Exercise PACIFEX21

Participant Handbook

A Pacific Tsunami Warning Exercise
March 24, 2021

US National Tsunami Hazard Mitigation Program
Warning Coordination Subcommittee

NOTE: The contents of this handbook are patterned after the Exercise Pacific Wave 08 manual published by the Intergovernmental Oceanographic Commission. Citation: *Exercise Pacific Wave 08. A Pacific-wide Tsunami Warning and Communication Exercise, 28-30 October 2008.* IOC Technical Series No. 82. Paris, UNESCO, 2008, and the PACIFEX16 handbooks.

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1. Background

This tsunami exercise is being conducted to assist tsunami preparedness efforts along the U.S. and Canadian Pacific coasts. Historical tsunami records from the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI) show that approximately 85% of the world's oceanic tsunamis occur in the Pacific Basin and surrounding seas. Tsunamis have impacted U.S. and Canadian Pacific coasts several times in the past century with devastating results. Preparing and exercising emergency response plans throughout this region is an important part of tsunami preparedness.

Scenario

The PACIFEX21 exercise simulates a tsunami generated by a magnitude 8.5 earthquake on the northern end of the Cascadia Subduction Zone, with an epicenter located 20 miles SW of Port Alice, British Columbia at 50.0°N, 127.5°W and a depth of 15 km (Figure 1). This source was originally intended to be used for a PACIFEX20 exercise, but that exercise was cancelled to the emergence of the Covid-19 pandemic.

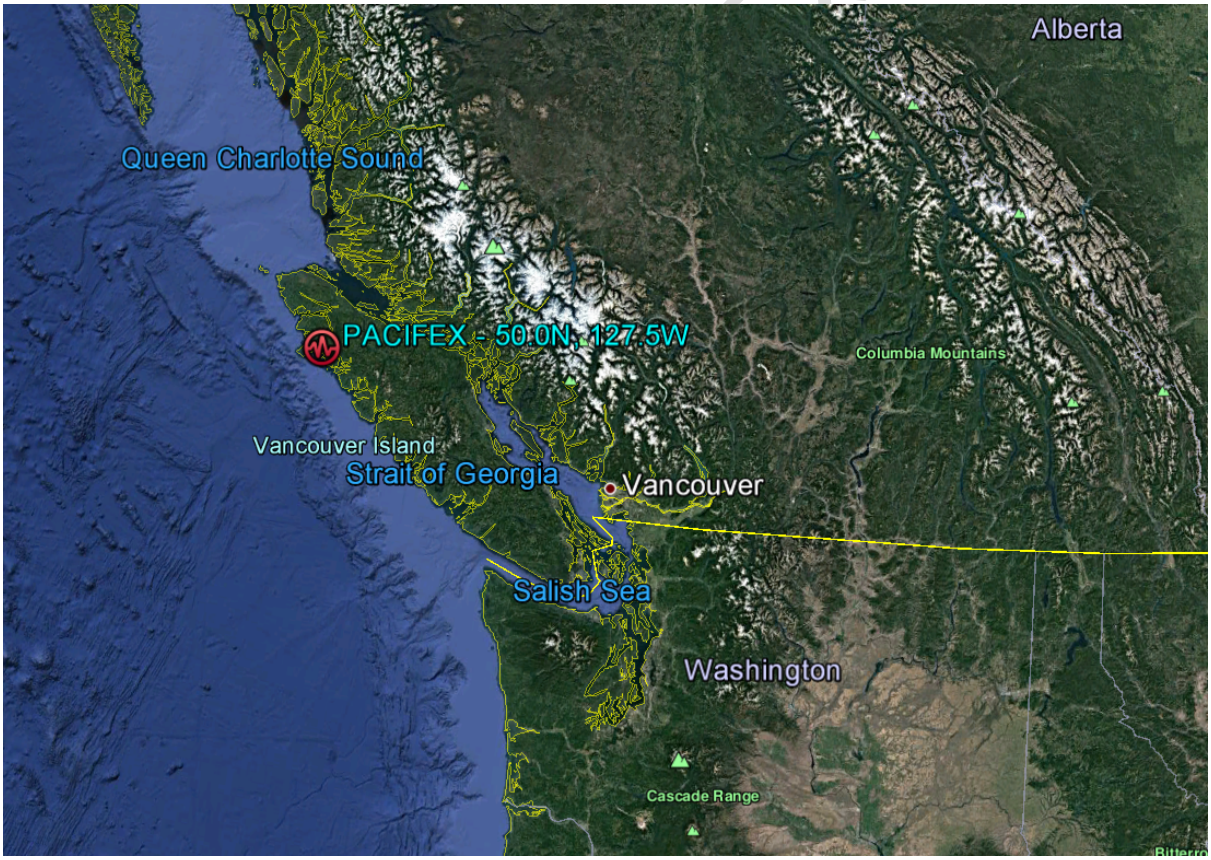

Figure 1: Location of event.

The Cascadia Subduction Zone is an approximately 1000 km long dipping fault zone that stretches from Northern Vancouver Island to Cape Mendocino, California. At the subduction zone, the Juan de Fuca tectonic plate dives, or subducts, northeast beneath North American Plate with relative plate motion of several centimeters per year. Farther offshore, upwelling at the Juan de Fuca Ridge spreading center adds

to the Juan De Fuca Plate as it spreads away from the Pacific Plate. The Juan de Fuca Plate together with the Explorer Plate to the north and Gorda Plate to the south make up the remnants of the Farallon Plate. The Gorda Plate section of the subduction zone is still active, while the Explorer Plate may have stopped.

The subduction of the Juan de Fuca plate beneath North America changes markedly along the length of the subduction zone, notably in the angle of subduction, distribution of earthquakes, volcanism, geologic and seismic structure of the upper plate, and regional horizontal stress. Density modeling experiments of the crust and mantle were conducted by the USGS along north and south transects across the Cascadia Subduction Zone. Results confirmed that the subducting plate dips significantly steeper beneath Oregon than beneath Vancouver Island, lending support to the idea that the Juan de Fuca plate is segmented from north to south. Models also indicate that the mantle wedge beneath western Oregon is lighter than the mantle beneath the Canadian continental crust.

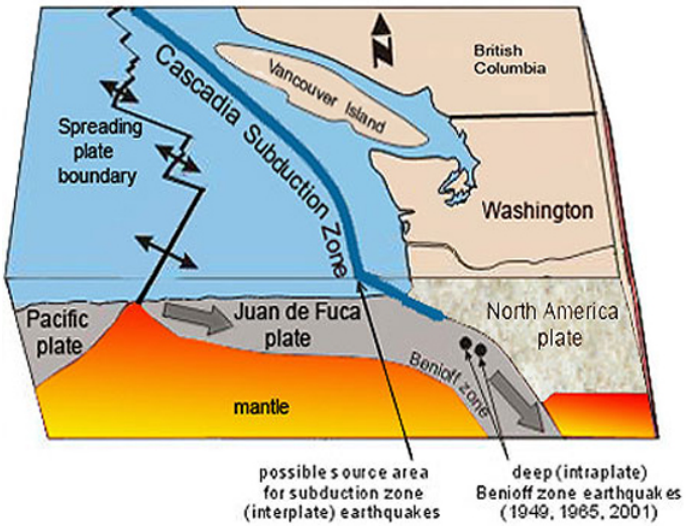

Figure 2: Northern Cascadia tectonic regime

Earthquakes in the Pacific Northwest are associated with both the subduction process and the deformation of the overriding North America plate. These quakes include subduction zone megathrust earthquakes, shallow crustal earthquakes within the North American Plate, deep "Benioff Zone" earthquakes resulting from deformation within the downgoing Juan de Fuca plate, and volcanic earthquakes associated with the Cascade volcanoes.

