



Information Requirements for Proposed Works and Activities Related to New Log Handling Facilities in Coastal British Columbia

Introduction

The purpose of this document is to provide clear and concise advice to the Coastal Forest Industry on the information that is required for Fisheries and Oceans Canada (DFO) to conduct an effective and timely *Fisheries Act* review for proposed log dump applications. Information outlined in this document will facilitate consistent and complete information packages and lead to improved coherence and predictability for DFO regulatory reviews consistent with our legislative mandate under the *Fisheries Act* and *Canadian Environmental Assessment Act*.

The information package applies to the construction and operation of new log handling facilities in marine waters which may consist of installation of a new layer of rock armour, skidway(s), bullpens, anchors, boom stick containment, barge grids, log storage and associated float camp facilities such as docks, fuel barges and walkways.

Under the federal *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. Applications will be reviewed to determine consistency with:

- The *Fisheries Act*
- *Policy for the Management of Fish Habitat* (Risk Management Framework)
- *Canadian Environmental Assessment Act* (CEAA)
- *Species at Risk Act* (SARA)
- *Navigable Waters Act*

Siting and design are key considerations in determining acceptability of anticipated impacts. DFO requires a thorough description of the proposed works and anticipated impacts to the present marine environment. Outlined within this document are information requirements for regulatory review for most new marine log handling facilities, however, DFO may require additional information if the potential risk to fish and fish habitat as a result of the proposed project is high. Additional detail on risk assessment is provided in sections E and F, and Appendices 1 and 3 of this document.

DFO Project Review Process – Preparing a Proponent Application

DFO requires the information outlined below to assess:

- a) The productivity of the existing aquatic environment; and
- b) The scale and severity of the potential impacts which may result from the proposed log handling activity; and
- c) Appropriate Mitigation and / or Compensation required for addressing anticipated impacts to fish/fish habitat.

A qualified professional (QP) should prepare the attached Information Requirements (on page 5) to ensure that appropriate information is included in the submission. A QP is defined as an applied scientist or technologist, where the individual is registered and in good standing in British Columbia with an appropriate professional organization that is constituted under an Act, acting under that organization's code of ethics and subject to disciplinary action by that organization.

To streamline potential provincial and federal approvals and review processes, applicants are encouraged to identify potential regional and site-specific requirements of the Integrated Land Management Bureau (ILMB – the lease application), Ministry of Environment (MoE- *Waste Management Act* permits), Environment Canada (EC), the *Navigable Waters Protection Act*, and other agencies before preparing the application (Appendix 1).

DFO recommends that early in the project planning stages applicants share the attached project information with First Nations.



Applications shall include the following information:

- A) Contact information for Proponent, Contractor and Consultants
- B) Location of Proposed Development
- C) Description of the Aquatic Environment
- D) Description of the Proposed Development
- E) Fish and Fish Habitat Impacts that may Result from the Project
- F) Measures to Mitigate Effects on Fish and Fish Habitat
- G) Measures to Compensate for Residual Effects on Fish and Fish Habitat
- H) Documentation of First Nations Engagement

A) Contact information for Proponent, Contractor and Consultants

Provide the name, mailing address, phone and fax numbers, and email address for each of the following, if applicable:

- Proponent
- Contractor in charge of carrying out the work described in this development proposal
- Consultant (i.e., qualified professional)

B) Location of Proposed Development

Describe the log handling site location in detail, include:

- Nearest community
- Municipality, District, Township, County, Province
- Name of the watercourse(s) or water body(ies) likely to be impacted by the proposed development
- Coordinates of the proposed development (i.e., GPS or UTM coordinates)
- A map and/or directions

All information from sections A and B should be included directly on the *Information Requirements Form* located on page 5 of this document.

C) Description of the Aquatic Environment

Describe in detail the existing marine riparian, intertidal and subtidal areas within and adjacent to the proposed log handling facility. Your description of the aquatic environment must include the following information:

- Physical description of area (including current and tidal activity; terrestrial topography and submarine bathymetry; characteristics of benthic substrate; proximity of streams or estuaries; proximity to other industrial usage in the area)
- Biotic description of fish and fish habitat characteristics (including diversity and relative abundance of flora, sessile fauna, and motile fauna; potential feeding, spawning, and migration activities)
- Still photographs and/or underwater video of the aquatic environment where the project will occur.
- A pre-development plan view figure for the entire assessment area, should be prepared. General marine plant categories (eg. rockweed, eelgrass, bull kelp, salt marsh, etc.), other notable habitat features (reef outcrops, shellfish beds, etc.) and areas of wood debris accumulation should be sketched to scale directly on a copy of the site plan.
- Cross-sectional bottom profiles should be prepared for each transect, indicating water heights at HHWM and at chart datum.

Prior to the initiation of field assessment, it is expected that a thorough review of relevant literature will be conducted in order to ensure that potential impacts to fish and fish habitat are known. The marine environmental assessment for the proposed development site shall follow the protocol outlined in Appendix 2, unless professional judgment dictates that modifications to the protocol are required to adequately assess the site.

D) Description of the Proposed Development

Describe in detail the proposed log handling project (construction and operations) and provide a detailed site plan, including schematic drawings. Indicate how the works are to be carried out, describe the machinery and materials that will be used, the maintenance and operational requirements and decommissioning plans. A project implementation schedule that includes construction and operational activities and applicable fisheries timing windows should be included. The project description should include the following information:



1. Brief overview of proposed operation (proposed activity, start/end dates, volume and species of wood).
2. Detailed components of the proposed log handling development (construction and operation). Include methods, construction materials to be used, heavy equipment to be employed and any maintenance requirements.
3. Plans, maps or drawings (preferably on 11" x 17" paper) prepared by a qualified professional and in accordance with Transport Canada / Navigable Waters Protection Division (TC/NWPD) requirements. Drawings should include dimensions/depths and or a scale bar at the bottom of the page.
 - o A large scale overview location map approximately 1:50,000 in scale
 - o A small scale overview location map approx. 1:20,000 in scale
 - o A plan view sketch of the proposed log handling construction works (i.e.: installation of rock armour, skidway(s), bullpens, anchors, boom stick containment, barge grids, log storage and associated float camp facilities such as docks and walkways) should be superimposed over the site plan, so that the effect of the project on navigation, fish habitat and the existing wood debris deposit area, is clear. Maps should be presented at in 1:2000 scale or less (multiple maps may be appropriate).
 - o Cross sectional profile drawings (1:2,000 scale or less) of structures within the operational area.
4. Project Implementation Schedule –detailed implementation plan for the log handling project, including timing of proposed construction and deconstruction phases, timing of construction and operational monitoring and timing of construction of fish habitat compensation (if required).
5. Details of the life expectancy of the project and include decommissioning plans.

E) Fish and Fish Habitat Impacts that May Result From the Project

1. Discuss anticipated impacts to fisheries and fish habitat productivity resulting from your project.
2. Identify the nature, duration, magnitude and location of potential impacts and effects on adjacent areas and fish habitats.
3. Prepare habitat assessment/impact analysis employing DFO Pathways of Effects and Risk Management Framework (http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/risk-risques_e.asp)

F) Measures to Mitigate Effects on Fish and Fish Habitat

Describe all actions, including contingency plans, which will be taken to avoid or reduce adverse effects of the project on fish and fish habitat.

