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Background

Graduate Research Focus

MGIS – University of Calgary

- Public Participation GIS in Isolated Community in Campache, Mexico

PhD – University of Calgary

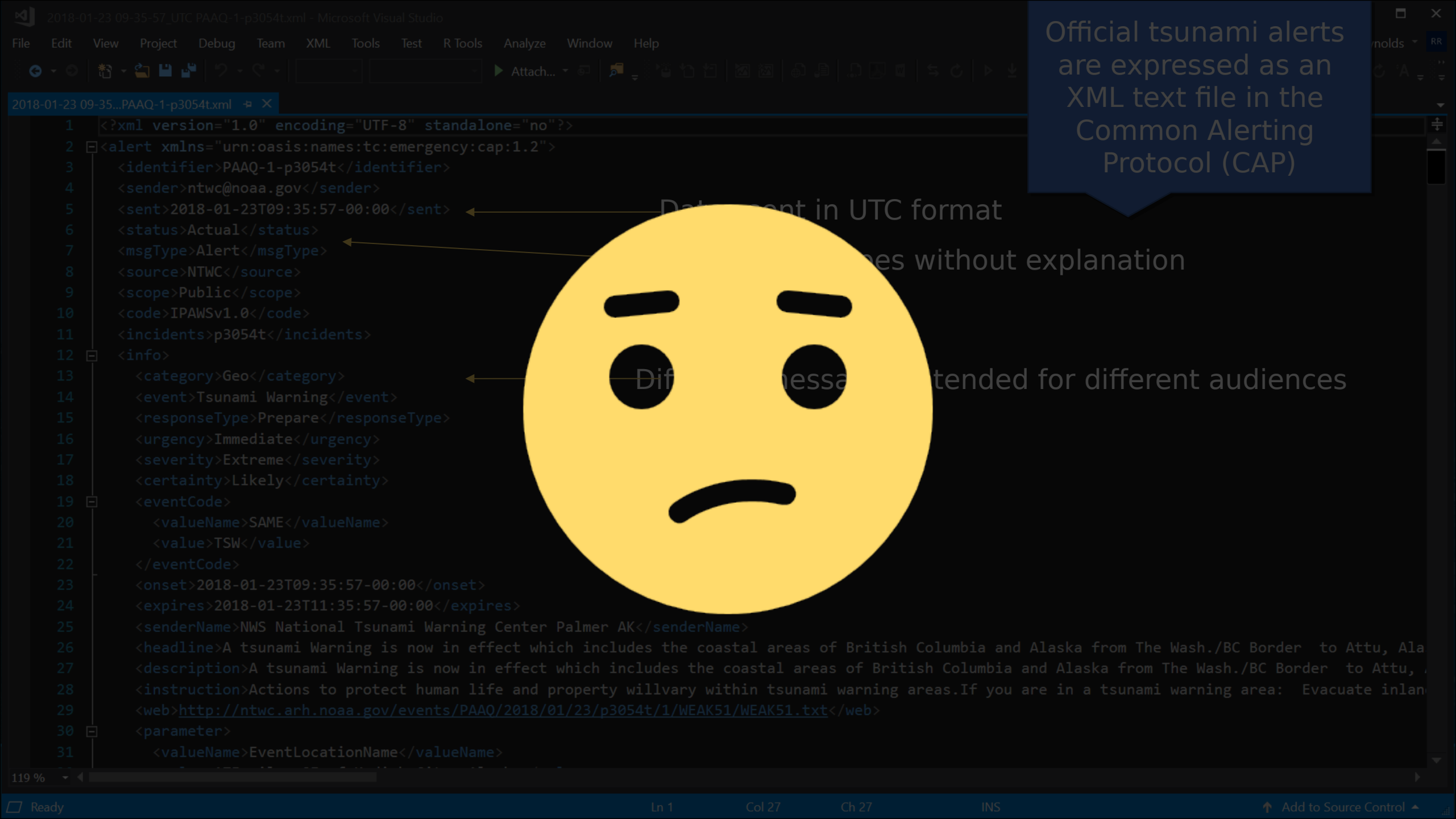
- Tsunami risk mapping
- Evacuation modelling
- Household disaster preparedness

