Tsunami High Risk
Coastal Community Project

Mapping Component: Extended Legend

SUNSHINE COAST REGIONAL DISTRICT;
DISTRICT OF SECHELT;
TOWN OF GIBSONS;
SECHELT INDIAN GOVERNMENT DISTRICT

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Prepared for:
Sunshine Coast Regional District,
District of Sechelt,
Town of Gibsons,
Sechelt Indian Government District,
British Columbia, Canada

Prepared by:
EmergeX Planning Inc.
1202 – 700 West Pender Street
Vancouver, BC, V6C 1G8

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www.emergexplanning.com

1. Introduction

In addition to the Hazard Risk and Vulnerability Assessment (HRVA) reflecting *all* hazards relevant to the districts and communities within the scope of this project, it is important to assess the specific telegenic tsunami hazard present in each respective area. The mapping component of the Tsunami High Risk Coastal Community Project highlights entities that are at risk from inundation following a tsunami. Land above the 10-metre contour is generally considered a "safe zone" in the event of a tsunami affecting coastal British Columbia along the Strait of Georgia (PEP, 2006), such as the communities discussed in this report.

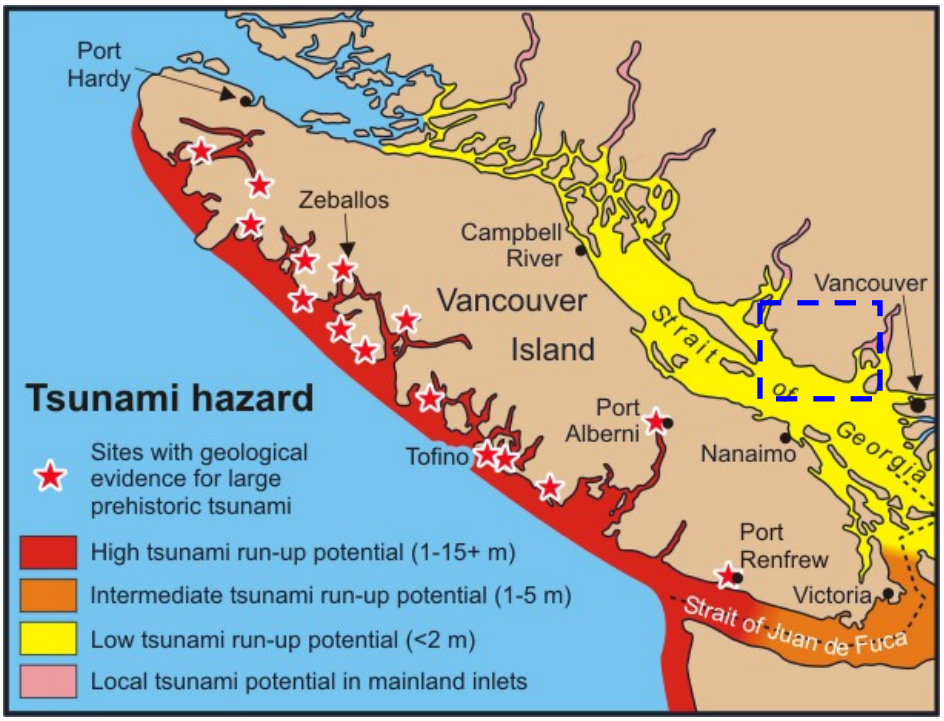

Figure 1 - Relative run-up potential for communities on or adjacent to Vancouver Island
(Source: Natural Resources Canada, 2005)

A depiction of relative potential for run-up during a tsunami event is given in Figure 1, with the area of focus highlighted by a blue box. In high risk areas such as the west coast of Vancouver Island, run-up potential is predicted to exceed 15 metres. Due to the Sunshine Coast Regional District's location, run up potential is predicted to be under 2 metres. This study considers the inundation zone to be the area below the 10 metre contour.

2. Methodology

Data

The shapefiles used for this project were a combination of data provided by the Sunshine Coast Regional District (SCRD) and that which was compiled by EmergeX. Details will

not be elaborated upon here, as metadata was provided in digital form for layers internally created. Layers used for the project included:

- Inundation area
- Buildings, civic and other infrastructure
- Critical facilities
- Road network
- Evacuation routes
- Municipal boundaries
- Contours: 10-metre and 10-metre estimate[1]
- Coastline
- Added building points

For accuracy and cartographic purposes, the coastline data was not used to define the inundation areas, these areas were manually created to the extent of the orthographic photos. This ensured (among other concerns) that small islands and entities outside the coastline plot would be included. While map scales are similar between maps, they are not consistent; varying scales exist to maximize communication. For example, the Sechelt central map was set at a slightly larger scale to focus on the District core.

The only point data visible on the final maps are the buildings and infrastructure that fall within the inundation area to highlight their location and relative vulnerability (approximate dot density). Critical infrastructure plots (with some appearing in Map 1 for example), were provided through GPS coordinates by the SCRD, hence this data precision is high.

Evacuation Routes

Following the completion of inundation area plots for each respective community, potential evacuation routes were plotted. Criteria for the designation of these evacuation routes include:

- Priority to major roadways (congestion and efficiency considerations)
- Direct and quick access to evacuation routes and areas above the 10-metre contour
- Originate route in most populated areas that are potentially inundated
- Consideration of evacuation direction route and possible congestion issues (apply a reasonable buffer between evacuation routes)

Limitations for evacuation route designations include the lack of major thoroughfares that lead in an inland direction away from the potential danger zone when analyzing the SCRD. Other limitations are discussed below in Section 4.

[1] Small stretches of the SCRD did not have corresponding elevation data due to limited extent of the topographic maps or overlap/quality issues, so a best guess estimate was used to create these contours.

