

**Decision Framework for the Determination and Authorization of  
Harmful Alteration, Disruption or Destruction of Fish Habitat**

Department of Fisheries and Oceans  
Habitat Management and Environmental Science  
Habitat Management Branch

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## Executive Summary

When reviewing project proposals, fish habitat managers must decide whether a Harmful Alteration, Disruption, or Destruction (HADD) of fish habitat is likely to result. This document describes a decision framework for making this determination, and whether an authorization under Subsection 35(2) of the *Fisheries Act* should be issued. The objective is to establish a practical and nationally consistent approach for use by the habitat managers responsible for such decisions.

Basically, the decision framework involves addressing the following questions:

1. Is fish habitat present at the project site or in an area potentially impacted by the project?
2. Could the proposed project cause HADD of fish habitat?
3. Can the impacts to fish habitat be fully mitigated?
4. Should the HADD be authorized?
5. Can the HADD be compensated?

The subsequent discussion, on issues and considerations related to implementing this framework, is summarized, as follows:

Fish habitat is defined in the *Fisheries Act* 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”. Fish habitat is comprised of those physical, chemical and biological attributes of the environment (e.g., substrate type and structure, aquatic macrophytes, water depth, water velocity, water temperature, dissolved oxygen, riparian vegetation, etc.) which are required by fish to carry out their life processes (e.g., spawning, nursery, rearing, feeding, overwintering, migration). Although not defined in the *Fisheries Act*, HADD of fish habitat is defined here as: *any change in fish habitat that reduces its capacity to support one or more life processes of fish*. In assessing a project proposal for its potential to cause a HADD, habitat managers identify changes to the bio-physical attributes that would be of a type and magnitude sufficient to render the habitat less suitable, or unsuitable, for supporting a fish’s life processes.

An assumption implicit in this approach is that, as a result of the reduced capacity of the habitat to support the life processes of fish, there will *also* be a loss in the capacity of the habitat to *produce* fish. This assumption is important because, while Section 35 of the *Fisheries Act* deals solely with a HADD of fish habitat, the No Net Loss guiding principle in DFO’s Habitat Policy makes the link between fish habitat and productive capacity, which does deal with the production of fish. Consequently, when reviewing project proposals, habitat managers strive, pursuant to the No Net Loss guiding principle, to maintain the current productive capacity of fish habitats supporting Canada’s fishery resources, such that the habitat is able to produce fish suitable for human consumption.

It must be emphasized, however, that the linkages between the biophysical attributes of fish habitat and productive capacity can be very difficult to quantify, particularly in the context of individual project reviews. As a result, in their review of projects habitat managers will normally make their decisions about whether HADD is likely to occur on the basis of predicted impacts, or changes, to those biophysical habitat attributes which are likely to reduce the habitat’s capacity to support one or more life

processes of fish, rather than on a quantitative assessment of potential impacts to productive capacity, *per se*. Implicit in their decisions, however, is the notion that where HADD is likely to occur, a reduction in habitat productive capacity (i.e., in the production of fish) would also be anticipated.

In order to satisfy the No Net Loss guiding principle, the habitat manager's first priority is to avoid or reduce the project's potential for a HADD through appropriate mitigation measures. If a HADD is still expected to occur, the manager then determines if appropriate compensation is possible, guided by a hierarchy of preferences. The hierarchy aims, to the extent possible, to provide for the replacement of the impacted habitat with similar habitat as close as possible to the impacted area, in order to maximize the potential for achieving No Net Loss, without actually requiring the comparison of productive capacity before and after project development.



## 1.0 Introduction

The responsibility for the administration of the fish habitat protection provisions of the *Fisheries Act* rests with the federal Minister of Fisheries and Oceans. The main provision dealing with the protection of fish habitat is Section 35. When reviewing project proposals, fish habitat managers determine what effects the project may have on fish habitat, in accordance with Subsection 35(1) of the *Fisheries Act*, which states that: “No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat”. However, Subsection 35(2) qualifies this prohibition, in that it allows for the authorization by the Minister of Fisheries and Oceans, or through regulation, of the alteration, disruption or destruction of fish habitat. Operationally, decisions on whether Subsection 35(2) authorizations are issued are made by regional Habitat Management staff within the Department of Fisheries and Oceans (DFO).

This document describes a decision framework for determining if Harmful Alteration, Disruption or Destruction (HADD) of fish habitat is likely to occur as a result of a project proposal, and whether an authorization under Subsection 35(2) of the *Fisheries Act* should be issued. The objective is to establish a practical and nationally consistent approach for use by the habitat managers responsible for such decisions. The framework is described in Section 2.0 of this document. Relevant details and related issues are discussed in Section 3.0, including a description of a simple, conceptual model for determining what constitutes a **HADD of fish habitat**. A Glossary is provided in the Annex, with definitions of those terms highlighted in boldface throughout the text.

This document is one of a series prepared by DFO regarding the application of the habitat protection provisions of the *Fisheries Act*. Other relevant documents are:

***Policy for the Management of Fish Habitat*** (the Habitat Policy), Department of Fisheries and Oceans, 1986 - includes a description of the guiding principle of **No Net Loss of productive capacity**, which is fundamental to implementing the Policy’s **Conservation Goal**.

***Directive on the Issuance of Subsection 35(2) Authorizations*** (the Subsection 35(2) Directive), Department of Fisheries and Oceans, May 25, 1995 - promotes consistency in the administration of Subsection 35(2) of the *Fisheries Act*.

***Habitat Conservation and Protection Guidelines*** (the C&P Guidelines), Department of Fisheries and Oceans, 1998 - provides a standard approach to habitat conservation and protection through the application of the No Net Loss guiding principle.

**A Guide to the Implementation of CEAA** (the DFO CEAA Guidelines), Department of Fisheries and Oceans, January, 1995 (under revision) - an interpretation of the requirements of the *Canadian Environmental Assessment Act* (CEAA) in terms of the responsibilities it places on habitat management staff.

The material presented in this document should be read and applied in conjunction with these documents, and they will be referred to here, as appropriate.

## 2.0 A Decision Framework for the Determination and Authorization of Harmful Alteration, Disruption or Destruction (HADD) of Fish Habitat

The decision framework for determining whether HADD of fish habitat is likely to occur, or whether an authorization should be issued is illustrated in Figure 1. Essentially, the manager is asked to make a “Yes” or “No” decision in response to questions concerning the potential effects of a proposed project on fish habitat. The following question numbers correspond to those found in Figure 1:

1. *Is fish habitat present at the project site or in an area potentially impacted by the project?*

Section 35 is not about the protection of fish habitat for the benefit of **fish**, but of *fisheries*. Therefore, the decision required is a determination of whether or not the potentially affected fish habitat directly or indirectly supports - or has the potential to support - a commercial, recreational or subsistence **fishery**. Although it is not necessary that a fishery be active, there should be a reasonable expectation for a **potential fishery**. If the decision is “No” then a Subsection 35(2) authorization is not required because the *Fisheries Act* does not apply. Further details are subsequently described in Section 3.1.

