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INTRODUCTION

The March 2011 tsunami, which was generated by the Tohoku Japan earthquake, was a catastrophic event that impacted millions of lives. In addition to widespread devastation across coastal Japan, millions of tonnes of debris were washed into the ocean with the receding waves. It is understood that the majority of debris sank, with heavier objects sinking closer to shore and other objects sinking during ocean transit. A significant portion is expected to end up in the North Pacific Garbage Patch and a smaller amount is expected to reach North American shores, dispersed from Alaska to California. It is also understood that a concentrated “debris field” would not have remained together due to the rough conditions of the ocean environment, but rather debris is widely dispersed and migrating across the Pacific Ocean.

In response to the tsunami debris event created by the Tohoku earthquake and its potential impact on British Columbia (BC), the provincial and federal governments joined efforts and established the Tsunami Debris Coordinating Committee (TDCC). The role of the TDCC is to bring together the various levels of government and key interest groups to coordinate a debris management strategy. As this is an issue without precedent in BC, there are no previously established solutions or financial allocations for the management of large amounts of marine debris. As such, the TDCC and associated stakeholders are working as a team to communicate, collaborate and support an appropriate and effective strategy. (See Appendix A for the membership of the TDCC and its four subcommittees.)

This document was prepared by the Debris Management Planning Subcommittee of the TDCC and represents a collaborative effort by federal, provincial and local governments, volunteer agencies and other stakeholders. As Phase I of a multi-phase Tsunami Debris Management Plan, this document is intended to:

- provide an assessment of the risks related to the tsunami debris;
- identify the roles and responsibilities of partner agencies; and
- outline the protocols for managing the tsunami debris event.

Phase II of the plan will focus on the development of disposal options for tsunami-related debris, including identifying and addressing waste management issues. The second phase is expected to be complete in the fall of 2012.
ABOUT THIS PLAN

- This plan is in effect from July 2012 through to July 2014; however, it is considered a ‘living document’ and will be updated as required, based on the amount and type of debris that arrives in BC and on the effectiveness of current management measures.

- The plan is not intended to replace existing procedures. It is a primary step to ensure information sharing among partners about existing procedures and available resources. Where possible, current protocols and capacities will be utilized until it is determined that the impact is beyond the capacity of identified agencies. If required, future iterations of the plan may include protocols for:
  - The identification of resources at the federal, provincial or local government levels to support tsunami debris management.
  - The identification of potential funding sources to manage tsunami debris.

- The plan provides management protocols for:
  - Onshore routine and small debris;
  - Onshore significant debris volumes and large objects (non-hazardous);
  - Onshore environmental or public safety threat;
  - Onshore traceable items of significance;
  - Onshore derelict vessels and wrecks;
  - Offshore derelict vessels, wrecks and large objects;
  - Offshore spills;
  - Human remains;
  - Marine mammal entanglement;
  - Aquatic invasive species; and
  - Radiation testing.

The objective of these protocols is to monitor, assess and manage tsunami debris in order to mitigate any impacts on BC shores in relation to public safety, the environment and the economy.

- This plan is based on the following assumptions:
  - The quantity and type of tsunami-related debris that will arrive on BC shores is unknown.
  - Depending on the volume and type of debris, local agencies may not have the necessary financial or human resources, or landfill capacity, for debris management.
  - Management measures may need to be adapted depending on the level of impact.
  - BC’s coastline includes remote areas that may be difficult or unsafe to access for the purposes of monitoring and removing debris.
  - In some cases, the safest and most cost-effective debris management strategy will be to leave the debris where it is.
  - Provincial and federal governments will provide coordinated support for debris management through the TDCC.
ROLES AND RESPONSIBILITIES

The following is an inventory of agencies that have a role in tsunami debris management. It is not considered an exhaustive list and, depending on the situation, some agencies may have a larger or smaller role in any specific management activity. See Appendix B for more detail about each agency.

### Provincial Government
- Ministry of Environment
- BC Parks
- Ministry of Forests, Lands and Natural Resource Operations
- Ministry of Health/BC Centre for Disease Control
- Emergency Management BC
- BC Coroners Service
- Ministry of Transportation and Infrastructure
- Ministry of Aboriginal Relations and Reconciliation

### Federal Government
- Environment Canada
- Department of Fisheries and Oceans
- Canadian Coast Guard
- Royal Canadian Mounted Police
- Parks Canada
- Transport Canada
- Aboriginal Affairs and Northern Development Canada
- Public Safety Canada
- Department of Foreign Affairs and International Trade
- Health Canada/Public Health Agency of Canada

### Other Governments
- Coastal local governments (municipalities and regional districts)
- Coastal treaty and non-treaty First Nations
- Governments of California, Oregon, Washington and Alaska
- National Oceanographic and Atmospheric Administration
- Consulate General of Japan

### Other Partners
- Local agencies (e.g., outdoors/environmental, school and marine groups)
- Surfrider Foundation
- The Great Canadian Shoreline Cleanup (Vancouver Aquarium)
- Maritime Museum of BC
- Canadian Red Cross
Table 1: Agency roles in the management of tsunami debris

