Planning & Protective Services

LGEPAC
AFTER ACTION REPORT

Tsunami Warning Event

Task Number # INAC # 185841

January 23, 2018

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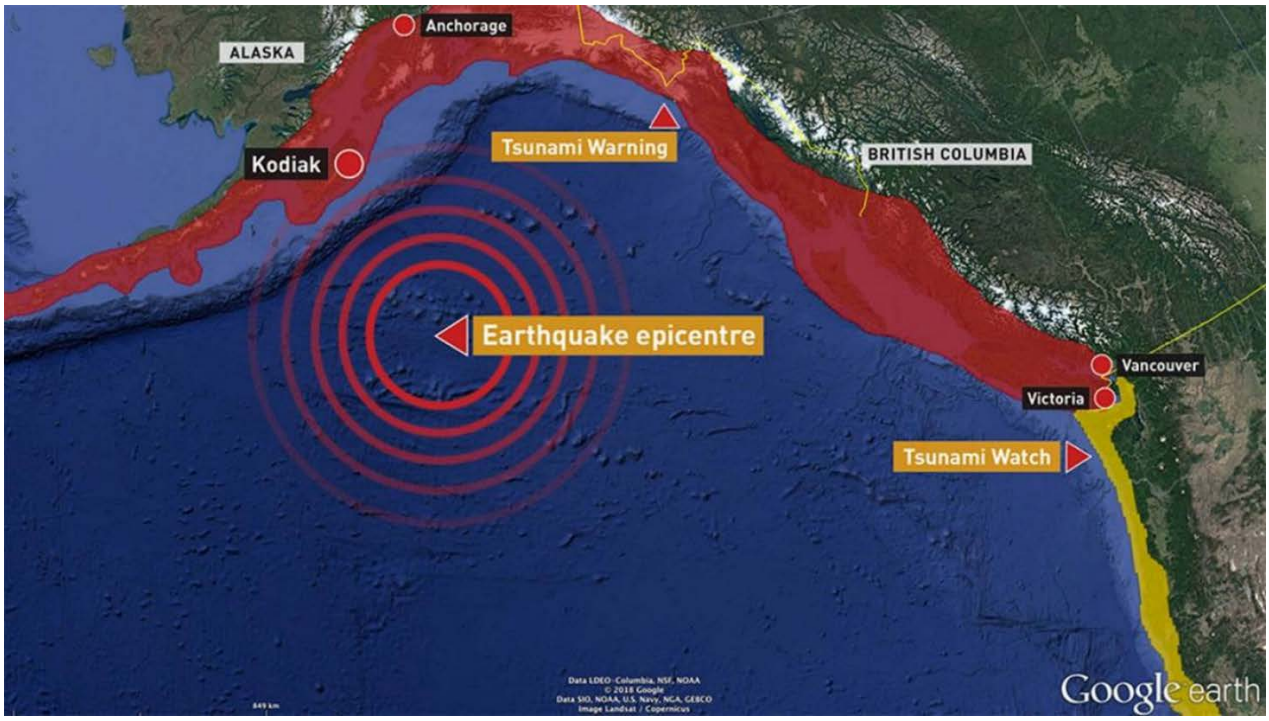

1.0 BACKGROUND

At 01:32 Pacific Standard Time (PST) hrs on Tuesday, January 23, 2018 the National Tsunami Warning Centre (NTWC) registered an 8.0 earthquake in the Gulf of Alaska with enough power to potentially generate a Tsunami. A series of messages ensued as detailed under timeline of events, ultimately culminating in a cancellation of the Tsunami warning at 04:13.

2.0 OBJECTIVES

The After Action Report (AAR) consolidates the lessons shared at an operational debriefing held at the corporate offices of the CRD on February 1, 2018 as well as direct feedback from participants.

The objectives of this After Action Report are to:

a) provide a record of Local Government and CRD response operations as a result of the tsunami warning event; and,

b) document the lessons learned from the event to support the refinement of the emergency response plans, including plans specific to tsunami warnings.

c) identify ways we can improve the collective response within the region and develop plans on how to move those actions forward.

The debrief was intended to identify successes, challenges and potential improvements to emergency preparedness within the Capital Regional District related to a tsunami warning event, it was not intended to be critical and does not replace Local Authorities (LA) after action reviews. The issues and challenges identified in this AAR are not consistent or pertinent to each local authority rather it reflects a generalized overview of the impact and actions throughout the region as a whole.

3.0 TIMELINE OF EVENT

The NTWC sent out seven (7) messages specific to this earthquake directed to the west coast of North America. For purposes of debriefing the first five (5) messages are of interest. EMBC issued:

01:35 PST (12:35 AKST) NTWC – Msg. #1 –
Tsunami Warning in effect for British Columbia, the Juan de Fuca Strait coast, the outer west coast of Vancouver Island, the central coast and northeast Vancouver Island, and the north coast of Haida Gwaii. Southeast Alaska, South Alaska and the Alaska Peninsula and the Aleutian Islands.

Tsunami Watch in effect for California, Oregon and Washington
Initial magnitude M8.0; earthquake occurred at 0132 BC time. Tsunami inundation forecast at Tofino 04:40 PST and Neah Bay 04:55 PST. No tsunami observations available to report.

01:39 PST Province of BC activated its Provincial Emergency Notification System (PENS) for local government, prompting activation of local emergency plans and urging immediate evacuation of areas identified at risk.

02:04 PST (01:04 AKST) NTWC – MSG #2 – same warning areas, revised magnitude, no tsunami observations to report; revised magnitude M8.2 Tsunami inundation forecast at Tofino 04:40 PST and Neah Bay 04:50 PST. No tsunami observations available to report.