2. *Could the proposed project cause a HADD of fish habitat?*

This step is an initial consideration of the proposed project’s potential impacts to fish habitat, and is an evaluation of the possible direct and indirect impacts to fish habitat that *could* result. If the habitat manager decides that the project has the *potential* to cause a HADD, irrespective of whether or not measures to **mitigate** the potential impacts are identified by the proponent in its proposal, then the decision is “Yes”, the project *could* cause a HADD. The project review proceeds to step 3 where any mitigation measures proposed by the proponent, or contemplated by the habitat manager are taken into account. If the decision is “No”, the project proposal *could not* cause a HADD, then a Subsection 35(2) authorization is not required because there is no potential for the project to adversely affect fish habitat. The *Fisheries Act* does not apply, and there is no need to review the project proposal further. A “No” decision for a proposal which includes mitigation measures is a very unlikely outcome since the inclusion of such measures implies that the project could cause a HADD to fish habitat. Further details are subsequently discussed in Section 3.2.

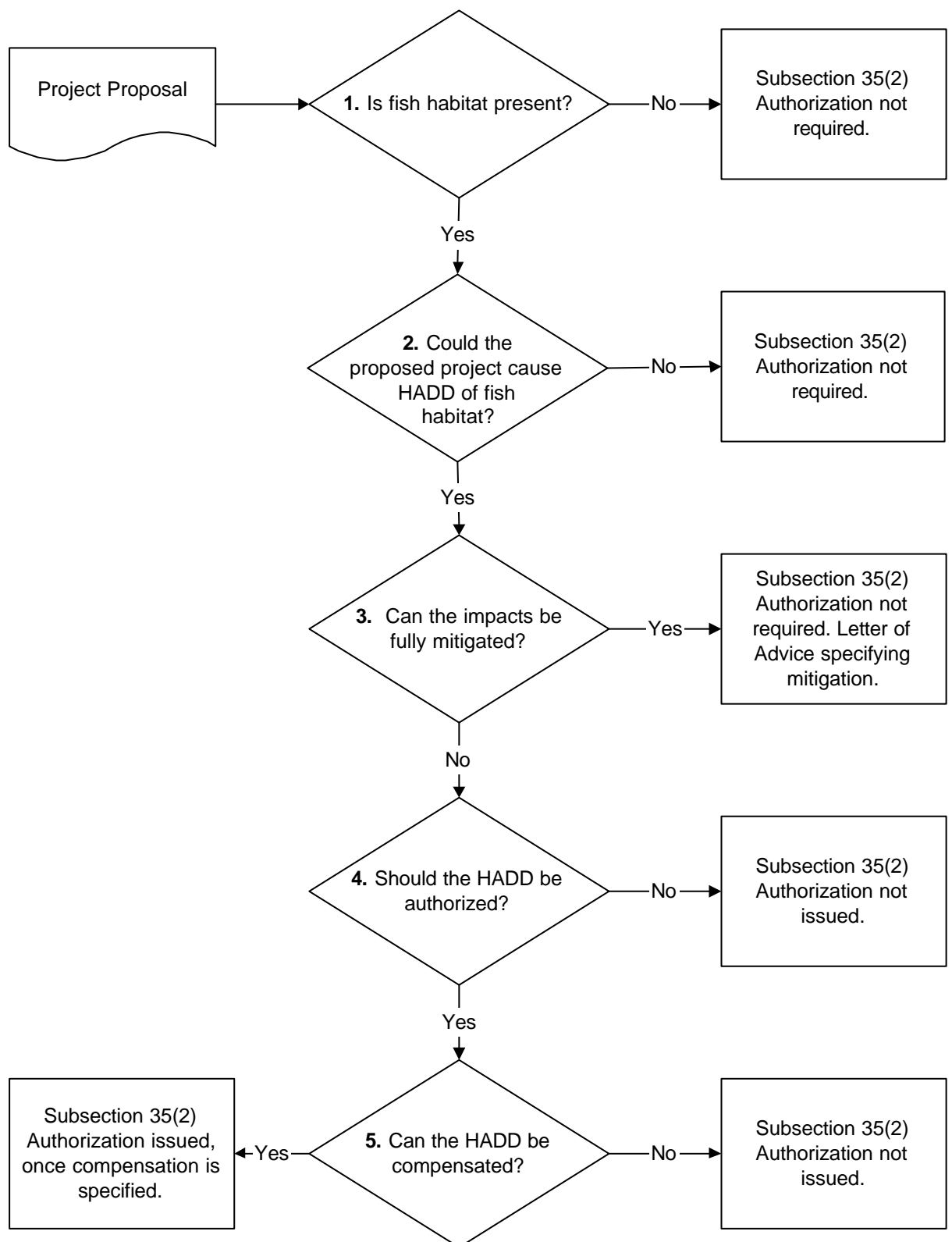


Figure 1: A decision framework for the determination and authorization of harmful alteration, disruption or destruction of fish habitat.

### 3. *Can the impacts to fish habitat be fully mitigated?*

Having decided that the project *could* cause a HADD of fish habitat, the decision at this step requires a determination of whether there is likely to be a HADD *after* taking into consideration mitigation measures. This consideration includes not only those measures that may already have been proposed by the proponent in its project proposal, but also any additional ones identified by the manager. Mitigation could include making changes to the project design or location and/or by implementing other measures, such as timing windows. If the decision is “Yes”, then a Subsection 35(2) authorization is not required, because, in the opinion of the manager, there will be no reduction, in either the short-term or long-term, in the capacity of the fish habitat to support one or more life processes of fish. A Letter of Advice, as per the Subsection 35(2) Directive, specifying mitigation measures is issued to the project proponent. Further details are subsequently discussed in Section 3.3.

### 4. *Should the HADD be authorized?*

If the decision in step 3 is “No” (i.e., there is likely to be a HADD even after application of mitigation measures), then a Subsection 35(2) authorization is required in order for the project to proceed without risking contravention of Subsection 35(1). The decision required at this step is to determine, at the outset, whether the likely HADD is acceptable. If not, then an authorization is not issued. Factors considered in making this decision are subsequently discussed in Section 3.4.