Megathrust earthquakes occur along the shallow part of the interface between the Juan de Fuca and North American plates. Between earthquakes, this fault zone is locked by friction, which builds up strain along the interface. The

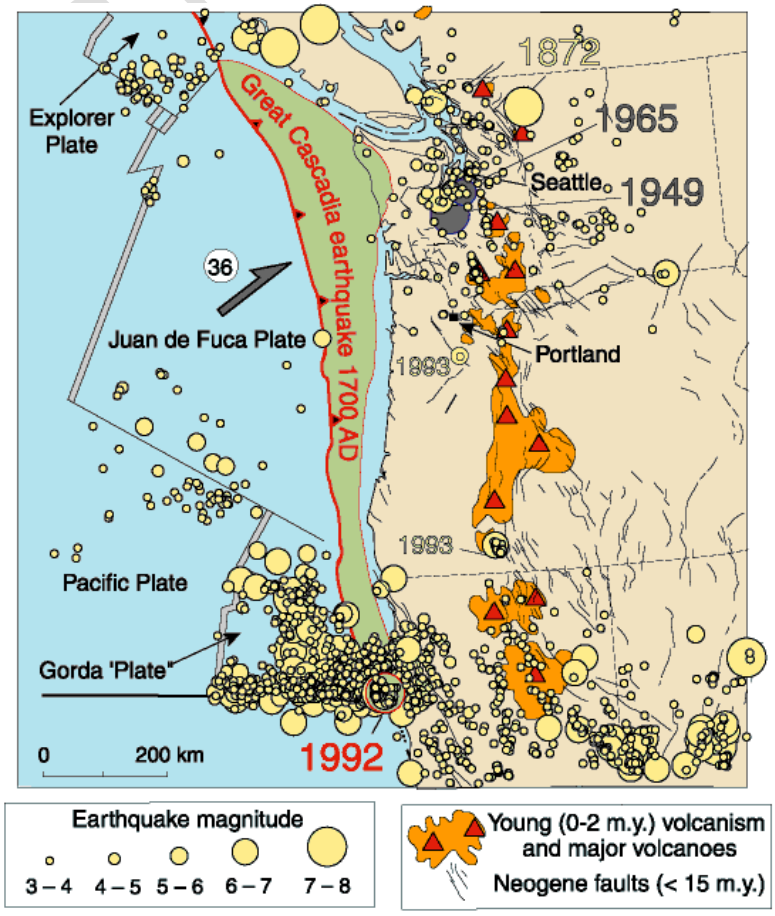

Figure 3: Active continental margin. Cascadian earthquakes, volcanic edifices and faults.

variation in subduction angle from south to north results in a locked zone that varies in width from a few tens of km along the Oregon coast to possibly 100 km+ off of Washington's Olympic Peninsula. The fault's frictional properties change with depth, such that immediately below the locked part is a strip (the "Transition Zone") that slides in "slow slip events" of a few centimeters over several weeks, every dozen months or so. The slow slip events relieve plate boundary stresses in the part of the fault where they occur, but add to the stress on the locked part of the fault.

The most recent megathrust earthquake in the Pacific Northwest was in January 1700, over 300 years ago. This quake is documented by studies of the resulting tsunami in Japan, by Native American oral traditions, and by geologic deposits from tsunami and offshore turbidity flows caused by the intense shaking and ground deformation associated with the earthquake. Geological evidence indicates that such great earthquakes have occurred at least seven times in the last 3500 years, a recurrence interval of ~400-600 years.

Contributing sources to this summary:

Pacific Northwest Seismic Network, “Cascadia Subduction Zone,” https://pnsn.org/outreach/earthquakesources/csz

Pacific Northwest Seismic Network, “Plate Tectonics,” https://pnsn.org/outreach/about-earthquakes/plate-tectonics

TOTLE, “Generalized Geologic Setting of the Pacific Northwest,” TOTLE Workshop, https://www.iris.edu/hq/inclass/downloads/optional/353

USGS, “Cascadia Subduction Zone: Two Contrasting Models of Lithospheric Structure,” https://earthquake.usgs.gov/data/crust/cascadia.php

Tsunami Warning System

To help communities respond to tsunami hazards, NOAA operates a tsunami warning system for U.S. and international coasts through its National Tsunami Warning Center (NTWC) in Alaska and the Pacific Tsunami Warning Center (PTWC) in Hawaii. These Centers provide rapid tsunami alerts after an earthquake’s occurrence, followed by impact estimates based on tsunami forecast models.

Primary recipients of Tsunami Warning Center (TWC) messages include National Weather Service (NWS) coastal Weather Forecast Offices (WFOs), state/territory warning points, national Coast Guards, Canada’s Provincial Emergency Program, national tsunami warning focal points, and military organizations. These agencies transmit the message to people potentially impacted by a tsunami.

NOAA and the National Tsunami Hazard Mitigation Program (NTHMP) are providing the framework for this exercise as a means for emergency responders along Pacific coasts to test and update tsunami response plans. High levels of vulnerability along the Pacific coast and the well-known tsunami threat in the Pacific should provide a strong incentive for local jurisdictions to prepare for a tsunami.

2. Exercise Concept

2.1 Purpose

The purpose of this exercise is to improve the effectiveness of the tsunami warning system along the U.S. and Canadian Pacific coasts. The exercise provides an opportunity for emergency management organizations along these coasts to exercise their operational lines of communications, review their tsunami response procedures, and promote tsunami preparedness. Regular exercising of response plans is critical to maintain readiness for an emergency. This is particularly true for tsunamis, which are infrequent but high impact events. Every coastal U.S. and Canadian Pacific emergency management organization (EMO) is encouraged to participate.

2.2 Objectives

Each organization can develop their objectives for the exercise depending on their level of involvement in the scenario. The following are the exercise's overarching objectives.

- Ensure message transmission from the TWC to Tsunami Warning Focal Points (TWFP) and from these primary contacts to the EMOs.
- Test tsunami response plans for Pacific EMOs that have developed plans, and provide a catalyst for countries and EMOs that have not developed plans.
- EMOs, Tsunami Warning Focal Points (TWFP) and Tsunami National Contacts review, discuss, and evaluate the various communication alternatives for receiving and disseminating tsunami messages.
- EMOs, Tsunami Warning Focal Points and Tsunami National Contacts review, discuss, and evaluate potential response actions and challenges.

2.3 Type of Exercise

The exercise should be carried out such that communications and decision making at various organizational levels are exercised and conducted without disrupting or alarming the general public. Individual localities, however, may at their discretion elect to extend the exercise down to the level of testing local notification systems such as the Emergency Alert System (EAS), sirens, or loudspeakers.

Exercises stimulate the development, training, testing, and evaluation of Disaster Plans and Standard Operating Procedures. Exercise participants may use their own past multi-hazard drills (e.g. flood, hurricane, tsunami, earthquake, etc.) as a framework to conduct PACIFEX21.

Exercises can be conducted at various scales of magnitude and sophistication. The following are examples of types of exercises conducted by EMOs:

1. **Orientation Exercise (Seminar):** An Orientation Exercise lays the groundwork for a comprehensive exercise program. It is a planned event, developed to bring together individuals and officials with a role or interest in multi-hazard response planning, problem solving, development of standard operational procedures (SOPs), and resource integration and coordination. An Orientation Exercise will have a specific goal and written objectives and result in an agreed upon Plan of Action.

2. **Drill:** The Drill is a planned activity that tests, develops, and/or maintains skills in a single or limited emergency response procedure. Drills generally involve operational response of single departments or agencies. Drills can involve internal notifications and/or field activities.

3. **Tabletop Exercise:** The Tabletop Exercise is a planned activity in which local officials, key staff, and organizations with disaster management responsibilities are presented with simulated emergency situations. It is usually informal, in a conference room environment, and is designed to elicit constructive discussion from the participants. Participants will examine and attempt to resolve problems, based on plans and procedures, if they exist. Individuals are encouraged to discuss decisions in depth with emphasis on slow-paced problem solving, rather than rapid, real time decision-making. A Tabletop Exercise should have specific goals, objectives, and a scenario narrative (see Appendix A for a Sample Tabletop Exercise Outline).

4. **Functional Exercise:** A Functional Exercise is a planned activity designed to test and evaluate organizational capacities. It is also utilized to evaluate the capability of a community's emergency management system by testing the Emergency Operations Plan (EOP). It is based on a simulation of a realistic emergency situation that includes a description of the situation (narrative) with communications between players and simulators. The Functional Exercise gives the players (decision-makers) a fully simulated experience of being in a major disaster event. It should take place at the appropriate coordination location (i.e. emergency operations center, emergency command center, command post, master control center, etc.) and activate all the appropriate members designated by the plan. Both internal and external agencies (government, private sector, and volunteer agencies) should be involved. It requires players, controllers, simulators, and evaluators. Message traffic will be simulated and inserted by the control team for player response/actions, under real time constraints. It may or may not include public evacuations. A Functional Exercise should have specific goals, objectives, and a scenario narrative.

