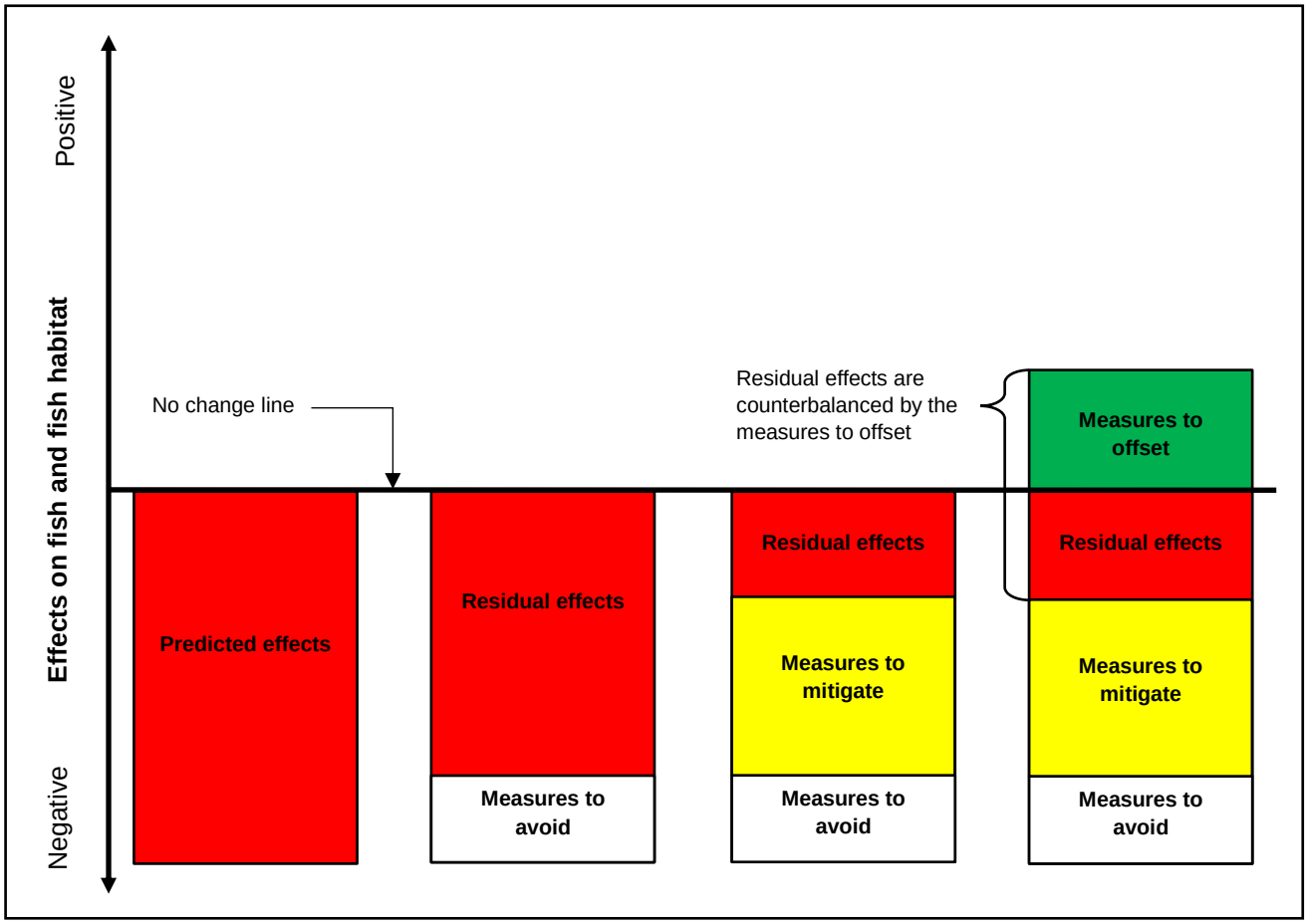

Figure 1. Conceptual diagram of the hierarchy of measures. (**Note:** the size of these boxes is for illustrative purposes only)

[3] References for the hierarchy of measures include: Business and Biodiversity Offsets Programme and the IUCN/ICMM Independent Report on Biodiversity Offsets.

Fish habitat components, their function and attributes, and the fish populations that rely on them (i.e. aquatic ecosystems) are dynamic and complex. It is more difficult, costly and uncertain to restore, enhance, or create, aquatic ecosystems than it is to avoid adverse effects in the first place. For this reason, the Department emphasizes measures to avoid and mitigate as the preferred steps in the hierarchy of measures, followed by measures to offset as a means of last resort.

Proponents are therefore required to demonstrate that measures to first avoid, then mitigate have been fully considered, for all life cycle phases of the works undertakings or activities, before finally contemplating measures to offset any residual effects on fish and fish habitat. Measures to avoid, mitigate and offset, as well as requirements for monitoring and reporting, may be included as conditions of authorization.