1. Describe efforts made to redesign or relocate project to avoid or minimize impacts to fish and fish habitat and rationale for final plan design/location;
2. Describe all fish and fish habitat protection measures applicable to the project (for land based and water based operations). Include all measures that will be taken to avoid or reduce any anticipated impacts during construction, operation and decommissioning of the log handling facility (consider potential impacts and applicable mitigation that could be applied to break Pathways of Effects – see Appendix 3).
3. Provide a Debris Management Plan that describes all mitigation measures (Best Management Practices [BMPs], actions, contingencies) that will be taken to avoid or reduce the generation and deposition of woody debris (logs, bark, log chunks, slabs, etc.) in fish-bearing fresh or marine waters that may be generated from the log handling facility and may pose a risk to impacting fish and fish habitat or navigation. Debris management Plans should include:
 - Measures for reducing wood generation on land and in-water operations.
 - Measures for containing wood and bark on land and in-water operations.
 - Monitoring (daily log book records) of the debris management measures taken.
4. Sediment, runoff and erosion control plans, which emphasize minimizing disturbances and source control.
5. Describe procedures for sheen or spill monitoring and response.
6. Describe the environmental monitoring plan that will be developed and implemented.

G) Measures to Compensate for Residual Effects on Fish and Fish Habitat

In cases where a harmful alteration, disruption and/or destruction (HADD) of fish habitat cannot be avoided, and if these impacts are deemed unavoidable and appropriate, DFO may require habitat compensation consistent with DFO Operating Policies. Any proposed habitat compensation measures should be developed consistent with DFO's Hierarchy of Compensation Options outlined in the [Practitioners Guide to Habitat Compensation For DFO Habitat](#)



Management Staff. As appropriate for your proposed development, describe compensation measures you propose, and include the following information:

1. Outline the objectives of the proposed habitat compensation plan (how will the proposed compensation offset the anticipated impacts to fish and fish habitat identified for the proposed project). Describe the general nature of proposed compensation works with a supporting rationale to confirm the plans are biologically sound, technically feasible, and based upon practical and proven techniques;
2. Identify the proposed location(s) for the compensation for the compensation works (geo-referenced – UTM's with photographs);
3. Concise description of how and when compensation habitats will be constructed;
4. Estimate the net amount of area (m²) of habitat that is expected to be created for each location and habitat type (riparian, intertidal, subtidal, instream, etc.);
5. Confirm land tenure and legal access to the site and/or that the location can be legally controlled and/or written approval from all affected tenure holders is obtained;
6. Include concept drawings (detailed engineering drawings are not required);
7. Provide an estimated cost of compensation measures (i.e. construction, and monitoring);
8. Describe a monitoring plan that will ensure that compensation measures are completed and functioning as intended (Refer to Appendix 4). Monitoring Plans should extend a number of years (depending on the nature of the habitat that is constructed) beyond the construction period to ensure the habitat is functioning as intended. Include a contingency plan to adjust or repair the compensation habitat should it be unsuccessful in meeting the objectives stated within the *Fisheries Act* Authorization.

H) Documentation of First Nations Engagement



INFORMATION REQUIREMENTS FORM LOG HANDLING

Fisheries and Oceans Canada
Pacific Region

Request for Review under the Habitat Provisions of the *Fisheries Act*

Please submit this form to DFO, HMP along with your development proposal. Be sure to fill out sections A and B carefully and refer to the information requirements requested in sections C through G as you complete your development proposal. This form must be submitted with all other required information, by mail to DFO. Incomplete submissions will be returned to the proponent, noting submission deficiencies. You must notify DFO at least 10 business days prior to planned construction start date.

Submission date:

Project title:

A) Contact information for Proponent, Contractor and Consultants	
Name of Proponent:	Name of Contractor/Agency/Consultant (<i>if applicable</i>):
Mailing address:	Mailing address:
City/Town: Province/Territory: Postal Code: Tel. No. : Fax No.: Email:	City/Town: Province/Territory: Postal Code: Tel. No.: Fax No.: Email:
B) Location of Proposed Development	
Describe the log handling site location in detail:	
Name of Nearest Community (<i>City, Town, Village</i>):	Municipality, District, Township, County, Province:
Name of watercourse(s) or water body(ies) likely to be impacted by the proposed development:	Coordinates of the proposed development in latitude / longitude and Universal Transverse Mercator Grid [UTM] coordinates:
Include a map or directions (<i>showing access routes, i.e., water, air</i>) to access the proposed development site ¹	

¹ Maps should include (NWPD-DFO approved): Site Reference: 1:50k, Overview: 1:20 and Site Plan: 1:2k with UTM or Lat/Long Coordinates



INFORMATION REQUIREMENTS FORM LOG HANDLING

Fisheries and Oceans Canada Pacific Region

Sections C through G attached as an included report:

- C) Description of the Aquatic Environment
□ D) Description of the Proposed Development
□ E) Fish Habitat Impacts that may result from the project
□ F) Measures to Mitigate Effects of Fish and Fish Habitat
□ G) Measures to Compensate for Residual Effects on Fish and Fish Habitat

I, _____ (print name) certify that the information given on this form is to the best of my knowledge, correct and completed.

Signature: _____

Date: _____

Position: _____

Information about the above-noted proposed work or undertaking is collected by DFO under the authority of the Fisheries Act for the purpose of administering the fish habitat protection provisions of the Fisheries Act. Personal information will be protected under the provisions of the Privacy Act and will be stored in the Personal Information Bank DFO-OCE-010. Under the Privacy Act, Individuals have a right to, and on request shall be given access to any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at www.infosource.gc.ca or in Government of Canada offices. Information other than "personal" information may be accessible or protected as required by the provision of the Access to Information Act.



Log Handling Office Information

Area 1: Queen Charlotte City

Send all log handling applications to Queen Charlotte City DFO Office:

P.O. Box 99
137 Bay Street, Queen Charlotte City, B.C. V0T 1S0
Tel: (250) 559-4412
Fax: (250) 559-4678

Area 2: Prince Rupert

Send all log handling applications to Prince Rupert DFO Office:

Suite 228-417 2nd Avenue West, Prince Rupert, B.C. V8J 1G8
Tel: (250) 627-3449
Fax: (250) 627-3480



Area 3: Bella Coola

Send all log handling applications to Bella Coola DFO Office:

P.O. Box 130
293 Mackenzie Highway, Bella Coola, B.C. V0T 1C0
Tel: (250) 799-5729
Fax: (250) 799-5540

Area 4: Campbell River

Send all log handling applications to Campbell River DFO Office:

315-940 Alder Street, Campbell River, B.C. V9W 2P8
Tel: (250) 850-5701
Fax: (250) 286-5852

Area 5: Madeira Park

Send all log handling applications to Madeira Park DFO Office:

P.O. Box 10
12841 Madeira Park Road, Madeira Park, B.C. V0N 2H0
Tel: (604) 883-3050
Fax: (604) 883-3051

Area 6: Nanaimo

For marine log handling, send applications to Nanaimo DFO Office:

3225 Stephenson Point Road, Nanaimo, B.C. V9T 1K3
Tel: (250) 756-7270
Fax: (250) 756-7162

Area 7: Lower Fraser

a. For log handling located upstream of Kanaka Creek on mainstem of the Fraser River, Stave River, Stave Lake, Harrison River and Harrison Lake, send applications to Mission DFO Office:

32873 London Avenue, Mission, B.C. V2V 6M7
Tel: (604) 814-1079
Fax: (604) 814-1064

b. For log handling located within FREMP and BIEAP areas (Fraser River downstream of Kanaka Creek, Pitt River downstream of Pitt Lake, Boundary Bay and its tributaries, Roberts and Sturgeon Banks, Burrard Inlet to Point Atkinson), send applications to Vancouver Fraser Port Authority:

100 The Pointe, 999 Canada Place, Vancouver, B.C. V6C 3T4
Tel: (604) 665-9000
Fax: 1 (866) 284-4271

c. For log handling located in Pitt Lake and in Howe Sound including Gibsons and up to Point Atkinson, send applications to Annacis Island DFO Office:

Unit 3-100 Annacis Parkway, Delta, B.C. V3M 6A2
Tel: (604) 666-8266
Fax: (604) 666-6627



Appendix 1 – Applicable Legislation

Applicable Federal Legislation, Policies, and Guidelines

Fisheries Act

The *Fisheries Act* (<http://laws.justice.gc.ca/en/F-14/60370.html>) provides protection for fish and fish habitat in Canada. The *Fisheries Act* defines ‘fish’ as “shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals” and 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” (Section 34[1]). The definition of habitat includes water, surrounding vegetation and substrate. Harmful alteration, disruption or destruction of fish habitat (HADD) is prohibited under Section 35(1) of the Act unless specifically authorized by DFO (Section 35(2) and no person may pollute water frequented by fish (Section 36). The Fishery Act’s *Marine Mammal Regulations* (<http://laws.justice.gc.ca/en/showtdm/cr/SOR-93-56//?showtoc=&instrumentnumber=SOR-93-56>) also list prohibitions concerning disturbance and killing of marine mammals.

DFO’s Policy for the Management of Fish Habitat (http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/policies-politique/operating-operation/fhm-policy/index_e.asp) seeks to increase productive capacity of fish habitat through conservation, restoration and managed development. The conservation objective is guided by the principle of No Net Loss which can be achieved in several ways: relocating proposed developments to avoid damaging habitats of higher value; mitigating to reduce impacts of proposed developments (e.g., building around sensitive habitat, shutting down at specific times of year, etc); and building compensatory habitat where impacts are unavoidable and the project is in the public interest. When a project is likely to cause a HADD, DFO policy requires proponents to explore alternatives such as modifying the design or relocating the project to avoid or reduce the HADD.

DFO’s Risk Management Framework (http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/index_e.asp) further guides DFO’s application of the HM Policy and emphasizes the application of the *Pathways of Effects* and related *Risk Management Framework*, along with development of new tools to address low risk activities. The Risk Management Framework for habitat management requires consideration of both effect severity and habitat sensitivity for assessment purposes.

Species at Risk Act

Species listed under the *Species at Risk Act* (SARA - <http://laws.justice.gc.ca/en/S-15.3/index.html>) are afforded protection from harassment, destruction of residences and harm to their critical habitats. In marine coastal waters of BC, certain whale species, leatherback turtles, and abalone are currently listed under SARA. Information on species listings can be found on DFO’s website (<http://www.dfo-mpo.gc.ca/species-especes/regions/Pac/pacific-index-eng.htm>) and Canadian Wildlife Service’s website (http://www.sis.ec.gc.ca/ec_species/ec_species_e.phtml). Additional information on SARA is available on Environment Canada’s National Species at Risk Registry website (http://www.sararegistry.gc.ca/default_e.cfm).

Navigable Waters Protection Act

The *Navigable Waters Protection Act* (NWPA – <http://laws.justice.gc.ca/en/N-22/87026.html>), administered by Transport Canada, protects the public right of navigation in all navigable waterways and coastal areas across Canada. Though navigation is not directly related to fish or fish habitat, installation of docks, booms and other in-water facilities will require a review under the NWPA.

Canadian Environmental Assessment Act

Log dump designs which necessitate a *Fisheries Act* authorization or a permit under the *Navigable Waters Protection Act*, will trigger a review under the *Canadian Environmental Assessment Act* (CEAA – <http://laws.justice.gc.ca/en/C-15.2/29026.html>). CEAA is administered by the Canadian Environmental Assessment Agency and requires federal authorities to conduct environmental assessments of proposed projects or activities for which they are the proponent or financier, or when a federal permit, authorization, or licence is required. Since the habitat provisions of the *Fisheries Act* include authorization responsibilities, DFO must subject project proposals (that require an authorization) to CEAA assessments to ensure that all environmental concerns are addressed. The



process for conducting environmental assessments as required by CEAA is outlined in a CEA Agency Practitioner's Guide (http://www.ceaa-acee.gc.ca/013/0001/0008/Part2_e.htm).

Provincial Review

Log handling application packages are available at the Front Counter BC (<http://www.frontcounterbc.gov.bc.ca/>) and the Integrated Land Management Bureau (<http://ilmbwww.gov.bc.ca/>). These sites also include review procedures and provide access to forms required to meet BC provincial requirements.

Guidelines

For additional information on log handling issues please consult the following sources:

- Guidebook, *Environmentally Sustainable Log Handling Facilities in British Columbia* (available online at <http://www-heb.pac.dfo-mpo.gc.ca/publications/pdf/274124.pdf>).
- *Best Management Practices (BMPs) for Re-activated Log Dumps in Marine Waters of British Columbia* (available online at <http://www.dfo-mpo.gc.ca/Library/334410.pdf>)
- *Best Management Practices (BMPs) for Helicopter Log Drop Sites in Marine Waters off British Columbia*. (available online at <http://www.dfo-mpo.gc.ca/Library/334408.pdf>)
- Information sheet, *DFO's Regulatory Role for Marine Log Handling Facilities in Coastal BC*.



Appendix 2 – Marine Assessment Protocol for Assessing Fish Habitat

General Conditions

A marine underwater assessment will be conducted according to established DFO/Industry protocol both **prior to** and, where appropriate, **following** construction and operation of the log handling facility. The assessments will be conducted by a qualified professional.

- a) **Pre-Operational Assessment:** Complete an intertidal/subtidal assessment of the log dump site **prior to construction and operation** commencing and submit to DFO as part of the project review process. Follow the Log Dump - Marine Assessment Protocol for Assessing Fish Habitat below (also available from the DFO Habitat Management offices).
- b) **Post-Operational Assessment:** Within 60 days of the closure of a log dump operation an underwater site assessment should be completed. The 60 day window may be extended when site conditions (i.e. weather, water clarity, etc.) prohibit effective reassessment.

In specific circumstances, when a pre-dive assessment by a qualified professional indicates that the potential for adverse impact to fish habitat at a site are negligible, a post-operation dive assessment may not be required.

Follow the Log Dump - Marine Assessment Protocol for Assessing Fish Habitat below (also available from the DFO Habitat Management offices).