### 5. *Can the HADD be compensated?*

Having concluded in the previous step that there are no *a priori* reasons for not issuing an authorization, the decision required in this step is to then determine whether the likely HADD can be compensated. If “Yes”, then an authorization under Subsection 35(2) can be issued. As per the Subsection 35(2) Directive, authorizations will not normally be issued until adequate **compensation** measures have been specified which will result in achieving No Net Loss of productive capacity. Factors considered in making this decision are subsequently discussed in Section 3.5.

While the HADD decision framework consists of five individual steps (Figure 1), the overall process can be partitioned into three distinct components, as follows:

1. A determination of whether HADD of fish habitat is likely to result, based upon:
  - the presence of fish habitat that supports fish which contributes, or potentially contributes, to a fishery, either directly or indirectly (i.e., step “1”);
  - a determination of whether there could be a HADD to fish habitat, prior to consideration of any mitigation measures (i.e., step “2”); and
  - the ability to fully mitigate the harmful effects (i.e., step “3”).

2. Given that a HADD is likely to result, a determination of whether the likely HADD should be authorized (i.e., step “4”).
3. Given there is no *a priori* reason for not issuing a Subsection 35(2) authorization, a determination of whether the HADD can be compensated (i.e., step “5”).

### **3.0 Implementing the Decision Framework - Relevant Factors and Considerations**

It should be acknowledged at the outset to this section that the decision-making framework represented by Figure 1 implies that the process of project review and decision-making is linear, with a series of sequential steps. In reality, this is often not the case, particularly for larger, more complex projects. In the review of a project proposal, the habitat manager is often working simultaneously at addressing several of the decision steps, and/or iteratively revisiting a given step, or series of steps, prior to finalizing the review. However, the decision-making framework does serve to identify those “milestone” points in the review of a project proposal that a manager must consider, and document.

The purpose of this section is to discuss in greater detail the factors and background considerations relevant to each of the five steps in the decision framework. All reasonable efforts have been made to include in the discussion about each step only those issues that are only relevant to that step. However, because the decision-making process is more of an “iterative continuum”, rather than a discrete series of linear steps, often topics discussed in a subsection regarding one step are applicable and relevant to one or more of the other steps in the decision making process. There may also be situations where there is some redundancy on certain topics. This is particularly the case with the extensive discussion in subsection 3.2, in regard to subsequent subsections (i.e., 3.3-3.5), and with subsection 3.4 versus subsection 3.5. The reader is encouraged to keep this in mind.

#### **3.1 IS FISH HABITAT PRESENT AT THE PROJECT SITE OR IN AN AREA POTENTIALLY IMPACTED BY THE PROJECT?**

Since Section 35 of the *Fisheries Act* concerns the protection of fish habitat for the purpose of supporting a fishery, the habitat manager must determine whether or not the potentially affected habitat directly or indirectly supports - or has the potential to support - commercial, recreational or subsistence fisheries. Although it is not necessary that a fishery be active, there should be a reasonable expectation for a potential fishery.

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”. Fish habitat consists of those physical, chemical and biological attributes of the environment (e.g., substrate type and structure, aquatic macrophytes, water depth, water velocity, water temperature, dissolved oxygen, riparian vegetation, etc.) which are required by fish to carry out their life processes

(e.g., spawning, nursery, rearing, feeding, overwintering, migration). Consequently, certain bio-physical information (e.g., water velocity, flow, stream width/depth, channel features, water temperature, oxygen levels, substrate, vegetation, etc.) is normally required by habitat managers to determine the presence, type, quality and quantity of fish habitat present at the project site or in an area impacted by a project.

In addition, generally all species and life stages of fish contributing to a fishery, and their use of the habitat must also be known to determine how the bio-physical attributes of the habitat(s) meet the requirements of the fish species. Details of the proposed project must also be available to assess its potential effects on the biophysical components of fish habitat and that habitat's capacity to provide for a fishery.

### 3.2 COULD THE PROPOSED PROJECT CAUSE HADD OF FISH HABITAT?

While fish habitat is defined in the *Fisheries Act*, there is no definition provided on what constitutes a harmful alteration, disruption or destruction (i.e., a HADD) of fish habitat. One is required, specifically, in order to make a decision at this step in the process; and more generally, to achieve the objective of establishing a practical and nationally consistent approach to decision making about HADD. A definition of HADD is provided in Subsection 3.2.1, while subsequent subsections discuss a wide range of relevant issues.

#### 3.2.1 HADD of Fish Habitat

HADD of fish habitat is defined in this document as: *any change in fish habitat that reduces its capacity to support one or more life processes of fish.*

It should be noted that this definition of HADD applies when determining if, or whether, any of the three conditions (i.e., **harmful alteration**, **disruption**, and **destruction**) identified in subsection 35(1) of the *Fisheries Act*, are likely to result from a project. These conditions do differ, and are differentiated essentially by the severity of impacts and their duration, as follows:

- **harmful alteration** - any change to fish habitat that *indefinitely* reduces its capacity to support one or more life processes of fish but *does not completely eliminate the habitat*;
- **disruption** - any change to fish habitat occurring for a *limited period* which reduces its capacity to support one or more life processes of fish; and
- **destruction** - any *permanent* change of fish habitat which *completely eliminates* its capacity to support one or more life processes of fish.

