

Coastal First Nations Tsunami Debris Monitoring Protocol

Regional Monitoring System

DRAFT – November 2012

Background

Tsunami debris from the Japanese earthquake is a concern for Coastal First Nations (CFN). Communities are worried about the amount of debris that may arrive on beaches, how the debris will be collected and disposed of, whether the debris is contaminated, the possible impacts of invasive species, and other health and environmental implications of debris arriving on the North and Central Coast. As such, a Coastal First Nation Tsunami Debris Action Plan has been drafted, along with the Tsunami Debris Monitoring Protocol. This Monitoring Protocol is intended to provide direction to CFN Resource Stewardship Offices and staff on how best to collect and store data on the tsunami debris. It is critical that each Nation adopts this monitoring protocol to ensure a consistent approach for assessing the extent and impacts of tsunami debris throughout CFN territories. This, in turn, will allow the development of a coordinated response.

Guardian Watchmen and other stewardship staff will play an important role in monitoring the tsunami debris by 1) recording incidental observations of all tsunami debris and 2) conducting periodic beach surveys on priority beaches on the outer coast. The information on tsunami debris gathered by stewardship staff is critical to build a case for getting the necessary resources and funds to address the financial burden and environmental impacts that a quantity of material of this magnitude may have on your community's waste management infrastructure and the impact on environmental and cultural values.

In addition to this Monitoring Protocol, a Tsunami Debris Q & A document has been developed to provide answers to questions such as how much tsunami debris is expected, why it is important for CFN communities to monitor what they find, what type of debris to expect, and concerns about radiation and radiation monitoring,

Tsunami Debris Data Collection Methods:

There are two methods for collecting data on tsunami debris:

1. **Incidental Observations** – Each time a piece of tsunami debris is sighted, it will be recorded using the Regional Monitoring System (RMS) Other Observations field card or CoastTracker sequence, and entered into the RMS online data management system. These incidental observations are very important to record and report because the information will help scientists to model and predict how materials will move through the currents in the ocean. It will also start to provide a picture of how much and what type of debris is arriving on the Coast.
2. **Beach Surveys** - One or two key beaches on the outer coast of your territory will be monitored on a periodic basis over time to assess changes in debris loading using a standardized survey developed by the US National Oceanic and Atmospheric Administration (NOAA). Each Nation should conduct the first survey on selected beaches before the end of 2012 to establish a baseline

assessment of the type and amount of materials that are ‘normally’ generated before the tsunami debris begins to accumulate.

Each Nation is being asked to dedicate some of their resource stewardship staff time to both collect incidental observations of tsunami debris, as well as conduct periodic beach surveys at a key beach in their territory. Without this information collected by local stewardship staff, Coastal First Nations will not be able to negotiate with provincial and federal government for the needed resources to clean up the tsunami debris and address other impacts that are a concern to the community.

All information collected by Coastal First Nations on tsunami debris and entered into the RMS online data management system will be shared with the Tsunami Debris Coordinating Committee (a multi-agency committee responsible for addressing key issues and allocating resources). The Committee is receiving data from agencies, communities and organizations throughout coastal BC. The data will also be shared with NOAA, the US agency responsible for monitoring and addressing tsunami related issues. With the agreement of the Nations, the data may also be shared with local non-profit organizations working to raise awareness around tsunami debris (e.g. Living Oceans Society).

We are currently exploring appropriate mobile apps that could be used to collect incidental observation data by community members and others. This data would also feed into the online data management system. It will be important for resource stewardship staff to communicate with community members regarding how best to respond if they find tsunami debris. We will be working with stewardship staff in the coming months to develop outreach tools for community members.

How to Collect Incidental Observations

Document any incidental observation of tsunami debris either on the water or on the shore. An incidental observation is when you find any objects while out on patrol, that you believe to be from the Japanese tsunami. Use the RMS Other Observations field card (see example below) or the Other Observations field sequence on your CoastTracker to record the following:

- ***Date and time***
- ***Type of Observation*** – Record “Japan tsunami debris”
- ***Location Description*** - Fill in a description of the location and the GPS coordinates where you observe the debris (remember that if you are using the CoastTracker, the latitude and longitude will be recorded once you save the Other Observation sighting)
- ***Description*** – Describe the object(s) that you are observing. When using the CoastTracker, use your RMS notebook to record details, then add it manually to the online data management system later. Record the following:
 - Size and aspect of the object (the aspect is a percentage estimate of how much of the object is above the water compared to how much is below the water)
 - Number of the same object if applicable
 - Material that the object is made out of