Submit a Post-Closure Monitoring Report to DFO within 90 days of cessation of activities (where practicable) at the log dump site. Describe the dates and specifics of operations conducted, status of site decommissioning, area impacted by wood debris, etc. Provide a summary of any issues that had the potential to impact fish habitat and how they were addressed, as well as a brief summary of debris management mitigation measures that were applied, and their effectiveness.

Specific Conditions

This protocol has been developed to provide direction on the appropriate marine assessment methods to employ for assessing the effects of log dump construction and operation on fish habitat. It is applicable to new log dump sites and re-activation of existing (formerly used) log dump sites where a HADD is expected to occur. Preliminary on-site examination of the perceived highest impact areas should provide the initial information from which to determine the expected degree of fish habitat impact for a specific site. All marine assessments must be conducted by a qualified professional. This protocol may be used for both a pre-operational and a post-operational assessment at log watering facilities.

1.0 INTRODUCTION

Marine foreshore projects have the potential to affect fish² and fish habitat³. Fisheries and Oceans Canada (DFO) is responsible for the protection and management of fish habitat under the authority of the *Fisheries Act*. Presented below are standardized, transect-based assessment procedures intended to provide Industry and DFO with the basic information required to determine the effects of proposed log handling projects on fish habitats. Where practicable, the assessment should be conducted April 1 through October 31 (generally the most productive period for fish habitat) or at a time when the site can be appropriately assessed for fish habitat and wood debris impacts.

² shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals;

³ 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;



2.0 **METHODS**

2.1 **Defining the Assessment Area**

The assessment area should include the entire area where potential impacts to the marine environment may occur. This should include the skidway area, bullpen area, barge grids, camp tie-up areas, log storage areas, and the area that may potentially be covered by the debris fan that may result from dumping logs. Information regarding local currents, winds and bathymetry and should be considered as they may influence debris distribution.

Provide a context for the project in order to determine possible cumulative effects related to the proposed construction and operational activities associated with log handling. An impact can only be demonstrated by comparison with controls. Therefore, it is important to have both temporal and spatial controls in a before-after-control-impact (BACI) survey design. The initial environmental survey for a new log handling facility acts as a pre-development baseline study which future monitoring and survey efforts can be compared against. A thorough baseline study is necessary for assessing future impacts and attributing any changes in environmental parameters to the development project. The assessment should include the entire area where potential impacts to the marine environment may occur. For comparative purposes, a control site in the adjacent marine area should also be surveyed to monitor changes in the area over time.

Prepare a large scale site plan, preferably an enlargement of the hydrographic chart, with a small scale insert of the general geographic location to serve as a base map of the study area. If site is a recovered log dump, include locations and extent of previous operational areas (skidway, booming areas, etc.). Include locations of the assessment surveys.

2.1.1 **Background Information**

Background research through available databases should be done to outline current and historical industrial uses of the surrounding area, as well as proximity to commercial fisheries and First Nations uses. Presence and proximity of known marine mammal haul outs or migration routes, and anadromous streams should be noted.

2.1.2 **Reconnaissance Survey**

A reconnaissance boat tour, snorkel swim and/or walking tour around the upland site should be undertaken, in order to focus the assessment effort on areas of greatest potential impact. The reconnaissance survey should give a general assessment of the entire area, and identify both control and impact study areas.

2.2 **Survey of Assessment Area**

2.2.1 **Guidelines for Establishing Transects**

Transects should be established perpendicular to the shoreline, and will normally extend from the HHWM (highest high water mark) through the intertidal, and extend far enough to assess the portion of the marine environment that has the potential to be impacted. This should be done to a minimum depth of 20m in order to assess a representative sample of the fish habitats. Each transect should be established laterally along the shore for as far as the effects of log handling on the environment at the site are expected to occur, even if the debris field is projected to extend beyond the applied-for tenure. Each individual transect must be numbered, geo-referenced, and delineated on the maps and site plans submitted.

Professional judgment of the assessor will determine the number, length, spacing and orientation of transects. Control and impact transects should be established to survey areas both within and beyond the expected impact footprint. Conditions influencing transect location should consider the location of industrial activity proposed for the future, and where any previous industrial impacts may have occurred in the past. Other conditions to consider are the variability of fish habitats supported by the site, and the size of the proposed tenure. At a new log handling site, the entire foreshore area potentially impacted must be assessed in a comprehensive manner. At a former log dump site, the skidway location may require two or more transects within a few meters of each other to properly define the area of impact from former log handling, while at the rest of site, enough transects should be established to determine the presence of sensitive habitat and to define the potential effects of the proposed log dump on the



fish habitats present. The nature of local site conditions (uniformity of shoreline, tides and currents, habitat variability, bathymetry, geography, fetch, geology, pre-existing wood debris footprint, etc.) must be considered. At a minimum, the skidway site, and any areas suspected of being impacted by log handling debris must be defined by transects.

Use of SCUBA and underwater video is recommended for examination of transects at both new and re-activated sites. SCUBA methodology allows the assessor more ability to identify specific areas of concern or interest during the survey, as opposed to ROV or drop camera methodologies. ROV/drop camera transects may be conducted if proposed log handling activities have the potential to affect deeper benthic habitats.

Habitat observations and depth measurements should be recorded every 10m along each transect. More detailed inspection may be warranted when there are significant changes in habitat characteristics or wood debris accumulations. All depths are to be converted to chart datum tide conditions. The lowest normal tide (0.0m), or chart datum, will be used as the reference point for the measurement of tidal height and water depth to accompany the assessment. Tidal height is recorded as positive relative to chart datum, while water depth below chart datum will be recorded as a negative value (e.g. if the assessment is made when the tide is at 2.0m, and a record is taken at a water depth of 8.0m, then the depth will be recorded as -6m). Tidal height will be corrected using the closest secondary port to the reference port found in the Canadian Tide and Current Tables, with further correction made for daylight savings time as required.

Assessment of the survey transects should include observations on the physical environment, biological environment, and pre-existing impacts.

2.2.2 Physical Environment

Reporting of the physical environment observed along transects should include depth and underwater bathymetry, and benthic substrate type (Table 1). Observations shall be recorded along each transect and captured in the video survey.

Table 1. List of substrate types and accompanying definitions for use in underwater assessments

Substrate	Definition
Silt / Clay / Mud	Loose sedimentary deposit; <0.06mm
Sand	Loose granular material; 0.06 – 2mm
Gravel	Loose rounded fragments of rock; 0.2 – 64mm
Cobbles	Loose stone larger than gravel, smaller than a boulder; 64 – 256mm
Boulders	A detached mass of rock; >256mm
Bedrock	Solid rock underlying unconsolidated surface material
Shell Hash	Shell fragments of various organisms
Wood debris	Fine-coarse and large as defined below

Additional parameters to be recorded for the area include: maximum and average tide & current activity in the area; general onshore topography and underwater bathymetry of the surrounding area; general water chemistry including presence of a freshwater lens.

2.2.3 Biological Environment

Reporting should include text detailing presence and relative abundance of marine flora and fauna for each transect. A general description of habitat characteristics for each of the foreshore, intertidal and subtidal areas should be included. Common and scientific names for the organisms encountered during the survey should be used throughout the text, tables and appendices. Estimates of abundance for marine plant life, sessile animals and motile animals within the survey area shall be recorded along each transect and captured in the video survey. Abundance estimates can be counts, percent coverage, or relative estimates, depending on the particular organism being assessed.