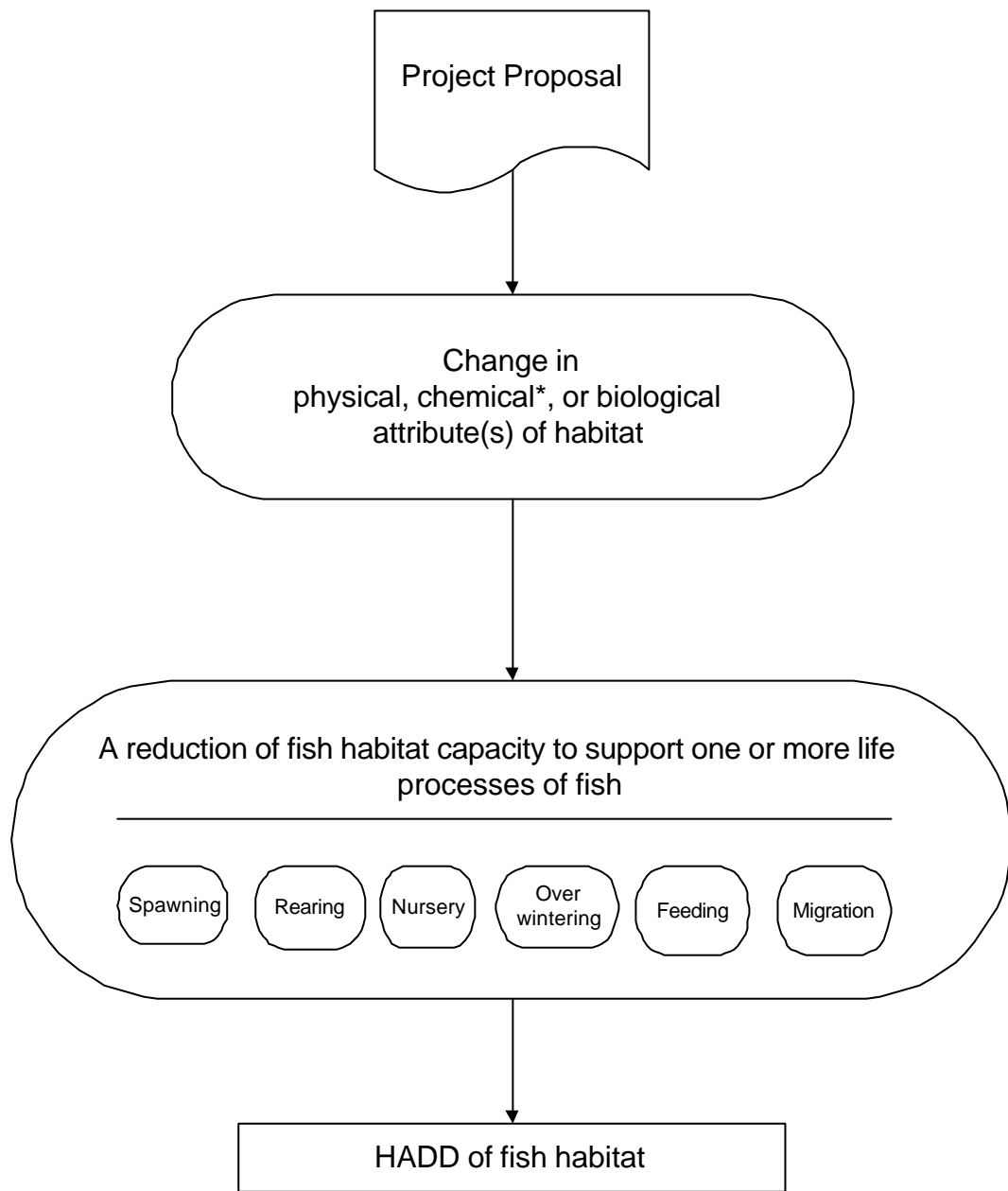
##### 3.2.1.1 A Conceptual Model of HADD of Fish Habitat

Figure 2 illustrates a simple, conceptual model to determine what constitutes a HADD of fish habitat. A HADD can occur when, as a result of project proposal, there is a change in the physical, chemical or biological attributes of fish habitat which is of a type and magnitude sufficient to render the habitat less suitable, or unsuitable, for supporting one or more life processes of fish. That is, a HADD occurs when these changes cause a reduction in the capacity of the habitat to support the life processes of fish.

An assumption implicit in this model is that, as a result of the reduced capacity of the habitat to support the life processes of fish, there will *also* be a loss in the of capacity of the habitat to *produce* fish. This assumption is important because, while Section 35 of the *Fisheries Act* deals solely with a HADD of fish habitat, the No Net Loss guiding principle in DFO's Habitat Policy makes the link between fish habitat and productive capacity, which does deal with the production of fish. Consequently, when reviewing project proposals habitat managers strive, pursuant to the No Net Loss guiding principle, to maintain the current productive capacity of fish habitats supporting Canada's fishery resources, such that the habitat continues to produce fish suitable for human consumption.

It must be emphasized, however, that the linkages between the biophysical attributes of fish habitat which, in turn, support the life processes of fish, and productive capacity can be very difficult to quantify, particularly in the context of individual project reviews. As a result, in their review of projects, habitat managers will normally base their decisions about HADD on whether the predicted impacts, or changes, to those biophysical habitat attributes will reduce the habitat's capacity to support one or more life processes of fish, rather than on a quantitative assessment of potential impacts on productive capacity (i.e., on the production of fish), *per se*. Implicit in their decisions, however, is the notion that where HADD occurs, a reduction in habitat productive capacity would also be anticipated.

While this general approach is applicable to all fish species, each species requires specific physical, chemical and biological conditions that must be taken into consideration in the assessment of impacts of project proposals. The goal of which is to ensure that the habitats of all fish species present which directly or indirectly support a fishery, are not negatively impacted or are addressed during habitat compensation.



\*Only changes that occur as a result of changes to the physical habitat should be included in the determination of HADD. The deposit of deleterious substances is prohibited under Subsection 36(3) of the Fisheries Act.

Figure 2: Conceptual model of how a project proposal may lead to a HADD.

### **3.2.2 Information Required to Determine HADD**

In order to determine the potential impacts of a proposed project on fish habitat, the project's design details, construction methodology, location, scheduling and operation must be reviewed and the direct and indirect impacts analysed. In addition, bio-physical information will also be required to characterise the habitat, to determine the fish species using the habitat at the project site or the area impacted by the project, so as to assess the suitability of the habitat to provide the life requisites for fish and to assess whether the project is likely to result in a HADD.

The level of project detail required to determine HADD depends upon the project and its location, but also depends upon the size, type and complexity of the project (e.g., a detailed site plan complete with engineering drawings may be required for projects with many components). For some projects, a significant amount of information may be required, while for others, brief descriptions may suffice. In some cases and in particular for large projects, required information may include seasonal biophysical data, forecasts of project impacts through detailed analysis and the results of public consultation with regard to fisheries concerns. The Habitat Policy and the C&P Guidelines provide additional guidance.

While it is the responsibility of the proponent to supply the information needed to make a determination, local knowledge of individual reviewers may facilitate the review process for simple projects.

#### **3.2.2.1 Factors Considered in the Determination of HADD**

When determining if a HADD of fish habitat is likely to result, the principal factors to consider include:

- environmental (fish habitat) information;
- fish species, and their respective life stages, use of the habitat, and their sensitivities to habitat changes;
- project impacts to bio-physical attributes such as substrate, aquatic or riparian vegetation, flow, sedimentation, hydrology, water quality (e.g., temperature, turbidity, oxygenation), etc.;
- the type and extent of habitat impacted (spatial context);
- timing of project construction/operation in relation to habitat utilisation;
- details of the project (construction and operation);
- change to the integrity of the habitat, that is whether post-project conditions will lead to future habitat impacts (e.g., erosion);
- short- and long-term impacts to key habitat components and life processes of fish, through the application of conceptual models; and, where appropriate,
- mitigation measures available to avoid or reduce the impacts.

The above is intended to be an overview of factors to be considered during the determination of the potential for HADD of fish habitat, not an exhaustive list of the factors that may be considered when reviewing a project proposal. Detailed consideration of any project will depend upon an understanding

of specific works, undertakings and activities proposed, the species and life stages of fish present which contribute to a fishery, and types of habitat present.