5. **Full-scale Exercise:** A Full-scale Exercise is the culmination of a progressive exercise program that has grown with the capacity of the community to conduct exercises. A Full-Scale exercise is a planned activity in a "challenging" environment that encompasses a majority of the emergency management functions. This type of exercise involves the actual mobilization and deployment of the appropriate personnel and resources needed to demonstrate operational capabilities. EOCs and other command centers are required to be activated. A Full-scale Exercise is the largest, costliest, and most complex exercise type. It may or may not include public evacuations.

Example Time Frames for Different Exercise Types

Style	Planning Period	Duration	Comments
Orientation Exercise	2 weeks	Hours	Individual or mixed groups
Drill	2 months	1 day	Individual technical groups generally
Tabletop Exercise	1 month	1-3 days	Single or multiple agency
Functional Exercise	>3 months	1-5 days	Multiple Agency participation
Full-scale Exercise	>6 months	1 day/ week	Multiple Agency participation

3. Exercise Outline

3.1 General

Tsunami messages for this exercise are issued by the TWCs based on a hypothetical earthquake with the following hypocenter parameters:

- Origin Time 17:00:00 UTC March 24, 2021
- Latitude 50.0°N
- Longitude 127.5°W
- Magnitude 8.5 – Mw
- Depth 15 km

Expected impact for this event is determined from tsunami forecast models. Appendix B provides model results.

Various levels of alert are issued by the TWCs throughout the event. PTWC international messages do not give a level of alert, but indicate whether or not there is a tsunami threat. Definitions of the U.S. domestic products that will be issued by the TWCs during this exercise are provided below.

U.S. Tsunami Warning Centers domestic alert definitions:

Tsunami Warning - A tsunami warning is issued when a tsunami with the potential to generate widespread inundation is imminent, expected, or occurring. Warnings alert the public that dangerous coastal flooding accompanied by powerful currents is possible and may continue for several hours after initial arrival. Warnings alert emergency management officials to take action for the entire tsunami hazard zone. Appropriate actions to be taken by local officials may include the evacuation of low-lying coastal areas, and the repositioning of ships to deep waters when there

is time to safely do so. Warnings may be updated, adjusted geographically, downgraded, or cancelled. To provide the earliest possible alert, initial warnings are normally based only on seismic information.

Tsunami Advisory - A tsunami advisory is issued due to the threat of a potential tsunami which may produce strong currents or waves dangerous to those in or near the water. Coastal regions historically prone to damage due to strong currents induced by tsunamis are at the greatest risk. The threat may continue for several hours after the arrival of the initial wave, but significant widespread inundation is not expected for areas under an advisory. Appropriate actions to be taken by local officials may include closing beaches, evacuating harbors and marinas, and the repositioning of ships to deep waters when there is time to safely do so. Advisories are normally updated to continue the advisory, expand/contract affected areas, upgrade to a warning, or cancel the advisory.

Tsunami Watch - A tsunami watch is issued to alert emergency management officials and the public of an event which may later impact the watch area. The watch area may be upgraded to a warning or advisory - or canceled - based on updated information and analysis. Therefore, emergency management officials and the public should prepare to take action. Watches are normally issued based on seismic information without confirmation that a destructive tsunami is underway.

Tsunami Information Statement (TIS) – A tsunami information statement is issued to inform emergency management officials and the public that an earthquake has occurred, or that a tsunami warning, watch or advisory has been issued for another section of the ocean. In most cases, information statements are issued to indicate there is no threat of a destructive basin wide tsunami and to prevent unnecessary evacuations as the earthquake may have been felt in coastal areas. An information statement may, in appropriate situations, caution about the possibility of destructive local tsunamis. Information statements may be re-issued with additional information, though normally these messages are not updated. However, a watch, advisory or warning may be issued for the area, if necessary, after analysis and/or updated information becomes available.

The TWCs will not issue live messages over broadcast dissemination channels other than to issue initial dummy messages to start the exercise at 1702 UTC on March 24, 2021. The content of the dummy message is given in Appendix C. The dummy message will indicate that exercise participants should refer to the first message provided in this handbook. From then on, participants should follow the schedule in Table 1 to look at new messages. Table 1 is the message timeline and can be used by EMOs to drive the exercise timing. The messages (Appendix D) cover a 7-hour period, though in an actual event they would likely continue longer. World Meteorological Organization (WMO) and Advanced Weather Interactive Processing System (AWIPS) headers used in the dummy messages are listed in Table 2.

The U.S. NTWC issues three official products each time a message is issued. The messages provided in Appendix D are known as the public message and do not contain codes or text intended for automated systems. English and Spanish versions of the messages are provided. The other message not shown in Appendix D is the segmented message. The segmented message includes encoded NWS

zones, Valid Time Event Codes (VTEC), and their level of threat. The segmentation is used for automated processing systems which parse NWS products.

Participants may elect to conduct this exercise using their own timelines in order to achieve their particular objectives. For example, a particular EMO's Exercise Controller may choose to feed the TWC bulletins into the exercise at times of their own choosing, or alternatively put them in envelopes with the time they must be opened written on each, with each key participant agency having their own set of envelopes. The messages, provided in Appendix D, will facilitate this approach.

EMOs are welcome to modify estimated arrival times and/or wave amplitudes to suit their exercise – for example, to have the tsunami arrive sooner and with larger amplitude. Other exercise injects, such as tsunami damage reports, are also encouraged.

3.2 Master Schedule (Exercise Script)

Table 1: Scenario Timeline
Tsunami generated by a magnitude 8.5 earthquake with epicenter at 50.0ºN, 127.5ºW occurring on March 24, 2021 at 1700 UTC. The initial alert is disseminated at 1702 UTC.

Date (UTC)	Time (UTC)	NTWC Message		
		#	Type	Dummy
03/24/2021	1700			
03/24/2021	1702	01	Warn/ Adv	Yes
03/24/2021	1731	02	Warn/ Adv	No
03/24/2021	1802	03	Warn/ Adv	No
03/24/2021	1831	04	Warn/ Adv	No
03/24/2021	1902	05	Warn/ Adv	No
03/24/2021	2002	06	Warn/ Adv	No
03/24/2021	2102	07	Warn/ Adv	No
03/24/2021	2201	08	Adv	No
03/24/2021	2301	09	Adv	No
03/24/2021	0003	10	Can	No

The initial dummy messages will be disseminated over all standard TWC broadcast channels as listed in Table 2. These are being issued to test communications with EMOs and Tsunami Warning Focal Points, and to start the exercise.

A real tsunami warning/watch/advisory issued for an event as described would likely last many hours longer than this exercise. The exercise is being tailored to complete within a compressed time frame.

TWC Message Types:

Warn	Tsunami Warning
Adv	Tsunami Advisory
Wat	Tsunami Watch
TIS	Tsunami Information Statement
Can	Cancellation
Threat	PTWC International Message - Alert

No Threat PTWC International Message - No Alert

Dummy:
Yes Dummy Issued
No Dummy Not Issued

Table 2: Product Types
Product Types Issued for Dummy Messages with Transmission Methods

Center	WMO ID	AWIPS ID	NWWS	GTS	EMWIN	AISR	Fax	Email
NTWC	WEPA41 PAAQ	TSUWCA	Yes	Yes	Yes	Yes	No	No
NTWC	WEAK51 PAAQ	TSUAK1	Yes	Yes	Yes	Yes	Yes	Yes
NTWC	WEAK61 PAAQ	TSUSPN	Yes	Yes	Yes	Yes	Yes	Yes

NWWS NOAA Weather Wire Service
GTS Global Telecommunications System
EMWIN Emergency Manager's Weather Information Network
AISR Aeronautical Information System Replacement

3.3 Actions in Case of a Real Event

In the case of a real event occurring during the exercise, the TWC will issue their normal messages for the event. Such messages will be given full priority and a decision will be made by the TWC whether to issue the dummy message. Smaller earthquakes that only trigger a Tsunami Information Statement will not disrupt the exercise. All documentation and correspondence relating to this exercise is to be clearly identified as "**PACIFEX21"** and "**Exercise**."

3.4 Procedure for False Alarm

Any time disaster response exercises are conducted, the potential exists for the public or media to interpret the event as real. Procedures should be set up by all participating entities to address public or media concerns involving this exercise in case of misinterpretation by media or the public.

3.5 Resources

Although EMOs will have advance notice of the exercise and may elect to stand up a special dedicated shift to allow normal core business to continue uninterrupted, it is requested that realistic resource levels be deployed in order to reflect some of the issues that are likely to be faced in a real event.