02:23 PST EMBC issues BC Bulletin #1 advising of tsunami warning covering Tsunami Inundation Zones A, B, C, D, Zone E not at risk and urging immediate evacuation of identified areas at risk.

02:42 PST (01:42 AKST) NTWC – MSG #3 – BC still under warning, including Juan de Fuca Strait; Washington State still under a Watch, including Strait of Juan de Fuca; revised magnitude M7.9. No change in forecast arrival times, still no tsunami observations available to report.

0316 PST (02:16 AKST) NTWC – MSG #4 - BC still under warning, including Juan de Fuca Strait; Washington State – Juan de Fuca Strat still under a Watch; first tsunami observation - .5 foot (six inches) in Old Harbour, Alaska

03:13 PST EMBC Advises of PREOC Activation

04:12 PST (03:12 AKST) NTWC - MSG #5 – BC Warning cancelled; several observations maximum wave height of .7 foot

04:16 PST EMBC issues cancellation of Tsunami Warning

4.0 MASS NOTIFICATION SYSTEMS

Presently, there are a number of processes used by local authorities within the region to notify the public regarding safety threats such as tsunami warnings these include sirens, telephone trees, door to door, social media, etc. The effectiveness of the varied processes depend on a number of factors such as location, communication services available, and voluntary subscription uptake. The different geographic and demographic areas of the region have different levels of risk and notification needs that require adaptive approaches tailored to each area. While there are a number of local authorities that have public mass notification programs this is not the case for all nor may they be appropriate for each local authority's notification requirements depending on the factors mentioned above.

The public emergency notification systems currently in place within the region are:

CRD - Public Alert Notification System (PANS) through RMS
Victoria – Vic Alert (Connect Rocket)
Sidney - RMS
North Saanich - RMS
Central Saanich - RMS
Metchosin – One Call Now

The remaining municipalities do not currently have emergency notification systems in place though several have indicated this as a priority for exploration. One of the benefits surrounding the tsunami warning event was the elevated media attention, in that it increased public awareness of the local emergency alert systems available in the region. This led to a significant increase in subscriptions to those public alert notification programs in all areas. This also created a challenge of expectation amongst the public for such systems to be in place and that messaging will be consistent which is not necessarily realistic considering the significant variations in geography and demography in the region. It is important to note that local authorities will utilize door-to-door or other notification methods for high risk areas as required in conjunction with emergency notification systems to ensure at risk populations are informed.

On April 6, 2018 the provincial government expanded the Alert Ready program developed by the federal government that projected emergency warnings to the public through TV and radio to now include LTE compatible cellular phones. The advent of this program will significantly increase the ability to get notifications out to the public quickly though is still limited to areas with effective cellular coverage and will only activate on compatible phones. The messaging expected to go out on the provincial Alert Ready notifications will be presented in the form of a high level overview, recommending at-risk populations to move to safer areas, and directing the public to their local authorities for area specific notifications and information.

5.0 SUCCESSES, CHALLENGES & OPPORTUNITIES

5.1 *Successes*

1. No injuries, deaths or property losses were recorded as a result of the event
2. Several authorities had protocols in place for a distant tsunami generating event, others relied on Emergency Management British Columbia (EMBC) for direction
3. The Provincial Emergency Notification System (PENS) system worked effectively
4. Social media was an effective way to get the message out. By monitoring other Local Governments, emergency programs were able to reaffirm a common source of truth message
5. Emergency Program Coordinators (EPCs) were notified quickly and connected with their the First Responder agencies early during the event
6. Evacuations that were undertaken by local authorities appeared to go well
7. Emergency Operating Centres (EOCs) were activated in a timely manner
8. Some emergency programs placed Emergency Social Services (ESS) on standby or activated ESS reception centres to support potentially displaced residents and these activations went well
9. Municipalities reported that the public alert notification systems appeared to function as intended
10. Post event subscription to local mass notification systems expanded significantly due to an increase in public awareness of both the tsunami threat and public emergency & preparedness programs

5.2 *Challenges*

1. Local authorities in the CRD do not have consistent planned approaches to the management of distant tsunami events. As an example, there are inconsistent

pre-inundation evacuation timeframes – some evacuated coincident with EMBC message others followed their existing protocols which lead to no evacuation taking place. This created a perception with the public that there was a disorganized response between the local authorities within the region.

2. Conflicting social media direction, particularly from out of area, caused challenges for accurate messaging. As an example Washington State was under a tsunami watch while the CRD was under a tsunami warning.
3. Conflicting public response, some upset they were not notified others were "glad as it wasn't needed".
4. No effective regional single access "source of truth option" available to public that provides real-time updates and direction of public to local authority sites.
5. In general, it appears that the public's perception of risk does not match the actual reality of the tsunami risk for the CRD as some residence self-evacuated despite not being in an inundation zone.
6. Cross-over from public notification systems created challenges in messaging as residents get messages from different local authority emergency programs if they are signed up to multiple notification systems.
7. There are multiple notification systems covering different local authority areas– need a clear process to improve coordination of messaging when there is cross-over.
8. Public expectations with respect to notifications – people want to know regardless whether they are at risk or not.
9. Determining the appropriate action (to set off or not) tsunami sirens for distant events when the expected inundation times are several hours away – activate immediately or wait in order to avoid extended displacement of residents.
10. Mass notifications not consistently applicable across entire region given the difference in ground elevations & topography – public does not understand different risk levels for different municipalities.
11. Some media outlets (Weather Network) continued to broadcast evacuation notification despite cancellation. Additionally, some outlets reported on PTWC instead of NTWC which is not applicable or relevant to the CRD which created conflicting messaging.
12. In isolated cases, media contacted Elected Officials directly, circumventing the emergency managers and Local Government's official points of contact, hence the need to disseminate both timely and accurate messaging to Elected Officials.
13. Local authorities in the CRD do not have a collaborative platform for situational awareness and emergency response information sharing amongst regional partners since the discontinuation of the E-Team software in 2016.
14. Unnecessary self-evacuation by residents will create public safety challenges for local authority emergency programs if unprepared for receipt of these individuals amassing in undetermined areas/facilities not identified as collection points.

