



## Approved Work Practices (AWP) for Re-activated Log Dumps in Marine Waters of British Columbia

The objective of this *Approved Work Practices* (AWP) document 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 AWP **will not apply** to a re-activated Log Dump facility, when:

- located in a Federal Marine Protected Area;
- sub-tidal blasting or dredging is required to re-activate the site;
- any component of the log dump facility (including float camps, skids, wharves, etc.) is 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 (please see Appendix A for further direction and additional options).

This AWP **may not apply** to re-activated log dump facilities:

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

This *Approved Work Practices* (AWP) document applies to the construction, operation and decommissioning 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 foreshore, intertidal and subtidal areas within and adjacent to log dump sites can provide important 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 may include:

1. Reduced or degraded water quality from the introduction and decomposition of wood debris on the foreshore and seabed;
2. Reduced or degraded water quality via the potential introduction of deleterious substances such as sewage, sediment and hydrocarbons;
3. Shading or smothering of marine animals and vegetation from log bundles, booms, camps and submerged woody debris;
4. 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, installation of skidways and establishment of bullpens;
5. Disruption of critical life history stages of fish and marine mammals caused by noise, wood debris and in-water activities; and
6. 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 under the *Fisheries Act* as well as marine mammals under the *Marine Mammal Regulations*. The *Fisheries Act* prohibits the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO, while the *Marine Mammal Regulations* prohibits the disturbance of marine mammals unless authorized.



DFO is also responsible for protecting aquatic species under the *Species at Risk Act* (SARA) which prohibits the killing, harming, harassing, capturing, harvesting, or destruction of critical habitat of a species that is listed as threatened or endangered. To ensure that your project(s) is compliant with SARA, you should consult the SARA web-site for the most up to date information: <http://www.dfo-mpo.gc.ca/species-especes/act-loi/act-loi-eng.htm>.

You may proceed with the re-activation 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**
- **DFO Project Review Application Form (PRAF)**

**Note:** *If you cannot meet all of the conditions identified above your project may result in a violation of subsection 35(1) of the Fisheries Act. If this is the case, this AWP may not be applicable to your project. To determine the necessary level of DFO review, please refer to Appendix A.*

**Other considerations:** You are required to comply with all municipal, provincial, and/or federal legislation that applies to the work being carried out in relation to this AWP document.

**You must notify DFO 10 working days before starting your onsite operations** by filling out and sending the DFO PRAF and required project information directly to the appropriate DFO Referral Centre (Appendix A). A copy of this AWP document and your DFO PRAF must be on the work site and available upon request.

For additional information on broader log handling issues, please consult the *Guidebook, Environmentally Sustainable Log Handling Facilities in British Columbia* (<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 habitats) and must occur within the previously approved lease area and/or impacts must be confined to the areas previously authorized under subsection 35(2) of the *Fisheries Act*.
2. A thorough intertidal and subtidal assessment of the log dump re-activation site must be completed by a qualified professional prior to the commencement of any construction or operation of the facility (see Appendix B - *Re-activated Log Dump - Marine Assessment Protocol for Assessing Fish Habitat and Wood Debris Deposition*).
3. When the intertidal and subtidal assessments 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 100 meters** of important fish habitats listed on page 1: consult your qualified professional for appropriate measures to implement in order to prevent negative impacts to these habitats.



- 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 professional and submit a request for project review to DFO.
4. Locate log storage areas such that no part of the enclosed area is in water that is less than **20 meters deep** at chart datum unless the area was previously impacted by log storage and shows continued degradation and remains impacted consistent with the Marine Assessment Protocol.
5. Locate, construct and operate all re-activated log-dump facilities to avoid physically disturbing the seafloor (e.g. grounding of log bundles, docks and walkways).
6. Locate float camps and fuel barges in areas with at least **12 meters depth** at chart datum.
7. Locate and operate the re-activated log dump facilities to avoid negative impacts to First Nations traditional food gathering sites and fishing activities (web link to listing of First Nations by Region <http://www.gov.bc.ca/arr/treaty/regional.html>).