The Department interprets these measures as follows:

Measures to Avoid

Measures to avoid are actions taken to prevent adverse effects to fish and fish habitat. Measures to avoid may include but are not limited to:

- carrying on works, undertaking or activities in areas where no harm will occur;
- designing works, undertaking or activities so that no harm occurs; and
- timing certain works, undertaking or activities to prevent interactions with fish at key life stages such as spawning or migration.

Measures to Mitigate

Measures to mitigate are actions taken to reduce the spatial scale, duration, or intensity of adverse effects to fish and fish habitat that cannot be avoided. The best available measures to mitigate should be implemented by proponents while carrying out any work, undertaking or activity.

Measures to mitigate may include but are not limited to:

- carrying on works, undertakings and activities (e.g., physical infrastructure and other physical disturbances) where adverse effects are minimized;
- employing best practices that minimize harm when carrying on works, undertakings or activities;
- undertaking measures to stabilize disturbed sites to minimize ongoing adverse effects; and
- timing certain works, undertakings or activities to minimize interactions with fish and fish habitat.

Measures to Offset

Measures to offset are actions taken to counterbalance the residual effects on fish and fish habitat at a given location, with measurable benefits for fish and fish habitat. These measures may take place where the residual effects will occur or elsewhere. Measures to offset may include but are not limited to:

- restoring degraded fish habitat to improve conditions for the production of fish.
- enhancing fish habitat to improve conditions for the production of fish; and
- creating productive and sustainable fish habitat where none existed before.

Part 2: Measures to Offset for the Protection of Fish and Fish Habitat

The objective of measures to offset is to support the conservation and protection of fish and fish habitat by counterbalancing the residual death of fish and/or harmful alteration, disruption or destruction of fish habitat resulting from carrying on works, undertakings or activities authorized under the *Fisheries Act*.

Guiding Principles

In considering the application of measures to offset, the proponent should select measures that meet the following principles:

Principle 1: Measures to offset should support fisheries management objectives and give priority to the restoration of degraded fish habitat.

Measures to offset should be designed to contribute to the objectives identified in fisheries management plans, where such plans exist. Where such objectives do not exist or where they do not give priority to the restoration of degraded fish habitat, Indigenous groups, fisheries managers, local organizations and stakeholders may help to identify areas that would benefit from restoration or enhancement.

It is important to note that the Department gives priority to measures to offset that focus on the restoration of degraded fish habitat pursuant to paragraph 34.1(1)(f) of the *Fisheries Act.*

In situations where measures to offset are built away from the geographic area of a work, undertaking or activity, a robust rationale is required and should be communicated to potentially affected parties.

Principle 2: Benefits from measures to offset should balance the adverse effects resulting from the works, undertakings or activities.

Measures to offset should be scaled such that they are proportional to the residual effects resulting from the works, undertakings or activities.

There is flexibility in the selection of measures to offset provided they are focused on conserving and protecting fish and fish habitat. These measures are most likely to balance the residual effects when they benefit the specific local fish populations and fish habitat that are affected by works, undertakings or activities. It is preferable that they be located within the vicinity of a work, undertaking or activity or within the same waterbody, or watershed. Provincial or territorial boundaries should be respected and therefore measures to offset should not be applied outside of those boundaries where the works, undertakings and activities are being proposed. However, measures to offset could be undertaken in waterbodies or for fish species other than those affected by the works, undertakings or activities, provided the measures are supported by clear fisheries management objectives and regional restoration priorities.

Measures to offset may take a variety of forms ranging from localized improvements to fish habitat to more complex measures addressing limiting factors to fish production. In some instances, the most appropriate measures to offset may be a replacement of the same type of habitat that is affected by a work, undertaking or activity. In other situations, better outcomes may be achieved by undertaking measures to offset in waterbodies or for fish species other than those affected by a work, undertaking or activity being considered for authorization.

The choice of appropriate measures to offset will vary based on the state, resiliency and natural biodiversity of the ecosystem; the limiting factors affecting fish populations and fish habitat function; and the geographic extent, duration and intensity of the adverse effects.

With an “in-kind” approach to measures to offset, the fish and fish habitat that is adversely affected is replaced by the same quantity and quality of the same type of fish or fish habitat, with additional measures to offset required to account for uncertainty and time lags. With this approach, balancing the residual adverse effects on fish and fish habitat resulting from works, undertakings or activities with the benefits resulting from measures to offset is an uncomplicated comparison.

With an “out-of-kind” approach to measures to offset, the fish habitat that is adversely affected is replaced by an appropriate quantity and quality of a different type of fish or fish habitat than was adversely affected, with additional measures to offset required to account for uncertainty and time lags. It can be more difficult to measure and compare the residual effects resulting from the works, undertakings or activities with fish and fish habitat benefits associated with the measures to offset when an out-of-kind approach is adopted. However, in some cases the resulting habitat has greater capability to produce

and sustain fish. More information on assessing equivalency between the residual effects and measures to offset is provided in Part 3 of this Policy.