5.3 Opportunities

1. Need to reinforce authoritative information source through Public Education (EmergencyinfoBC https://www.emergencyinfobc.gov.bc.ca/ and https://twitter.com/emergencyinfobc?lang=en and Prepare Yourself https://www.crd.bc.ca/prepare-yourself).

2. Potential to amend current distant tsunami event planning guidelines based on modelling / scientific evidence to reflect a consistent response amongst the different local authorities.
3. Unnecessary evacuations put population at risk, a better determination of actual threat is required in conjunction with improved public awareness.

6.0 RECOMMENDATIONS

Recommendations:

1. That local authorities in the CRD work collaboratively with with provincial, federal and scientific partners to conduct modelling and to determine a best practice for distant tsunami events recognizing specific areas may have different threat levels and requirements.
2. Local authorities should work with the Regional Emergency Management Partnership (REMP) to consider establishing minimum evacuation times based on anticipated inundation for distant tsunami events. Local Government would have the ability to increase evacuation times based on known local population/demographics at risk.
3. Work with appropriate government agencies to consider re-aligning the tsunami warning boundaries, with an aim to associate hazard areas more closely with each other (Saanich Peninsula to be part of Zone E), to be more consistent with NWTC boundaries and to provide more detailed notifications instead of including all zones in the warning, unless warranted (Zone E).
4. That local authorities collaborate to update and ratify the 2012 Emergency Communications Plan for Tsunami Alerts in the Capital Regional District to ensure enhanced situational awareness and consistent public messaging during tsunami warning events.
5. Investigate the possibility of a regional situational awareness and emergency management collaborative platform or software solution to enhance coordination of information sharing and response within the region (replaces the E-Team program that was discontinued in 2016).
6. Establish a single window access to regional emergency information that is readily accessible to the public and directs to individual municipal sites for area specific directions and warnings.
7. Work collaboratively with local media partners to enhance public messaging during emergencies.
8. Public alert notification systems in the local authorities within the region will need to be ready to respond to the new “Alert Ready” program being implemented by the Province for tsunami warnings as that program will be directing the public to follow local authority direction. Local notification systems will need to be on top of the messaging to provide clear direction as to what to do and where to go as agencies will be inundated with calls as soon as the alert ready message goes out.
9. Encourage expansion of public alert notification systems in the region to areas where no program exists currently if appropriate for that local authority.
10. Enhance public education and messaging for susceptible areas and populations within the region.

7.0 CONCLUSION

While overall, the local authorities were effective in the implementation of their individual tsunami warning emergency plans, the variations in emergency plans and public notifications led to indications of concern from the public that the response in the region was disparate and not well coordinated amongst the jurisdictions. The introduction of the new Alert Ready system will help to get the message out widely during any future tsunami warnings and would be supported locally by municipal and regional public alert systems where in place. The development of a regional concept of operations by the REMP along with planning collaboration between jurisdictions will improve consistency of the regional response. Additionally, it is clear that an enhancement of tsunami warning education to the public in conjunction with collaboration with the media would be beneficial to future tsunami warning events.

APPENDIX 1
NWTC MESSAGES

WEAK51 PAAQ 230935
TSUAK1

BULLETIN
Public Tsunami Message Number 1
NWS National Tsunami Warning Center Palmer AK
1235 AM AKST Tue Jan 23 2018

...A TSUNAMI WARNING IS NOW IN EFFECT...

...A TSUNAMI WATCH IS NOW IN EFFECT...

Tsunami Warning in Effect for;

* BRITISH COLUMBIA, The Juan de Fuca Strait coast, the outer west coast of Vancouver Island, the central coast and northeast Vancouver Island, and the north coast and Haida Gwaii

* SOUTHEAST ALASKA, The inner and outer coast from The BC/Alaska Border to Cape Fairweather, Alaska (80 miles SE of Yakutat)

* SOUTH ALASKA AND THE ALASKA PENINSULA, Pacific coasts from Cape Fairweather, Alaska (80 miles SE of Yakutat) to Unimak Pass, Alaska (80 miles NE of Unalaska)

* ALEUTIAN ISLANDS, Unimak Pass, Alaska (80 miles NE of Unalaska) to Attu, Alaska including the Pribilof Islands

Tsunami Watch in Effect for;

* CALIFORNIA, The coast from The Cal./Mexico Border to The Oregon/Cal. Border including San Francisco Bay

* OREGON, The coast from The Oregon/Cal. Border to The Oregon/Wash. Border including the Columbia River estuary coast

* WASHINGTON, Outer coast from the Oregon/Washington border to Slip Point, Columbia River estuary coast, and the Juan de Fuca Strait coast

PRELIMINARY EARTHQUAKE PARAMETERS
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* The following parameters are based on a rapid preliminary assessment and changes may occur.

* Magnitude 8.0
* Origin Time 0032 AKST Jan 23 2018
0132 PST Jan 23 2018
0932 UTC Jan 23 2018
* Coordinates 56.0 North 149.2 West

* Depth 12 miles
* Location 175 miles SE of Kodiak City, Alaska
365 miles S of Anchorage, Alaska

FORECASTS OF TSUNAMI ACTIVITY
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* Tsunami activity is forecasted to start at the following locations at the specified times.