- Record any identifiable markings such as serial numbers, a stamp with the city and prefecture, boat name, etc. (ie., anything that could locate it as being from a specific place or geographical area)
- Note if there is marine life attached to the object (algae, invertebrates, etc.) (see section below for instructions on what to do with potential aquatic invasive species)
- Note anything that leads you to believe that the object is from the Japan tsunami (ie., Japanese text, etc.)
- **Comments:**
 - Describe any actions that you take (e.g., removed or collected the object, disposed of it at the dump, called the Coast Guard, etc.)
 - Describe any further actions needed, such as reporting the object to the authorities, etc.
 - Note whether there is a concern (e.g., Is it a hazard to marine traffic? Could the material be harmful to cetaceans in the area? Could the object be a potential toxic hazard (e.g., oil drum, etc.)? Are there potential aquatic invasive species attached?)

Other Observations (v.2)

Date: 15/11/12

Entered in DMS: _____

Time	Type of Observation (event, activity, site, etc.)	Lat/long	Location description
1345	Japan tsunami debris	52 10.779 -128 07.005	Off northeast corner of Sable Island
Description			
<p>Large 20 gallon drum bobbing in the water, approximately 1 m in length. Covered in Styrofoam - looks like some kind of tarp covering outside, tied on with rope. Unusual looking flotation device. Probably from the Japan tsunami. Suspect that it is empty but not certain. No marine life attached to the outside.</p> <p>We towed it back home and will leave it there until someone arrives to take a look. Because it's so buoyant, don't suspect that it has anything inside, probably just a flotation device.</p>			
<input checked="" type="checkbox"/> Photos			
Comments			
<p>We reported it to the spill report line at MoE (1-800-663-3456). Talked to Bob Brown who said that someone locally would check back with us by the end of the week.</p>			

Steps for Collecting Incidental Observations of tsunami debris:

1. Fill in "Other Observations" Field Card or CoastTracker sequence as described above.

2. Take several photos of the object and of any identifiable markings.
3. Enter data into the RMS online data management system either manually from the RMS field cards or upload data from the CoastTracker.
4. If you find any items that you believe may have potential aquatic invasive species attached see the section “Protocol for Potential Aquatic Invasive Species” below.
5. Report any potential hazardous materials, vessels or large objects, mementos or personal materials or remains that you find according to the section “Debris Handling and Reporting Protocol” below.

How to Conduct a Beach Survey

The following protocol is adapted from the NOAA monitoring protocol for conducting an “accumulation” beach survey and is part of the recommended methodologies that are being used across communities and agencies on the BC Coast. This type of survey provides information on the rate of deposition (flux) of debris onto the shoreline. It requires that you tally the amount (# of items per unit area) and the types of debris found on the shoreline and remove the debris. The survey provides an assessment of the total load of debris and can be used to determine the density (# of items per unit area, per unit time) and type of debris present.

Selecting Beaches that Your Community Will Monitor:

Choose 1 or 2 exposed beaches on the outer islands or coast of your territory that have a safe and direct access by boat. Beaches should be selected based on local knowledge in your community of which areas are most likely to accumulate debris from Pacific Ocean currents and/or beaches where traditional harvesting takes place on the outer coast. Ideally the beach will have: sandy or pebble shoreline; south-eastern aspect, if possible; clear, direct, year-round access; at least 100 m in length parallel to the water; and no other regular cleanup activities.

Equipment Needed:

- Hand-held GPS unit or CoastTracker
- Flag markers or stakes
- 100 m fiberglass measuring tape
- Work gloves
- Trash bags or buckets for collecting material
- Flagging tape
- 12” ruler
- Clipboard
- Data sheets on waterproof paper and pencils

Data Sheets Needed:

There are two data sheets that are used to conduct a beach survey. Fill out a Shoreline Characterization Sheet (Appendix A) once a year for each beach that you are surveying. Fill out the Debris Density Data Sheet (Appendix B) each time that you conduct a beach survey.