Currently

Coastal Hazards Risk in Canada

Postdoctoral Research – University of British Columbia

- **Resilient-C:** Platform to promote coastal hazards resilience
- **Disaster Risk Reduction Pathways** for the BC Lower Mainland
- Agent-based tsunami **evacuation modelling**



Official tsunami alerts are expressed as an XML text file in the Common Alerting Protocol (CAP)



Date sent in UTC format

Messages without explanation

Different messages intended for different audiences

2018-01-23 09:35...PAAQ-1-p3054t.xml

```
1 <?xml version="1.0" encoding="UTF-8" standalone="no"?>
2 <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
3   <identifier>PAAQ-1-p3054t</identifier>
4   <sender>ntwc@noaa.gov</sender>
5   <sent>2018-01-23T09:35:57-00:00</sent>
6   <status>Actual</status>
7   <msgType>Alert</msgType>
8   <source>NTWC</source>
9   <scope>Public</scope>
10  <code>IPAWSv1.0</code>
11  <incidents>p3054t</incidents>
12  <info>
13    <category>Geo</category>
14    <event>Tsunami Warning</event>
15    <responseType>Prepare</responseType>
16    <urgency>Immediate</urgency>
17    <severity>Extreme</severity>
18    <certainty>Likely</certainty>
19    <eventCode>
20      <valueName>SAME</valueName>
21      <value>TSW</value>
22    </eventCode>
23    <onset>2018-01-23T09:35:57-00:00</onset>
24    <expires>2018-01-23T11:35:57-00:00</expires>
25    <senderName>NWS National Tsunami Warning Center Palmer AK</senderName>
26    <headline>A tsunami Warning is now in effect which includes the coastal areas of British Columbia and Alaska from The Wash./BC Border to Attu, Ala
27    <description>A tsunami Warning is now in effect which includes the coastal areas of British Columbia and Alaska from The Wash./BC Border to Attu,
28    <instruction>Actions to protect human life and property willvary within tsunami warning areas.If you are in a tsunami warning area: Evacuate inland
29    <web>http://ntwc.arh.noaa.gov/events/PAAQ/2018/01/23/p3054t/1/WEAK51/WEAK51.txt</web>
30    <parameter>
31      <valueName>EventLocationName</valueName>
```

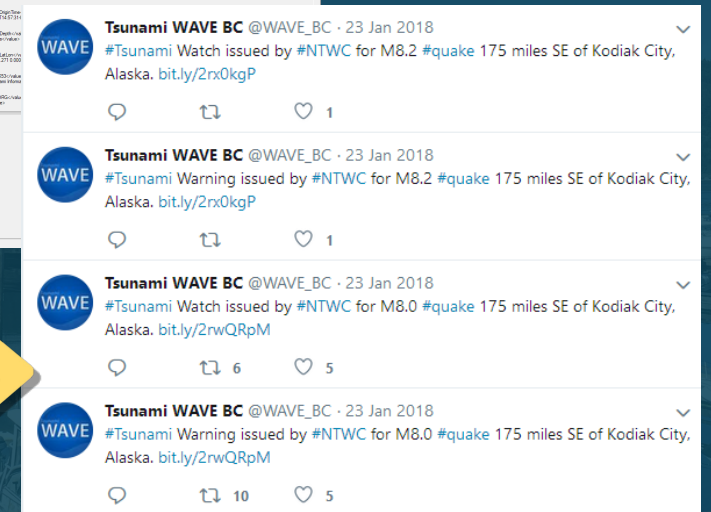
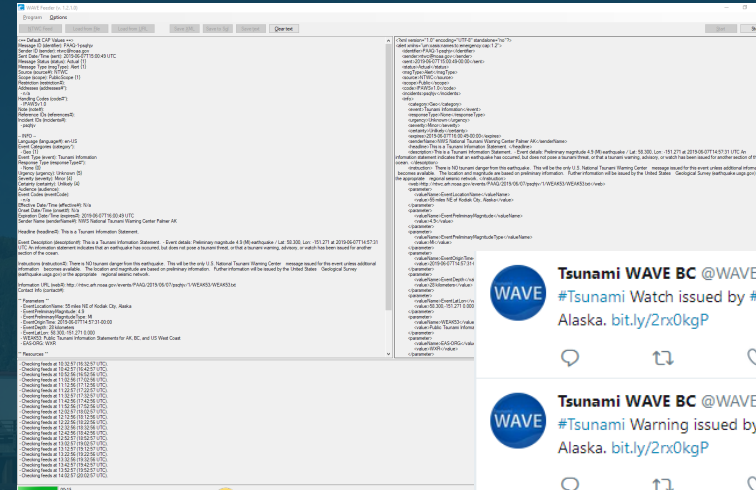
WAVE BC