Areas of Coverage

The project includes the Sunshine Coast Regional District, District of Sechelt, Town of Gibsons, and Sechelt Indian Government District. Some portions of these defined areas were not included due to the non-coastal nature of them and / or the lack of people and property potentially impacted by a telegenic tsunami. An example of this includes a large portion of Electoral Area B, which is inland (local marine tsunamis and local terrestrial tsunamis were not considered in the scope of this project). An overview of areas covered can be seen in Figure 2. Table 1 provides a summary of included maps.

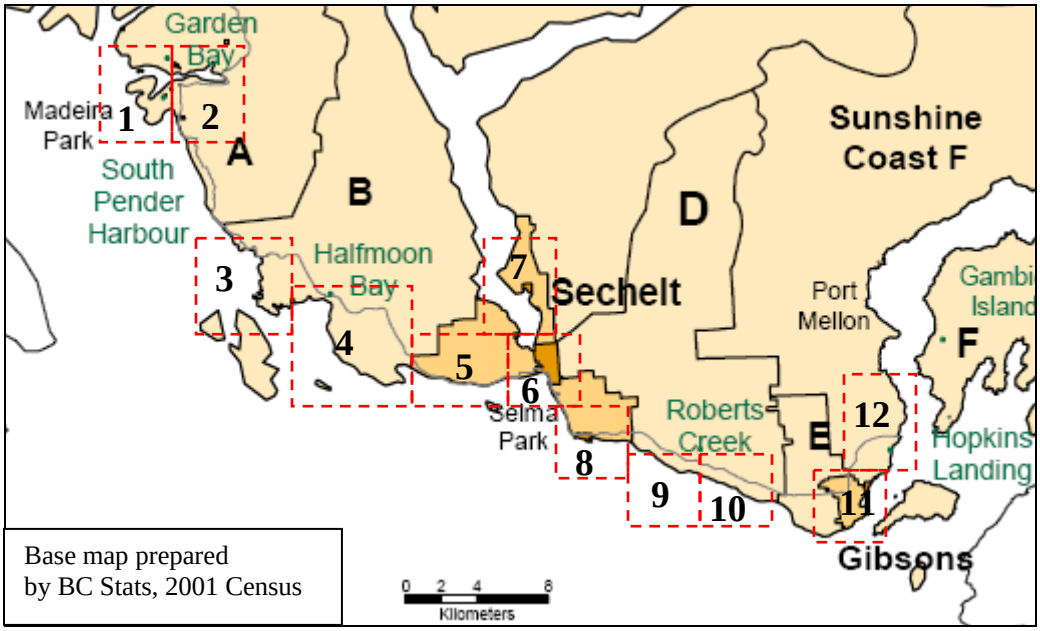

Figure 2 – Overview of Maps Created within the Sunshine Coast Regional District

Table 1 – Maps and Areas of Focus

Map #	Electoral Area	Area of Focus
1	A	Pender Harbour
2		Gunboat Bay and Oyster Bay
3	B	Secret Cove
4		Halfmoon Bay and Sergeant Bay
5	C	District of Sechelt (West)
6		District of Sechelt (Central)
7		District of Sechelt (North)
8		District of Sechelt (East)
9	D	Roberts Creek
10		Roberts Creek (East)
11	E	Town of Gibsons
12	F	Hopkins Landing

3. Conclusion

After completing the mapping component for all areas within the scope of the project, there are some important trends and recommendations that should be noted. The Sechelt District Municipality, the Town of Gibsons and the settlements in and around Pender Harbour have a significant number of buildings and other infrastructure lying within the 10-metre inundation area. Of these three areas, Sechelt is most vulnerable due to the following factors:

- Much of the District centre is flat and below the 10-metre contour
- There is limited sheltering by local offshore islands
- Critical infrastructure exists within the potential inundation area, as well as a relatively high number of buildings and other vulnerable entities
- Sechelt has undergone significant population growth since the last census (Table 2)

Table 2 – Sunshine Coast Regional District Population Estimates

Name	2001	2002	2003	2004	2005	2004-05 % Chg.
Sunshine Coast	**26,713**	**26,978**	**27,389**	**27,702**	**28,557**	**3.1**
Gibsons (T)	4,076	4,111	4,190	4,216	4,349	**3.2**
Sechelt (DM)	8,113	8,240	8,395	8,511	8,901	**4.6**
Sechelt Ind Gov Dist (IGD)**	829	795	790	792	812	**2.5**

** Sechelt Indian Government District is split between Sunshine Coast and Powell River Regional Districts (Source: BC Stats, 2005).

Due to the orientation of major thoroughfares along the coast, it may be feasible to designate refuge areas in the event of a telegenic tsunami. This will work to maximize efficiency and minimize congestion on limited routes available to potentially vulnerable residents. While the Sunshine Coast Highway can handle relatively large amounts of traffic, it extends below the 10-metre contour in some areas rather than extending directly perpendicular to the inundation areas.

4. Sources of Error

The following issues may affect accuracy and / or integrity of the final results:

- The added building points are only as accurate as the date of the orthographic photos; these points were manually plotted based on infrastructure visible and were not ground-truthed.

- The building plots are only meant to show relative dot density of infrastructure within a given area and should be interpreted accordingly.

- The evacuation routes were created based on the criteria discussed in Section 2, but should be treated as potential routes only. Local experts should discuss the feasibility of these routes and weigh appropriate options.

References

Provincial Emergency Program (2006). Earthquake and Tsunami Smart Manual, A guide for protecting your family. Province of British Columbia. Available from: http://www.pep.bc.ca/hazard_preparedness/Earthquake_and_Tsunami_Smart_Manual.pdf

BC Stats (2005). Municipal Population Estimates 2005. David O'Neil, Service BC, Ministry of Labour and Citizen's Services.