Steps for Conducting a Beach Survey:

1. Describe the beach shoreline site using the Shoreline Characterization Sheet (Appendix A). This must be completed once a year for each beach surveyed. On this data sheet you will record information such as:
 - a. GPS coordinates at the beginning and end of your shoreline site, or at the site's four corners if the width of the beach is > 6 m
 - b. Shoreline characteristics (e.g., tidal range and substrate)
2. Check local tide tables and plan to arrive at your site during low tide.
3. Begin by filling out the "Additional Information" section of the Debris Density Data Sheet (Appendix B). Mark the beginning and end of a section of the shoreline that is at least 100 m in length and relatively uniform in substrate type. Place flag markers at the start and end of your transect or at the four corners if the width of the beach is > 6 m.
4. You must cover the entire site from waters edge to the back of the shoreline, preferably walking in lines 1 m wide. Depending on how many people are conducting the survey and the tides, traverse the survey area either parallel or perpendicular to the water. See Appendix C for a diagram of walking patterns. If more than one surveyor is available, the survey area should be divided evenly with clearly specified areas assigned to each individual. Surveyors should traverse the survey area until the entire site is cleared of debris.
5. Tally all debris items over 2.5 cm in length according to the type of debris on the Debris Density Data Sheet. Count the item if any part of the item is within the survey area.
6. Record large debris items (anything bigger than ~ 0.3 m) in the large debris section of the Debris Density Data Sheet.
7. Use garbage bags or buckets to remove all items from the survey area after you have recorded it on your data sheet.
8. Remember to remove the flag markers when you have completed your survey.
9. Take photos of your shoreline transect and some of the debris items!
10. Send copies of your data to Coastal Stewardship Network staff. We will share these surveys with the BC Tsunami Debris Coordinating Committee and NOAA.
11. For all subsequent beach surveys at the same site, begin your survey by relocating the four corners of the transects using your GPS coordinates and mark them once again with flag markers. Repeat steps 2 to 10.

Disposing of Materials Collected during the Beach Survey:

Put all the debris removed from the survey area in sturdy garbage bags as you collect it. Find an appropriate location that is protected from wind and storms, well above the highest tide mark. Record the GPS location, in the event that it will be possible for your community to collect and dispose of the debris at a later date. Dispose of any items that may have potential invasive species attached according to the section "Protocol for Potential Aquatic Invasive Species" below. Report any potential hazardous materials, vessels or large objects, mementos or personal materials or remains according to the section "Debris Handling and Reporting Protocol" below.

Protocol for Potential Aquatic Invasive Species

Tsunami debris that originated in the marine environment such as docks, piers, buoys, vessels, aquaculture floats, and other buoyant materials poses the greatest concern with respect to aquatic invasive species. There is a high likelihood that living Asian species not native to North America may colonize these items. Some of these animals and plants pose a serious threat to our native species and the environment by competing with native fish and wildlife for food and habitat. If you come in contact with tsunami debris that you suspect to be contaminated with aquatic invasive species take the following measures:

- a) If debris is encountered that is suspected to carry aquatic invasive species, take clear photos of the piece of debris, close-ups of the attached organisms and any identifiable marks on the debris. Record the date and location of the sighting.
- b) Report your sighting by phone to your local DFO officer and by email to DisasterDebris@noaa.gov.
- c) If the suspicious debris has landed *onshore* and it is safe and feasible to do so, it should be disposed of in a landfill as soon as possible. If the debris cannot be disposed of in a landfill, attempt to move the item well above the high-tide line so that any organism living on it will not survive or return to the ocean during high tide and storm events.
- d) If the suspicious debris is located *offshore*, you are encouraged to retrieve debris if it is safe to do so and deck space permits. If you are able to retrieve the debris, please indicate when and where you will be landing when you make your report, as you may be given drop-off or disposal instructions. **Do not attempt to tow large debris items**, as they may be heavily contaminated with animals or plant material. Movement may increase the risk of dislodging and transporting potentially invasive species. Instead report the debris to the Coast Guard by phone at 1-800-889-8852 or by radio on Channel 16 VHF and report to your local DFO officer.
- e) Record your sighting using the Coastal First Nations Tsunami Debris Monitoring Protocol and Regional Monitoring System field cards.

Debris Handling and Reporting Protocol

This section provides specific handling and reporting protocols for some of the debris material that you may find.

➤ **Litter and other typical marine debris items**

Examples: Plastic bottles, aluminum cans, buoys, Styrofoam

Common marine debris types may vary by location. If you are monitoring a shoreline on land (conducting a beach survey following the Coastal First Nations Tsunami Debris Monitoring Protocol) and it is safe and practical, we encourage you to put the debris in garbage bags and move it to an appropriate location that is protected and well above the highest tide mark. Record the GPS location where you leave the debris, in the event that it will be possible for your community to collect and dispose the debris at a later date.

