Fisheries and Oceans Canada | Pêches et Océans Canada

Coast Forest Products Association

BCTS BC Timber Sales

Version 1 July 2008

Best Management Practices (BMPs) for Re-activated Log Dumps in Marine Waters of British Columbia

The objective of this Best Management Practice (BMP) is to describe the applicable conditions and measures to incorporate for the **re-activation of an existing log dump site** to avoid negative impacts to fish, fish habitat and marine mammals.

This BMP **will not apply** to re-activated Log Dump sites:

- In a Federal Marine Protected Area;
- That are sited in important fish habitat areas: estuaries of anadromous fish-bearing streams, tidal flats, salt marshes, shellfish beds, eelgrass beds, kelp beds, productive rocky reefs, active marine mammal haul outs or other important fish habitats;
- That involve subtidal blasting or dredging to activate the site.

This BMP **may not apply** to re-activated sites:

- That include the use of an existing filled causeway (filled road or isthmus out to a log dump site), not previously authorized under section 35(2) of the *Fisheries Act*;
- Where watered wood volumes are projected to be greater than initial wood volumes.

This Best Management *Practice (BM*P) applies to the construction and operation of a re-activated log dump facility 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. The marine riparian, intertidal and subtidal foreshore areas within and adjacent to log dump sites are potential feeding, spawning, migration habitat for a variety of aquatic organisms, including fish and marine mammals.

Potential effects to fish, fish habitat and fisheries associated with log dump operations include:

1. reduced or degraded water quality from the introduction and decomposition of wood debris (foreshore and seafloor) and the potential introduction of deleterious substances such as sewage, sediment and hydrocarbons;
2. shading or smothering of marine animals and vegetation from log bundles, booms, camps and submerged woody debris;
3. physical alteration and disruption of intertidal and subtidal fish habitat from grounding logs, accumulations of woody debris, installation of a new layer of rock armour on the face of the log dump and installation of skidways and establishment of bullpens;
4. disrupting critical life history stages of fish and marine mammals from in-water activities, wood debris and noise; and
5. disrupting commercial, recreational and subsistence fisheries (fish and shellfish) due to blocked access, habitat impacts and contamination.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. 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. You may proceed with the reactivation project without a DFO review if you can meet the conditions outlined in the following sections.

- **Siting Criteria Conditions;**
- **Debris Management Plan Conditions;**
- **Measures to Protect Fish and Fish Habitat;**
- **Marine Assessment Protocol; and**
- **BMP Notification Form**

If you cannot meet all of the conditions listed in the above sections, your project may result in a violation of subsection 35(1) of the *Fisheries Act*. If this is the case, this BMP may not be applicable to your project and a DFO review may be required. Non compliant conditions must be identified and documented as described on the Notification Form.

You are required to comply with all municipal, provincial, and/or federal legislation (including the Species at Risk Act http://www.dfo-mpo.gc.ca/species-especes/home_e.asp) that applies to the work being carried out in relation to this BMP document.

You must notify DFO 10 working days before starting your work by filling out and sending the BMP Notification: Re-activated Log Dump Sites in Marine Waters of BC and required project information directly to the appropriate DFO Area Office. This information is required to evaluate the effectiveness of the work carried out in relation to this BMP. A copy of the BMP and notification form must be on the work site and available upon request.

For additional information on broader log handling issues, mitigation measures and provincial application considerations, please consult and adhere to the *Guidebook, Environmentally Sustainable Log Handling Facilities in British Columbia* (available online at http://www-heb.pac.dfo-mpo.gc.ca/publications/pdf/274124.pdf)