### **3.2.2.2 Uncertainty**

As indicated above, determining if HADD of fish habitat is likely to result requires adequate information about the project, fish habitat characteristics and fish populations in the project area. HADD is determined by combining knowledge of the proposed project with knowledge of the specific habitats and fish populations that may be impacted. In cases where either DFO reviewers or their provincial or territorial counterparts do not have sufficient information, the proponent is responsible for providing, and will be requested to supply, the necessary information. However, in cases where there is doubt about the impact of a project on fish habitat and if sufficient information is not provided to enable for a conclusion that a HADD is not likely to result, reviewers should adopt a precautionary approach and conclude that a HADD is likely to result.

### **3.2.3 Spatial Context**

The determination of HADD is not necessarily related to the size of the area impacted. Although projects which impact smaller areas may often be less harmful than those which impact large areas, it does not necessarily follow that impacts to fish habitat are directly related to the size of the project, as other factors must also be considered. For example, a project which destroys or degrades a small area of high value habitat could be more harmful than one which impacts a larger area of habitat of very low value. It is therefore important that each project be assessed on the nature and extent of habitat to be affected, and decisions made accordingly as to whether or not a HADD is likely to result; or, with respect to subsequent steps in the decision making process, whether an authorization should be issued.

Land-based projects, such as forest harvesting, agriculture, and urbanization, which do not occur directly on or in a water body, can also result in a HADD. Although factors such as area of land impacted and proximity to fish habitat can be important determinants of whether a HADD is likely to result, again, habitat managers must assess impacts in the context of the nature and extent of the habitat to be impacted and make their decisions accordingly.

### **3.2.4 Temporal Context**

In some cases, the timing of project construction/operation to avoid work in or near water during periods when fish are using the habitat can be an effective mitigation measure. Provided that the project will not result in a long-term habitat change during and following construction/operation,

avoiding short-term periods of habitat use (e.g., spawning, egg incubation, migration) may be effective in avoiding a HADD. For example: a wet pipeline crossing of a stream may have some short-term impacts on fish and fish habitat (e.g., instream construction, sedimentation, restricted fish passage). However, pipeline construction is normally only permitted during non-sensitive times of the year (e.g.,

outside expected periods of spawning, egg incubation, migration). This is intended to avoid HADD that may occur as a result of the project. Nevertheless, the avoidance of periods of habitat utilisation may not be sufficient in all cases to lead to a conclusion that a HADD is not likely to result. For example, this may be the conclusion in the pipeline crossing situation, if sedimentation downstream renders spawning habitat unsuitable for species which spawn after construction.

In general, projects that occur over a shorter period may be considered less disruptive than those that occur over a longer period, since it is easier to avoid sensitive periods. Also, the longer the period of disturbance, the greater the potential for causing a HADD (e.g., release of sediment, blockage to fish passage). The evaluation of project duration, timing, impacts, construction methods and available mitigation will determine the best practical means of avoiding or minimising HADD of fish habitat. For projects which involve ongoing activities that could cause a HADD (e.g., water withdrawal, the operation of water control structures), the temporal patterns of construction and operation (e.g., ramping rates) are important considerations to avoid long-term or frequent re-occurring HADD of fish habitat.

### **3.2.5 Impacts of Different Types of Projects**

It is difficult to prejudge whether particular types of projects are or are not likely to result in HADD of fish habitat. HADD is determined by combining knowledge of the proposed project with knowledge of the specific habitat components and fish populations that may be impacted. Since the specific characteristics of both the impacted habitat and the project differ from project to project, the determination of HADD is highly site- and project-specific. It is not merely a question of what is done, but more importantly how it is done, and when and where. It is not so much the type of project as much as the type of habitat that is to be impacted that is the most important factor in assessing the potential impact on habitat from a project. For example, a culvert installation may not necessarily result in a HADD, but any culvert installation on top of brook trout spawning habitat is very likely to result in a HADD. The site-specific environmental differences that occur between projects of the same type can lead, on superficial observation, to a conclusion of inconsistency in approach where none exists.

Guidelines that outline means of mitigating fish habitat impacts are becoming more widely used. An important point to remember is that guidelines are general and may not provide the site-specific and/or project-specific guidance for all cases. As a result, guidelines, even appropriately applied, do not provide absolute assurance that a HADD is not likely to result. If in doubt, the proponent should contact the appropriate management agency to find out whether the proposed project is likely to harm fish habitat.

### **3.2.6 Types of Projects Generally Considered to Likely Result in HADD**

Types of projects to likely result in HADD are those that cause any degree of habitat alteration, disruption or destruction such that adverse effects to habitat attributes are likely to occur, and this would

be expected to reduce the habitat's capacity to support one or more life processes of fish. This may include, but is not necessarily limited to, the following:

- any filling of existing habitat regardless of the purpose, such as encroachments of roads or bridges, piers for bridges or causeways, construction of dikes or breakwaters, marinas;
- substrate removal/alteration such as dredging, in-stream gravel mining, channel maintenance, marine construction, culverts;
- channel diversions;
- prevention or restriction of access to habitat, including ephemeral habitats, such as from dams, dikes, culverts;
- change in the hydrology, hydraulics or geomorphology of a water course including constrictions from culverts and water withdrawal where the remaining flow may be below that required for successful utilisation of the habitat; and
- habitat conversion, or any activity or set of activities such as, water control dams and reservoir creation, which cause a shift in the habitat suitability to favour a different type of fish community.

When there is a project of these types, or when a project results in one or more of these consequences, a conclusion that a HADD is likely to result would usually be reached.

As appropriate (i.e., step 3 in the decision making process), the application of mitigation measures could lead to a conclusion that a HADD is not likely to result. However, the nature of these projects is such that, generally, there would still be a conclusion that a HADD is likely to result even after mitigation measures have been implemented. In some cases, modification of the project design or its location, to eliminate the activity or its impacts, could lead to a conclusion that a HADD is not likely to result.

### **3.2.7 Types of Projects Generally Considered to Not Likely Result in HADD**

In general, there are no projects that occur on or in a water body, coincident with fish habitat utilisation, that are considered to never likely result in a HADD.

Operationally, however, general practice has shown that the application of mitigation measures during periods when fish are not actively utilising the habitat may be sufficient to avoid HADD, especially if the mitigation results in the elimination of the need for instream work(s). For example, an open cut crossing for pipeline installation is more likely to result in a HADD, while crossing techniques such as dam and pump or directional drilling may reduce the potential to cause a HADD.