<table>
<thead>
<tr>
<th>MAJOR ROLES</th>
<th>OFFSHORE DEBRIS</th>
<th>ONSHORE DEBRIS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Modeling/risk analysis</strong>&lt;br&gt;Analysis of tsunami debris movement across the Pacific Ocean and potential associated risks, including aquatic invasive species.</td>
<td>Dept. of Fisheries and Oceans*</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Debris monitoring</strong>&lt;br&gt;Establishment and operation of monitoring sites at select coastal locations, including provincial and national parks.</td>
<td>Transport Canada*</td>
<td>BC Parks&lt;br&gt;BC Parks&lt;br&gt;Local governments&lt;br&gt;Volunteer groups</td>
</tr>
<tr>
<td><strong>Detection of/finding debris</strong></td>
<td>Canadian Coast Guard*</td>
<td>Public&lt;br&gt;Local agencies</td>
</tr>
<tr>
<td><strong>Shoreline cleanup of routine and small debris</strong>&lt;br&gt;Removal of small items and litter such as small containers, pieces of plastic, bottles, etc.</td>
<td>N/A</td>
<td>Volunteer groups&lt;br&gt;BC Parks&lt;br&gt;BC Parks&lt;br&gt;Local governments</td>
</tr>
<tr>
<td><strong>Onshore environmental or public safety threat</strong>&lt;br&gt;Removal of potentially hazardous items such as fumigation containers, shipping containers, propane tanks, oil drums and unknown chemicals.</td>
<td>N/A</td>
<td>BC Ministry of Environment&lt;br&gt;Environment Canada&lt;br&gt;Emergency Management BC&lt;br&gt;Royal Canadian Mounted Police&lt;br&gt;Local governments</td>
</tr>
<tr>
<td><strong>Traceable items of significance</strong>&lt;br&gt;Return of items that are traceable to a specific individual and have financial or sentimental value.</td>
<td>Dept. of Foreign Affairs and International Trade&lt;br&gt;Consulate General of Japan</td>
<td>Dept. of Foreign Affairs and International Trade&lt;br&gt;Consulate General of Japan</td>
</tr>
<tr>
<td><strong>Offshore hazard removal</strong>&lt;br&gt;Removal of large objects such as derelict vessels or wrecks that could pose a threat to navigation, public safety, the environment or economic and recreational activities.</td>
<td>Transport Canada&lt;br&gt;Canadian Coast Guard&lt;br&gt;Dept. of Fisheries and Oceans</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Offshore spills</strong>&lt;br&gt;Cleanup of offshore hydrocarbon spills.</td>
<td>Canadian Coast Guard&lt;br&gt;Transport Canada&lt;br&gt;Environment Canada</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Human remains</strong></td>
<td>BC Coroners Service</td>
<td>BC Coroners Service&lt;br&gt;Royal Canadian Mounted Police</td>
</tr>
<tr>
<td><strong>Marine mammal entanglement</strong>&lt;br&gt;Removal of debris that is causing distress for marine mammals or seabirds.</td>
<td>Dept. of Fisheries and Oceans&lt;br&gt;Environment Canada</td>
<td>Dept. of Fisheries and Oceans&lt;br&gt;Environment Canada</td>
</tr>
<tr>
<td><strong>Radiation testing/monitoring</strong>&lt;br&gt;Periodic testing of tsunami debris for radiation.</td>
<td>Health Canada</td>
<td>Health Canada&lt;br&gt;BC Parks&lt;br&gt;BC Parks&lt;br&gt;Local governments</td>
</tr>
<tr>
<td><strong>Storage of debris</strong></td>
<td>Transport Canada</td>
<td>BC Parks&lt;br&gt;BC Parks&lt;br&gt;Local governments</td>
</tr>
<tr>
<td><strong>Disposal of debris (e.g., recycling or landfill)</strong></td>
<td>N/A</td>
<td>BC Parks&lt;br&gt;BC Parks&lt;br&gt;Local governments</td>
</tr>
<tr>
<td><strong>Public notification and reporting</strong>&lt;br&gt;(e.g., website, status reports, etc.)</td>
<td>Federal agencies</td>
<td>All agencies</td>
</tr>
<tr>
<td><strong>Psychosocial support</strong>&lt;br&gt;Provision of psychosocial support to Japanese citizens who travel to BC to claim tsunami items.</td>
<td>N/A</td>
<td>Canadian Red Cross</td>
</tr>
</tbody>
</table>

*These agencies are working in collaboration with the US National Oceanographic and Atmospheric Administration (NOAA).
RISK ASSESSMENT

The following provides an assessment of the potential risks relating to tsunami debris. These considerations have guided tsunami debris planning with partner agencies.

**Quantity**

The majority of debris expected to arrive on our coast will be small and consist of plastics, Styrofoam, driftwood, rope, fishing nets and buoys. Larger objects and those with high windage values (i.e., objects with greater buoyancy that have large surface areas exposed to the wind) will arrive sooner and, in fact, have already begun to arrive. Convergence of debris in concentrated areas will pose a challenge for disposal and, depending on location, may prove difficult to retrieve due to isolation and associated logistical challenges. As of July 2012, the volume of tsunami debris does not warrant provincial and federal agency support for removal. Specific locations across BC have been selected to regularly monitor and assess debris accumulations compared to past debris accumulation levels. Debris monitoring activities are being conducted by Parks Canada, BC Parks, local government staff and volunteer groups and are linked to the TDCC Science and Monitoring Subcommittee in order to assess the changes in marine debris volume.