Questions on the exercise can be addressed to:

Person	Telephone #	Email
Yvette LaDuke CalOES, Tsunami PC	916-715-2243	Yvette.LaDuke@caloes.ca.gov
Althea Rizzo OR OEM Tsunami PM	503-378-2911	Althea.Rizzo@state.or.us
Maximilian Dixon WA EMD Tsunami PM	253-512-7084	Maximilian.dixon@mil.wa.gov
Robert White BC Tsunami PM	250-952-5834	Robert.White@gov.bc.ca
Kevin Richards HI CD Tsunami PM	808-733-4301	krichards@scd.hawaii.gov
James Benzschawel AK DHS&EM Tsunami PM	907-428-7049	james.benzschawel@alaska.gov
James Gridley NTWC Director	907-745-4212	james.gridley@noaa.gov
Summer Ohlendorf NTWC SO	907-745-4212	summer.ohlendorf@noaa.gov
Charles McCreery PTWC Director	808-725-6380	Charles.mccreery@noaa.gov

3.6 Media Arrangements

One advantage in conducting exercises is that it provides a venue to promote awareness of the exercise topic. Many residents along the Pacific coasts may not realize that a tsunami warning system exists for their region, let alone the proper response. Communities may wish to invite their local media to the exercise to promote local awareness of the tsunami hazard. Appendix E contains a sample press release which can be adapted as necessary.

Appendix A. Example Tabletop Exercise

Tabletop Exercise Development Steps

Source: California Office of Emergency Services

A Tabletop Exercise is a planned activity in which local officials, key staff, and organizations with disaster management responsibilities are presented with simulated emergency situations. It is usually informal and slow paced, in a conference room environment, and is designed to elicit constructive discussion from the participants to assess plans, policies, and procedures. Participants will examine and attempt to resolve problems, based on plans and procedures, if they exist. Individuals are encouraged to discuss decisions in depth based on their organization's Standard Operating Procedures (SOPs), with emphasis on slow-paced problem solving, rather than rapid, real time decision-making. An Exercise Controller (moderator) introduces a simulated tsunami scenario to participants via written message, simulated telephone or radio call, or by other means. Exercise problems and activities (injects) are further introduced. Participants conduct group discussions where resolution is generally agreed upon and then summarized by a group leader. A Tabletop Exercise should have specific goals, objectives, and a scenario narrative.

The following provides a Tabletop Exercise structure with sample text and example.

1. Vulnerability Analysis: Problem Statement

An example for a hurricane might be:
Due to the recent Hurricane incidents in the Southeast region of the United States, an awareness of the threat risk involved in these disasters has become more apparent, therefore the need for evacuation system is vital. The state of Louisiana continues its ongoing tasks of planning, preparing, and training for Hurricane preparedness.

2. Purpose (Mission): Intent, what you plan to accomplish (Policy Statement)

An example for a hurricane might be:
The State of Louisiana has realized and recognizes the need for a more efficient and effective evacuation system, and is responding with this Comprehensive Exercise Plan. These events will include seminars, workshops, a tabletop exercise, functional and full-scale exercises within an 18-month time frame, under the State Homeland Security grant program.

3. Scope: Exercise Activities
Agencies Involved
Hazard Type
Geographic Impact Area

An example might be:
Emergency Services coordinators at local levels of government will identify representative jurisdictions from each of the six mutual aid regions located throughout the State to participate as host jurisdictions in a series of disaster preparedness exercises. These host jurisdictions will develop a progressive series of exercises each type building upon the previous type of exercise. The process will begin with a vulnerability analysis for each jurisdiction and continue through a progression of exercise activities including: orientation seminars, workshops, and tabletop and functional exercises. The eventual objective of these activities will be to reduce disaster impacts to their populations and city infrastructure. All events will be evaluated utilizing US Homeland Security Exercise Evaluation Program (HSEEP) after action reporting (AAR)

standards. Steps for corrective actions will be made a part of the after action process and report. Surrounding jurisdictions in the mutual aid area will act as exercise design team members, exercise evaluators, or exercise observers for the purpose of information transfer to increase their operational readiness. Jurisdictions will participate on a rotational basis every two years to provide the opportunity for multiple jurisdiction participation.

4. Goals and Objectives:

Criteria for good objectives: Think SMART

- Simple (concise)
- Measurable
- Achievable (can this be done during the exercise?)
- Realistic (and challenging)
- Task Oriented (oriented to functions)

An example might be:

Comprehensive Exercise Program (CEP) Objectives

- *To improve operational readiness*
- *To improve multi-agency coordination and response capabilities for effective disaster response*
- *To identify communication pathways and problem areas pre-event between local jurisdictions and operational area, regional and state emergency operations centers*
- *To establish uniform methods for resource ordering, tracking, and supply for agencies involved at all levels of government.*

5. Narrative:

The Narrative should describe the following:

- Triggering emergency/disaster event
- Describe the environment at the time the exercise begins
- Provide necessary background information
- Prepare participants for the exercise
- Discovery, report: how do you find out?
- Advance notice?
- Time, location, extent or level of damage

6. Evaluation:

The Evaluation should describe the following:

- Objectives Based
- Train Evaluation Teams
- Develop Evaluation Forms

7. After Action Report (AAR): The AAR should be compiled using the evaluation reports.

8. Improvement Plan (IP): The IP should reduce vulnerabilities.

Appendix B. Scenario Description

Tsunami models were computed using the Short-term Inundation Forecasting of Tsunamis (SIFT), the Alaska Tsunami Forecast Model (ATFM), and the Rapid Inundation Forecasting of Tsunamis (RIFT) models to generate expected impacts throughout the region.

The earthquake hypocenter parameters used for this exercise are:

- Origin Time 17:00:00 UTC March 24, 2021
- Latitude 50.0°N
- Longitude 127.5°W
- Magnitude 8.5 – Mw
- Depth 15 km

The following graphics show some of the model output for a better understanding of the event. When using the forecast coastal amplitudes, note that the highest tsunami elevation reached on shore could be double that of the coastal forecast since these are determined at the coast.

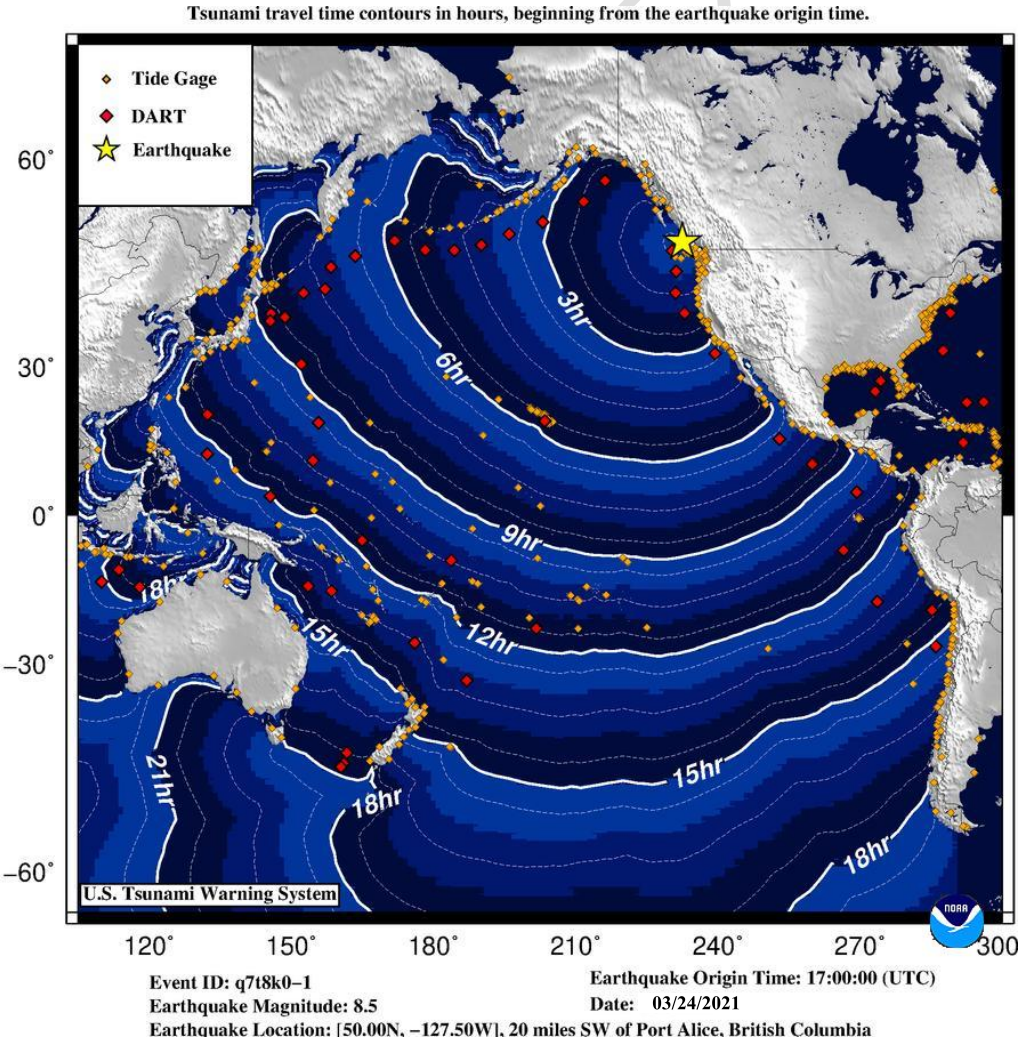

Figure B1. Tsunami travel time map for PACIFEX21.