Marine plants include rooted vascular vegetation (eelgrass, salt marsh vegetation) and marine algae (seaweed/kelp). Marine plant observations are usually recorded as percent areal coverage, although counts of individual plants can be made where few are encountered. The presence of occasional sprigs of eelgrass in sediment-covered wood debris may be indicative of a recovering fish habitat and should be assessed with care, applying sound professional judgement. Although not classified as a marine plant, bacterial mats such as *Beggiatoa* (sulphur-fixing and indicative of decaying organic matter) can be encountered in marine areas where wood waste is present. Quantification of bacterial matting should also be made via percent areal coverage estimates.

Many marine invertebrate animals become permanently attached to the substrate as part of their life history. These animals may also function as habitats that are important to fish. Barnacles, mussels and oysters are examples of animals that function as fish habitat in rocky intertidal areas of the marine environment, such as rip rap armour slopes of log handling sites. Quantification of sessile animals is typically conducted via percent areal coverage estimates along the transect line, although individual counts may be considered in some instances.

Motile animals include finfish and marine invertebrates such as crabs and snails. These should be counted and recorded individually along the transect line where possible, or, in cases where they are too numerous, estimates of their numbers should be recorded. Estimates will most likely be applied to species such as schools of herring or other forage fish or mysid shrimp that occur in large numbers. Flatfishes, prawns and shrimp are often seen in association with large chunks of wood debris; in this case, the impact of log handling is still present, but motile animals have begun to use this habitat for feeding and as cover. The presence of large clams or juvenile fish in association with scattered marine vegetation such as eelgrass shoots or benthic kelp may be indicative of a recovering environment or a productive environment if it is a newly proposed log dump without historic impact, and should be assessed with care, employing sound professional judgment.

2.2.4 Pre-existing Impact (If site has been previously used for industrial activity, but does not meet the criteria to be considered a re-activation under the Re-activation BMP)

Assessors should record evidence of previous anthropogenic impacts to the area. This includes the presence of industrial refuse, sunken logs, bark chunks, fine woody debris or logging refuse such as wire rope, boom chain or other debris, etc.

Precise delineation of pre-existing impact footprint at a log handling site is essential for quantifying the impact of previous industrial activities. Methods employed need to be capable of quantifying both the area and depth of accumulated debris. These methods must also be capable of measuring the “new” wood debris that may be deposited at the site once the proposed forestry operations are completed.

Reporting should include areal coverage, thickness, and type of debris observed along transects. The terms in Table 2 should be used when describing wood waste and other debris along transects. This will provide a consistent approach to describing the nature of the debris at each site:

Table 2. Debris categories for impact assessments of log handling facilities.

Fine Wood Waste	Coarse Wood Waste	Large Wood Waste	Other
- small wood pieces - woody silt	- defined strips - small branches - sticks - bark	- large branches - stumps - logs - log bundles	- cable - steel pipe - glass - refuse - etc

When previous industrial operations at the site are known, level of recovery from previous impact should be recorded. The following categories and criteria in Table 3 should be used when recording and interpreting pre-existing impact observational data.



Table 3: Pre-existing impact categories for assessing log handling facilities.

Pre-existing Impact	Criteria
No - Low	<ul style="list-style-type: none"> - 0% - 33% wood debris coverage - Little or negligible wood debris present - No habitat scouring - Flora remains rooted in/on substrate - Infaunal organisms abundant (substrate dependent) - Species assemblages, diversities and abundances present
Moderate	<ul style="list-style-type: none"> - 34-66% wood debris coverage - Wood debris < 2.5cm depth - Occasional flora present (rooted and up-rooted), subject to substrate - Occasional infauna present (substrate dependent), but indicative of impacted environments - Flora and infaunal species assemblages are different compared to native assemblages, diversities and abundances
High	<ul style="list-style-type: none"> - 67-100% wood debris coverage - Wood debris > 2.5cm thick - Rooted flora absent - Infauna absent or indicative of highly impacted industrial environments

If wood waste is encountered graduated ruler probe/rebar stakes should be set out within, and along the perimeter, of any pre-existing impact footprint so to provide a means to monitor future deposition and dispersal of wood debris originating from the new log handling facility. Similarly, debris baskets may be established at key locations throughout the anticipated area of impact. The post-use assessment will locate the geo-referenced stakes or baskets to determine whether additional wood debris deposition has occurred at the various reference points noted throughout the site. Interpretation of this data will allow for quantification of the effects of any new debris deposited on fish habitats. Care must be taken, however, to factor in other impacts of industrial use such as sediment deposition and relocation of stakes/baskets caused by physical disturbance resulting from dumping or boom boat activity.

3.0 MAPPING

A plan view figure for the entire assessment area, pre-development, should be prepared. General marine plant categories (i.e.: rockweed, eelgrass, bull kelp, salt marsh, etc.), other notable habitat features (reef outcrops, shellfish beds, etc.) and transect locations should be sketched to scale directly on a copy of the site plan.

A plan view sketch of the proposed log handling construction works (i.e.: installation of rock armour, skidway(s), bullpens, anchors, boom stick containment, barge grids, log storage and associated float camp facilities such as docks and walkways) should be superimposed over the site plan, so that the effect of the project on fish habitat and the existing wood debris deposit area, is clear. Maps should be presented at in 1:2000 scale or less (multiple maps may be appropriate).

Cross-sectional bottom profiles should be prepared for each transect, indicating water heights at HHWM and at chart datum.



4.0 VIDEO AND STILL PHOTOGRAPHY

Video and still photographs provide a real-time record of the fish habitat characteristics of the site and can be used to assess future impacts of proposed new or re-activated log dumps, based on detailed site monitoring.

A labelled copy of video transects should be submitted with the assessment report. The video footage should be referenced with additional information (time, date, depth, heading etc.) for later analysis. A written or recorded interpretation should accompany the video.

Aerial photos are often useful as well, and these should preferably be taken at low tide. Such photographs will help the assessor to put the site into context with the surrounding area, and verify information provided from other sources. Photographs taken of the site from both land and water should also be included within the report.

5.0 SUMMARY – PRE-OPERATIONAL ASSESSMENT

The following information should be provided with the Pre-Operational Assessment:

1. A base map showing tenure area boundaries, surrounding area, transect locations, site specific sampling stations and major construction items such as skidways, barge grids, float camps, boom boat tie-ups, shoreline areas scheduled for armouring or log storage areas, etc.
2. A shoreline video and still photographs of the intertidal zone.
3. A CD ROM copy of the underwater video along each established transect. Still photographs can also be provided.
4. A detailed assessment with interpretive data for each transect which describes fish habitat observations (include depth profile diagrams of each transect showing slope, sediment types, major marine plants or animals and areas of wood debris deposition observed).
5. Fish habitat areas and locations of wood or industrial debris deposit map(s) for the entire tenure area showing locations of different substrate types, riparian and marine plants, invertebrate and vertebrate animals must be provided. Relate these areas to proposed operational infrastructure (skidways, barge grids, float camps, boom boat tie-ups, shoreline areas scheduled for armouring or log storage areas, etc.).
6. Interpretive summary and description of fish habitats present or associated with the proposed log dump site in relation to possible recent historic industrial use or wood debris deposits. How has past use of the site impacted fish habitats and to what degree have they recovered from former industrial activity?