Tsunami Alert Collection and Rebroadcasting for BC

Alert messages are processed, stored, and re-distributed to the BC public via Twitter in human readable format

Specifically:

- Police service locations
- Fire station locations
- Medical service locations
- K-12 schools



WAVE BC

Tsunami Alert Collection and Rebroadcasting for BC

Just in the process of completely re-writing my monitoring and analysis software

- More flexible to accommodate more tsunami warning centre messages – not just CAP
- Move from a high-power server to a **Raspberry Pi**
- Better language processing for **“friendlier,”** more informative tweets

Port Alberni – What’s That Sound?

Looking at How People Reacted During and After a “Near Miss” Tsunami Evacuation

We spoke with **local officials** and **community residents** roughly 3 months following the event to understand how these two groups perceived an evacuation from a “near miss” **tsunami warning**

Funded by Institute for Catastrophic Loss Reduction (ICLR)



Port Alberni – What’s That Sound?

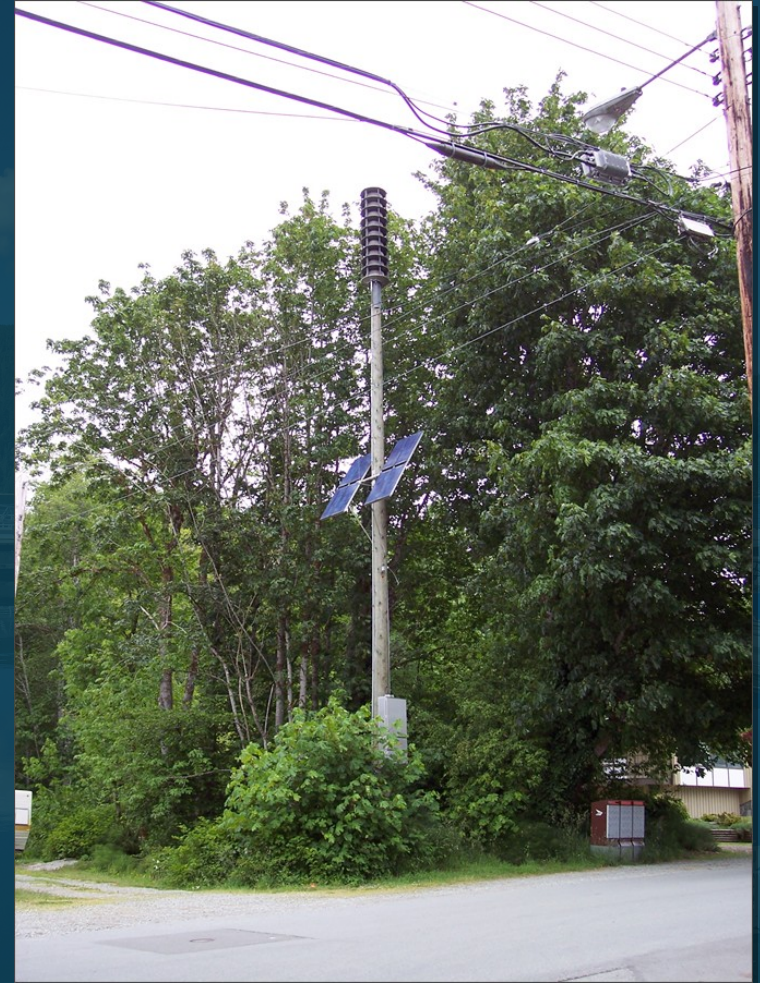
Looking at How People Reacted During and After a “Near Miss” Tsunami Evacuation