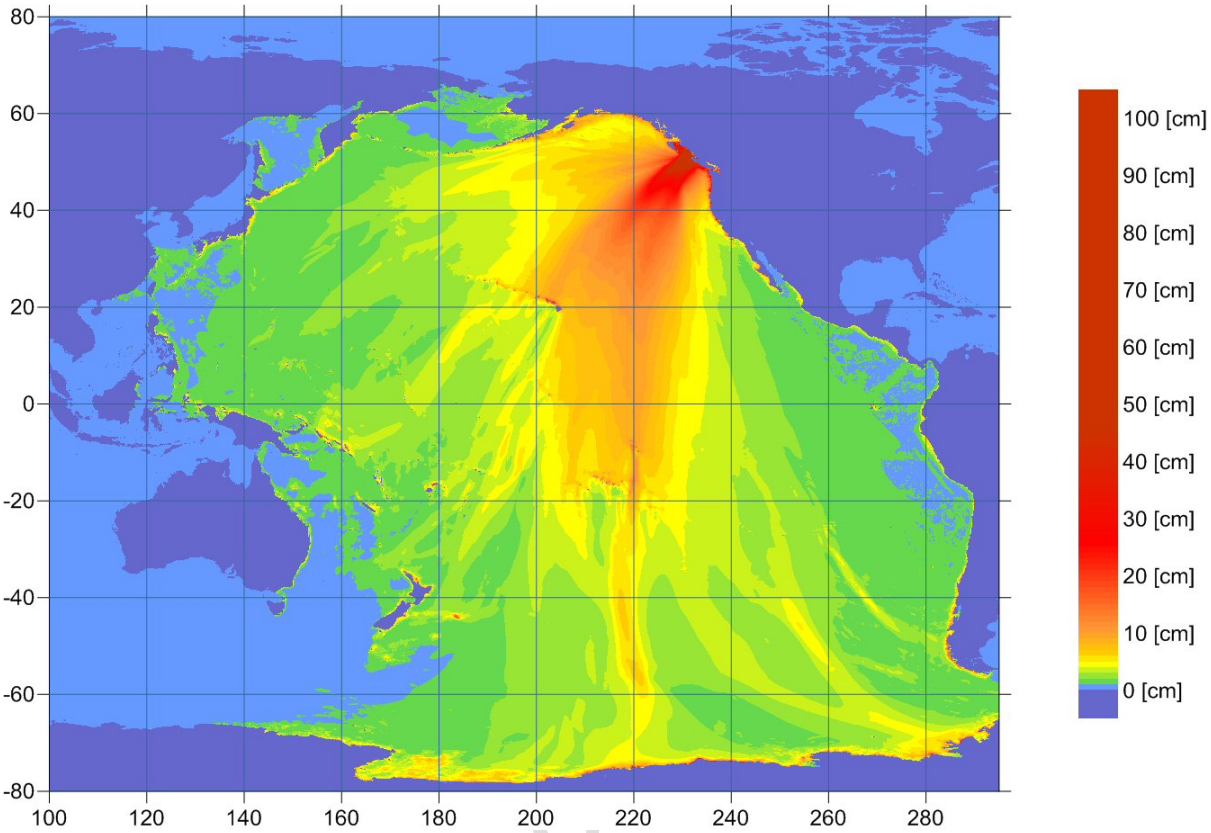

Figure B2. ATFM Maximum tsunami amplitude map for PACIFEX21.

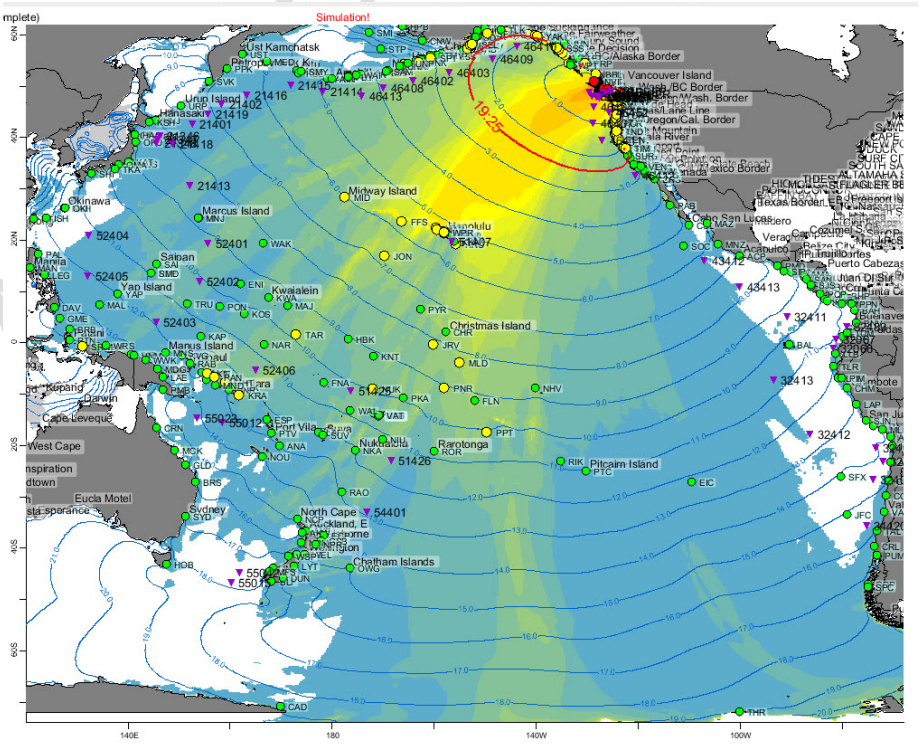

Figure B3. SIFT Maximum tsunami amplitude map for PACIFEX21.