SITE	FORECAST START OF TSUNAMI
* Alaska	
Kodiak	0145 AKST Jan 23
Seward	0155 AKST Jan 23
Elfin Cove	0155 AKST Jan 23
Sitka	0200 AKST Jan 23
Yakutat	0205 AKST Jan 23
Valdez	0215 AKST Jan 23
Sand Point	0220 AKST Jan 23
Cordova	0225 AKST Jan 23
Unalaska	0240 AKST Jan 23
Homer	0255 AKST Jan 23
Craig	0300 AKST Jan 23
Cold Bay	0300 AKST Jan 23
Adak	0305 AKST Jan 23
Shemya	0350 AKST Jan 23
Saint Paul	0400 AKST Jan 23
* British Columbia	
Langara	0210 AKST Jan 23
Tofino	0340 AKST Jan 23
* Washington	
Neah Bay	0455 PST Jan 23
Long Beach	0500 PST Jan 23
Moclips	0500 PST Jan 23
Westport	0510 PST Jan 23
Port Angeles	0530 PST Jan 23
Port Townsend	0555 PST Jan 23
* Oregon	
Port Orford	0505 PST Jan 23
Charleston	0510 PST Jan 23
Seaside	0510 PST Jan 23
Newport	0515 PST Jan 23
Brookings	0515 PST Jan 23
* California	
Crescent City	0520 PST Jan 23
Horse Mountain	0525 PST Jan 23
Fort Bragg	0525 PST Jan 23
Monterey	0555 PST Jan 23
San Francisco	0620 PST Jan 23

Port San Luis 0620 PST Jan 23
Santa Barbara 0635 PST Jan 23
Los Angeles Harb 0650 PST Jan 23
Newport Beach 0700 PST Jan 23
La Jolla 0705 PST Jan 23
Oceanside 0705 PST Jan 23

OBSERVATIONS OF TSUNAMI ACTIVITY
---
* No tsunami observations are available to report.

RECOMMENDED ACTIONS

Actions to protect human life and property will
vary within tsunami warning areas.

If you are in a tsunami warning area;

* Evacuate inland or to higher ground above and beyond designated tsunami hazard zones or move to an upper floor of a multi-story building depending on your situation.

* Move out of the water, off the beach, and away from harbors, marinas, breakwaters, bays and inlets.

* Be alert to and follow instructions from your local emergency officials because they may have more detailed or specific information for your location.

* If you feel a strong earthquake or extended ground rolling take immediate protective actions such as moving inland and/or uphill preferably by foot.

* Boat operators,
  * Where time and conditions permit, move your boat out to sea to a depth of at least 180 feet.

  * If at sea avoid entering shallow water, harbors, marinas, bays, and inlets to avoid floating and submerged debris and strong currents.

* Do not go to the shore to observe the tsunami.

* Do not return to the coast until local emergency officials indicate it is safe to do so.

If you are in a tsunami watch area;

* Prepare to take action and stay alert for further information.

IMPACTS

Impacts will vary at different locations in the warning
areas.

If you are in a tsunami warning area;

* A tsunami with damaging waves and powerful currents is possible.

* Repeated coastal flooding is possible as waves arrive onshore, move inland, and drain back into the ocean.

* Strong and unusual waves, currents and inland flooding can drown or injure people and weaken or destroy structures on land and in water.

* Water filled with floating or submerged debris that can injure or kill people and weaken or destroy buildings and bridges is possible.

* Strong and unusual currents and waves in harbors, marinas, bays, and inlets may be especially destructive.

* Some impacts may continue for many hours to days after arrival of the first wave.

* The first wave may not be the largest so later waves may be larger.

* Each wave may last 5 to 45 minutes as a wave encroaches and recedes.

* Coasts facing all directions are threatened because the waves can wrap around islands and headlands and into bays.

* Strong shaking or rolling of the ground indicates an earthquake has occurred and a tsunami may be imminent.

* A rapidly receding or receded shoreline, unusual waves and sounds, and strong currents are signs of a tsunami.

* The tsunami may appear as water moving rapidly out to sea, a gentle rising tide like flood with no breaking wave, as a series of breaking waves, or a frothy wall of water.

ADDITIONAL INFORMATION AND NEXT UPDATE
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* Refer to the internet site tsunami.gov for more information.

* Pacific coastal residents outside California, Oregon, Washington, British Columbia and Alaska should refer to the Pacific Tsunami Warning Center messages at tsunami.gov.

* This message will be updated within 30 minutes.

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WEAK51 PAAQ 231005
TSUAK1

BULLETIN

Public Tsunami Message Number 2

NWS National Tsunami Warning Center Palmer AK
105 AM AKST Tue Jan 23 2018

UPDATES
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* Revised magnitude

...THE TSUNAMI WARNING REMAINS IN EFFECT...

...THE TSUNAMI WATCH REMAINS IN EFFECT...

Tsunami Warning in Effect for;

* BRITISH COLUMBIA, The Juan de Fuca Strait coast, the outer west coast of Vancouver Island, the central coast and northeast Vancouver Island, and the north coast and Haida Gwaii

* SOUTHEAST ALASKA, The inner and outer coast from The BC/Alaska Border to Cape Fairweather, Alaska (80 miles SE of Yakutat)

* SOUTH ALASKA AND THE ALASKA PENINSULA, Pacific coasts from Cape Fairweather, Alaska (80 miles SE of Yakutat) to Unimak Pass, Alaska (80 miles NE of Unalaska)

* ALEUTIAN ISLANDS, Unimak Pass, Alaska (80 miles NE of Unalaska) to Attu, Alaska including the Pribilof Islands

Tsunami Watch in Effect for;

* CALIFORNIA, The coast from The Cal./Mexico Border to The Oregon/Cal. Border including San Francisco Bay

* OREGON, The coast from The Oregon/Cal. Border to The Oregon/Wash. Border including the Columbia River estuary coast

* WASHINGTON, Outer coast from the Oregon/Washington border to Slip Point, Columbia River estuary coast, and the Juan de Fuca Strait coast

PRELIMINARY EARTHQUAKE PARAMETERS - UPDATED
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* The following parameters are based on a rapid preliminary assessment and changes may occur.