**Radiation**

As the marine debris was generated and dispersed offshore several days prior to the Fukushima nuclear plant leak, contamination from radiation is very unlikely. Radiation tests conducted on recovered objects generated from the Japanese tsunami have returned a negligible reading and therefore do not warrant public safety concerns. Although continued tests are expected to return the same results, periodic testing will be conducted by appropriate agencies to ensure public safety. Radiation risk to marine species and ecosystems in BC is also low.

**Invasive Species**

There is a risk of unknown magnitude of aquatic invasive species being transported to BC shores on certain types of debris, as evidenced by the large dock that beached near Newport, Oregon on June 15, 2012. The dock had approximately 1.5 tonnes of marine growth, including more than 15 species that are potentially invasive. It should be noted that not all alien species become invasive, and although it is difficult to predict beforehand which species may be problematic, there are several species from Japan that are known to become invasive outside their native range. The Department of Fisheries and Oceans is currently conducting a risk assessment for this issue and is working with partners in US federal and state agencies to develop protocols for monitoring and responding to the arrival of debris fouled with potentially invasive species.
**Economic**
The potential exists for debris to impact areas used for commercial or recreational purposes. Coastal areas that typically witness marine debris can expect to see more debris and are encouraged to have a cleanup plan in place should the convergence of debris impact land or marine use. In such cases, there may be additional resource demands on landowners, tenure holders, communities and government agencies to manage the debris.

**Navigation Hazard**
While most objects large enough to be considered a hazard to navigation are not expected to remain afloat, some may and would be a risk if unidentified by surveillance. Vessels or wreckage from vessels that pose a hazard to navigation will be dealt with according to existing protocols by responsible agencies such as Transport Canada. Smaller debris such as ropes, drift nets and other entanglements may have an impact on navigation if accumulated.
**PROTOCOLS**

Marine debris is not new to BC’s coast; unidentifiable debris is deposited on BC shorelines every day from a variety of sources. However, the tsunami debris event caused by the Tohoku earthquake is unique and unprecedented for BC, creating the need for an integrated, coordinated and comprehensive plan to manage the impacts. The following protocols outline the appropriate courses of action for responding agencies based on debris type, hazard and identified role and responsibility.

The TDCC’s current direction is to plan for the management of tsunami debris using existing protocols and partnerships. Should the amount or type of debris overwhelm these resources, responding agencies, including local governments, should advise the TDCC for a case-by-case assessment of management options for specific situations.

<table>
<thead>
<tr>
<th>1. Onshore Routine and Small Debris</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Relevant agencies:</strong> Local governments, First Nations, Parks Canada, BC Parks, Ministry of Forests, Lands and Natural Resource Operations, landowners, tenure holders and non-governmental organizations.</td>
</tr>
<tr>
<td><strong>Objective:</strong> To keep shorelines clean and to reduce the environmental impact resulting from accumulations of routine and small debris items (i.e., litter such as small containers, pieces of plastic, bottles, etc.).</td>
</tr>
<tr>
<td>- Given the size and dispersed nature of many debris items, it is not practical to manage routine and small debris offshore.</td>
</tr>
<tr>
<td>- So long as volumes are manageable, local resources will be used to remove routine and small debris.</td>
</tr>
<tr>
<td>- <strong>If it is safe and practical to do so, individuals who find small amounts of marine debris onshore may wish to remove the items and deposit them in an appropriate receptacle or other designated area.</strong></td>
</tr>
<tr>
<td>- For coordinated cleanups of small, non-hazardous debris, the appropriate local agency (e.g., private/commercial landowner, tenure holder, local government, First Nation or park staff) should organize safe and environmentally sensitive cleanup activities on their lands.</td>
</tr>
<tr>
<td>- Local agencies and individuals may consider partnering with a shoreline cleanup group such as:</td>
</tr>
<tr>
<td>- Surfrider Foundation;</td>
</tr>
<tr>
<td>- Great Canadian Shoreline Cleanup; or</td>
</tr>
<tr>
<td>- Other local groups that have experience in conducting safe and low-impact shoreline cleanups.</td>
</tr>
<tr>
<td>- Currently, there are no identified disposal or debris storage locations beyond what is already in place. Depending on volume, this could change. <em>(For more information, see Protocol 2: Onshore Significant Debris Volumes and Large Objects [non-hazardous].)</em></td>
</tr>
</tbody>
</table>
2. Onshore Significant Debris Volumes and Large Objects (non-hazardous)


Objective: To safely assess, minimize or eliminate the environmental and safety risks posed by significant debris accumulations and large debris items, particularly in those instances where shoreline use is impacted.

- Large objects are those items that were swept out to sea following the tsunami and remained intact during the journey across the Pacific Ocean. Objects may include parts of buildings, docks and containers.

⚠️ Large objects could be dangerous, either because of what they contain or because their structural integrity has been compromised. Therefore, large objects should be treated with the same caution afforded suspected hazardous materials. *(For more information, see Protocol 3: Onshore Environmental or Public Safety Threat.)*

- If tsunami debris is determined to be beyond local agency capacity, either because of size, type or volume, coordinated support from provincial and federal agencies may be available and will be determined on a case-by-case basis.