Door to door survey:

- Visited more than 400 homes in the inundation zone
- Spoke with residents in 275 households
- **Collected 111 surveys**

Online survey (1 month):

- Surveys completed: 358
- **Verified addresses: 353**

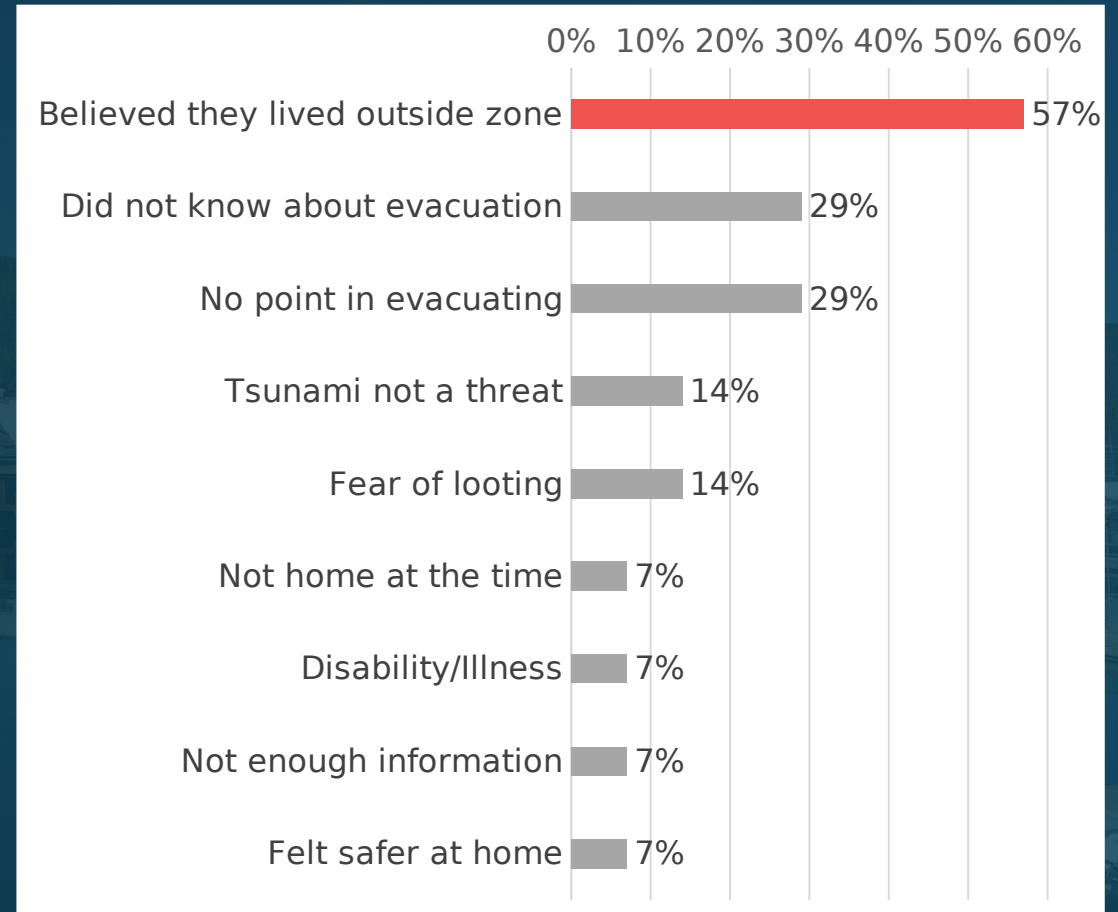


Port Alberni – What’s That Sound?

Reasons for Those Living in the Evacuation Zone for Not Evacuating

57% of those living within the inundation zone who did not evacuate indicated they believed they did not live within the zone

29% were not aware of the evacuation



N=14

Port Alberni – What’s That Sound?

Confusion Around Location of Tsunami Inundation Zone

“Hazard Risk Maps are intended to quickly and easily communicate information about hazard risks to the public.”