POST-OPERATIONAL ASSESSMENT

The objective of the post-operational assessment is to confirm that construction and operation of the log dump did not result in an increase to the originally applied-for log dump site footprint and has not resulted in a negative impact on fish or fish habitat at the site beyond what has been accounted for in a letter of advice or habitat authorization. The post-operational assessment should:

- a. confirm whether or not the construction and operational activities occurred outside of the approved log dump lease area;
- b. confirm whether or not the construction and operational activities resulted in an increase to the existing habitat impacts associated with the original log dump application site;
- c. confirm if effective mitigation measures were implemented to prevent negative impacts to important and sensitive fish habitats that may be in close proximity to the site;
- d. confirm that only the authorized HADD has resulted and that appropriate fish habitat compensation has been applied to the site (compliance and effectiveness monitoring).

The Marine Assessment Protocol for Assessing the Effects of Log Dump Construction on Fish Habitat described above shall be used by the qualified professional to conduct the post-operational assessment. Applicants may wish to contact your local DFO Habitat practitioner for advice before proceeding with the post-operational assessment.

Components of the Post-Operational Assessment

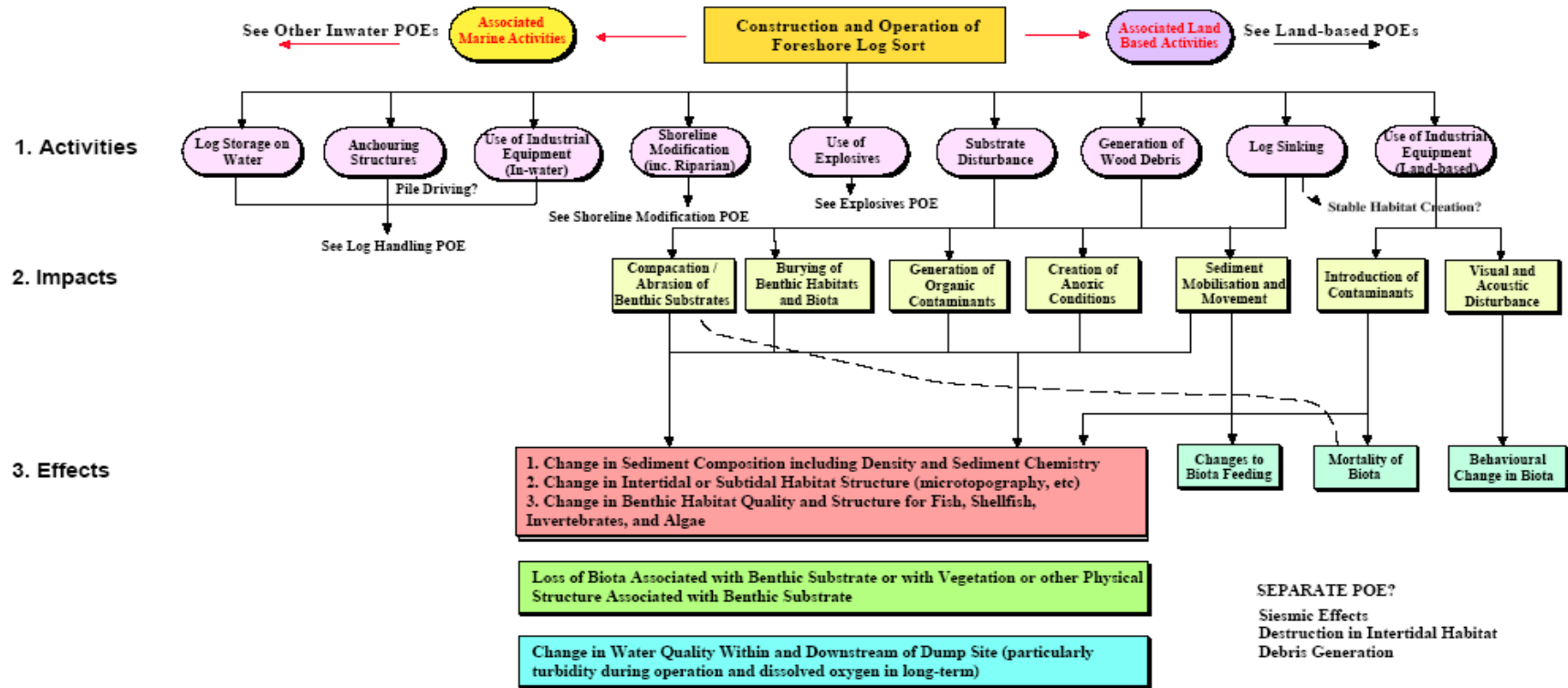
The following information should be provided with the Post-Operational Assessment:

1. A base map showing tenure area boundaries, surrounding area, transect locations, site specific sampling stations and major construction items such as skidways, barge grids, float camps, boom boat tie-ups, shoreline areas scheduled for armouring or log storage areas, etc.
2. A shoreline video and still photographs of the intertidal zone.
3. A CD ROM copy of the underwater video along each established transect. Still photographs can also be provided.
4. A detailed assessment with interpretive data for each transect which describes fish habitat observations (include depth profile diagrams of each transect showing slope, sediment types, major marine plants or animals and wood debris deposition areas observed).
5. Fish habitat areas and locations of wood or industrial debris deposit map(s) for the entire tenure area showing locations of different substrate types, riparian and marine plants, invertebrate and vertebrate animals must be provided. Relate these areas to proposed operational infrastructure (skidways, barge grids, float camps, boom boat tie-ups, shoreline areas scheduled for armouring or log storage areas, etc.).
6. Interpretive summary and description of fish habitats present or associated with the proposed log dump site in relation to possible recent historic industrial use or wood debris deposits. How has past use of the site impacted fish habitats and to what degree have they recovered from former industrial activity?