It is the preferred approach that measures to offset are implemented before any work, undertaking or activity that results in the death of fish and/or the harmful alteration, disruption or destruction of fish habitat. Proponents should make all reasonable efforts to avoid time lags between the adverse effects and the implementation of the measures to offset. When a time lag is unavoidable, the measures to offset should make up for fish and fish habitat that has been adversely affected because of the time lag. For example, measures to offset may include restoring, creating or enhancing more habitat than is adversely affected so that once the habitat becomes functional it will produce enough fish to make up for the fish and fish habitat adversely affected during the time lag. Please see Part 3 of this Policy for further details about the concepts behind managing uncertainty and time lags.

Where the residual effects on fish and fish habitat cannot be adequately offset because of the irreplaceability or vulnerability of the fish or fish habitat, the residual effects may be unacceptable and the authorization may be refused.

Principle 3: Measures to offset should provide additional benefits to the ecosystem.

Measures to offset are additional works, undertakings or activities that should achieve conservation and protection outcomes greater than the results that would have occurred if the measures to offset had not taken place. In other words, the coincidental positive benefits of the works, undertakings and activities being authorized should not be considered as measures to offset. For example, nearshore areas created as a result of the rock used in a proposed shoreline stabilization cannot be used as measures to offset.

The restoration of orphaned sites – those with no known responsible party or owner or with no possibility of restoration due to company closure, bankruptcy or other similar circumstance – could be considered an appropriate measure to offset.

However, restoration of degraded sites, for which the proponent, another person or organization is responsible for the environmental damage, should not be considered appropriate measures to offset because such sites should be brought into compliance by the responsible party.

Similarly, conservation and protection outcomes that are being or will be provided by other programs or activities should not be considered measures to offset (e.g., publicly or privately funded habitat restoration programs).

Principle 4: Measures to offset should generate self-sustaining benefits over the long term.

Measures to offset should strive to generate self-sustaining benefits to fish and fish habitat conservation and protection. The benefits of the measures to offset fish and fish habitat should last at least as long as the adverse effects from the works, undertakings or activities being authorized.

Types of Measures to Offset

Measures to offset may be grouped into four general categories. The proponent's selection of one or more measures should respect the guiding principles and reflect the specific circumstances of a work, undertaking or activity for which the measures to offset are required.

Offsetting plans can be complex with lasting changes to fish habitat or ongoing death of fish. Therefore appropriate expertise (e.g., qualified environmental professional) may be needed to identify suitable measures to offset the residual death of fish and/or the harmful alteration, disruption or destruction of fish habitat to support the conservation and protection of fish and fish habitat.

Changing one habitat feature for another should be considered only when there is sufficient knowledge such that there is reasonable confidence that the change in habitat will improve its capacity to produce and sustain fish.

Habitat Restoration and Enhancement

Habitat restoration (i.e., actions taken to return fish habitat to an improved or unimpaired condition) and enhancement (i.e., actions taken to improve fish habitat quality) include physical manipulation of existing fish habitat to improve its capacity to produce and sustain fish.

Examples of habitat restoration and enhancement measures to offset may include but are not limited to:

- increasing structure through the placement of coarse material or large woody debris to improve fish habitat components such as spawning beds, reefs, etc.;
- increasing shoreline complexity;
- stabilizing river banks using bioengineering methods and re-vegetating of riparian areas;
- improving access to off-channel habitats[4];
- removal of anthropogenic barriers to fish migration[4];
- establishing or enhancing vegetated areas in lakes, estuaries and coastal areas; or
- improving local hydraulic conditions to favour certain functions of fish habitat.

[4] It is important to note that these measures should not provide opportunities for the introduction of non-indigenous species.

This group of measures is generally focused in areas where habitat conditions are considered poor or degraded because such areas provide opportunity for the most ecological benefit.

Habitat Creation

Habitat creation is the development or expansion of aquatic habitat into a terrestrial area. These measures to offset can be used when the fish habitat that was degraded and cannot be restored by manipulation of the original or surrounding fish habitat.

When habitat creation is proposed as a measure to offset fish and fish habitat residual effects, the created fish habitat should provide the same or greater capacity to produce and sustain fish when compared to the affected fish and fish habitat.

Examples of measures to offset for habitat creation may include but are not limited to the creation or expansion of natural stream channels, lakes, side channel habitats, wetlands, or bays.

Chemical or Biological Manipulations

This group of measures to offset includes chemical manipulation of waterbodies to address water quality issues, stocking of fish or shellfish, and management or control of aquatic invasive species. These measures should be used only when the other types of measures to offset are not available, and only under specific circumstances, such as where the site-specific issues are well understood, the limitations to fish production are known, and fisheries management objectives are clear for the fishery.

When chemical or biological manipulations are proposed as potential offsets, the proponent should provide a sound rationale to demonstrate how the measure will conserve and protect fish and fish habitat. The rationale should also provide scientifically defensible evidence of the successful application of the measure under similar conditions (e.g., similar aquatic ecosystems).