- Items fouled with aquatic species may harbour potentially invasive species that could be damaging to BC’s near-shore coastal environment. The Department of Fisheries and Oceans will lead an appropriate response to assess, monitor and respond to aquatic invasive species. *(For more information, see Protocol 10: Aquatic Invasive Species.)*
### 3. Onshore Environmental or Public Safety Threat

**Relevant agencies:** BC Ministry of Environment, Emergency Management BC, Public Safety Canada, Transport Canada, Canadian Coast Guard, Environment Canada and Royal Canadian Mounted Police.

**Objective:** To ensure safe and prompt removal of items that could pose a threat to public safety, the environment and economic and recreational activities.

- Examples of potential hazardous items include fumigation containers, shipping containers, propane tanks, oil drums and unknown chemicals.

**⚠️ Items that pose an immediate environmental or public safety threat should not be removed by untrained personnel and are to be reported to 9-1-1/local police as soon as possible.**

**⚠️ If items are not an immediate threat but still pose a hazard, they should promptly be reported to BC’s spill reporting line at 1-800-663-3456.**

**⚠️ If it is unclear whether an item is hazardous, do not approach it. Exercise caution by reporting it to BC’s spill reporting line at 1-800-663-3456.**

- Once a report is made, Environmental Emergency Response Officers from the Ministry of Environment will make an assessment of the risk and develop an appropriate response. They may seek additional information about the report from the individual(s) who submitted it.

- Items fouled with aquatic species may harbour potentially invasive species that could be damaging to BC’s near-shore coastal environment. The Department of Fisheries and Oceans will lead an appropriate response to assess, monitor and respond to aquatic invasive species. *(For more information, see Protocol 10: Aquatic Invasive Species.)*
4. Onshore Traceable Items of Significance

**Relevant agencies:** BC Ministry of Environment, Transport Canada, US National Oceanographic and Atmospheric Association (NOAA) and Consulate General of Japan.

**Objective:** To work with Japan to return items of significance found on Canada’s West Coast.

- Tsunami debris should be handled with respect, as items may hold importance to the people of Japan. Traceable items of significance are items that meet all of the following criteria:
  - are traceable to the Japanese tsunami;
  - are traceable to a specific individual; and
  - have obvious financial, sentimental and/or cultural value.

- For tracking purposes, items that can be attributed to the tsunami should be reported to NOAA’s Marine Debris program at DisasterDebris@noaa.gov. Reports should include as much detail as possible, including the specific location and relevant photos. If it is safe to do so, objects should be moved to a safe location. An information exchange system has been established with NOAA.

- There are instances where a derelict vessel is a traceable item of significance. In these cases the direction regarding safety in Protocol 5 should be followed, and all reports should be submitted following the steps outlined in protocols 5 and 6 relating to onshore and offshore derelict vessels and wrecks.

- All tsunami debris reports directed to NOAA from Canada are forwarded to the BC Ministry of Environment for notification and response. The BC Ministry of Environment will report items of significance to the Consulate General of Japan in Vancouver for direction about next steps.
## 5. Onshore Derelict Vessels and Wrecks

**Relevant agencies:** Transport Canada, Environment Canada, BC Ministry of Environment, landowners and tenure holders.

**Objective:** To safely assess, minimize or eliminate the environmental and safety risks posed by derelict vessels, particularly in those instances where beach use is impacted.

- For the purposes of this plan, derelict vessels and wrecks can be described as any part of a ship or boat that was lost following the tsunami. Depending on its condition, it may contain information that can link it to a specific owner.

> **Derelict vessels and wrecks can be dangerous, either because of what is contained within or because their structural integrity has been compromised. Therefore, they should be treated with the same caution afforded suspected hazardous materials.**

- If a derelict vessel or wreck is located onshore, report details - including location and identifying features - to Transport Canada by phone at 604-775-8867 or by e-mail at pacnwp-penpac@tc.gc.ca.

- Transport Canada will work with the BC Ministry of Environment and relevant landowners and tenure holders to determine the appropriate next steps. Decisions to remove derelict vessels and wrecks will be made on a case-by-case basis taking environmental, public safety, economic and recreation risks into consideration.

- Derelict vessels that are considered to be traceable items of significance will be reported differently than other items of significance. In these instances, Transport Canada will report derelict vessels of significance to the Consulate General of Japan in Vancouver for direction about next steps.
6. Offshore Derelict Vessels, Wrecks and Large Objects¹

**Relevant agencies:** Transport Canada, Canadian Coast Guard, Environment Canada, and BC Ministry of Environment.

**Objective:** To ensure safe and prompt removal of items that could pose a threat to navigation, public safety, the environment, and economic and recreational activities.

- For the purposes of this plan, derelict vessels and wrecks can be described as any part of a ship or boat that was lost following the tsunami. Depending on its condition, it may contain information that can link it to a specific owner.

- **In case of a derelict vessel that is closing in on BC’s coast and presents a pollution threat, the Canadian Coast Guard is the responsible agency.** To report a sighting, contact the Canadian Coast Guard by phone at 1-800-889-8852 or by radio on Channel 16 VHF and provide details, including location and any identifying features.