The application of measures normally considered to be mitigation is not always sufficient to lead to a conclusion that a HADD is not likely to result since the conclusion depends on both the type *and* location of the project. For example, directional drilling of a pipeline crossing under brook trout spawning habitat could be found to likely result in a HADD, even though no instream work was involved, if the sub-stream work were to disrupt the upwelling of groundwater upon which brook trout

depend for successful spawning. However, this does not necessarily mean that a less conservative crossing method (e.g., open cut) would be considered better. What is important is that the potential impacts to fish habitat of various project “options” need to be reviewed to determine which one most effectively protects fish habitat.

### **3.2.8 Tools and Resources that can Facilitate the Determination of HADD**

Tools that can facilitate the fish habitat assessment, and determination of whether or not a HADD is likely to result, include:

- training in fish habitat assessment;
- consolidation and communication of the current understanding of the links between various bio-physical attributes of habitat and the production of fish;
- habitat resource inventories;
- formal checklists of project and bio-physical information required and factors to be considered in making a determination of HADD;
- scientific studies on the quantitative impacts of development which may involve existing knowledge and new knowledge from experimental manipulation and post-project monitoring;
- scientific models to evaluate impacts, links to habitat and productive capacity;
- evaluation of the potential effectiveness of mitigation strategies;
- on-site environmental inspection and co-ordination;
- regional/watershed management plans which establish the expected threshold(s) of development consistent with avoiding cumulative effects;
- fisheries or habitat management plans;
- assessment of the potential cumulative effects of common small-scale projects;
- evaluation of the potential effectiveness of compensation strategies;
- project follow-up and monitoring, especially to determine the effectiveness of compensation actions; and
- a clear understanding by proponents of the decision process.

DFO has been and is continuing to develop the above tools to ensure that fish habitat issues can be identified and addressed in a consistent, timely and effective manner. In some cases, these tools are being developed in co-operation with provincial and territorial counterparts and other federal departments, as well as municipal governments, industry and specific proponents and other stakeholder groups.

### **3.3 CAN THE IMPACTS TO FISH HABITAT BE FULLY MITIGATED?**

The Subsection 35(2) Directive states that the implementation of mitigation must be considered before finalizing a decision about whether a HADD of fish habitat is likely to result. This step in the decision making process addresses this requirement.

Under the Habitat Policy, mitigation is defined as “action taken during the planning, design, construction and operation of works and undertakings to alleviate potential adverse effects on the productive capacity of fish habitats”. Under the Subsection 35(2) Directive, the term mitigation is also meant to include measures which are undertaken to maintain habitat or to prevent residual damage to habitat at the project site or that occurs as a direct result of the project. Mitigation could thus include a wide variety of activities (e.g., redesign or relocation of project components, timing of works, methods of construction or operation) which avoid or minimise changes to habitat attributes and thus minimise impacts to the habitat’s capacity to produce fish.

If, after the application of mitigation, the manager concludes that there will no longer be adverse effects on the habitat’s capacity to support the life processes of fish (Figure 2) and, consequently, that there is not likely to be a loss in the habitat’s productive capacity, then the decision is that a HADD is not likely to result (i.e., as per Figure 1, step 3, “Yes” answer - the impacts can be fully mitigated). But, if the conclusion is that there is still likely to be a reduction in the habitat’s capacity to support life processes of fish and, consequently, there is likely to be a loss in the habitat’s productive capacity, then the decision is that a HADD is likely to result (i.e., as per Figure 1, step 3, “No” answer - the impacts cannot be fully mitigated).

It is acknowledged that any change in habitat, no matter how minor, could be expected to have some effect on fish habitat attributes which support life processes of fish; however, in making a determination of the likelihood of a HADD, habitat managers should determine if, in their professional judgement, such effects would be expected to result in a reduction in the habitat’s capacity to produce fish, relative to the fishery or potential fishery in question. This implies that habitat managers should be able to support their determination of HADD, in at least a qualitative sense, with a logical extension and/or extrapolation of the project’s impacts to at least one of the attributes of fish habitat upon which fish depend, directly or indirectly, to carry out their life processes (e.g., spawning, rearing, nursery, overwintering, feeding, or migration). As mentioned previously, this does not mean to imply that habitat managers would be expected to predict quantitative changes in productive capacity, but rather be able to predict where losses in productive capacity might be expected in light of expected changes to those attributes of the fish’s habitat which support one or more life processes of fish.

### **3.4 SHOULD THE HADD BE AUTHORIZED?**

When a conclusion is reached that a proposed project will likely result in a HADD - even with the application of mitigation measures - an authorization is required for the project to proceed without risking contravention of Subsection 35(1) of the *Fisheries Act*. However, at this point in the process a decision is required about whether the likely HADD of fish habitat is acceptable, and an authorization under Subsection 35(2) is to be issued. It is important to emphasize that this step is different than the subsequent one (i.e., Can the HADD be compensated?), even though the decision made here may include consideration of issues related to compensation (e.g., is compensation even feasible?), or that an outcome of a decision made at the next step may well be the same as that made here (i.e., Figure 1, steps 4 and 5, the “No” decision).

### **3.4.1 Factors to Consider in Deciding Whether to Issue an Authorization**

The determination about whether an authorization should be issued is based upon such considerations as:

- the acceptability of the HADD of fish habitat;
- fisheries management or fish population objectives;
- whether the habitat is supporting an active fishery - where there is no active fishery, there may be more flexibility in the timing of the implementation of compensation;
- importance of the habitat - as per the C&P Guidelines, whether the impacted habitat type is in low supply and/or may be of high value to fish production;
- whether the effects of the HADD will be temporary or permanent;
- whether the HADD will cause a significant change in the capacity of the habitat to produce fish - either because the project will result in a relatively large change, or a small but significant, or cumulative change;
- the availability of technically feasible habitat compensation options, as well as evidence of past success in efforts to compensate for the loss of the type of habitat impacted by the project;
- compatibility with the hierarchy of preference for compensation options, as per the Habitat Policy and the C&P Guidelines; and
- whether the authorization would set a precedent that could lead to future cumulative impacts.

The conditions under which a Subsection 35(2) authorization should be issued are more fully described in DFO’s C&P Guidelines. Note that DFO is not obliged to issue an authorization in situations where adverse impacts to fish habitat are judged to be unacceptable.

### **3.4.2 Cumulative Effects and Authorizing HADD**

The potential for cumulative impacts to fish habitat from a large number of individually “insignificant” projects is a difficult issue faced by fish habitat managers. Although the guiding principle of the Habitat Policy’s Conservation Goal is to ensure the “No Net Loss” of fish habitat productive capacity on a project-by-project basis, it is understood that these “insignificant” project-level impacts may be more significant (i.e., cumulative) if viewed from a different perspective (e.g., a watershed versus site-specific).