Siting Criteria Conditions

1. Construction and operation of the re-activated log dump must not result in an increase to the original log dump site footprint (intertidal and subtidal marine foreshore) and must occur within the previously approved lease area and/or impacts must be confined to the areas previously authorized under Section 35(2) of the *Fisheries Act*.
2. If it is known that the site was previously authorized under section 35(2) of the *Fisheries Act*, include the file number with the notification submission.
3. A thorough intertidal and subtidal assessment of the log dump re-activation site m*ust be comple*ted by a qualified marine biological professional prior to the commencement of any construction or operation of the facility (see Appendix 1 - *Re-activated Log Dump - Marine Assessment Protocol for Assessing Fish Habitat and Wood Debris Deposition).*
4. When the intertidal and subtidal a**s**sessments confirm:
    a. that the site remains degraded, and that the proposed re-activation construction and operational activities will not result in an increase to the existing habitat impacts associated with the original log dump: **you may proceed with notification**;
    b. that the site remains degraded, but is within 100m of important fish habitats listed on page 1: consult your qualified marine biological professional for appropriate measures to implement in order to prevent negative impacts to these habitats. Document measures that will be implemented in the notification process;
    c. that significant biological recovery within the former log dump site has occurred, with zero to low levels of wood debris accumulations (areal coverage): consult your qualified marine biological professional and contact your local DFO Habitat Management office for advice.
5. Locate log storage areas such that no part of the enclosed area is in water that is less than 20m deep at chart datum unless the area was previously impacted by log storage and shows continued degradation.
6. Locate, construct and operate all re-activated log dumps to avoid grounding on or physically disturbing the seafloor (e.g. grounding of log bundles, docks and walkways).

7. Locate float camps and fuel barges in areas with at least 12m of water depth at chart datum. Consult a tide table to ensure that sufficient water exists at the site for operational needs.
8. Operate the re-activated log dump site to avoid negative impacts to First Nations traditional food gathering sites and fishing activities (First Nation contact information available online at http://www.gov.bc.ca/arr/treaty/regional.html).

Debris Management Plan Conditions

Prepare and submit as part of BMP Notification a site specific Debris Management Plan that includes at minimum the following elements:

General

1. All staff working on the log dump re-activation site must be briefed on the Debris Management Plan prior to initiating work on the site.

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Minimize Debris Generation

2. If logs are sorted or handled on land prior to being bundled, limb them and collect loose bark and wood debris as much as practicable before logs are transferred into the water. Loose debris and wood chunks should not be in the bundles.
3. Ensure log bundles are tightly secured to prevent escape, breakage or excessive shifting during handling on the skidway and during watering activities. Loose debris and wood chunks should not be in the bundles.
4. Avoid violent dumping of log bundles by constructing the angle of the skidway so that log bundle velocity is minimized. Where practicable, consider the use of floating steel skidway(s).
5. Minimize the duration of in-water log storage to reduce abrasion of bundles and deposition of bark and wood debris in the marine environment.

Debris Containment and Collection

6. Wood debris generated as logs are moved from the dumping platform onto the skidway should be contained (e.g. in transfer bunks) to facilitate removal and prevent loss to the marine environment. The dumping platform (and transfer bunks, if used) will be cleaned daily, or as required, to prevent wood debris accumulation and deposition on the marine foreshore.
7. A berm (e.g. brow logs, blasted rock, concrete lock blocks) must be established around the seaward edge of the dumping platform to facilitate wood debris clean-up and prevent loss of wood debris onto the marine foreshore.
8. Where a pre-dive assessment shows sensitive habitat nearby (Siting Criteria condition 4b), there may be a requirement to incorporate effective and practical debris containment techniques (e.g. skidway debris nets and suspended debris curtains) in log dumping areas (e.g. at skidways, bullpens, and storage areas) to minimize and contain wood debris entry into the marine environment. Debris nets should be monitored and cleaned daily or as needed. Debris nets and suspended debris curtains are intended to contain wood debris accumulations and reduce deposition areas, facilitate regular site clean-up and assist site remediation when short-term log handling activities cease.
9. Collect and remove bark and wood debris deposited at the skidway and on the adjacent upland, intertidal and shallow foreshore areas regularly (e.g. daily if possible). Remove wood debris to appropriate designated temporary or permanent upland disposal locations only, such that there will be no impact to fresh water streams, wetlands or marine waters.