Complementary Measures

Complementary measures are actions like data collection and scientific research related to maintaining or enhancing the conservation and protection of fish and fish habitat. Complementary measures may be considered in areas where there are limited opportunities for on-the-ground measures to offset fish and fish habitat residual effects and where there is limited understanding or data on fish populations. Complementary measures may comprise up to 10% of the required amount of the measures to offset (i.e., restore,

enhance or create fish habitat); the remaining 90% of the amount of measures to offset should consist of habitat enhancement, restoration or creation. Calculation of the value of the proposed complementary measures is derived from the estimated cost of implementing measures to offset. Complementary measures are not regarded as measures to offset on their own because they generally do not give rise to measurable, on-the-ground, conservation outcomes. However, they may indirectly support meeting these outcomes.

Complementary measures may be considered when they take into account the guiding principles outlined in Part 2 of this Policy. For example, complementary measures such as data collection and scientific research should be designed to fill significant knowledge gaps regarding fish and fish habitat conservation and protection such that fisheries management objectives and local restoration priorities may be established, and provide benefits that are in addition to any existing research or data collection programs. Furthermore, complementary measures should be undertaken in a transparent, scientifically robust and timely manner by a qualified individual or organization approved by the Department. Complementary measures may not replace monitoring requirements related to the measures to offset.

Complementary measures should only be considered in exceptional circumstances such as in remote, pristine areas where there is a lack of information about fish and fish habitat, including their conservation and protection and where measures to offset are limited. The application of these measures is determined on a case-by-case basis, in consultation with the Department. A sound rationale describing why other measures to offset are not appropriate for fulfilling the entire offset requirement, and a detailed plan outlining how the proposed complementary measure will be carried out, evaluated, and communicated, will both be required.

Options for Implementing Measures to Offset

Measures to offset are typically applied by proponents in two ways:

- through project-specific measures; or
- through fish habitat banks.

Project–Specific Measures

Project-specific measures to offset are carried out by the proponent of particular works, undertakings or activities in order to counterbalance particular adverse effects on fish and fish habitat resulting from particular works, undertakings or activities. The proponent typically carries out the measures to offset at the site of the authorized works, undertakings or activities or at an off-site location within the same watershed after the *Fisheries Act* authorization is issued.

Fish Habitat Banks

A fish habitat bank[5] is a formalized approach for a proponent[6] to create measures to offset, for their own use, in advance of the adverse effects on fish and fish habitat resulting from the carrying on of proposed works, undertaking or activities in order to counterbalance those adverse effects.

The *Fisheries Act* defines a fish habitat bank as an area of a fish habitat that has been restored, enhanced or created by the carrying on of one or more conservation projects[7] within a service area[8] and in respect of which area the Minister has certified any habitat credit[9] under paragraph 42.02(1)(b) of the *Fisheries Act*.

A fish habitat bank can be a defined area of a lake, river, or the ocean designated and managed to restore, enhance or create fish habitat's capability to produce and sustain fish. The benefits accumulated in the fish habitat bank are counted as credits, while death of fish or harmful alteration, disruption or destruction resulting from the proponent's works, undertakings or activities are considered debits. The proponent that has established the fish habitat bank may withdraw certified habitat credits from the fish habitat bank to offset the death of fish or harmful alteration, disruption or destruction of fish habitat resulting from the carrying on of their works, undertakings or activities within the service area. When the balance of habitat credit in the habitat bank reaches zero, the bank is closed and no more "withdrawals" can be made.

Fish habitat banks may be useful for proponents with recurring works, undertakings or activities where:

- a large number of adverse effects, each affecting a small geographic area, arise from a single large project; or
- the death of fish or harmful alteration, disruption or destruction of fish habitat may result from a number of projects.

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[5] Section 42.01 of the *Fisheries Act* defines 'fish habitat bank' as an area of a fish habitat that has been created, restored or enhanced by the carrying on of one or more conservation projects within a service area and in respect of which area the Minister has certified any habitat credit under paragraph 42.02(1)(b).
[6] Section 42.01 of the Fisheries Act defines 'proponent' as a person who proposes the carrying on of a conservation project and any other work, undertaking or activity within a proposed service area.
[7] Section 42.01 of the *Fisheries Act* defines 'conservation project' as a work, undertaking or activity that is carried on by a proponent for the purpose of creating, restoring or enhancing fish habitat within a service area in order to acquire habitat credits
[8] Section 42.01 of the *Fisheries Act* defines 'service area' as the geographical area that encompasses a fish habitat bank and one or more conservation projects and within which area a proponent carries on a work, undertaking or activity.
[9] Section 42.01 of the *Fisheries Act* defines 'habitat credit' as a unit of measure that is agreed to between any proponent and the Minister under section 42.02 that quantifies the benefits of a conservation project.

An additional benefit of habitat banking is that the bank is established in advance of the adverse effects. Consequently, there is less uncertainty related to the effectiveness of the measures to offset or the time required for the measures to offset to become functional. Finally, fish habitat banks help reduce the time and resources required to issue *Fisheries Act* authorizations, because the value of the habitat credits within the habitat bank is known and the development of the offsetting plan is simplified.