Cumulative effects are not a factor in determining whether a HADD is likely to occur in an individual project assessment, but they may influence the decision about whether a HADD will be authorized. In cases where the level of development may already be causing cumulative stress to fish habitat such that the ability to produce or maintain fish is impacted, fish habitat managers may be more reluctant to issue a Subsection 35(2) authorization, particularly if options for compensation are limited. The uncertainty about acceptable levels of development and the risk of establishing precedents leading to significant cumulative effects will normally cause habitat managers to recommend against issuing a Subsection 35(2) authorization. In addition, cumulative effects may also limit the options available for habitat compensation such as in a highly stressed situation or where there is an active fishery. Time to achieve compensation may be limited, whereas, in a less developed area, there may be greater flexibility in both timing and compensation options. Conversely, in areas where broader-scale analyses have been conducted (e.g., watershed management plans) and specific development thresholds identified, habitat managers may be able to identify explicitly the potential for cumulative effects and recommend issuing a Subsection 35(2) authorization (with appropriate compensation) within the established thresholds.

In general, cumulative effects are best addressed through the development of habitat or integrated resource management plans based on fish community or fisheries management objectives. The Habitat Policy encourages and promotes the development and implementation of such plans, as well as the need for habitat decision making to be undertaken in the context of such plans.

### **3.5 CAN THE HADD BE COMPENSATED?**

#### **3.5.1 Compensation**

Compensation is defined in the Habitat Policy as “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”. Any instruction, action, intervention, construction or undertaking to offset an unmitigated impact to fish habitat, in order to achieve the No Net Loss of fish habitat productive capacity should thus be considered as an effort towards compensation.

It is important to understand that habitat compensation does not include financial means for compensating for tangible economic losses but deals only with actions intended to maintain the net production potential of fish habitat. It should also be noted that compensation is not an option for

projected habitat damage as a result of the introduction into fisheries waters of a deleterious substance. As per Subsection 36(3), or the subsequent regulations under Subsection 36(5) of the *Fisheries Act*, these deposits are to be controlled at their source. Issues involving silt should either be dealt with in terms of a HADD, when considering physical impacts such as smothering of spawning areas or otherwise, under the provisions of Subsection 36(3) of the *Fisheries Act*, which prohibit the introduction of a deleterious substance to fisheries waters.

On-site compensation is an option where site rehabilitation can be successfully undertaken. Compensation can also take place off-site and is normally the only option when there are long-term impacts to habitat or it is simply destroyed, on-site. It is often difficult to predict the success of compensation measures. Since the relationship between the quantity and quality of fish habitat and fish production is not well understood, project reviewers are often concerned that compensation measures may not completely offset a HADD of fish habitat resulting from a project development. If a habitat manager is making decisions about the adequacy of the proposed fish habitat compensation measures when detailed quantitative analysis is not available, then the manager should seek to achieve compensation which is at least equivalent with respect to the quantity and quality of habitat impacted by the project. The goal of No Net Loss of productive capacity is thus applied not as a rigid quantitative rule, but as a guiding principle.

Even though a proponent may be willing to undertake compensation, issuance of a Subsection 35(2) authorization with compensation specified is viewed as the least preferred approach. Because the success of compensation in maintaining productive capacity is not always certain, the preferred approach (i.e., the hierarchy of preferences) is to fully mitigate impacts to such an extent that a HADD is not likely to result. The first step in applying the hierarchy is to try to avoid impacts through relocation or redesign of the project. If impacts remain, then the next step is to identify specific mitigation measures, such as timing windows. If a HADD is still expected to occur then the manager determines if appropriate compensation is possible.

The Habitat Policy and the C&P Guidelines provide additional details on this hierarchy of preferences for achieving No Net Loss of productive capacity, including a description of the preferred hierarchy for compensation options. A key consideration in applying the hierarchy is the need to take into account fisheries management objectives. Where there are no applicable fisheries management objectives, the hierarchy of preferences remains relevant.

The rationale behind the hierarchy is based on the acknowledged uncertainty, and difficulty, in quantifying productive capacity, as discussed previously in Section 3.2.1.1. Given this, it is assumed that there is a greater likelihood of achieving No Net Loss by maintaining, to the extent possible, the existing integrity, structure, and function of the attributes of fish habitat which sustain a fish's life processes. Consequently, with respect to compensation, the intent of the hierarchy is to provide for the replacement of the impacted habitat with similar habitat as close as possible to the impacted area. This is in order to maximize the potential for achieving No Net Loss, without actually requiring the comparison of productive capacity before and after project development.

### 3.5.2 Mitigation versus Compensation

The differences between mitigation and compensation can be understood in the context of the following example. A proposal is put forward to construct a bridge across a river with support piers in the river being constructed on an area of feeding habitat. Any potential impacts to fish habitat could be eliminated by relocating the bridge to avoid the habitat or modifying the design to a clear span which would not require pier construction or encroachment on the habitat. These types of redesign actions would be considered as mitigation, leading to a conclusion that a HADD is not likely to result, since fish habitat impacts were avoided in the first place. Similarly, redesign that reduces the size of the piers would be considered a partial mitigation. Another example of mitigation, for a project that will result in inputs of silt, would be the implementation of a sediment control plan using such measures as silt curtains, check dams, settling ponds, buffer strips, etc. Offsetting the HADD to fish habitat caused by pier construction, or by silt smothering, by creating similar habitat on-site or off-site would be considered compensation.

## 4.0 Relationship of Subsection 35(2) Authorizations to the *Canadian Environmental Assessment Act (CEAA)*

This discussion deals only briefly with the administration of the *Canadian Environmental Assessment Act (CEAA)*, in context of Subsection 35(2) authorizations under the *Fisheries Act*. Further details regarding the relationship between the CEAA and Subsection 35(2) authorizations are found in the DFO CEAA Guidelines document. In addition, the DFO CEAA Guidelines document discusses how the manager should address other requirements of CEAA, such as matters related to other federal jurisdictions (e.g., migratory birds) that may also be affected by a project proposal.

Under the CEAA, DFO is required to conduct an environmental assessment of most project proposals prior to issuing a *Fisheries Act* Subsection 35(2) authorization. The exception is in those cases where the project is of a type to which the CEAA does not apply (e.g., physical activities requiring a Subsection 35(2) authorization which are not described on the *Inclusion List Regulations*, made pursuant to Subsection 59(b) of the CEAA). Note that pursuant to Subsection 35(2) Directive, Subsection 35(2) are for authorizing a HADD of fish habitat and are not intended to authorize works or undertakings (i.e., the project).