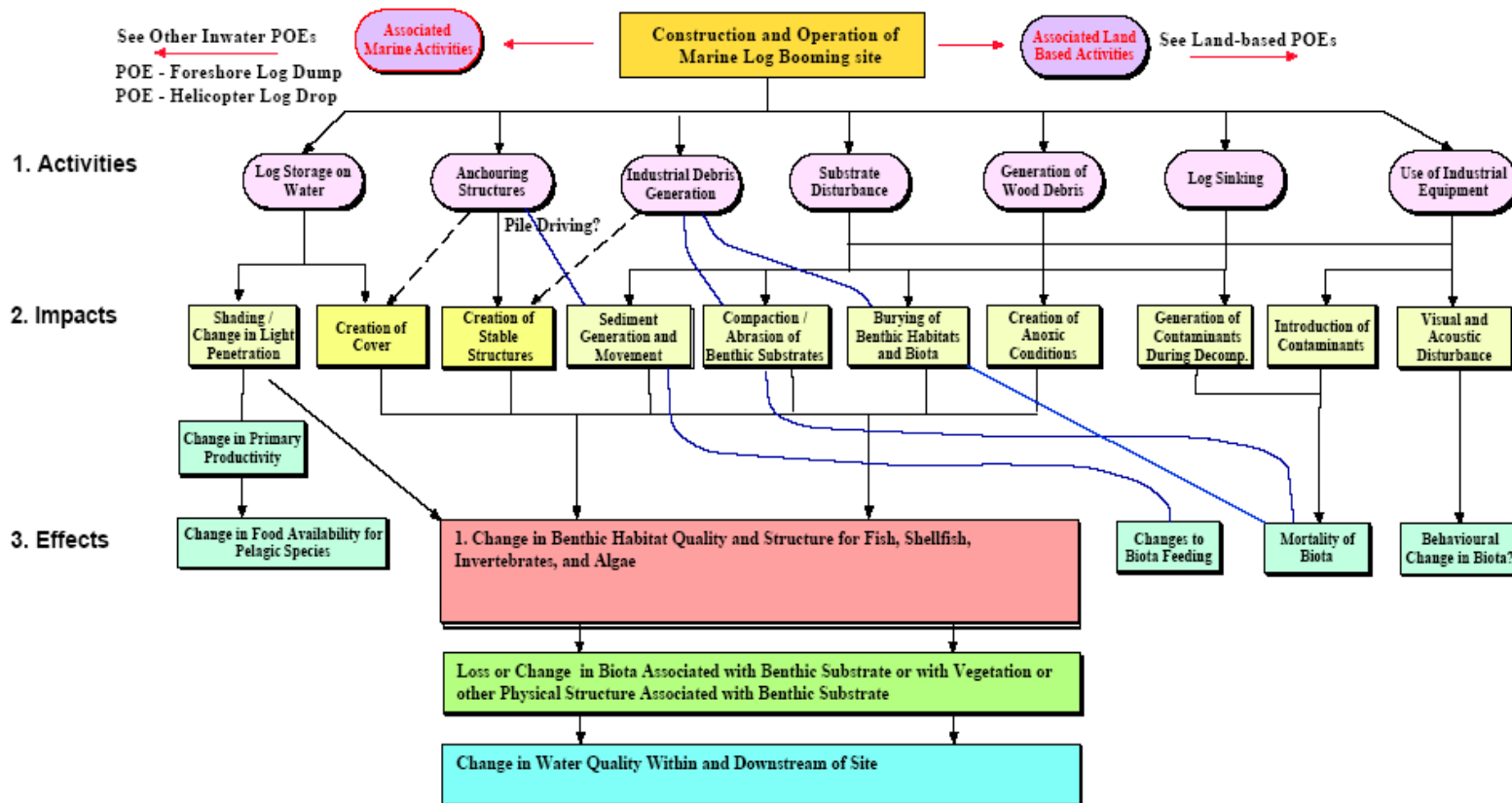
Appendix 3 – Pathways of Effects for Log Handling Facilities