## Debris Management Plan Conditions

Prepare and submit a site specific Debris Management Plan that, at a minimum, includes the following:

### General

1. Brief crews on the Debris Management Plan prior to commencement of operations, and ensure copies are available onsite.

### Minimize Debris Generation

2. If logs are sorted or handled on land prior to being bundled, limb them and collect loose bark, limbs and wood debris as much as practicable before logs are transferred into the water.
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, excess limbs 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. transfer bunks) to facilitate removal and prevent deposition into 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 constructed of non-erodible materials (e.g. brow logs, blasted rock, or 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, 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 or as required). Remove wood debris to appropriate designated temporary or permanent upland disposal locations only, such that there will be no impact to riparian vegetation, fresh water streams, wetlands or marine waters.
10. Solid waste (cables, metal bands, machinery parts, metal drums, lubricant containers, etc.) will be regularly collected and removed to an appropriate designated upland disposal location where it is not permitted to enter riparian vegetation, 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. Species Specific Mitigation Measures

#### Marine Mammals:

1. In-water operations must be temporarily suspended if dolphins, porpoises or whales approach to within **500 meters** of the re-activated log dump site;
2. Vessels operating near whales, dolphins and porpoises should be cautious, slow down, keep clear of the animals' path and not approach or be positioned within **400m**. If a vessel is unexpectedly within **100m** of a dolphin, porpoise, or whale, stop immediately and allow the animal(s) to pass.

#### Herring:

3. If the re-activated log dump is constructed or operated outside of the least risk work window for herring (<http://www.pac.dfo-mpo.gc.ca/habitat/timing-periodes/tp-map-carte-eng.htm>), and in an area known to be frequented by herring, a qualified 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 (<http://www.pac.dfo-mpo.gc.ca/habitat/timing-periodes/tp-map-carte-eng.htm>), and in an area known to be frequented by salmon, a qualified 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 rock armouring is required to re-construct the skidway or dumping platform cribwall, installation of new rock must be restricted to the original log dump footprint. Clean, uncontaminated rock must be used. Where practicable, if rocks at the re-activated log dump are covered with marine life, they should be carefully removed during construction and re-keyed back into the re-constructed fill slope to assist with habitat re-colonization. Consult a qualified professional for further advice.
4. 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. Float camps must be equipped with appropriate sewage containment and treatment facilities to prevent discharge of deleterious substances to fish-bearing waters.
6. Use of fuel barges, fuelling platforms and oil/water separators must follow appropriate fuel handling and storage procedures to prevent discharge of deleterious substances to fish-bearing waters.
7. Emergency spill kits and spill response plans should be kept 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*.
9. Engage local First Nations and stakeholder groups (example: Pacific Prawn Fisherman's Association, Marine Fishing Vessel Owner's Association, etc.) who may be affected by reactivated log dump operations on project design and operations prior to initiation in order to avoid potential impacts on their use of the fisheries resource. Documentation of this process is recommended.

## Marine Assessment and Monitoring Report Requirements

A marine underwater assessment will be conducted according to established DFO/Industry protocol both **prior to** and, where required, **following** the re-activation of the log dump (see Appendix B). The assessment(s) will be conducted by a qualified professional.

- A. **Pre-Operational Assessment:** An inter/subtidal assessment of the original log dump site will be completed prior to re-activation operations commencing, and submitted to DFO as part of the re-activation notification process. The *Re-activated Log Dump - Marine Assessment Protocol for Assessing Fish Habitat and Wood Debris Deposition* is attached to this document as Appendix B.
- 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-operational assessment by a qualified professional indicates that the potential for adverse impacts to fish habitat at a re-activated site are negligible, a post-operation dive assessment may not be required, subject to DFO approval. The protocols for conducting this assessment are attached to this document as Appendix B.
  - Within 60 days of closure of operations (where practicable) at the re-activated log dump facility, provide the appropriate DFO Referral Center with an electronic copy of the following information:



- A cover page which clearly states **Monitoring Report** and identifies the date of the original submission, contact information, the location of the project and if available the DFO File #;
- The dates and specifics of operations conducted;
- The status of site decommissioning;
- The measured area impacted by the log dump facility (wood waste footprint);
- A summary of any issues that had the potential to impact fish, fish habitat or marine mammals and how they were addressed;
- A brief summary of the Debris Management Plan, and the mitigation measures that were applied and their effectiveness.