For more information about fish habitat banks please contact Fisheries and Oceans Canada's Fish and Fish Habitat Protection Program.

Part 3: Preparing an offsetting plan

The offsetting plan is included as part of the application under the *Authorizations Concerning Fish and Fish Habitat Protection Regulations*. This part of this Policy outlines the content and key steps for preparing an offsetting plan.

Offsetting plans are negotiated between the proponent and the Department on a case-by-case basis. Development of an offsetting plan would benefit from early engagement with Indigenous peoples and stakeholders potentially affected by the offsetting plan.

Proponents are encouraged to review the 'Applicants Guide Supporting the Authorizations Concerning Fish and Fish Habitat Protection Regulations' for more detailed information.

Content of the Plan

The *Authorizations Concerning Fish and Fish Habitat Protection Regulations* set out the information requirements and documentation of offsetting plan. These requirements include, but are not limited to:

- the geographic coordinates of the location where measures to offset will be implemented;
- a small-scale site plan identifying the general location and boundaries of the location where the measures will be implemented;
- a detailed description of the measures and an explanation of how those measures will meet their objectives;
- a detailed description of the monitoring measures that will be put in place to assess the effectiveness of the selected measures to offset;
- a description of the contingency measures and associated monitoring measures that will be put into place if the selected measures are not successful in meeting their objectives;
- a detailed description of any adverse effects on fish and fish habitat that could result from the implementation of the plan;
- a detailed description of the measures that will be implemented to avoid or mitigate the adverse effects and an explanation of how those measures will meet these

objectives;

- the timeline for the implementation of the plan;
- an estimate of the cost of implementing each element of the plan; and
- if the implementation of the plan requires access to lands, water sources or waterbodies that are not owned by the proponent, a description of the steps proposed to be undertaken to obtain the authorization required for the applicant, the Department and anyone authorized to act on the Department's behalf to access the lands, water sources or waterbodies in question. It is the proponent's responsibility to provide this information with their application and to secure the necessary approval before the offset plan is implemented. This information is not required if the proponent is Her Majesty in right of Canada, Her Majesty in right of a province or the government of a territory.

Using the Factors to Consider to Guide Offsetting Plan Development

The factors to consider in subsection 34.1(1) of the *Fisheries Act* provide a framework to focus the application of the fish and fish habitat protection provisions on achieving the purpose of the *Fisheries Act*. They provide a decision-making framework to manage adverse effects on fish and fish habitat of proposed works, undertakings or activities before they are carried out through a consistent defensible process.

Proponents are encouraged to review the factors when designing their offsetting plan as the Department will consider these factors when making a decision with respect to an application for authorization. For more information on the factors to consider please refer to the Fish and Fish Habitat Protection Policy Statement.

Considering Indigenous Peoples Perspectives in Developing an Offsetting Plan

Indigenous peoples in Canada have Aboriginal and treaty rights recognized and affirmed under section 35 of the *Constitution Act*. The *Fisheries Act* requires the Minister of Fisheries, Oceans and the Canadian Coast Guard to consider any adverse effects on the rights of Indigenous peoples when making decisions under the *Fisheries Act*. This includes the decision to authorize any work, undertaking or activity and the offsetting plan associated with it.

It is therefore important, and good practice, for proponents to engage Indigenous peoples early in the planning phase of the offsetting plan. Indigenous peoples and the knowledge of the Indigenous peoples of Canada can inform the design of measures to offset residual effects on fish and fish habitat.

Key Steps in Preparing an Offsetting Plan

Offsetting plans should be developed by proponents in a manner that is specific to the residual effects resulting from their work, undertaking or activity. Figure 2 summarizes the key steps in preparing an offsetting plan.

Step 1: Characterize the residual death of fish and harmful alteration, disruption or destruction of fish habitat

After applying all appropriate measures to avoid and mitigate, the proponent should determine and quantify the death of fish and/or harmful alteration, disruption or destruction of fish habitat that remains. This is called the residual effects.

The Pathways of Effects[10] diagrams are tools developed by the Department that can be used to identify and characterize the residual effects on fish and fish habitat that may remain after the application of measures to avoid and mitigate.

The residual death of fish and/or harmful alteration, disruption or destruction of fish habitat should be determined and quantified for each impact type in relation to each phase of a proposed work, undertaking or activity. This may include estimating the geographic extent, duration and intensity of the residual death of fish and/or harmful alteration, disruption or destruction of fish habitat, as applicable.

It is important to carefully describe and quantify the residual death of fish and/or harmful alteration, disruption or destruction of fish habitat because this is the loss that should be counterbalanced by the proposed measures to offset.

Step 2: Select measures to offset

The offsetting plan should include information about the objective of the proposed measures to offset and details about the measures that are proposed.