A: Pathway of Effect – Foreshore log sort



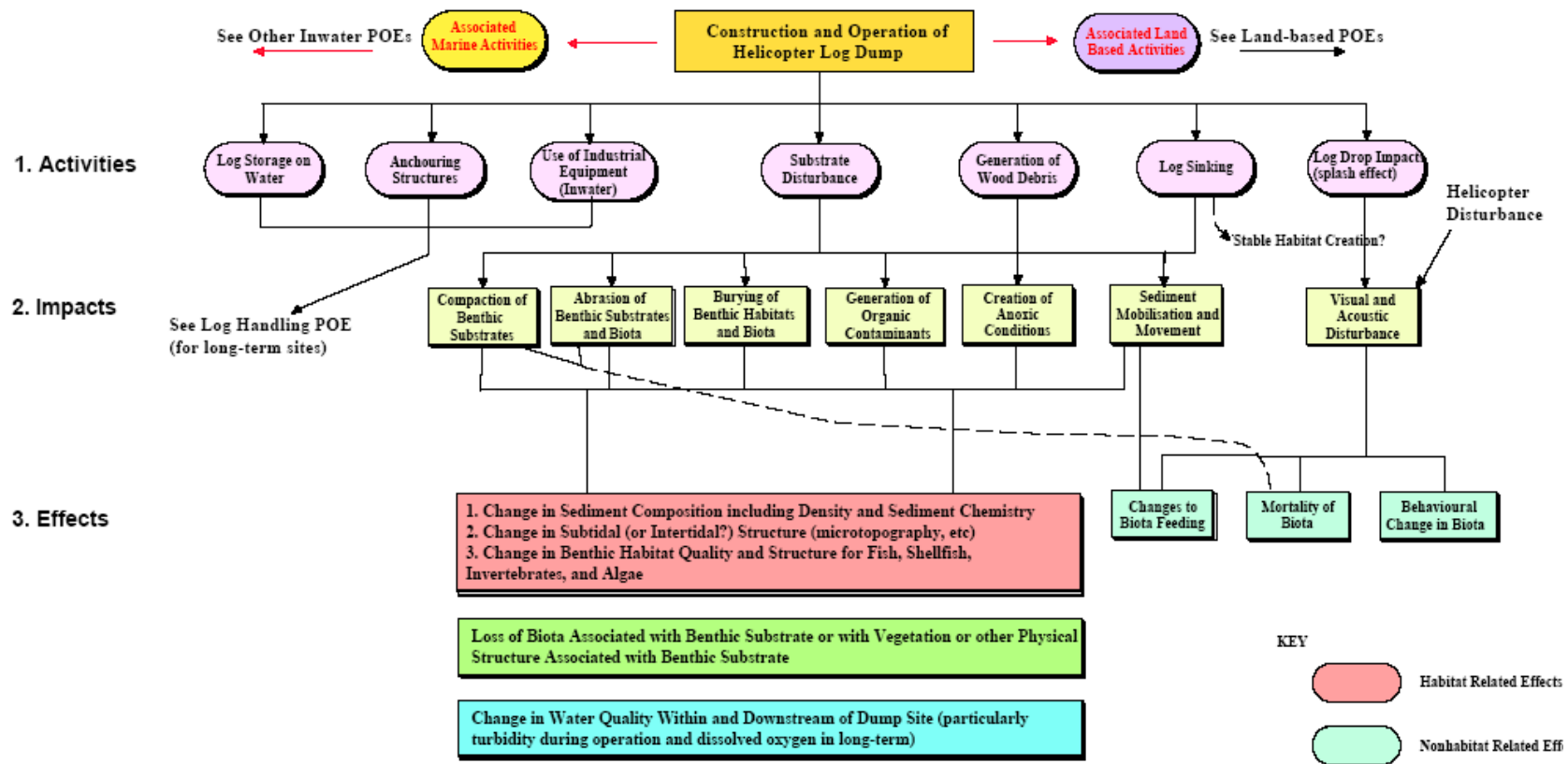


B: Pathway of Effect -In water Log Handling and Storage



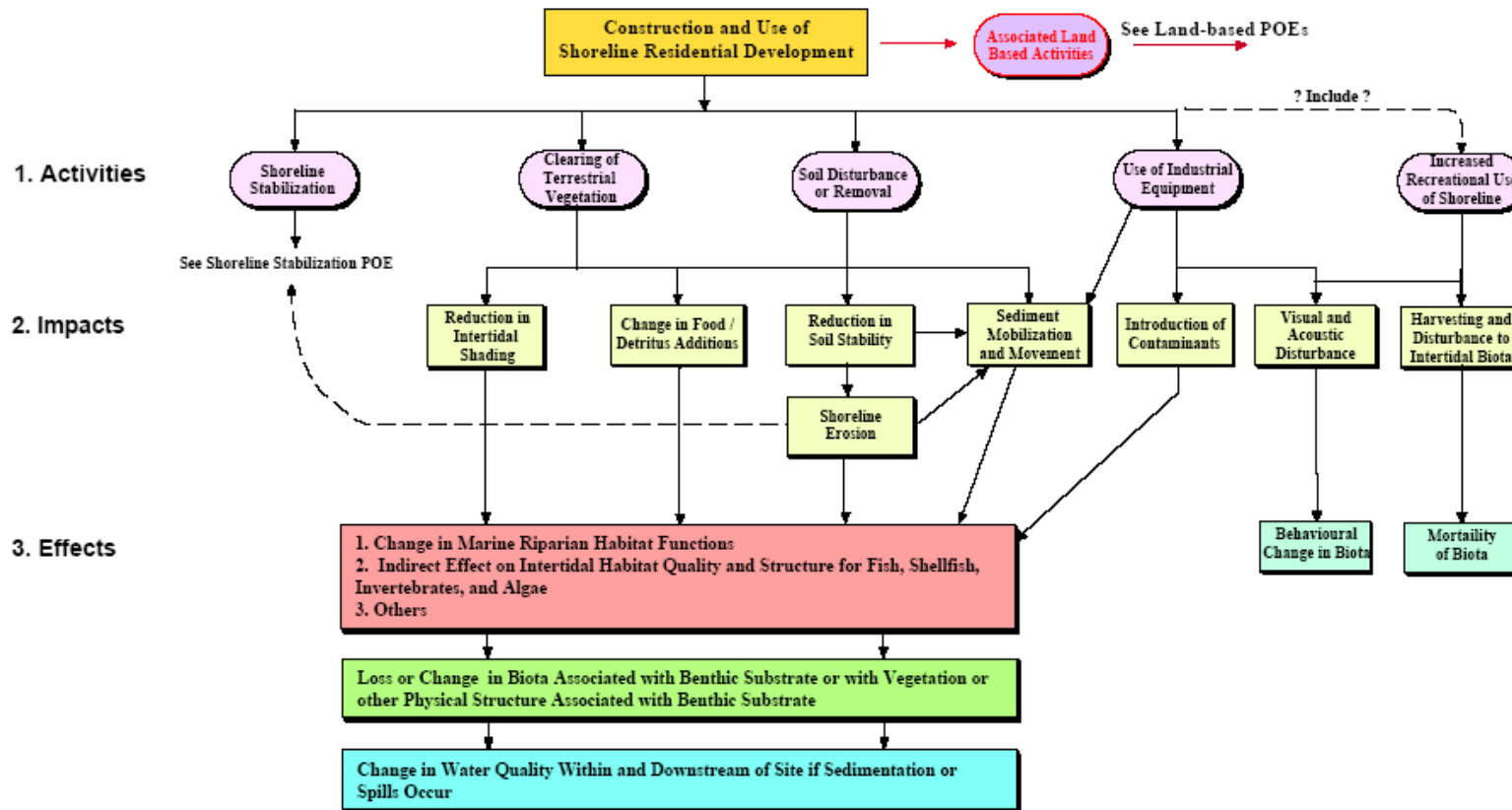


C: Pathway of Effect - In-water Helicopter Log Dumps





D: Pathway of Effect - Backshore / Foreshore Development





Appendix 4 – Guidelines for Monitoring Works Related to New Log Handling Facilities

POST-OPERATIVE MONITORING

The objective of the post-operational assessment is to confirm that construction and operation of the log dump did not result in an increase to the originally applied-for log dump site footprint and has not resulted in a negative impact on fish or fish habitat at the site beyond what has been accounted for in a letter of advice or habitat authorization. The post-operational assessment will assess residual impacts from the log handling facility. An impact is identified as a change in quality or quantity of the biological or physical environment. The observations from the post-operational assessment should be compared against the observations recorded in the pre-operational assessment report so that environmental changes can be identified. This comparison is important for quantifying the magnitude of impact and evaluating the effectiveness of mitigation measures used.

Monitoring should be conducted by a qualified professional and take place on both the compensation site and at the de-activated facility.

Monitoring of Compensation

Compensation works should be monitored for two purposes: (1) to determine if they are in compliance with authorization conditions, (2) to determine the effectiveness of the compensation habitat. Consult your local DFO Habitat Practitioner for direction on what level of monitoring is required for the project.

1) Monitoring should consist of baseline information, an assessment of the completed compensation and a reporting and maintenance program. Within 60 days following construction compliance monitoring should be completed. Compliance monitoring will verify that the compensation project is being carried out as per the Authorization and to ensure that all established commitments contained in the Authorization were fulfilled. The compliance monitoring report should include at minimum:

- A basemap showing locations of structures built,
- Still photographs of operations,
- Underwater video footage of the compensation structure to act as a baseline,
- Written summary of operations conducted with reference to the project Authorization,
- Size measurement quantifying the structure.

2) Effectiveness-monitoring of the compensation will be conducted to determine whether the compensation is functioning, and will continue to function as intended. Functioning compensation will be identified by significant establishment of marine biota indicating an increase in biomass measured over the time period from installation to termination of monitoring. Compensation must offset the loss of the log handling development. A monitoring schedule of 1, 3, and 5 years post-installation of the compensation project should be implemented, however the duration of monitoring is at the discretion of DFO and is dependent upon the complexity or uncertainty of the works.. Monitoring should continue long enough to determine whether the compensation will function, or is functioning properly. The effectiveness-monitoring reports should include:

- Underwater video footage of the compensation structure,
- Description and quantification of colonizing marine biota,
- Interpretive summary describing changes from the initial baseline survey and level of effectiveness of the compensation.

If, over the course of the monitoring, it is determined that the conditions of the compensation plan have not been met or the compensation is not functioning as intended consult your local DFO Habitat Practitioner for advice.



Monitoring of De-activated Facility

The de-activated log handling facility should have a similar monitoring schedule as outlined above for the compensation site. The post-operational assessment will act as the compliance monitoring following de-activation of the site, as well as a baseline for which future environmental recovery can be measured against. Refer to “Appendix 2: Marine Assessment Protocol for Assessing Fish Habitat – New Log Handling Facilities” in *Information Requirements for Proposed Works and Activities Related to New Log Handling Facilities* for survey protocol and reporting requirements of the post-operational assessment.

Monitoring of the de-activated site in conjunction with the compensation site (where in close proximity to one another) verify that de-activation measures were effective and that No Net Loss of fish habitat has occurred. A similar monitoring schedule of 1, 3, and 5 years (or 1, 5, and 10 years, dependent upon the complexity or uncertainty of the works) post-operation could be done for the site of the log handling facility. In most cases, monitoring of the de-activation site should continue along the same duration as the corresponding compensation. Consult your local DFO Habitat Practitioner to determine duration and level of monitoring required for de-activated site. The effectiveness-monitoring reports should include:

- Underwater video footage,
- Measurement of area & depth of impact footprint,
- Interpretive summary describing state of recovery and changes from the initial post-operational assessment, confirming impacts have not spread to habitats beyond authorized HADD area.