10. Solid waste (cables, metal bands, machinery parts, metal drums, lubricant containers, etc.) must not be disposed of in or adjacent to the marine environment. Solid waste will be regularly collected and removed to an appropriate designated upland disposal location where it is not adjacent to and must not enter any fresh water streams, wetlands or marine waters.
11. Maintain daily log book records of the debris management measures taken to reduce, remove and monitor wood debris from the upland sort surface and the tidal marine foreshore areas.

Measures to Protect Fish and Fish Habitat

A. Whale Mitigation Measures and Species Timing Windows

Grey, Humpback and Killer whales:

1. In-water operations must be temporarily suspended if whales approach to within 500m of the re-activated log dump site;
2. Follow BMP's for vessels operating near whales, dolphins and porpoises: be cautious, slow down, keep clear of the animals' path and do not approach or position your vessel within 400m of a whale. If a vessel is unexpectedly within 100 m of a whale, stop immediately and allow the whale to pass. For more information see http://www.pac.dfo-mpo.gc.ca/species/marinemammals/view_e.htm

Herring:

3. If the re-activated log dump is constructed or operated outside of the least risk work window for herring (e.g. operating between February 15 until May 31 each year; for the specific area timing windows contact DFO Area offices), a qualified herring monitor must be available for this entire period to monitor herring presence and implement appropriate mitigation actions/measures to avoid harming herring, spawn and larvae. This may include the temporary suspension of in-water operations to allow herring spawn to hatch and disperse.

Salmon:

4. If re-activated log dump construction in the marine foreshore is conducted outside of the least risk work window for juvenile salmon (e.g. construction between February 15 until May 31 each year; for the specific area timing windows contact DFO Area offices), and in an area known to be frequented by salmon, a qualified marine biological professional must be available during the construction period to monitor salmon presence and implement appropriate mitigation actions/measures to avoid harm to fish. This may include the temporary suspension of in-water construction activities.

B. General Operation Mitigation Measures

1. Enclose all log dump sites with a ring of boom sticks to prevent escape of log bundles and wood debris.
2. To prevent boom sticks (for log dump and booming areas) from collapsing onto the shoreline, keep boom sticks offshore with stiff legs and/or anchors. If anchors are required, anchor lines, chains or cables should be employed such that excess line does not collect on the bed of the water body or form loops that may ensnare marine mammals. If concrete anchors are used, they are to be pre-cast and cured away from water before use to prevent seepage of potentially toxic substances.
3. If blasted armor rock is required to re-construct the skidway or dumping platform crib wall, minimize installation of new rock use clean, uncontaminated rock and keep within the original log dump footprint. If rocks at the re-activated log dump are covered with marine life, where practicable, they should be carefully removed during construction and relocated to another area on the beach at the same tidal elevation or keyed back into the

re-constructed fill slope to assist with habitat re-colonization. Consult the marine biological professional for further advice.

4. Where practicable, grade and slope the dumping platform surface so that water drains to the rear of the site where it can be filtered to remove leachate and fine wood debris before entering fresh water streams, wetlands or marine waters.
5. Equip float camps with appropriate sewage containment and treatment facilities to prevent discharge of deleterious substances to fish-bearing waters.
6. Use fuel barges, fuelling platforms and oil/water separators which follow appropriate fuel handling and storage procedures to prevent discharge of deleterious substances to fish-bearing waters.
7. Keep emergency spill kits and spill response plans on-site at all times.
8. Site de-activation and remediation should follow the BMP's listed in the *Guidebook, Environmentally Sustainable Log Handling Facilities in British Columbia*. Contact DFO upon completion of de-activation and remediation activities for a site inspection.
9. Engage local First Nations and stakeholder groups (e.g. Pacific Prawn Fisherman's Association; Marine Fishing Vessel Owner's Association) who may be affected by the re-activated log dump on project design and operation to avoid potential impacts on their use of the fisheries resource. Documentation of this process is recommended.