The objective of the measures to offset is guided by the geographic extent, duration and intensity of the residual adverse effects on fish and fish habitat. The measures to offset may be ‘in-kind’ or ‘out-of-kind’ (see Part 2 in this Policy for more information). Regardless of whether an in-kind or out-of-kind approach is undertaken, the proposed measures to offset should meet the guiding principles for measures to offset described in Part 2 of this Policy.

The offsetting plan should also include clearly articulated criteria for measuring success that are linked to the objective of the measures to offset and that provide benchmarks for measuring progress, as well as a schedule that reflects the timeline, and start and end dates for implementing the measures to offset.

[10] Government of Canada. 2012. Pathways of Effects National Guidelines. Fisheries and Oceans Canada. https://waves-vagues.dfo-mpo.gc.ca/Library/365312.pdf

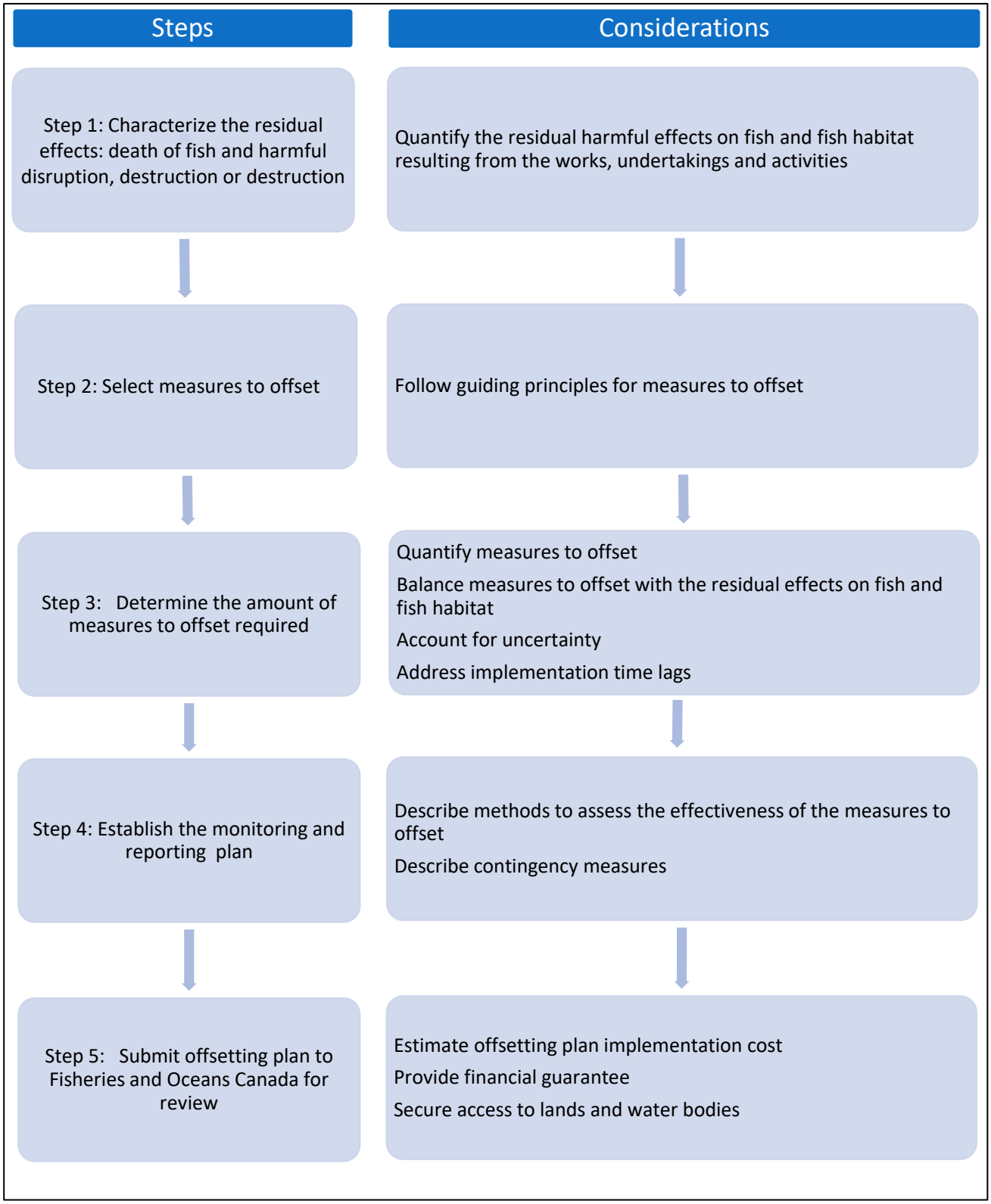

Figure 2. Key steps in preparing the offsetting plan

Step 3: Determine the amount of measures to offset required

The amount of measures to offset required to counterbalance the adverse effects of a proposed work, undertaking or activity should provide ecological benefits that are proportional to the residual effects resulting from the works, undertakings or activities. In addition, there may be a need to increase the amount of measures to offset in order to manage uncertainty associated with the proposed measures or when there is a time lag between the adverse effects on fish and fish habitat and the time it takes for the measures to offset to become functional.

a) Quantifying the residual effects and the offset measures

Equivalency is a term used to describe the results of an analysis that compares the residual effects of the works, undertakings or activities on fish and fish habitat to the benefits of the measures to offset.