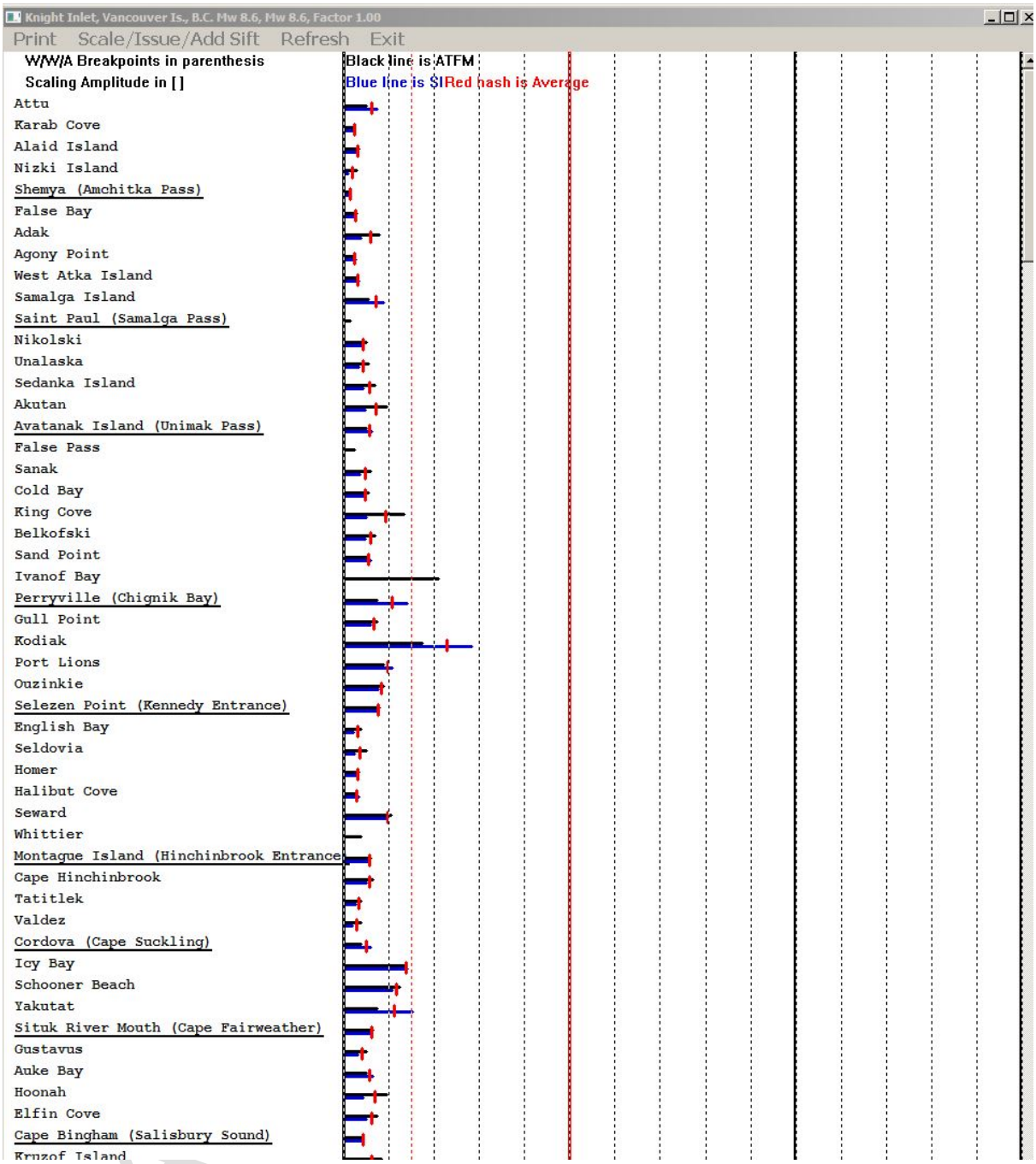

Figure B4. Bar chart showing expected coastal amplitudes from Attu, Alaska, to Salisbury Sound, Alaska. The black line is the ATFM forecast; blue line is the SIFT forecast; red hash is the average of the two. The scale is in meters where each solid vertical line to the right of the far left vertical black line represents one meter in water height.

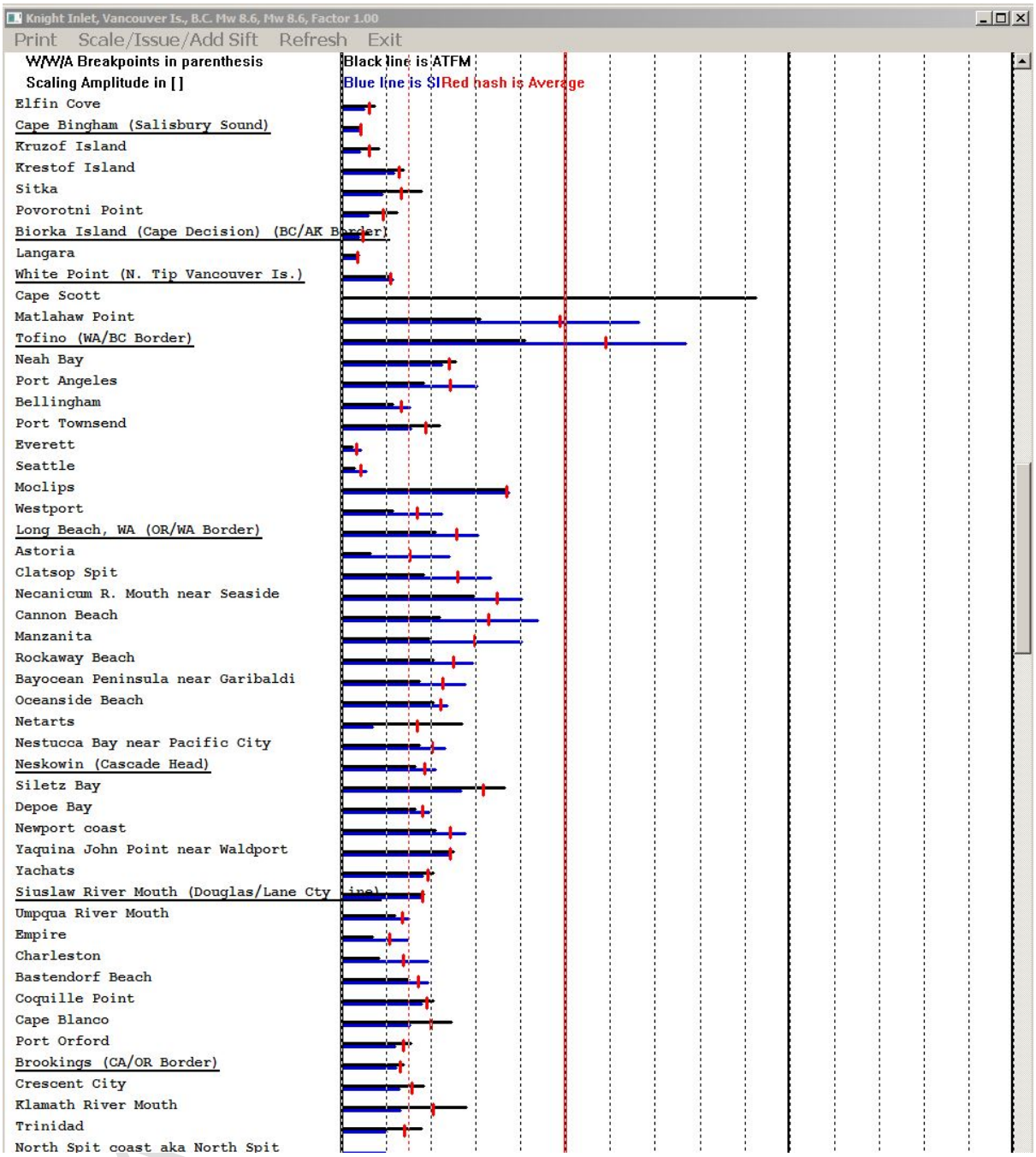

Figure B5. Bar chart showing expected coastal amplitudes from Salisbury Sound, Alaska to Trinidad, California. The black line is the ATFM forecast; blue line is the SIFT forecast; red hash is the average of the two. The scale is in meters where each solid vertical line to the right of the far left vertical black line represents one meter in water height.