Marine Assessment Protocol

A marine underwater assessment will be conducted according to established DFO/Industry protocol both **prior to** and, where appropriate, **following** the re-activation of the log dump (see Appendices 1 and 2). The assessments will be conducted by a qualified marine biological professional.

a. **Pre-Operational Assessment**: Complete your inter/subtidal assessment of the original log dump site **prior to re-activation operations** commencing and submit to DFO as part of the re-activation notification process. Follow the Re-activated Log Dump - Marine Assessment Protocol for Assessing Fish Habitat and Wood Debris Deposition attached in Appendix 1 and is also available from the DFO Habitat Management office in your area.

b. **Post-Operational Assessment**: Within 60 days of the closure of a re-activated 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 re-assessment.
In specific circumstances, when a pre-dive assessment by a qualified marine biological professional indicates that the potential for adverse impact to fish habitat at a re-activated site are negligible, a post-operation dive assessment may not be required.
Follow the protocols for conducting this assessment attached in Appendix 2 and are also available from the DFO Habitat Management office in your area. Provide completed electronic copies to DFO.

2. Submit a Post Closure Monitoring Report to DFO within 90 days of cessation of activities (where practicable) at the re-activated log dump site (end date on notification form). 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.

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BMP Notification: Re-activated Log Dump Sites in Marine Waters of BC

A

□ All BMP conditions **have been** met (DFO Notification only)

□ All BMP conditions **have not been** met (DFO review/response is required)

Was there a previous notification for this site? If so, when?: _____

B

Proponent Contact (your name):_____

Proponent (organization): _____

Address: _____

Telephone #/cell#: _____

C

DFO File # (if previously assigned): _____

Navigable Waters Protection Division File #: _____

Provincial File #:

D

Nearest Community: _____

Local Waterway: _____

Location Detail: (UTM – GPS coordinates and brief description)_____

_____

Map sheet: (CHS Chart#)_____

E

Brief Description of Work (volume of wood through site, scale/scope of site operations, duration):

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F

Marine Assessment Date: _____

Impact Assessment Rating: □ No – Low □ Moderate □ High

G

If all conditions of this BMP have not been met a DFO review/response is required:

Identify which condition/s has/have not been met and provide details including mitigation measures that are proposed (attach additional information if necessary): _____

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H
Start Date for Work: _____ **End Date for Work**: _____

I
Required information to include with notification:
□ Pre-operation Assessment
□ Site specific Debris Management Plan
□ Commitment to provide a Post-operation Assessment and Monitoring Report (conduct and submit within 90 days of end date for work) if deemed applicable by qualified marine biological professional. Estimate date for submission:_____
□ Attach a map sheet showing site plan layout

Completion of this form does not constitute approval or authorization under the Federal *Fisheries Act.*
I confirm that the appropriate Best Management Practices referenced in this document are understood and will be implemented to avoid negative impacts to fish and fish habitat.

J

Signature: _____ Date Signed: _____

Name: _____Telephone #: _____

Fax or Mail this form to the appropriate DFO office for your area **AT LEAST 10 BUSINESS DAYS PRIOR** to the planned construction start date. A Fisheries Officer may inspect your construction site to ensure compliance with the *Fisheries Act*.

DFO Fax Numbers:
South Coast: Nanaimo (250) 756-7162 / Campbell River (250) 286-5852 / Pender Harbour: (604) 883-2152
North Coast: Prince Rupert (250) 627-3480 / Bella Coola (250) 799-5540 / Queen Charlotte City (250) 559-4678
Lower Fraser: Delta (604) 666-6627

If you have questions regarding this BMP, please contact DFO Regional Headquarters at: Toll Free: 1-866-845-6776 / Fax: (604) 666-7907 / Email: dfo_epmp@pac.dfo-mpo.gc.ca

Appendix 1

Re-activated Log Dump - Marine Assessment Protocol for Assessing Fish Habitat and Wood Debris Deposition

This protocol has been developed to provide direction on the appropriate marine assessment methods to employ for assessing fish habitat and wood debris impacts related to a proposed project for reactivating an existing (formerly used) log dump. Preliminary on-site examination of the perceived highest impact areas should provide the initial information from which to determine if the Re-activation or Standard Foreshore Marine Assessment Protocol is applicable for a specific site. All marine assessments must be conducted by a qualified marine biological professional. This protocol may be used for both a pre-operational and a post-operational assessment at re-activated log watering facilities.