## Appendix A - DFO Notification, Request for Project Review or Request for Authorization

When **all** conditions / measures of this AWP **can** be met, only Notification to DFO is required. If this is the case follow the instructions provided in Section 1 of the DFO PRAF (<http://www.pac.dfo-mpo.gc.ca/habitat/steps/praf/index-eng.htm>) and include the following additional information with your submission:

- Current Wood Debris Assessment Rating (include in DFO PRAF - Section 3):
  - Date of Assessment
  - Rating: *Low* – AWP does not apply, *Moderate* - DFO response may be required, *High* - Notification only no DFO response required
- Pre-operation Marine Assessment (summarize in DFO PRAF - Section 12 and attach report):
- Site specific Debris Management Plan (attach report)
- Map sheet showing site plan layout (attach map)
- Post-operation Assessment and Monitoring Report (DFO PRAF - Section 3), include either:
  - a) Commitment to conduct and submit within 60 days of end date for work (where practicable); or
  - b) Request not to conduct based on the qualified professional pre-operational assessment results.

When **all** conditions / measures of this AWP **cannot** be met you must complete all sections of the DFO PRAF. If this is the case do one of the following:

### 1. Notification: Professional Reliance (minor variance from AWP)

If, in the opinion of a qualified professional, impacts to fish and fish habitat can be avoided by applying alternate conditions / mitigation measures to those laid out in this AWP, you may proceed with Notification only. Ensure that you clearly identify **all** conditions / measures of this AWP that cannot be met, describe the potential impacts to fish and fish habitat and outline **in detail** all additional measures that are being proposed to minimize or eliminate potential impacts.

### 2. Request for Project Review:

If the conditions / mitigation measures laid out in this AWP cannot be met and impacts to fish and fish habitat cannot be avoided by other means, a DFO review under the habitat protection provisions of the *Fisheries Act* may be required. To initiate a project review, complete the DFO PRAF and include additional information with your submission as described on the DFO Working Near Water webpage (<http://www.pac.dfo-mpo.gc.ca/habitat/know-savoir-eng.htm>). Based on the information you provide, DFO will determine if your proposal is likely to harm fish or fish habitat. **You should plan to submit your request for project review as soon as possible.**

### 3. Request for *Fisheries Act* Authorization

Harm to fish and fish habitat cannot be avoided and a *Fisheries Act* Authorization is requested. Follow the instructions provided on the DFO Working Near Water webpage: (<http://www.pac.dfo-mpo.gc.ca/habitat/know-savoir-eng.htm>). **You should plan to submit your request for project review as soon as possible.**

**Note:** In all cases ensure that you fill out the appropriate sections of the DFO PRAF by summarizing information in the space provided **and** attaching all relevant reports to your submission (<http://www.pac.dfo-mpo.gc.ca/habitat/steps/praf/index-eng.htm>). For a detailed explanation of how to fill out the DFO PRAF see: <http://www.pac.dfo-mpo.gc.ca/habitat/steps/praf/guide-eng.pdf>.

**Contact Information** - A list of DFO Referral Centres and local area contacts can be found at the following web address: <http://www.pac.dfo-mpo.gc.ca/habitat/referral-services/index-eng.htm>



## Appendix B - Marine Assessment Protocol for Assessing Fish Habitat and Wood Debris Deposition for Re-activated Log Dumps

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 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 effect fish<sup>1</sup> and fish habitat<sup>2</sup>. 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 habitat. 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 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.).