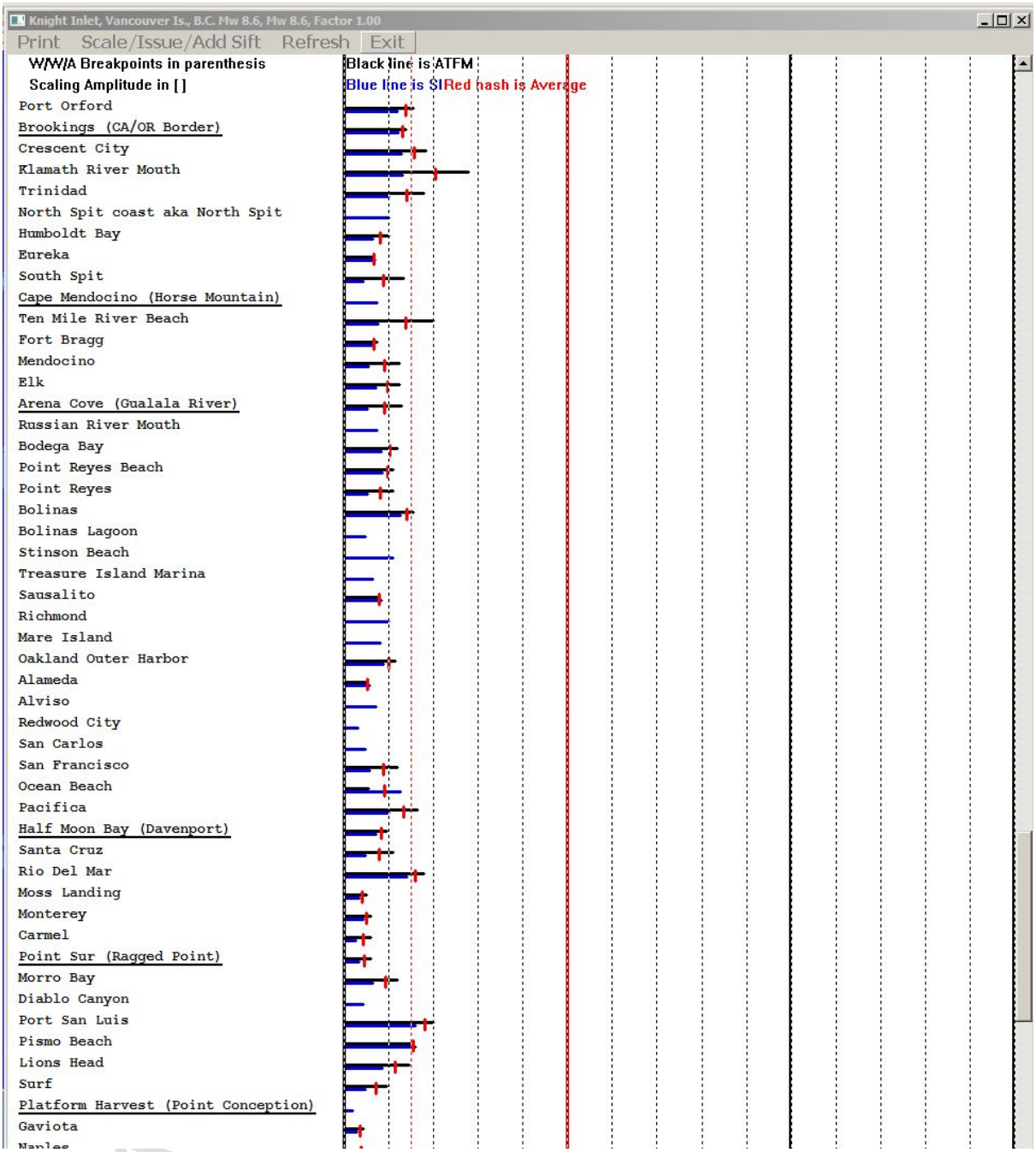

Figure B6. Bar chart showing expected coastal amplitudes from Trinidad, California to Point Conception, California. The black line is the ATFM forecast; blue line is the SIFT forecast; red hash is the average of the two. The scale is in meters where each solid vertical line to the right of the far left vertical black line represents one meter in water height.

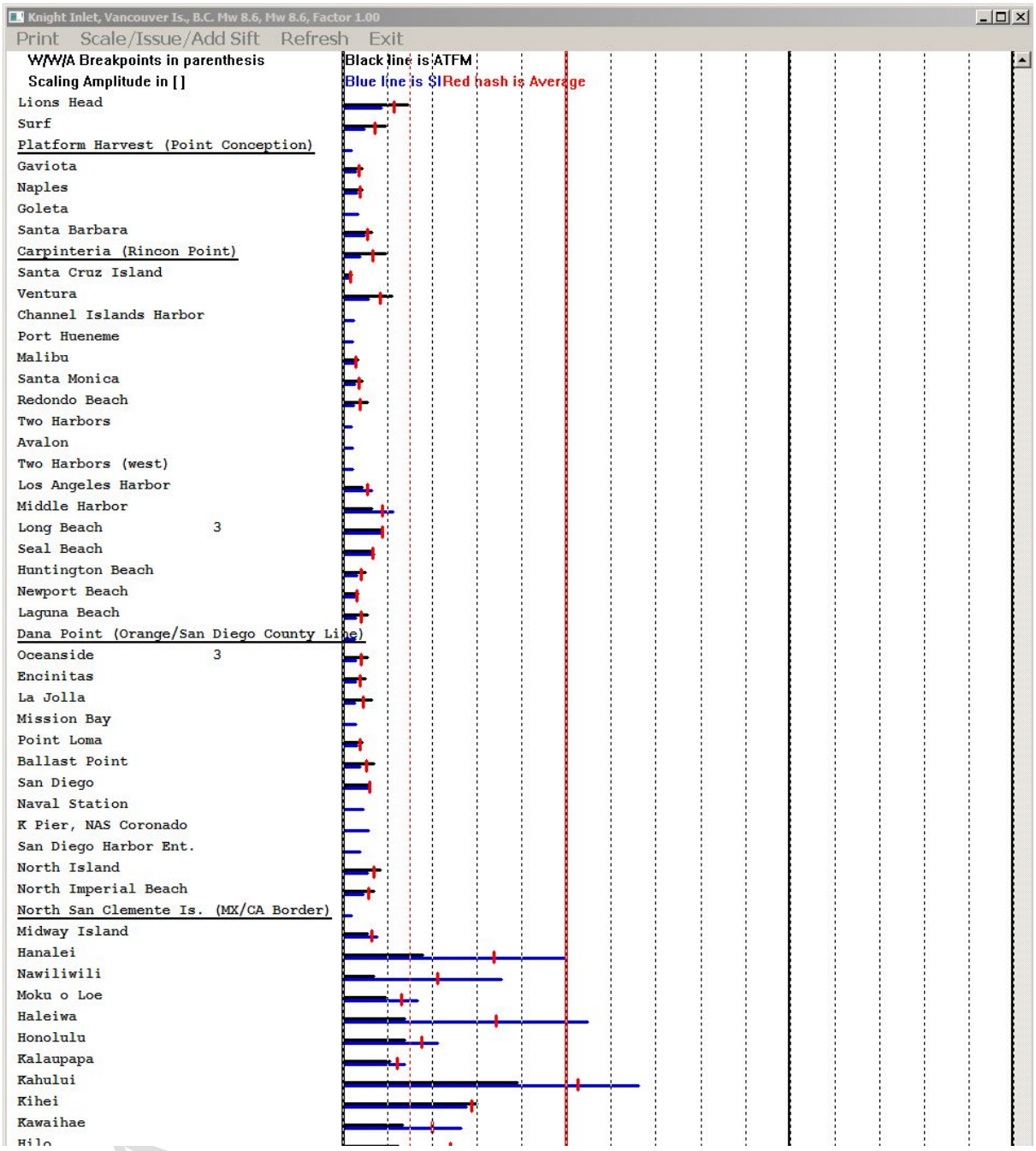

Figure B7. Bar chart showing expected coastal amplitudes from Point Conception, California to Kawaihae, HI. The black line is the ATFM forecast; blue line is the SIFT forecast; red hash is the average of the two. The scale is in meters where each solid vertical line to the right of the far left vertical black line represents one meter in water height.