* Magnitude 8.2
* Origin Time 0032 AKST Jan 23 2018
  0132 PST Jan 23 2018
  0932 UTC Jan 23 2018
* Coordinates 56.0 North 149.1 West

* Depth 12 miles
* Location 175 miles SE of Kodiak City, Alaska
360 miles S of Anchorage, Alaska

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La Jolla 0705 PST Jan 23

OBSERVATIONS OF TSUNAMI ACTIVITY
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* No tsunami observations are available to report.

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* Evacuate inland or to higher ground above and beyond designated tsunami hazard zones or move to an upper floor of a multi-story building depending on your situation.

* Move out of the water, off the beach, and away from harbors, marinas, breakwaters, bays and inlets.

* Be alert to and follow instructions from your local emergency officials because they may have more detailed or specific information for your location.

* If you feel a strong earthquake or extended ground rolling take immediate protective actions such as moving inland and/or uphill preferably by foot.

* Boat operators,
  * Where time and conditions permit, move your boat out to sea to a depth of at least 180 feet.

  * If at sea avoid entering shallow water, harbors, marinas, bays, and inlets to avoid floating and submerged debris and strong currents.

* Do not go to the shore to observe the tsunami.

* Do not return to the coast until local emergency officials indicate it is safe to do so.

If you are in a tsunami watch area;

* Prepare to take action and stay alert for further information.

IMPACTS

Impacts will vary at different locations in the warning
areas.

If you are in a tsunami warning area;

* A tsunami with damaging waves and powerful currents is possible.

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* Water filled with floating or submerged debris that can injure or kill people and weaken or destroy buildings and bridges is possible.

* Strong and unusual currents and waves in harbors, marinas, bays, and inlets may be especially destructive.

* Some impacts may continue for many hours to days after arrival of the first wave.

* The first wave may not be the largest so later waves may be larger.

* Each wave may last 5 to 45 minutes as a wave encroaches and recedes.

* Coasts facing all directions are threatened because the waves can wrap around islands and headlands and into bays.

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Public Tsunami Message Number 3

NWS National Tsunami Warning Center Palmer AK
142 AM AKST Tue Jan 23 2018

UPDATES
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* Revised magnitude

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Newport 0515 PST Jan 23
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* Be alert to and follow instructions from your local emergency officials because they may have more detailed or specific information for your location.

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* The first wave may not be the largest so later waves may be larger.

* Each wave may last 5 to 45 minutes as a wave encroaches and recedes.

* Coasts facing all directions are threatened because the waves can wrap around islands and headlands and into bays.

* Strong shaking or rolling of the ground indicates an earthquake has occurred and a tsunami may be imminent.

* A rapidly receding or receded shoreline, unusual waves and sounds, and strong currents are signs of a tsunami.

* The tsunami may appear as water moving rapidly out to sea, a gentle rising tide like flood with no breaking wave, as a series of breaking waves, or a frothy wall of water.

ADDITIONAL INFORMATION AND NEXT UPDATE
---

* Refer to the internet site tsunami.gov for more information.

* Pacific coastal residents outside California, Oregon, Washington, British Columbia and Alaska should refer to the Pacific Tsunami Warning Center messages at tsunami.gov.

* This message will be updated within 30 minutes.

$$

WEAK51 PAAQ 231116
TSUAK1

BULLETIN
Public Tsunami Message Number 4
NWS National Tsunami Warning Center Palmer AK
216 AM AKST Tue Jan 23 2018

UPDATES
---
* Updated observations

...THE TSUNAMI WARNING REMAINS IN EFFECT...

...THE TSUNAMI WATCH REMAINS IN EFFECT...

Tsunami Warning in Effect for;

* BRITISH COLUMBIA, The Juan de Fuca Strait coast, the outer west coast of Vancouver Island, the central coast and northeast Vancouver Island, and the north coast and Haida Gwaii

* SOUTHEAST ALASKA, The inner and outer coast from The BC/Alaska Border to Cape Fairweather, Alaska (80 miles SE of Yakutat)

* SOUTH ALASKA AND THE ALASKA PENINSULA, Pacific coasts from Cape Fairweather, Alaska (80 miles SE of Yakutat) to Unimak Pass, Alaska (80 miles NE of Unalaska)

* ALEUTIAN ISLANDS, Unimak Pass, Alaska (80 miles NE of Unalaska) to Attu, Alaska including the Pribilof Islands

Tsunami Watch in Effect for;

* CALIFORNIA, The coast from The Cal./Mexico Border to The Oregon/Cal. Border including San Francisco Bay

* OREGON, The coast from The Oregon/Cal. Border to The Oregon/Wash. Border including the Columbia River estuary coast

* WASHINGTON, Outer coast from the Oregon/Washington border to Slip Point, Columbia River estuary coast, and the Juan de Fuca Strait coast

FORECASTS OF TSUNAMI ACTIVITY
---
* Tsunami activity is forecasted to start at the following locations at the specified times.