#### 2.2 Guidelines for Establishing Transects

A reconnaissance boat tour 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. In addition, a snorkel swim examination of the nearshore adjacent areas should be conducted.

---

<sup>1</sup> 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;

<sup>2</sup> 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;





Transects should be established perpendicular to the shoreline, and will normally extend from the highest high water mark (HHWM) through the intertidal, and extend far enough to map the existing debris fan and any areas beyond that new operations may impact. This should be done to a minimum depth of **20 meters** 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 (and quantify) the area of impact from former log handling. However, for the remainder of the 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 included in the transects.

Use of SCUBA is recommended for examination of transects at re-activated sites. SCUBA methodology allows the assessor to more effectively 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 effect 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 **-6.0m**). 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 **10 meters** 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; 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 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 sp.* (sulphur-fixing bacteria 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 invertebrates 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**

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



The following categories and criteria should be used when recording and interpreting observational wood deposition data. The applicability of the *Log Dump Reactivation AWP* 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**

Wood Debris	Criteria	DFO Project Review Requirements
<p><b>No - Low</b> (0%-33% wood debris coverage)</p>	<ul style="list-style-type: none"> <li>- Little or negligible wood debris present</li> <li>- No habitat scouring</li> <li>- Flora remains rooted in/on substrate</li> <li>- Infaunal organisms abundant (substrate dependent)</li> <li>- Native species assemblages, diversities and abundances present</li> </ul>	<ul style="list-style-type: none"> <li>- <b><u>Log Dump Re-activation AWP does not apply</u></b></li> <li>- <b><u>DFO Review Required</u></b> - Contact local DFO Habitat practitioner</li> <li>- Letter of Advice or Authorization likely</li> <li>- In cases where the Qualified Biological Professional determines that habitat values are negligible, contact local DFO Habitat practitioner to determine if the AWP for re-activated sites can be applied</li> </ul>
<p><b>Moderate</b> (34-66% wood debris coverage) Wood debris &gt; 2.5cm depth</p>	<ul style="list-style-type: none"> <li>- Wood debris present, but less than 2.5cm thick</li> <li>- Occasional flora present (rooted and up-rooted), subject to substrate</li> <li>- Occasional infauna present (substrate dependent), but indicative of impacted environments</li> <li>- Flora and infaunal species assemblages are different compared to native assemblages, diversities and abundances</li> </ul>	<ul style="list-style-type: none"> <li>- <b><u>Log Dump Re-activation AWP may or may not apply</u></b></li> <li>- Contact local DFO Habitat practitioner</li> <li>- Exercise professional judgement to determine whether flora and fauna are indicative of a site recovering from industrial impact</li> </ul>
<p><b>High</b> (67-100% wood debris coverage) &gt; 2.5cm depth</p>	<ul style="list-style-type: none"> <li>- Large areas with high or total coverage of wood debris &gt; 2.5cm thick</li> <li>- Rooted flora absent</li> <li>- Infauna absent or indicative of highly impacted industrial environments</li> </ul>	<ul style="list-style-type: none"> <li>- <b><u>Log Dump Re-activation AWP applies</u></b></li> <li>- Exercise professional judgement and use AWP</li> </ul>

### 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.

#### **4.0 Video and Still Photography**

Include video and still photographs to provide a visual record of the fish habitat characteristics of the site and to allow assessment of future impacts of proposed log dump re-activation.

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 should be taken, preferably 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?



## **Post-Operational Assessment**

### **1.0 Post-Operational Assessment**

The objective of the post-operational 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:

1. Confirm that the reactivation construction and operational activities did not occur outside of the previously approved log dump lease area;
2. 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;
3. Confirm that effective mitigation measures were implemented to prevent negative impacts to important and sensitive fish habitats (listed on AWP page 1) that may be in close proximity to the site;
4. 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 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 Components of 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. 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, deposition depth measurements and sample locations in relation to 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?