- **In case of a derelict vessel that is in Canadian territorial waters and does not present a pollution threat, but presents an obstruction to navigation, the responsibility is with Transport Canada Marine Safety.** Report details, including location and identifying features to Transport Canada by phone at 604-775-8867 or by e-mail at pacnwp-penpac@tc.gc.ca.

- **In case of a derelict vessel salvaged by the marine industry with the intention of being brought into Canada, the responsibility is with Transport Canada Marine Safety.** Report to Transport Canada by phone at 604-775-8867 or by e-mail at pacnwp-penpac@tc.gc.ca.

- Large objects discovered offshore will be monitored by the Canadian Coast Guard to assess possible threats to navigation and the environment. Decisions regarding offshore response will be made on a case-by-case basis and in consultation with other relevant provincial and federal agencies.

- Derelict vessels that are considered to be traceable items of significance will be reported differently than other items of significance. In these instances, Transport Canada will report derelict vessels of significance to the Consulate General of Japan in Vancouver for direction about next steps.

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7. Offshore Spills

**Relevant agencies:** Canadian Coast Guard, Transport Canada, Environment Canada and BC Ministry of Environment.

**Objective:** To ensure safe and prompt cleanup of offshore hydrocarbon spills that could pose a threat to public safety, the environment, and economic and recreational activities.

- If spills are discovered offshore, call the Canadian Coast Guard by phone at 1-800-889-8852 or by radio on Channel 16 VHF.
- In consultation with other agencies and stakeholders, the Coast Guard will manage material based on established protocols.

8. Human Remains

**Relevant agencies:** BC Coroners Service and Royal Canadian Mounted Police.

**Objective:** To ensure the prompt repatriation of human remains to Japan in the unlikely event that human remains from the tsunami are found on Canada’s West Coast.

- If human remains are discovered, call 9-1-1/local police.
- The police will contact the BC Coroners Service which will confirm whether or not the remains are human. If the remains are human, the BC Coroners Service will work with local law enforcement agencies to determine likely origin and circumstances surrounding the death. If the remains are determined to be from the tsunami, then those agencies will work with the Consulate General of Japan in Vancouver to confirm identity and facilitate repatriation.

9. Marine Mammal Entanglement

**Relevant agencies:** Department of Fisheries and Oceans Canada, Environment Canada and BC Ministry of Environment.

**Objective:** To ensure safe and prompt removal of items that are causing distress to marine mammals.

- If a marine mammal is observed entangled in marine debris, phone the Department of Fisheries and Ocean’s 24-hour Marine Mammal Incident Reporting Hotline at 1-800-465-4336.
10. Aquatic Invasive Species

**Relevant agencies:** Department of Fisheries and Oceans, Environment Canada and BC Ministry of Environment.

**Objective:** To limit the impact of aquatic invasive species associated with tsunami debris on BC’s shoreline.

- The Department of Fisheries and Oceans is the lead on this issue and will work with partner agencies, including international agencies, to identify the most appropriate response on a case-by-case basis using a risk-based approach.

- More information will be forthcoming in Phase II of the *Tsunami Debris Management Plan*, based on a risk assessment and current research study results that will be consistent with international best practices for aquatic invasive species management.

11. Radiation Testing

**Relevant agencies:** Health Canada/Public Health Agency of Canada, BC Centre for Disease Control (BC Ministry of Health), Department of Fisheries and Oceans and BC Ministry of Environment.

**Objective:** To confirm that there is no threat of radiation from tsunami debris landing on BC shorelines.

- Training for radiation monitoring will be conducted by Health Canada to allow for regular tests of marine debris. These will be reported to the TDCC Science and Monitoring Subcommittee.

- It is not expected that any items will be radioactive; however, Health Canada will provide support to crews from lead departments/agencies involved in beach monitoring and surveys so they can do spot checks for radiation of tsunami debris. In the unlikely event that an area or a piece of debris shows a significant level of radioactivity, Health Canada’s Radiation Protection Bureau can provide scientific advice and additional support.
PUBLIC NOTIFICATION AND REPORTING

Successful debris management involves ensuring members of the public have the information necessary to make informed decisions about their health and safety. While it is unlikely that the tsunami debris will create a significant health or safety concern, the appropriate agencies will notify the public promptly, according to existing emergency notification protocols, if an imminent threat exists.

The TDCC will provide the public with information regarding the scope of tsunami debris activities. This will be done through the tsunami debris information website at www.tsunamidebrisbc.ca and additional outreach activities based on community need and the evolving debris situation. Also, the Ministry of Environment will provide status reports on the number of sightings of Japanese tsunami debris in BC. The frequency of these reports will be determined based on volume but will be no less than once a year.