A CEAA environmental assessment should be initiated concurrently with the determination, in either step 2 or 3 of the decision making process (Figure 1), that a project is likely to result in a

HADD, and an authorization is therefore likely to be required. Prior to issuing an authorization, a CEAA environmental assessment must be completed and the conclusion must be that, after taking into account any mitigation measures, the adverse environmental effects are not significant, or, if they are significant, they are justifiable in the circumstances. For the purposes of an environmental assessment made under the CEAA, the CEA Act defines the term “mitigation” such that it includes both mitigation

and compensation, as defined in the Habitat Policy. Generally, in those situations where a habitat manager has concluded that a likely HADD can be mitigated and/or compensated to achieve No Net Loss then the manager would also conclude that impacts to fish habitat are not considered significant pursuant to CEAA and issue a Subsection 35(2) authorization with appropriate conditions.

If the decision is that the likely HADD is unacceptable (i.e., DFO is not prepared to issue a Subsection 35(2) authorization), DFO would terminate the CEAA assessment and not issue the authorization. Where the impacts of a project to fish and fish habitat are unknown, or compensation not feasible or unknown, but a determination of the acceptability of impacts cannot be made, then the project would normally be referred to a mediator or public review, as prescribed by the CEAA. DFO would not issue an authorization until a decision was made pursuant to the completion of the CEAA process, that either impacts to fish habitat would not be significant, or that they would be significant, but justifiable in the circumstances.

If, in those cases where the decision is that the likely HADD is unacceptable (i.e., DFO is not prepared to issue a Subsection 35(2) authorization), but where the proponent wishes to appeal this decision on technical grounds, or where the proponent is of the view the project should proceed on the basis of social, economic or other benefits to Canadians, the Habitat Policy provides for an appeal process.

In response to a request for an appeal, and in certain cases (e.g., major projects that have potential for significant environmental and fish habitat impacts, and/or socio-economic or policy implications), the following general approach may be appropriate: DFO would inform the proponent of its decision not to issue a Subsection 35(2) authorization and indicate that if the proponent wishes to pursue the project, DFO would be prepared to make written representation to the Minister of Environment that the project go to a CEAA panel. In so doing, it should be made clear to the proponent that DFO will maintain its position, when making submissions to the CEAA panel, that there are unacceptable impacts to fish habitat associated with the project. Subsequent to the release of the panel's report, DFO's decision as to whether or not an authorization will be issued, and the appropriate compensation, if any, to be applied, would be based on the recommendations set out in the panel report, as approved by Governor in Council.

By taking this general approach, DFO officials would be able to make their decisions based on the nature and extent of impacts to fish habitat. It would provide a formal, open, public process for other factors, such as socio-economic considerations, to be examined and provide the Minister with a broader, supportable rationale for authorizing, or not authorizing, a HADD likely to result from such major projects.

## **5.0 References**

Department of Fisheries and Oceans. 1986. *Policy for the Management of Fish Habitat*.

Department of Fisheries and Oceans. 1998. *Habitat Conservation and Protection Guidelines*.

Department of Fisheries and Oceans. 1995 (under revision). *A Guide to the Implementation of CEEA by DFO's Marine Environment and Habitat Directorate.*

Department of Fisheries and Oceans. 1995. *Directive on the Issuance of Subsection 35(2) Authorizations.*

The House of Commons of Canada. 1994. *Canadian Environmental Assessment Act.*

The House of Commons of Canada. 1985 (amended list 1991) *Fisheries Act.*

## **Appendix I: Glossary**

### **Harmful Alteration of Fish Habitat**

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.

### **Compensation**

Compensation is defined in the Habitat Policy as: “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”.

Compensation may occur either on-site or remote from the project site based upon the hierarchy of preferences listed in the Habitat Policy and C&P Guidelines. Any instruction, action, intervention, construction or undertaking to offset an unmitigated reduction in productive capacity in order to satisfy the no net loss guiding principle, can be considered as compensation.

### **Conservation Goal**

The first goal of the Habitat Policy is to maintain the current productive capacity of fish habitats supporting Canada’s fishery resources, such that fish suitable for human consumption may be produced. The Conservation Goal is implemented using the no net loss guiding principle.

### **Destruction of Fish Habitat**

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.).

### **Disruption of Fish Habitat**

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

### **Fish**

Fish is defined in the *Fisheries Act* as: “includes (a) parts of fish; (b) shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and (c) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals”.

### **Fishery**

Fishery is defined in the *Fisheries Act* as: “includes the area, locality, place or station in or on which a pound, seine, net, weir or other fishing gear or equipment is used, set, placed or located, the area, tract or stretch of water in or on from which fish may be taken by the pound, seine, net, weir or other fishing gear or equipment, and the pound, seine, net, weir or other fishing gear or equipment used in connection therewith”.

**Fish Habitat**

Fish habitat is defined in the *Fisheries Act* 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”. Fish habitat is comprised of those physical, chemical and biological attributes of the environment which are required by fish to carry out their life processes (e.g., spawning, nursery, rearing, feeding, overwintering, migration). It consists of those freshwater, estuarine and marine environments that directly or indirectly support fish stocks of fish populations that sustain, or have the potential to sustain, subsistence, commercial or recreational fishing activities.

**Harmful Alteration, Disruption or Destruction of Fish Habitat (HADD)**

Although not defined in the *Fisheries Act*, HADD of fish habitat is defined here as: any change in fish habitat that reduces its capacity to support one or more life processes of fish. In assessing a project proposal for its potential to cause a HADD, habitat managers identify changes to the bio-physical attributes of fish habitat that would be of a type and magnitude sufficient to render the habitat less suitable, or unsuitable, for supporting a fish’s life processes.

**Mitigate**

Mitigation is defined in the Habitat Policy as: “actions taken during the planning, design, construction and operation of works and undertakings that alleviate potential adverse effects on the productive capacity of fish habitats.” Under the Subsection 35(2) Directive, the term mitigation is meant to include measures which are undertaken to maintain habitat or to prevent residual damage to habitat at the project site or that occurs as a direct result of the project. Mitigation could thus include a wide variety of activities (e.g., redesign or relocation of project components, timing of works, methods of construction or operation) which avoid or minimise changes to habitat attributes and thus minimise impacts to the habitat’s capacity to produce fish.

**No Net Loss (NNL)**

No Net Loss is defined in the Habitat Policy as: “A working principle by which the department strives to balance unavoidable habitat losses with habitat replacement on a project-by-project basis so that further reductions to Canada’s fisheries resources due to habitat loss or damage may be prevented.” The NNL principle is fundamental to achieving the Habitat Policy’s Conservation Goal.

**Potential Fishery**

A fish stock or fish population capable of supporting a subsistence, commercial or recreational fishery but which is not currently being exploited.

**Productive Capacity**

Productive capacity is defined in the Habitat Policy as: “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”.