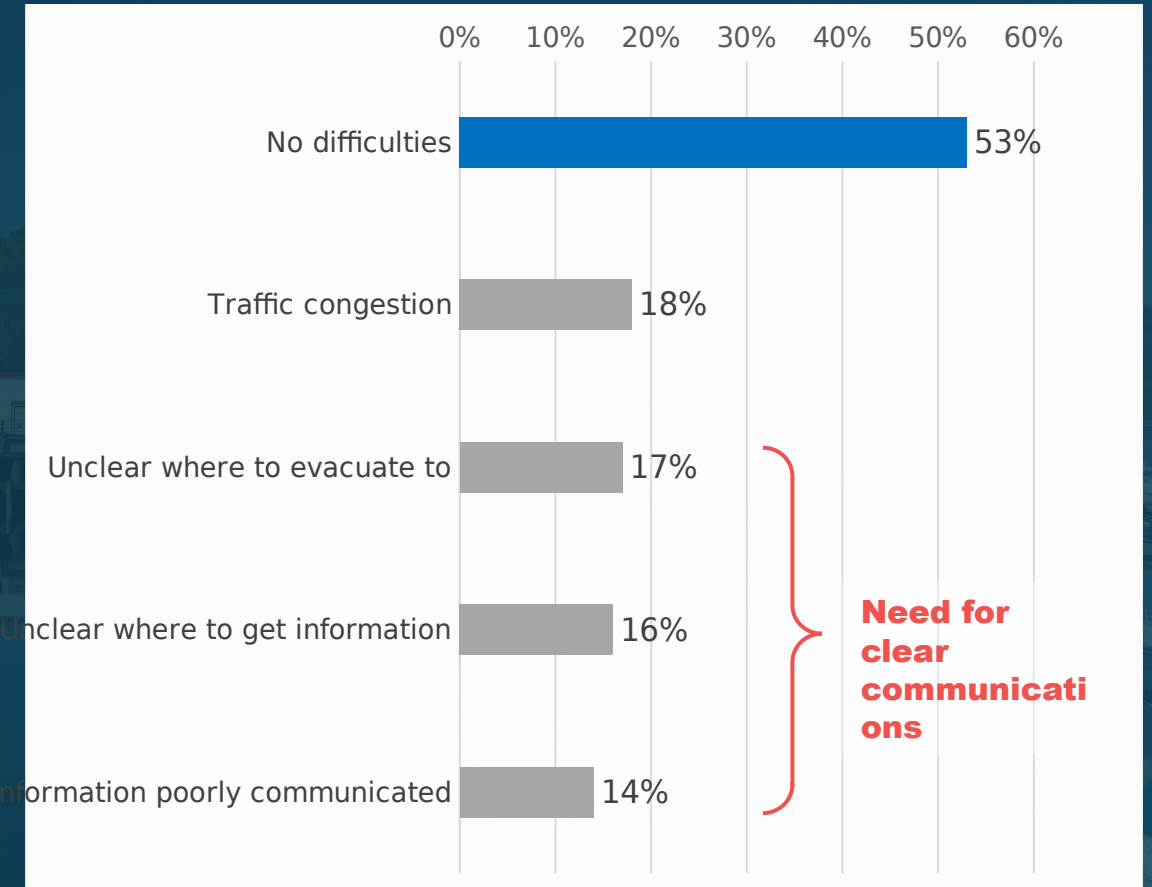
Port Alberni – What’s That Sound?

Difficulties Experienced During Evacuation

53% reported no difficulties

3 of top 5 difficulties related to unclear communications to residents

- Unclear where to evacuate to
- Unclear where to get information
- Information poorly communicated