ADDITIONAL RESOURCES

- BC Ministry of Environment tsunami debris website – www.tsunamidebrisbc.ca
- Pacific Coast Collaborative – www.disasterdebris.wordpress.com
- NOAA tsunami debris website – http://marinedebris.noaa.gov/tsunamidebris/
- Department of Fisheries and Oceans’ report on tsunami debris - www.dfo-mpo.gc.ca/csas-sccs/Publications/ScR-RS/2012/2012_006-eng.html
- Great Canadian Shoreline Cleanup - http://shorelinecleanup.ca/
- Surfrider Foundation - http://vancouverisland.surfrider.org/
- Information on recycling materials – http://rcbc.bc.ca/recyclepedia
APPENDIX A: Organization of the Tsunami Debris Coordinating Committee

Japanese Tsunami Debris Coordinating Committee (TDCC)

Jim Standen, ADM, BC Ministry of Environment (Co-chair)
Paul Kluckner, RDG, Environment Canada (Co-chair)

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<th>Provincial government:</th>
<th>Intergovernmental Relations Secretariat</th>
<th>Federal government:</th>
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<td>Ministry of Environment</td>
<td>Government Communications and Public Engagement</td>
<td>Environment Canada</td>
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<tr>
<td>Emergency Management BC</td>
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<td>Public Safety Canada</td>
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<td>Ministry of Forests, Lands and Natural Resource Operations</td>
<td>Ministry of Health</td>
<td>Department of Fisheries and Oceans</td>
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<td>Ministry of Community, Sport and Cultural Development</td>
<td>Ministry of Finance</td>
<td>Canadian Coast Guard</td>
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<tr>
<td>Ministry of Aboriginal Relations and Reconciliation</td>
<td>Ministry of Labour, Citizens’ Services and Open Government</td>
<td>Royal Canadian Mounted Police</td>
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<th>Other:</th>
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<tbody>
<tr>
<td>Union of BC Municipalities</td>
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<tr>
<th>Science and Monitoring Team</th>
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<tr>
<td>Department of Fisheries and Oceans (co-chair)</td>
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<td>Ministry of Environment (co-chair)</td>
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<td>Ministry of Health</td>
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<td>Health Canada/Public Health Agency of Canada</td>
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<td>Canadian Food Inspection Agency</td>
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<th>Debris Management Planning Team</th>
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<td>Emergency Management BC (co-chair)</td>
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<td>Public Safety Canada (co-chair)</td>
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APPENDIX B: 
Agency Roles and Responsibilities in the Management of Tsunami Debris

The following, is an inventory of agencies that have a role in tsunami debris management. It is not considered an exhaustive list and, depending on the situation, some agencies may have a larger or smaller role in any specific management activity.

PROVINCIAL GOVERNMENT

Ministry of Environment
The Environmental Emergency Program of the BC Ministry of Environment (MoE) leads the Province's ongoing commitment to prevent, prepare for, mitigate and respond to hazardous materials that affect the environment. The provincially funded program plays an essential role in protecting both human health and the environmental quality of the province’s water, land, and air resources along with the flora and fauna they contain. The program will address any hazardous materials impacting the province and provincial lands, in particular including those originating from the Japanese tsunami. The program can also assist with the removal of other tsunami debris that is deemed to be a threat to public safety and/or the environment. The MoE will assist in planning for and responding to the arrival of aquatic invasive species, as capacity allows.

BC Parks
BC Parks is responsible for the designation, management and conservation of a system of ecological reserves, provincial parks and recreation areas located throughout the province. As the manager of these designated areas in BC, BC Parks has a key role in determining how to address tsunami debris that ends up in these areas. BC Parks will also have a role in monitoring the amount of debris in strategic coastal locations using National Oceanographic and Atmospheric Administration (NOAA) protocols to collect data.

Ministry of Forests, Lands and Natural Resource Operations
The Ministry of Forests, Lands and Natural Resource Operations (FLNRO) is responsible for the allocation and administration of provincial Crown natural resources and provides certain rights to these resources through licences, tenures and grants. In addition, FLNRO oversees the management of identified resources through reserves, objectives or establishing designated areas. Integral to FLNRO’s work is ensuring that environmental standards are upheld and environmental sustainability is achieved with resource use activities. As the manager of these natural resources and administrator of resource use authorizations, FLNRO plays a key role in advising on how to address tsunami debris that arrives on these lands.
Ministry of Health/BC Centre for Disease Control
The BC Ministry of Health (MoH) is identified as the lead provincial agency for radiation emergencies in the province. MoH works with health system partners, including the Provincial Health Officer and BC Centre for Disease Control (BCCDC) on issues related to public health. BCCDC works with partner agencies to provide expertise, coordination and support in response to public health emergencies and the public health aspects of natural disasters and other emergencies in BC. The BC health system is working with federal partners to address potential health issues related to the tsunami debris. This includes issues related to radiation and other health hazards.

Emergency Management BC
Emergency Management BC (EMBC) enhances public safety and reduces property and economic loss from actual or imminent emergencies or disaster. If items resulting from tsunami marine debris pose a significant risk to public safety, EMBC will activate provincial resources and support a coordinated response to the emergency. Marine debris that poses an environmental or public safety threat will be reported through the Emergency Coordination Centre’s 24-hour phone lines, where information will be gathered, logged and distributed to appropriate stakeholders.

BC Coroner’s Service
The BC Coroner’s Service (BCCS) has jurisdiction over all human remains related to sudden and unexpected deaths that have occurred in BC. All remains discovered in BC are assumed to be the result of a sudden and unexpected death having occurred in BC until a thorough and detailed investigation confirms otherwise. The Coroner’s Service will therefore take possession of discovered remains and, with the assistance of law enforcement and other stakeholders, work toward positively identifying them as well as investigating the nature and circumstances surrounding the death.