SITE	FORECAST START OF TSUNAMI
* Alaska	

Kodiak 0145 AKST Jan 23
Seward 0155 AKST Jan 23
Elfin Cove 0155 AKST Jan 23
Sitka 0200 AKST Jan 23
Yakutat 0205 AKST Jan 23
Valdez 0215 AKST Jan 23
Sand Point 0220 AKST Jan 23
Cordova 0225 AKST Jan 23
Unalaska 0240 AKST Jan 23
Homer 0250 AKST Jan 23
Craig 0300 AKST Jan 23
Cold Bay 0300 AKST Jan 23
Adak 0305 AKST Jan 23
Shemya 0350 AKST Jan 23
Saint Paul 0400 AKST Jan 23

* British Columbia
Langara 0210 AKST Jan 23
Tofino 0340 AKST Jan 23

* Washington
Neah Bay 0450 PST Jan 23
Moclips 0500 PST Jan 23
Long Beach 0500 PST Jan 23
Westport 0510 PST Jan 23
Port Angeles 0530 PST Jan 23
Port Townsend 0555 PST Jan 23

* Oregon
Port Orford 0505 PST Jan 23
Seaside 0505 PST Jan 23
Charleston 0510 PST Jan 23
Newport 0515 PST Jan 23
Brookings 0515 PST Jan 23

* California
Crescent City 0520 PST Jan 23
Horse Mountain 0525 PST Jan 23
Fort Bragg 0525 PST Jan 23
Monterey 0555 PST Jan 23
San Francisco 0615 PST Jan 23
Port San Luis 0620 PST Jan 23
Santa Barbara 0635 PST Jan 23
Los Angeles Harb 0650 PST Jan 23
Oceanside 0700 PST Jan 23
Newport Beach 0700 PST Jan 23
La Jolla 0705 PST Jan 23

OBSERVATIONS OF TSUNAMI ACTIVITY - UPDATED
---

* Observed max tsunami height is the highest recorded water level above the tide level up to the time of this message.

SITE	TIME OF MEASUREMENT	OBSERVED MAX TSUNAMI HEIGHT

Old Harbor Alaska 0256 PST Jan 23 0.5ft

PRELIMINARY EARTHQUAKE PARAMETERS
---
* Magnitude 7.9
* Origin Time 0032 AKST Jan 23 2018
0132 PST Jan 23 2018
0932 UTC Jan 23 2018
* Coordinates 56.0 North 149.1 West
* Depth 12 miles
* Location 175 miles SE of Kodiak City, Alaska
360 miles S of Anchorage, Alaska

RECOMMENDED ACTIONS

Actions to protect human life and property will
vary within tsunami warning areas.

If you are in a tsunami warning area;

* Evacuate inland or to higher ground above and beyond designated tsunami hazard zones or move to an upper floor of a multi-story building depending on your situation.

* Move out of the water, off the beach, and away from harbors, marinas, breakwaters, bays and inlets.

* Be alert to and follow instructions from your local emergency officials because they may have more detailed or specific information for your location.

* If you feel a strong earthquake or extended ground rolling take immediate protective actions such as moving inland and/or uphill preferably by foot.

* Boat operators,
  * Where time and conditions permit, move your boat out to sea to a depth of at least 180 feet.

  * If at sea avoid entering shallow water, harbors, marinas, bays, and inlets to avoid floating and submerged debris and strong currents.

* Do not go to the shore to observe the tsunami.

* Do not return to the coast until local emergency officials indicate it is safe to do so.

If you are in a tsunami watch area;

* Prepare to take action and stay alert for further information.

IMPACTS

Impacts will vary at different locations in the warning

areas.

If you are in a tsunami warning area;

* A tsunami with damaging waves and powerful currents is possible.

* Repeated coastal flooding is possible as waves arrive onshore, move inland, and drain back into the ocean.

* Strong and unusual waves, currents and inland flooding can drown or injure people and weaken or destroy structures on land and in water.

* Water filled with floating or submerged debris that can injure or kill people and weaken or destroy buildings and bridges is possible.

* Strong and unusual currents and waves in harbors, marinas, bays, and inlets may be especially destructive.

* Some impacts may continue for many hours to days after arrival of the first wave.

* The first wave may not be the largest so later waves may be larger.

* Each wave may last 5 to 45 minutes as a wave encroaches and recedes.

* Coasts facing all directions are threatened because the waves can wrap around islands and headlands and into bays.

* Strong shaking or rolling of the ground indicates an earthquake has occurred and a tsunami may be imminent.

* A rapidly receding or receded shoreline, unusual waves and sounds, and strong currents are signs of a tsunami.

* The tsunami may appear as water moving rapidly out to sea, a gentle rising tide like flood with no breaking wave, as a series of breaking waves, or a frothy wall of water.

ADDITIONAL INFORMATION AND NEXT UPDATE
---

* Refer to the internet site tsunami.gov for more information.

* Pacific coastal residents outside California, Oregon, Washington, British Columbia and Alaska should refer to the Pacific Tsunami Warning Center messages at tsunami.gov.

* This message will be updated within 30 minutes.

$$

WEAK51 PAAQ 231212
TSUAK1

BULLETIN
Public Tsunami Message Number 5
NWS National Tsunami Warning Center Palmer AK
312 AM AKST Tue Jan 23 2018

UPDATES
---
* A tsunami has been confirmed and some impacts are expected
* Updated observations
* Revised alert areas

...A TSUNAMI ADVISORY IS NOW IN EFFECT...

Tsunami Advisory in Effect for;

* SOUTH ALASKA AND THE ALASKA PENINSULA, Pacific coasts from Hinchinbrook Entrance, Alaska (90 miles E of Seward) to Chignik Bay, Alaska

Alerts in the following areas have been canceled because additional information and analysis have better defined the threat.

* The Tsunami Watch is canceled for the coastal areas of California, Oregon and Washington from The Cal./Mexico Border to The Wash./BC Border

* The Tsunami Warning is canceled for the coastal areas of British Columbia, Southeast Alaska and South Alaska and the Alaska Peninsula from The Wash./BC Border to Hinchinbrook Entrance, Alaska (90 miles E of Seward)

* The Tsunami Warning is canceled for the coastal areas of South Alaska and the Alaska Peninsula and Aleutian Islands from Chignik Bay, Alaska to Attu, Alaska

For other US and Canadian Pacific coasts in North America, there is no tsunami threat.