➤ **Potential hazardous materials (HAZMAT)**

Examples: Oil or chemical drums, gas cans, propane tanks, fumigation containers, shipping containers.

Items that pose an immediate environmental or public safety threat should not be removed by untrained personnel and are to be reported to 911/local RCMP 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.

➤ **Derelict vessel or other large debris item**

Examples: Adrift fishing boat, shipping containers

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 email at pacnwp-penpac@tc.gc.ca.

➤ **Mementos or possessions**

Examples: Items with unique identifiers, names, or markings

If an item can 1) be traced back to an individual or group and 2) has personal or monetary value, it should be reported to DisasterDebris@noaa.gov. NOAA will work with local Japan consulates to determine if they can help identify its owner.

➤ **Remains**

It is highly unlikely that remains from the tsunami will reach Canada, but if you see human remains anywhere, contact your local RCMP and report what you observed. Do not touch or attempt to move them.

Further Information

For more information about tsunami debris, check out the following websites:

- BC Tsunami Debris Coordinating Committee <http://www.env.gov.bc.ca/epd/tsunami-debris/index.htm>
- National Ocean and Atmospheric Administration (NOAA) – Marine Debris Program <http://marinedebris.noaa.gov/tsunamidebris/>

Appendix A – Shoreline Characterization Sheet

SHORELINE DEBRIS Shoreline Characterization Sheet	Nation		Name of Nation responsible for collecting the data
	Surveyor name		Name of person responsible for filling in this sheet
	Phone number		Phone contact for surveyor
Complete this form ONCE for each site location	Date		Date of this survey

SAMPLING AREA

Shoreline name			Name by which the section of shoreline is known (e.g., beach name, park)
Province	BC		
Coordinates at start of shoreline section	Latitude	Longitude	Recorded as XXX.XXXX (decimal degrees) at start of shoreline section (in both corners if width > 6 meters)
Coordinates at end of shoreline section	Latitude	Longitude	Recorded as XXX.XXXX (decimal degrees) at end of shoreline section (in both corners if width > 6 meters)
Photo number/ID			The digital identification number(s) of photos taken of shoreline section

SHORELINE CHARACTERISTICS - from beginning of shoreline site

Length of sample area		Length measured along the midpoint of the shoreline (in meters)
Substratum type		For example, a sandy or gravel beach
Substrate uniformity		Percent coverage of the main substrate type (%)
Tidal range		Maximum & minimum vertical tidal range. Use tide chart (usually in meters).
Tidal distance		Horizontal distance (in meters) from low- to high-tide line. Measure on beach at low and high tides or estimate based on wrack lines.
Back of shoreline		Describe landward limit (e.g., vegetation, rock wall, cliff, dunes)
Aspect		Direction you are facing when you look out at the water (e.g., northeast)

LAND-USE CHARACTERISTICS – within shoreline location

Location & major usage	Urban	N/A	Select one and indicate major usage (e.g., recreation, boat access, remote)
	Suburban		
	Rural		
Access			Vehicular (you can drive to your site), pedestrian (must walk), isolated (need a boat or plane)
Nearest town			Name of nearest town/village
Nearest town distance			Distance to nearest town (kms)
Nearest town direction			Direction to nearest town (cardinal direction)
Nearest river name			If applicable, name of nearest river or stream. If blank, assumed to mean no inputs nearby
Nearest river distance			Distance to nearest river/stream (km)
Nearest river direction			Direction to nearest river/stream (cardinal direction from site)
River/creek input to beach	YES	NO	Whether nearest river/stream has an outlet within this shoreline section
Pipe or drain input	YES	NO	If there is a storm drain or channelized outlet within shoreline section
<p>Notes (including description, landmarks, fishing activity, etc.):</p>			

Appendix B – Debris Density Data Sheet

SHORELINE DEBRIS Debris Density Data Sheet	Nation		Name of Nation responsible for data collection
	Surveyor name		Name of person responsible for filling in this sheet
	Phone number		Phone contact for surveyor
Complete this form during EACH survey per site visit	Email address		Email contact for surveyor
	Date		Date of this survey