1.0 Introduction

Marine foreshore projects have the potential to affect fish[1] and fish habitat[2]. 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 re-activation projects on fish habitats. Where practicable the assessment should be conducted between 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, based on the opinion of a qualified marine biological professional.

2.0 Methods

2.1 Defining the Assessment Area

The assessment should include the entire area where potential impacts to the marine environment may have occurred, as well as the adjacent foreshore, for comparative purposes. Particular attention should be paid to the areas of greatest perceived or potential impact: the former log skidway area; the debris fan that may have resulted from dumping logs; the bullpen area; barge grids; camp tie-up areas and the areas where logs were formerly stored. In addition, knowledge and information related to local currents, winds and bathymetry should be considered (incorporate professional judgement) as they may have influenced debris distribution. This will provide a context for the project and will allow determination of possible cumulative effects, particularly when the proposed construction and operational activities associated with the log dump re-activation are considered. 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. Where known, include locations and extent of previous operational areas (skidway, booming areas, etc.).

[1] 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;

[2] 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;

2.2 Guidelines for Establishing Transects

A reconnaissance boat tour, snorkel swim and/or walking tour around the upland site should be undertaken prior to establishing transects, in order to focus the assessment effort on areas of greatest potential impact.

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 map the portion of the existing debris fan that new operations may impact. This should be done to a minimum depth of 20m in order to assess a representative sample of the fish habitats and impacts of previous industrial activities across the assessment area. Each transect should be established laterally along the shore for as far as the evidence of former log handling at the site occurs, even if the debris field extends beyond the applied-for tenure. Each individual transect must be numbered, geo-referenced, and delineated on the maps and site plans submitted.

Professional judgement of the assessor will determine the number, length, spacing and orientation of transects. Conditions influencing transect location should consider where log handling impacts have occurred in the past, the location of industrial activity proposed for the future (see 2.1 above), the variability of fish habitats supported by the site, and the size of the proposed tenure. At a former skidway location, for example, two or more transects may be necessary within a few meters of each other to properly define the area of impact from former log handling. However, at the rest of site, if replacement of rip rap rock armour along the face of the dump is the only new construction planned, fewer transects may be sufficient to define the effects of log dump re-activation on the fish habitats present. The nature of local site conditions (uniformity of shoreline, tides and currents, habitat variability, bathymetry, geography, fetch, geology, 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 is recommended for examination of transects at 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.

2.3 Tidal Height and Water Depth

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 (i.e.: 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. Water depths for each transect are to be recorded every 10 meters.

2.4 Guidelines for Recording Fish Habitat Observations and Assessing Wood Debris Deposition Areas

Marine assessments should be conducted in the following manner:

- Observations should be recorded every 10m along each transect, or more frequently when there are significant changes in habitat characteristics or wood debris accumulations that warrant closer inspection. All depths are to be converted to chart datum tide conditions.

- Assessors should record substrate type and composition, marine plants, sessile and motile marine animals, presence of sunken logs, bark chunks, fine woody debris or logging refuse such as wire rope, boom chain or other debris, etc.
- Reporting should include text detailing substrate type, presence and relative abundance of marine animals and plants, and thickness of wood debris deposits for each transect. Common and scientific names for the organisms encountered during the survey should be used throughout the text, tables and appendices.
- Include an overall site plan sketch showing the entire assessment area, proposed log handling operations, impacted areas, key habitat features/species observed, wood debris deposits (with associated accumulation depths), and transect line locations.

2.4.1 Substrate

Substrate type, definition and relative abundance are to be recorded along each transect. Observations will be recorded and captured in the video survey when there are significant changes in substrate characteristics along the transect. The table below lists the various categories of substrate that may be defined:

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

2.4.2 Marine Plants, Sessile Animals and Motile Animals

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 and should be assessed with care, employing sound professional judgement.