FORECASTS OF TSUNAMI ACTIVITY
---
* A tsunami has been generated. The first waves are forecasted to arrive at the following locations and specified times.

* Forecast tsunami duration is the approximate length of time which the tsunami may produce dangerous currents and waves.

* Forecast max tsunami height is the highest expected water level above the tide.

* Forecasts are not provided for sites which have been impacted

more than an hour prior to the time of this message.

SITE	FORECAST START OF TSUNAMI	FORECAST TSUNAMI DURATION	FORECAST MAX TSUNAMI HEIGHT
* Alaska			
Homer	0250 AKST Jan 23		less than 1ft

OBSERVATIONS OF TSUNAMI ACTIVITY - UPDATED

* Observed max tsunami height is the highest recorded water level above the tide level up to the time of this message.

SITE	TIME OF MEASUREMENT	OBSERVED MAX TSUNAMI HEIGHT
Kodiak Alaska	0329 PST Jan 23	0.6ft
Seward Alaska	0331 PST Jan 23	0.4ft
Old Harbor Alaska	0338 PST Jan 23	0.7ft
Sitka Alaska	0318 PST Jan 23	0.4ft
Yakutat Alaska	0335 PST Jan 23	0.5ft

PRELIMINARY EARTHQUAKE PARAMETERS

* Magnitude 7.9
* Origin Time 0032 AKST Jan 23 2018
  0132 PST Jan 23 2018
  0932 UTC Jan 23 2018
* Coordinates 56.0 North 149.1 West
* Depth 12 miles
* Location 175 miles SE of Kodiak City, Alaska
  360 miles S of Anchorage, Alaska

RECOMMENDED ACTIONS - UPDATED

Actions to protect human life and property will vary within tsunami advisory areas.

If you are in a tsunami advisory area;

* Move out of the water, off the beach, and away from harbors, marinas, breakwaters, bays and inlets.

* Be alert to and follow instructions from your local emergency officials because they may have more detailed or specific information for your location.

* If you feel a strong earthquake or extended ground rolling take immediate protective actions such as moving inland and/or uphill preferably by foot.

* Boat operators,
  * Where time and conditions permit, move your boat out to sea to a depth of at least 180 feet.

* If at sea avoid entering shallow water, harbors, marinas, bays, and inlets to avoid floating and submerged debris and strong currents.

* Do not go to the shore to observe the tsunami.

* Do not return to the coast until local emergency officials indicate it is safe to do so.

IMPACTS

Impacts will vary at different locations in the advisory areas.

If you are in a tsunami advisory area;

* A tsunami with strong waves and currents is possible.

* Waves and currents can drown or injure people who are in the water.

* Currents at beaches and in harbors, marinas, bays, and inlets may be especially dangerous.

* Some impacts may continue for many hours to days after arrival of the first wave.

* The first wave may not be the largest so later waves may be larger.

* Each wave may last 5 to 45 minutes as a wave encroaches and recedes.

* Coasts facing all directions are threatened because the waves can wrap around islands and headlands and into bays.

* Strong shaking or rolling of the ground indicates an earthquake has occurred and a tsunami may be imminent.

* A rapidly receding or receded shoreline, unusual waves and sounds, and strong currents are signs of a tsunami.

* The tsunami may appear as water moving rapidly out to sea, a gentle rising tide like flood with no breaking wave, as a series of breaking waves, or a frothy wall of water.

ADDITIONAL INFORMATION AND NEXT UPDATE
---
* Refer to the internet site tsunami.gov for more information.

* Pacific coastal residents outside California, Oregon, Washington, British Columbia and Alaska should refer to the Pacific Tsunami Warning Center messages at tsunami.gov.

* This message will be updated within 30 minutes.

$$

WEAK51 PAAQ 231240
TSUAK1
BULLETIN
Public Tsunami Message Number 6
NWS National Tsunami Warning Center Palmer AK
340 AM AKST Tue Jan 23 2018

UPDATES
---
* Updated observations

...THE TSUNAMI ADVISORY REMAINS IN EFFECT...

Tsunami Advisory in Effect for;

* SOUTH ALASKA AND THE ALASKA PENINSULA, Pacific coasts from Hinchinbrook Entrance, Alaska (90 miles E of Seward) to Chignik Bay, Alaska

For other US and Canadian Pacific coasts in North America,
there is no tsunami threat.

FORECASTS OF TSUNAMI ACTIVITY
---
* A tsunami has been generated. The first waves are forecasted to arrive at the following locations and specified times.

* Forecast tsunami duration is the approximate length of time which the tsunami may produce dangerous currents and waves.

* Forecast max tsunami height is the highest expected water level above the tide.

* Forecasts are not provided for sites which have been impacted more than an hour prior to the time of this message.

SITE	FORECAST START OF TSUNAMI	FORECAST TSUNAMI DURATION	FORECAST MAX TSUNAMI HEIGHT
* Alaska			
Homer	0250 AKST Jan 23		less than 1ft

OBSERVATIONS OF TSUNAMI ACTIVITY - UPDATED
---
* Observed max tsunami height is the highest recorded water level above the tide level up to the time of this message.

SITE	TIME OF MEASUREMENT	OBSERVED MAX TSUNAMI HEIGHT
Kodiak Alaska	0329 PST Jan 23	0.6ft

Seward Alaska	0331 PST Jan 23	0.4ft
Old Harbor Alaska	0338 PST Jan 23	0.7ft
Sitka Alaska	0318 PST Jan 23	0.4ft
Yakutat Alaska	0335 PST Jan 23	0.5ft
Langara BC	0330 PST Jan 23	0.4ft

PRELIMINARY EARTHQUAKE PARAMETERS

* Magnitude 7.9
* Origin Time 0032 AKST Jan 23 2018
  0132 PST Jan 23 2018
  0932 UTC Jan 23 2018
* Coordinates 56.0 North 149.1 West
* Depth 12 miles
* Location 175 miles SE of Kodiak City, Alaska
  360 miles S of Anchorage, Alaska

RECOMMENDED ACTIONS

* See message number 5 for recommended actions.