ADDITIONAL INFORMATION

Shoreline name			Name for section of shoreline (e.g., beach name, park)
Survey Type	Accumulation <input checked="" type="checkbox"/>		
Coordinates of start of shoreline site	Latitude	Longitude	Recorded as XXX.XXXX (decimal degrees). Record in both corners if width > 6 m.
Coordinates of end of shoreline site	Latitude	Longitude	Recorded as XXX.XXXX (decimal degrees). Record in both corners if width > 6 m.
Width of beach			Width of beach at time of survey from water's edge to back of shoreline (meters)
Time start/end	Start	End	Time at the beginning and end of the survey
Season			Spring, summer, fall, winter, etc.
Date of last survey			Date on which the last survey was conducted
Storm activity			Describe significant storm activity within the previous week (date(s), high winds, etc.)
Current weather			Describe weather on sampling day, including wind speed and % cloud coverage
Number of persons			Number of persons conducting the survey
Large items	YES	NO	Did you note large items in the large debris section?
Photo ID #s			The digital identification number(s) of debris photos

		taken during this survey.
Notes: Evidence of cleanup, sampling issues, etc.		

DEBRIS DATA: (continued on back)

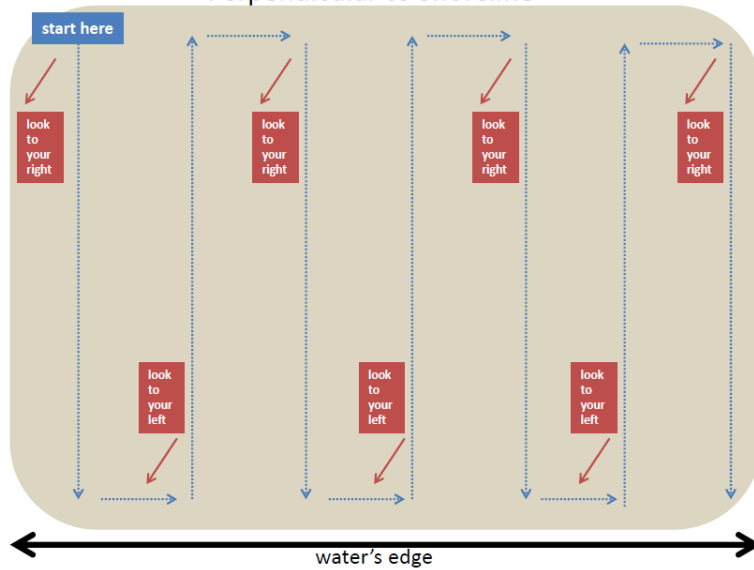
ITEM	TALLY (e.g., III)			TOTAL
	<i>PLASTIC</i>			
Plastic fragments	Hard	Foamed	Film	
Food wrappers				
Beverage bottles				
Other jugs or containers				
Bottle or container caps				
Cigar tips				
Cigarettes				
Disposable cigarette lighters				
6-pack rings				
Bags				
Plastic rope/small net pieces				
Buoys & floats				
Fishing lures & line				
Cups (including polystyrene/foamed plastic)				
Plastic utensils				
Straws				
Balloons				
Personal care products				
Other:				
<i>METAL</i>				
Aluminum/tin cans				
Aerosol cans				
Metal fragments				
Other:				
<i>GLASS</i>				
Beverage bottles				
Jars				

Glass fragments				
Other:				
ITEM	TALLY (e.g., III)			TOTAL
RUBBER				
Flip-flops				
Gloves				
Tires				
Rubber fragments				
Other:				
PROCESSED LUMBER				
Cardboard cartons				
Paper and cardboard				
Paper bags				
Lumber/building material				
Other:				
CLOTH/FABRIC				
Clothing & shoes				
Gloves (non-rubber)				
Towels/rags				
Rope/net pieces (non-nylon)				
Fabric pieces				
Other:				
OTHER/UNCLASSIFIABLE				
LARGE DEBRIS ITEMS (> 0.3 m)				
Item type (vessel, net, etc.)	Status (sunken, stranded, buried)	Approximate width (m)	Approximate length (m)	Description / photo ID #
Notes on debris items, description of "Other/unclassifiable" items, etc:				

Appendix C –Shoreline Walking Patterns

The schematics below are potential survey walking patterns to ensure that the entire shoreline site or transect is covered. Suggested distance between walking lines is approximately one meter.

Walking Pattern #1:
Perpendicular to Shoreline



Walking Pattern #2
Parallel to Shoreline