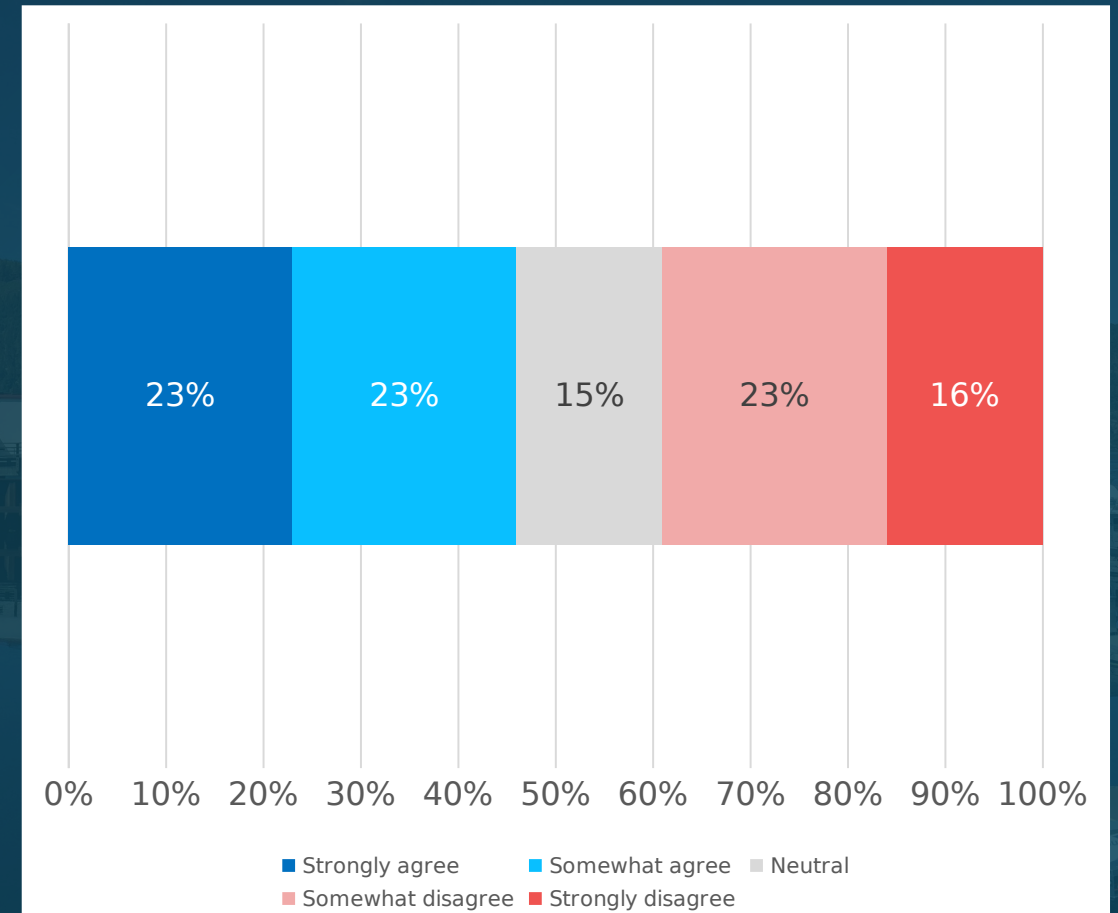
N=292

Port Alberni – What’s That Sound?

Community Feedback on Evacuation Performance

“I believe that evacuation instructions were clearly communicated during the evacuation”

- **46%** indicated they felt evacuation instructions were communicated clearly



Port Alberni – What’s That Sound?

Looking at How People Reacted During and After a “Near Miss” Tsunami Evacuation

Key findings:

- Residents identified a need for better online communication during emergencies
- Some confusion about the location of the inundation zone
- Evacuation routing signs could be clearer



Port Alberni – What’s That Sound?

Looking at How People Reacted During and After a “Near Miss” Tsunami Evacuation

Best Practices:

- Focus on risk communication for small- and medium-sized communities

58

Lessons Identified & Best Practices



Figure 19: The Port Alberni Harbour Quay

One of the key reasons we opted to conduct this study, and part of our third research question, was to see what lessons could be identified from the event and to discover any best practices related to how hazards risk—and tsunami risk in particular—can best be communicated to potentially vulnerable residents in small and medium-sized Canadian communities.

Based on the information we received from our two surveys, interviews with emergency officials, and reviews of the academic literature, we have identified a number of best practices, separated into six themes, that could be implemented to help improve hazards-related evacuations in Alberni Valley and elsewhere in Canada. Not all of our suggestions will be appropriate in all contexts, but the goal is to put information into the hands of emergency planners and managers to select those ideas they feel might work best in their own communities.