IMPACTS

* See message number 5 for possible impacts.

ADDITIONAL INFORMATION AND NEXT UPDATE

* Refer to the internet site tsunami.gov for more information.

* Pacific coastal residents outside California, Oregon, Washington, British Columbia and Alaska should refer to the Pacific Tsunami Warning Center messages at tsunami.gov.

* This message will be updated within 30 minutes.

$$

WEAK51 PAAQ 231313
TSUAK1

BULLETIN
Public Tsunami Message Number 7
NWS National Tsunami Warning Center Palmer AK
413 AM AKST Tue Jan 23 2018

...THE TSUNAMI ADVISORY IS CANCELLED...

* The Tsunami Advisory is canceled for the coastal areas of
  South Alaska and the Alaska Peninsula

OBSERVATIONS OF TSUNAMI ACTIVITY - UPDATED
---

* Observed max tsunami height is the highest recorded water level
  above the tide level up to the time of this message.

SITE	TIME OF MEASUREMENT	OBSERVED MAX TSUNAMI HEIGHT
Kodiak Alaska	0329 PST Jan 23	0.6ft
Seward Alaska	0331 PST Jan 23	0.4ft
Old Harbor Alaska	0338 PST Jan 23	0.7ft
Sitka Alaska	0318 PST Jan 23	0.4ft
Yakutat Alaska	0335 PST Jan 23	0.5ft
Langara BC	0330 PST Jan 23	0.4ft

RECOMMENDED ACTIONS - UPDATED
---

* Do not re-occupy hazard zones until local emergency officials
  indicate it is safe to do so.

IMPACTS - UPDATED
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* A tsunami was generated by this event, but no longer
  poses a threat.

* Some areas may continue to see small sea level changes.

* The determination to re-occupy hazard zones must be made
  by local officials.

ADDITIONAL INFORMATION AND NEXT UPDATE
---

* Refer to the internet site tsunami.gov for more information.

* Pacific coastal regions outside California, Oregon,
  Washington, British Columbia, and Alaska should refer to the
  Pacific Tsunami Warning Center messages at tsunami.gov.

* This will be the final U.S. National Tsunami Warning Center
  message issued for this event.

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APPENDIX 2
EMBC MESSAGES

Tue 23/01/2018 03:13
EMBC VIR PREOC Operations 1 EMBC:EX <preoc1.ops1@gov.bc.ca>
VIR PREOC Activation for Earthquake/Tsunami Event January 23, 2018
To:

The VIR Provincial Regional Emergency Coordination Centre is activated today.

VIR PRECC OPERATIONAL PERIOD – January 23, 2018 1430–1700hr

The primary contact numbers and email address are:

Phone: 250 952-4909 Fax: 250 952-4539
E-mail: preoc.ops1@gov.bc.ca

David Tomaz
Operations Section Chief
Vancouver Island Provincial Regional Emergency Operations Centre (PREOC)
Emergency Management BC
PO Box 9201 Stn Prov Gov
Victoria, B.C. CANADA V8W 9J1

Ph: 250-952-4900 Fax: 250-952-4539
24 Hour Emergency Reporting 1-800-663-3456

Follow us on Twitter @EmergencyInfoBC and @PreparedBC

Tue 23/01/2018 04:27
EMBC VIR PREOC Operations 1 EMBC:EX <preoc1.ops1@gov.bc.ca>
VIR PREOC Update 0415
To:

Latest from National Tsunami Centre Bulletin #5

Warning has been cancelled!

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BULLETIN
Public Tsunami Message Number 5
NWS National Tsunami Warning Center Palmer AK
312 AM AKST Tue Jan 23 2018

UPDATES
-------
* A tsunami has been confirmed and some impacts are expected
* Updated observations
* Revised alert areas


...A TSUNAMI ADVISORY IS NOW IN EFFECT...
```

Tsunami Advisory in Effect for;

* SOUTH ALASKA AND THE ALASKA PENINSULA, Pacific coasts from
  Hinchinbrook Entrance, Alaska (90 miles E of Seward) to
  Chignik Bay, Alaska

Alerts in the following areas have been canceled because
additional information and analysis have better defined the
threat.

* The Tsunami Watch is canceled for the coastal areas of
  California, Oregon and Washington from The Cal./Mexico
  Border to The Wash./BC Border

* The Tsunami Warning is canceled for the coastal areas of
  British Columbia, Southeast Alaska and South Alaska and the
  Alaska Peninsula from The Wash./BC Border to Hinchinbrook
  Entrance, Alaska (90 miles E of Seward)

* The Tsunami Warning is canceled for the coastal areas of
  South Alaska and the Alaska Peninsula and Aleutian Islands
  from Chignik Bay, Alaska to Attu, Alaska

For other US and Canadian Pacific coasts in North America,
there is no tsunami threat.

There may still be some water activity visible in our regional coastal regions so diligence is still prudent.

David Tomaz
Operations Section Chief
Vancouver Island Provincial Regional Emergency Operations Centre (PREOC)
Emergency Management BC
PO Box 9201 Stn Prov Gov
Victoria, B.C. CANADA V8W 9J1

Ph: 250-952-4909 Fax: 250-952-4539
24 Hour Emergency Reporting 1-800-663-3456

Follow us on Twitter @EmergencyInfoBC and @PreparedBC