In its simplest form, equivalency has been achieved when the residual adverse effects on fish and fish habitat are counterbalanced by the fish and fish habitat benefits provided by the measures to offset. Out-of-kind measures to offset require more complex equivalency analyses to determine whether the measures to offset balance the residual effects. A variety of equivalency analysis methodologies exist. Generally, they require the calculation of a common 'currency' that may be used to compare the residual effects and measures to offset across fish life stages, species and habitat types (e.g., in-kind habitat; habitat functions and ecosystem services; habitat indices, fish biomass or abundance, etc.). These methods may be data intensive and require specific expertise. An overview of equivalency analyses is provided in publications by Fisheries and Oceans Canada's Canadian Science Advisory Secretariat[11]. Quantifying equivalency creates opportunities for more flexible approaches to offsetting. However, in the absence of data to support the calculation of equivalency, in-kind measures to offset may be a better option.

b) Accounting for uncertainty

There are many sources of uncertainty when developing and implementing measures to offset. For example, uncertainty may arise in the initial prediction of residual death of fish and/or harmful alteration, disruption or destruction of fish habitat; in the measures to mitigate the adverse effects; in the measures to offset themselves through design or implementation failure; from the overestimation of the ecological benefits of a particular measure to offset; or the unknown nature of the future state of fish habitat. In addition to the variability associated with the measures to offset themselves, uncertainty may also arise from the natural variability of fish populations and ecosystem dynamics, a changing climate, and invasive

[11] Bradford, Michael J; Smokorowski, K.E; Clarke, Keith D; Keatley, B.E; Wong, Melisa C. 2016. Equivalency metrics for the determination of offset requirements for the Fisheries Protection Program. Canadian Science Advisory Secretariat. National Capital Region. (https://waves-vagues.dfo-mpo.gc.ca/Library/364029.pdf)

species. For more information on managing uncertainty related to offsetting plans, please refer to publications available from Fisheries and Oceans Canada's Canadian Scientific Advisory Secretariat[12, 13, 14].

In general the approach to addressing the uncertainty associated with working in natural environments is to restore, enhance or create additional fish habitat. When untested measures to offset are proposed, then additional measures to offset and more rigorous monitoring may be required to address the uncertainty (see Figure 1).

When addressing uncertainty, proponents should recognize that:

- habitat restoration projects may improve fish habitat's capacity to produce and sustain fish but these projects may also experience structural or ecological failure due to changing environmental conditions;
- habitat creation projects result in new fish habitat with capacity to produce and sustain fish, however this fish habitat may not function as effectively as intended;
- fish stocking may increase fish abundance with ongoing investment, however it may also result in adverse effects on the reproductive success or fitness of natural populations;
- chemical alteration may improve the capability to produce and sustain fish of a system but often requires continued maintenance; and
- untested techniques or methods may increase risks of failure of the measures to offset.

Equivalency analyses for out-of-kind measures to offset account for uncertainty in a more precise and quantitative fashion; however, the analytical approach to determine that residual effects have been balanced depends on the type of equivalency analysis employed. Any equivalency analysis used should be accompanied by a clear rationale to demonstrate its appropriateness for the particular measure to offset.

c) Time lags

Time lags between the adverse effects on fish and fish habitat resulting from the work, undertaking or activity and the benefits from the measures to offset – ranging from months to even years – may contribute to loss of fish or fish habitat. Time lags should be avoided where possible by implementing the measures to offset prior to carrying on the work, undertaking or activity resulting in the residual death of fish and/or the harmful alteration,

[12] Fisheries and Oceans Canada. 2014. Science Advice for Managing Risk and Uncertainty in Operational Decisions of the Fisheries Protection Program. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2014/015 (https://waves-vagues.dfo-mpo.gc.ca/Library/363993.pdf)

[13] Fisheries and Oceans Canada. 2017. Science advice on the determination of offset requirements for the Fisheries Protection Program. Canadian Science Advisory Secretariat. National Capital Region (https://waves-vagues.dfo-mpo.gc.ca/Library/4060018x.pdf)

[14] Bradford, Michael J; Smokorowski, K.E; Clarke, Keith D; Keatley, B.E; Wong, Melisa C. 2016. Equivalency metrics for the determination of offset requirements for the Fisheries Protection Program. Canadian Science Advisory Secretariat. National Capital Region. (https://waves-vagues.dfo-mpo.gc.ca/Library/364029.pdf)

disruption or destruction of fish habitat. When a time delay is unavoidable, the offset should include measures that account for the time delay to make up for the lost fish or fish habitat.