Make Risk Communications Part of the “Front Line”

One of the clear messages arising from the January 2018 tsunami evacuations across Vancouver Island, and in Port Alberni in particular, is the need for communicators to be made part of the ‘front line’ of responders. Information we received from the public and officials in the Alberni Valley consistently highlighted the lack of clear communications as a key failure for this event. Partly this was because there was no one in the EOC who was focusing on communicating important information with the public during the evacuation, and partly this was because this information was not easily accessible to residents online prior to the evacuation event.

Communications teams are a critical component of the function of an EOC: to get the appropriate messages out to the public, either directly or through local media. They not only compose messages during an emergency but also develop the necessary materials that might be needed in advance of such



THE UNIVERSITY OF BRITISH COLUMBIA



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Tsunami WAVE

Web-Accessible Vulnerability Estimator (WAVE) – Customized Household Preparedness

An online application (now defunct) to generate household **emergency preparedness** and response plans **personalized to the needs of the people** living in the household

This screenshot shows the 'Basic Info' section of the Tsunami WAVE application. The form is titled 'Tell us some basic information about this person' and includes a sub-header: 'The following information helps us to understand how this person fits into appropriate demographic groups, and to help with your household disaster preparation and response planning. All information can always be changed later!'. The form fields include: 'NICKNAME' (set to 'Participant'), 'Which gender does this person self-identify as?' (radio buttons for Female, Male, Trans*, and I'd rather not say), 'Does this person self-identify as LGBTQ?' (checkbox for Yes), 'When was this person born?' (MM/YY - OR - YYYY/YY, with an 'I'd rather not say' option), 'How is this person a part of your household?' (radio buttons for Lives in our household full-time, Lives in our household part-time, Lives in another home, Lives in a managed care facility, Lives away at school, and I'd rather not say), and 'If this person has immigrated to Canada, in which year did they officially immigrate?' (dropdown menu with 'Not applicable / I'd rather not say' selected). 'Cancel' and 'Continue' buttons are at the bottom.

This screenshot shows the 'Household Information' section of the Tsunami WAVE application. The form is titled 'Household Information' and includes a sub-header: 'The following information helps us to understand more about the place you call home and identify some aspects that might impact your ability to recover following a disaster.'. The form fields include: 'What type of structure is your home?' (dropdown menu with 'Single-detached house' selected), 'When was your home originally built?' (dropdown menu with '1960 to 1969' selected), 'Does your home have a basement?' (checkbox for Yes, which is checked), 'Does your home require any special repairs?' (radio buttons for No, Yes some minor repairs, and Yes major repairs), and 'Your home is:' (radio buttons for Owned, Rented, and I don't know / I'd rather not say). 'Back' and 'Continue' buttons are at the bottom.

Tsunami WAVE

Web-Accessible Vulnerability Estimator (WAVE) – Customized Household Preparedness

Bring **authoritative** preparedness information into a single place

Personalized preparedness and response plans to each home

- Homes with disabilities
- Homes with very young children
- Homes with older residents
- Homes with pets

Plans for multiple arrival times from 10 minutes to 16 hours

The screenshot shows the 'Basic Information' form in the Tsunami WAVE application. The form is titled 'Tell us some basic information about this person' and includes a navigation bar with 'Dashboard', 'Household', 'Sign Out', and 'Help'. The form fields are: Nickname (set to 'Participant'), Gender (Female selected), Gender & Sexuality (Does this person self-identify as LGBTQ? No selected), Date of Birth (MM/YY/YY - OR - I'd rather not say), Household Membership (Lives in our household full-time selected), and Immigration (Not applicable / I'd rather not say selected). A 'Continue' button is visible at the bottom right.

The screenshot shows the 'Household Information' form in the Tsunami WAVE application. The form is titled 'Household Information' and includes a navigation bar with 'Sign Out' and 'Help'. The form fields are: Dwelling Information (Single-detached house selected), Construction Period (1960 to 1969 selected), Basement (Yes, this dwelling includes a basement selected), Maintenance Status (No, only regular maintenance is needed selected), and Home Tenure (Owned by you (or a member of your household) Even if it is still being paid for selected). A 'Continue' button is visible at the bottom right.