2.4.3 Wood Debris Accumulations

Precise delineation of wood debris deposition at the log dump re-activation 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 wood waste. 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. Graduated ruler probe/rebar stakes set out within, and along the perimeter, of the existing wood debris field prior to re-activation may be used to determine wood dispersal and deposition depth over time. Similarly, debris baskets may be established at key locations throughout the anticipated area of impact. The post-use re-activation 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 re-activation such as sediment deposition and relocation of stakes/baskets caused by physical disturbance resulting from dumping or boom boat activity.

The terms in the table 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 log dump re-activation assessments

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

The following categories and criteria should be used when recording and interpreting wood deposition observational data. The applicability of the ***Log Dump Reactivation BMP*** and/or the requirements for DFO project review can then be extrapolated from column 3 in the table:

Table 3. Subtidal Log Dump Transect Analysis Impact Assessment Rating Guide[3]

Wood Debris	Criteria	DFO Project Review Requirements
No - Low (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) - native species assemblages, diversities and abundances present	- **Log Dump Re-activation BMP does not apply** - **DFO Review Required -** Contact local DFO Habitat practitioner - Letter of Advice or Authorization likely - In cases where the Qualified Biological Professional determines that habitat values are negligible, contact local DFO Habitat practitioner to determine if the BMP for re-activated sites can be applied
Moderate (34-66% wood debris coverage) Wood debris > 2.5cm depth	- Wood debris present, but less than 2.5cm thick - 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	- **Log Dump Re-activation BMP may or may not apply** - Contact local DFO Habitat practitioner - Exercise professional judgement to determine whether flora and fauna are indicative of a site recovering from industrial impact
High (67-100% wood debris coverage) > 2.5cm depth	- Large areas with high or total coverage of wood debris > 2.5cm thick - Rooted flora absent - Infauna absent or indicative of highly impacted industrial environments	- **Log Dump Re-activation BMP applies** - Exercise professional judgement and use BMP

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 areas of wood debris accumulation 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 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 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.

[3] Professional judgment supported by rationale takes precedence

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 log dump re-activation, 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 from both land and water, of the site 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 re-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 wood debris deposition areas and 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/wood debris deposit map(s) for the entire tenure area showing locations of different substrate types, riparian and marine plants, invertebrate and vertebrate animals and areas of wood debris deposition in relation to proposed operational infrastructure.
6. Interpretive summary and description of fish habitats present or associated with the proposed log dump re-activation site in relation to recent historic 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 2

1.0 Post-Operational Assessment

The objective of the assessment is to confirm that construction and operation of the re-activated log dump did not result in an increase to the original log dump site footprint and has not resulted in a negative impact on fish or fish habitat at the site. The post-operational assessment should:

a. confirm that the reactivation construction and operational activities did not occur outside of the previously approved log dump lease area;
b. confirm that the reactivation construction and operational activities did not result in an increase to the existing habitat impacts associated with the original log dump;
c. confirm that effective mitigation measures were implemented to prevent negative impacts to important and sensitive fish habitats (listed on BMP page 1) that may be in close proximity to the site;
d. confirm that a HADD has been avoided.

The "Re-activated Log Dump - Marine Assessment Protocol for Assessing Fish Habitat and Wood Debris Deposition" protocol described above shall be used by the qualified marine biological professional to conduct the post-operational assessment. However, the level of effort applied to the assessment may be modified, depending on the site specific conditions which may influence the level of information (detailed data collection) required to satisfy the assessment objective. You may wish to contact your local DFO Habitat practitioner for advice before proceeding with the post-operational assessment.

2.0 Summary - 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 re-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 wood debris deposition areas and 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/wood debris deposit map(s) for the entire tenure area showing locations of different substrate types, riparian and marine plants, invertebrate and vertebrate animals and areas of wood debris deposition in relation to proposed operational infrastructure.
6. Interpretative summary and description of fish habitats present or associated with the log dump re-activation site in relation to wood debris deposits that have occurred during recent use of the site. How has recent use of the site affected fish habitats?