Ministry of Transportation and Infrastructure
The mandate of the Ministry of Transportation and Infrastructure (MOTI) is to maintain and improve the provincial highway system, ensuring the safe and efficient movement of people and goods provincially, nationally and internationally. MOTI will ensure that staff are following safe procedures while protecting MOTI-owned infrastructure from any potential impacts of tsunami debris. Additionally, it is conceivable that roadways under the jurisdiction of MOTI may be needed for such things as heavy equipment access, removal routes for debris, emergency routes, traffic control and access. MOTI staff and maintenance contractors may be involved in specific operations associated with tsunami debris and they will cooperate in whatever capacity possible.

Ministry of Aboriginal Relations and Reconciliation
The Ministry of Aboriginal Relations and Reconciliation provides advice and assistance to the TDCC with respect to the engagement of First Nations in the management of tsunami debris.
FEDERAL GOVERNMENT

Royal Canadian Mounted Police
The Royal Canadian Mounted Police (RCMP) is the provincial police force for BC. They provide assistance with public safety, security and law enforcement issues and have the capacity to deploy additional personnel and resources if required to complement local police personnel. The RCMP's West Coast Marine Service also provides policing services and federal law enforcement to coastal communities along the West Coast of Canada.

Department of Fisheries and Oceans
The federal Department of Fisheries and Oceans (DFO) has scientific expertise in the fields of ocean currents and marine environments. DFO has analyzed the tsunami debris issue with respect to Canadian (BC) shores and, together with NOAA, is: analysing patterns of marine debris movement across the Pacific Ocean using models and oceanographic observations; monitoring levels of debris accumulating on BC shores; and providing recommendations to the committee with respect to debris response. DFO also leads the British Columbia Marine Mammal Response Network which responds to debris-entangled marine mammals. All debris removed from entangled mammals is catalogued and the origin identified if possible. DFO also has expertise in dealing with aquatic invasive species (AIS), and will be the lead agency on this issue. They are currently completing a risk assessment for AIS, and are working with US federal and state agencies to develop protocols for monitoring and responding to the arrival of debris fouled with potentially invasive species.

Canadian Coast Guard
The Environmental Response program of the Canadian Coast Guard (CCG) is responsible for ensuring an appropriate level of preparedness and response capability for all ship source and mystery source pollution incidents in waters under Canadian jurisdiction. Under the Canada Shipping Act (CSA), CCG is authorized to take measures considered necessary to prevent or minimize the impacts of pollution from ships, or from spills in the marine environment that are believed to have come from ships. This authority allows CCG to take any measures deemed necessary, including removing or destroying the vessel and/or directing any person to take such measures.

Transport Canada
Transport Canada (TC) is the lead federal regulatory agency responsible for the National Oil Spill Preparedness and Response Regime. TC has authority under the Canada Shipping Act to ensure that marine navigational channels are safe. It utilizes sophisticated aerial surveillance equipment to detect and monitor offshore areas as part of pollution prevention operations. If debris is deemed hazardous to marine vessels, TC, in consultation with DFO and CCG, has procedures in place to respond to the risk that vary depending on the location, trajectory and type of debris. This may include the removal or marking of hazards to navigation within the navigational channel. Under the authority of the Canada Shipping Act, the TC Receiver of Wreck acts as the custodian of found and recovered wrecks and is
responsible for the disposal of vessels, aircraft and cargo found for which no owner can be located. All wrecks are to be reported to the Receiver of Wreck.

Environment Canada
Environment Canada (EC) coordinates federal tsunami debris-related activities. If required, EC has the capacity to provide oil and chemical spill fate and effects modelling and air plume dispersion modelling. In the case of marine environmental emergencies (most often led by TC or the CCG), EC will provide scientific and response advice as necessary.

Aboriginal Affairs and Northern Development Canada
Aboriginal Affairs and Northern Development Canada’s role is to support the efforts of the primary provincial or territorial emergency management organization to address an emergency situation on-reserve, and to manage the consequences arising from the emergency such as disruptions to community-level critical services delivered in First Nations communities.

Parks Canada Agency
Parks Canada (PC) protects and presents nationally significant heritage areas across the country including national parks, national historic sites and national marine conservation areas. On the Pacific Coast, tsunami debris is likely to arrive in Gwaii Haanas National Park Reserve and National Marine Conservation Area as well as Pacific Rim National Park Reserve. PC’s roles include monitoring and ensuring the maintenance of ecological integrity of marine and terrestrial areas of national parks, managing for sustainable use of national marine conservation areas and communicating with visitors about the values of these protected places. PC will communicate with visitors regarding potentially hazardous tsunami debris and is working with local communities as well as multiple partners to coordinate local responses.

Public Safety Canada
Public Safety Canada (PS) develops and maintains the federal government’s capacity to manage emergencies, monitors and coordinates the federal response and provides support to provinces and territories when federal assistance is needed. Working at the national (strategic) whole-of-government level, the Government Operations Center (GOC), an interdepartmental, response-focused asset of the Government of Canada housed in PS, brings all partners into a common environment to harmonize collective actions and abilities into efficient analysis and action. The GOC’s role is to support response coordination on behalf of the Government of Canada with respect to the Japanese tsunami debris issue. The PS BC Regional Office provides support to the TDCC by coordinating information from federal departments and agencies, most specifically as it relates to roles, responsibilities and capabilities.
Department of Foreign Affairs and International Trade
The Department of Foreign Affairs and International Trade will act as interface between the TDCC and the Government of Japan, through the Embassy of Japan in Ottawa, to assist in managing the debris issue.