With in-kind measures to offset, the approach to addressing delays in the function of the offset is to require the creation or restoration of additional habitat. This helps to ensure that that offset replaces the fish and fish habitat that was initially destroyed as well as the fish production lost during the delay. When measures to offset are undertaken in advance of carrying on the work, undertaking or activity resulting in the death of fish and/or the harmful alteration, disruption or destruction of fish habitat, there is no need to account for time lags.

As with accounting for uncertainty, equivalency analysis for out-of-kind measures to offset accounts for time lags in a more precise and quantitative fashion. Again, the analytical approach depends on the type of equivalency analysis employed and any equivalency analysis used should be accompanied by a clear rationale to demonstrate its appropriateness for the particular measure to offset.

Step 4: Establish the monitoring measures

Proponents are required to provide monitoring measures as part of their offsetting plan. Monitoring measures must assess the effectiveness of the measures to offset relative to their objectives. The monitoring measures must also include contingency measures, and associated monitoring measures, that will be implemented if deficiencies are detected. The monitoring measures will be included as conditions of the authorization. Common monitoring and reporting conditions may include the provision of:

- dated photographs of works, undertakings, activities or operations related to measures to mitigate specific to the offsetting plan and photographs of completed measures to offset;
- timelines for monitoring and reporting;
- monitoring and inspection records;
- details of any measures to mitigate changes, corrective actions or contingency measures that were followed in the event that measures to mitigate or offset did not function as described; or
- the methodology and criteria that will be used to evaluate the success of the measures to offset.

Monitoring and reporting of measures to offset should be undertaken for a period of time sufficient to allow for:

- biological or physical changes to be reflected in the data collected;
- possible adjustments to the monitoring to better estimate changes in fish habitat function or fish population size; and
- the restored, enhanced or created fish habitat to reach full ecological functionality.

Should measures to offset be poorly designed or implemented, then the proponent is responsible for the maintenance or repair of the measures to offset, as may be set out as conditions of the *Fisheries Act* authorization. The requirement for adjustments and contingencies may be included in the terms and conditions of the authorization.

Proponents are responsible for implementing offsetting plans and monitoring their effectiveness, as well as for reporting on implementation and the results of monitoring. Monitoring should be designed to confirm that the measures to offset have been effective in counterbalancing the death of fish or harmful alteration, disruption or destruction of fish habitat and may identify the need for contingency measures should deficiencies be found.

For more information on developing monitoring conditions please refer to Smokorowski et al.[15]

Step 5: Submit plan to Fisheries and Oceans Canada for review

The proponent should prepare an offsetting plan in accordance with the information requirements set out in the *Authorizations Concerning Fish and Fish Habitat Protection Regulations*. The offsetting plan is submitted as part of the proponent's application for an authorization.

When the proponent's application is complete, the Department will either issue an authorization or notify the applicant that the authorization is refused within 90 calendar days. There are several circumstances under which the time limit ceases to apply. Detailed information on the process and time limits is provided in *Authorizations Concerning Fish and Fish Habitat Protection Regulations*.

Cost of implementing offsetting plan

The monetary value of the financial guarantee is determined by estimating the cost for implementing all elements of the offsetting plan, including elements related to monitoring, and maintenance of the measures to offset. The estimate should consider any additional expenses that could be incurred by the Department to complete the offsetting plan (e.g., costs for administration, costs for mobilization, cost of external expertise, etc.), and allow for cost overruns for remobilizing machinery onto the work site.

Financial guarantee

If conditions of the offsetting plan subject to the authorization are not completed, the Department requires funds to implement all remaining elements of the plan. The proponent's offsetting plan must therefore include a financial guarantee, which can be an irrevocable letter of credit issued by a recognized Canadian financial institution, or another

[15] Smokorowski, K. E. et al. 2015. Assessing the Effectiveness of Habitat Offset Activities in Canada: Monitoring Design and Metrics. Canadian Technical Report of Fisheries and Aquatic Sciences 3132 (http://www.dfo-mpo.gc.ca/Library/357725.pdf)

equivalent financial guarantee, including a performance bond. The amount of credit should be sufficient to complete the offsetting plan and monitoring program.

Additional guidance on financial guarantee is available in the Treasury Board Policy on Letters of Credit (Appendix R).

Access and approvals for implementing offsetting plan

Where measures to offset are proposed on provincial, territorial or treaty lands, engagement and approvals may also be required with the relevant authority. It is important to note that such approvals may be necessary to secure the site to implement the offsetting plan, and that obtaining these approvals are the responsibility of the proponent.

It is also the proponent's responsibility to comply with the *Fisheries Act* and its regulations, the *Species at Risk Act*, and to meet all other federal, territorial, provincial and municipal requirements that apply to the offsetting plan.

Part 4: Additional Information

The following Departmental guidance documents are available from the Department's Projects Near Water website:

- Applicants Guide Supporting the *Authorizations Concerning Fish and Fish Habitat Protection Regulations*
- Fish and Fish Habitat Protection Policy Statement
- Pathways of Effects

This website also provides information on how to contact your local Departmental office.