Health Canada/Public Health Agency of Canada
The mandate of the Radiation Protection Bureau (RPB) within Health Canada is to promote and protect the health of Canadians by assessing and managing the risks posed by radiation exposure in living, working and recreational environments. RPB routinely monitors the environment for radioactivity and can provide, or arrange for the provision of, training in field radiological surveying, the basics of radiation physics, use of detectors, field work health and safety procedures, sample collection and analysis, and data interpretation. The Public Health Agency of Canada (PHAC) coordinates the federal government’s response to human health hazards and provides advice on the human health risks related to potential biological, chemical or radiological hazards. PHAC is the federal point of contact for the province for a health-related emergency.

OTHER GOVERNMENTS

Local Governments
Local governments (municipalities and regional districts) are responsible for land-use planning and provision of services, including waste management systems such as recycling and disposal, within their jurisdictional boundaries. The capacity to address and manage tsunami debris may vary according to geographical region and depend on the size, type and location of debris affecting the jurisdiction. Local governments may play a key role in communicating issues to the public, and in supporting and coordinating volunteer community groups, including shoreline cleanup groups. Efforts towards tsunami debris management must be coordinated with other neighbouring communities, stakeholders and with the TDCC.

Treaty and Non-Treaty First Nations
Both treaty and non-treaty First Nations are key local partners in our collective efforts to address tsunami debris. The TDCC is currently in the process of engaging with coastal First Nations to discuss and clarify their role and responsibilities in the planning and management of the debris issue.
Pacific Coast Collaborative
In partnership with the governments of California, Oregon and Washington, the Government of BC has committed to:

- Develop a joint communication strategy;
- Share safety protocols and training for volunteers who participate in beach cleanups; and
- Work with our respective federal agencies and the Japanese government to establish protocols for the identification and management of any particularly sensitive items that may wash ashore.

The goal of this coordinated work is to ensure that these west coast jurisdictions are working together in those areas where it makes sense. In particular, the Province and states are sharing information and techniques for managing tsunami debris so that each jurisdiction can learn from its partners.

National Oceanographic and Atmospheric Administration
The National Oceanographic and Atmospheric Administration (NOAA) Marine Debris Program in the United States supports national and international efforts to research, prevent and reduce the impacts of marine debris. As such, NOAA has been involved in modeling anticipated trajectories and time of arrival of tsunami debris, monitoring debris through satellite, aerial, offshore and onshore observations, and tracking information from the public regarding marine debris sightings and forwarding this information to the BC MoE. NOAA also serves as a conduit into collaboration and information sharing with other US federal, state and local activities related to Japanese tsunami debris.

Consulate General of Japan in Vancouver
The Consulate General of Japan in Vancouver ensures that any information developed by the Government of Japan on marine tsunami debris is conveyed to the TDCC. It also assists with the identification of marine debris and items of significance, and can establish contact with relevant authorities or individuals in Japan if significant, identifiable items are recovered.

OTHER PARTNERS

Local Agencies
There may be local community and business groups relating to the outdoors/environment, schools, tourism, forestry, marine community, etc. that may have roles specific to marine debris that are not represented in this plan. These agencies and their efforts should be connected, wherever possible, with the TDCC either directly or through their local government representative.

Surfrider Foundation
Surfrider Foundation has expertise in conducting shoreline cleanups of marine debris. The mission of the Surfrider Foundation is to work toward the protection and enjoyment of oceans, waves and beaches. The Combing the Coast campaign combines monthly beach cleanups with data collection of findings through NOAA shoreline monitoring protocols. The Foundation has been following NOAA protocols for shoreline monitoring of marine debris since September 2011.
The Great Canadian Shoreline Cleanup (Vancouver Aquarium)
The Great Canadian Shoreline Cleanup has expertise in conducting shoreline cleanups and in organizing and supporting independent cleanups. Its mission is to promote understanding and education about shoreline litter issues by encouraging Canadians to rehabilitate shoreline areas through cleanups. There are two main cleanup initiatives: a National Cleanup Week and a Spring Cleanup for schools. In response to the tsunami debris, this organization has created a volunteer sign-up program to connect concerned individuals with communities in need of support. Support materials for organizing beach cleanups are available on the website.

Maritime Museum of BC
The Maritime Museum of BC has developed a project to collect photos of flotsam that has washed ashore. A Facebook site has been launched that will allow users to upload photos of debris that is found along the beaches. Moderators at the museum will attempt to determine the origin of debris, assess any potential value and place photos of the objects on the site. The museum aims to collect images from the driftage which will have sentimental value to Japanese people. The Maritime Museum is also cooperating with federal, provincial and state departments and non-governmental organizations in Canada and the US to share the data collected.

Canadian Red Cross
The Canadian Red Cross has expressed an interest in assisting Japanese citizens who may wish to travel to BC if identifiable items of significance are recovered. The Red Cross is connected to the TDCC and will be engaged as required.