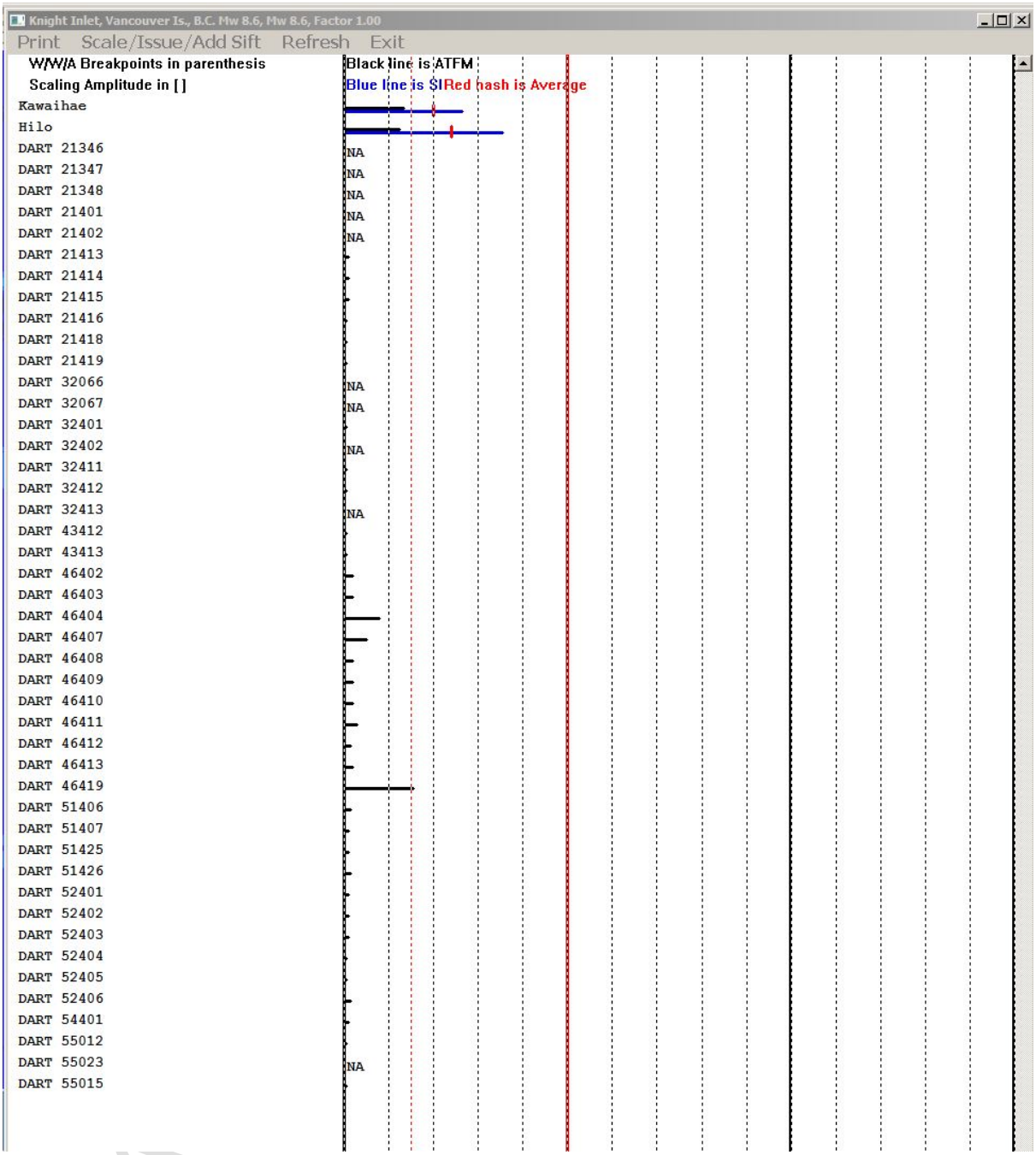

Figure B8. Bar chart showing expected coastal amplitudes from Kawaihae, HI to various DART buoy responses to this event. The black line is the ATFM forecast; blue line is the SIFT forecast; red hash is the average of the two. The scale is in meters where each solid vertical line to the right of the far left vertical black line represents one meter in water height.

Appendix C. TWC Dummy Messages

NTWC

```
WEPA41 PAAQ 261702
TSUWCA

TEST...TSUNAMI EXERCISE MESSAGE NUMBER 1...TEST
NWS NATIONAL TSUNAMI WARNING CENTER PALMER AK
1002 AM PDT WED MAR 24 2021

...PACIFEX21 TSUNAMI EXERCISE MESSAGE. REFER TO NTWC MESSAGE 1 IN THE
EXERCISE HANDBOOK. THIS IS AN EXERCISE ONLY...

THIS MESSAGE IS BEING USED TO START THE PACIFEX21 PACIFIC TSUNAMI
EXERCISE.  THIS WILL BE THE ONLY EXERCISE MESSAGE BROADCAST FROM THE
NATIONAL TSUNAMI WARNING CENTER.  THE HANDBOOK IS AVAILABLE AT THE WEB
SITE TSUNAMI.GOV. THE EXERCISE PURPOSE IS TO PROVIDE EMERGENCY
MANAGEMENT A REALISTIC SCENARIO TO TEST TSUNAMI RESPONSE PLANS.

THIS IS ONLY AN EXERCISE.

$$
```

```
WEAK51 PAAQ 261702
TSUAK1

TEST...PUBLIC TSUNAMI EXERCISE MESSAGE NUMBER 1...TEST
NWS NATIONAL TSUNAMI WARNING CENTER PALMER AK
1002 AM PDT WED MAR 24 2021

...PACIFEX21 TSUNAMI EXERCISE MESSAGE. REFER TO NTWC MESSAGE 1 IN THE
EXERCISE HANDBOOK. THIS IS AN EXERCISE ONLY...

THIS MESSAGE IS BEING USED TO START THE PACIFEX21 PACIFIC TSUNAMI
EXERCISE.  THIS WILL BE THE ONLY EXERCISE MESSAGE BROADCAST FROM THE
NATIONAL TSUNAMI WARNING CENTER.  THE HANDBOOK IS AVAILABLE AT THE WEB
SITE TSUNAMI.GOV. THE EXERCISE PURPOSE IS TO PROVIDE EMERGENCY
MANAGEMENT A REALISTIC SCENARIO TO TEST TSUNAMI RESPONSE PLANS.

THIS IS ONLY AN EXERCISE.

$$
```

```
WEAK61 PAAQ 261702
TSUSPN

TEST...MENSAJE DE EJERCICIO DE TSUNAMI NUMERO 1...TEST
NWS CENTRO NACIONAL DE ALERTA DE TSUNAMI PALMER AK
1002 AM PDT WED MAR 24 2021

...MENSAJE PARA DAR COMIENZO AL EJERCICIO DE TSUNAMI PACIFEX21.
REFERIRSE AL MENSAJE 1 DE NTWC EN EL MANUAL PARA EL EJERCICIO.  ESTO ES
UN EJERCICIO SOLAMENTE...

ESTE MENSAJE ESTA SIENDO USADO PARA DAR COMIENZO AL EJERCICIO DE TSUNAMI
PACIFEX21.  ESTE SERA EL UNICO MENSAJE QUE SERA EMITIDO DESDE EL CENTRO
NACIONAL DE ALERTA DE TSUNAMI.  EL MANUAL ESTA DISPONIBLE EN LA PAGINA
```

TSUNAMI.GOV. EL PROPOSITO DEL EJERCICIO ES PROVEER A LAS AUTORIDADES DE MANEJO DE EMERGENCIA UN ESCENARIO REALISTICO PARA PROBAR LOS PLANES DE RESPUESTA A TSUNAMIS.

ESTE ES SOLO UN EJERCICIO.

$$

Appendix D. TWC Exercise Messages

The following messages, created for the PACIFEX21 tsunami exercise, are representative of the public messages issued by the U.S. NTWC during a magnitude 8.5 earthquake and tsunami originating at 50.0°N, 127.5°W. During a real event, the NTWC would also issue graphical and html-based products to tsunami.gov and via RSS.

NTWC Bulletin #1

```
WEAK51 PAAQ 261702
TSUAK1

BULLETIN
Public Tsunami Message Number 1
NWS National Tsunami Warning Center Palmer AK
1002 AM PDT Wed Mar 24 2021

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


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


Tsunami Warning in Effect for;

 * CALIFORNIA, The coast from Point Conception, California 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

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


Tsunami Advisory in Effect for;

 * 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)


For other US and Canadian Pacific coasts in North America,
the level of tsunami danger is being evaluated.  Further
information will be provided in supplementary messages.
```

PRELIMINARY EARTHQUAKE PARAMETERS
---

* The following parameters are based on a rapid preliminary assessment of the earthquake and changes may occur.

* Magnitude 8.5
* Origin Time 0900 AKDT Mar 24 2021
1000 PDT Mar 24 2021
1700 UTC Mar 24 2021
* Coordinates 50.0 North 127.5 West
* Depth 9 miles
* Location 20 miles SW of Port Alice, British Columbia
290 miles NW of Seattle, Washington

FORECASTS OF TSUNAMI ACTIVITY
---

* Tsunami activity is forecasted to start at the following locations at the specified times.

SITE	FORECAST START OF TSUNAMI
* British Columbia	
Tofino	1010 PDT Mar 24
Langara	1110 PDT Mar 24
* Washington	
La Push	1050 PDT Mar 24
Neah Bay	1050 PDT Mar 24
Moclips	1105 PDT Mar 24
Long Beach	1105 PDT Mar 24
Westport	1110 PDT Mar 24
Port Angeles	1110 PDT Mar 24
Port Townsend	1135 PDT Mar 24
* Oregon	
Seaside	1115 PDT Mar 24
Charleston	1125 PDT Mar 24
Port Orford	1125 PDT Mar 24
Newport	1125 PDT Mar 24
Brookings	1140 PDT Mar 24
* California	
Crescent City	1145 PDT Mar 24
Fort Bragg	1200 PDT Mar 24
Monterey	1235 PDT Mar 24
San Francisco	1255 PDT Mar 24
Port San Luis	1300 PDT Mar 24
* Alaska	
Sitka	1055 AKDT Mar 24
Elfin Cove	1105 AKDT Mar 24

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Craig            1125 AKDT Mar 24
Yakutat          1155 AKDT Mar 24
Seward           1230 AKDT Mar 24
Kodiak           1230 AKDT Mar 24
Valdez           1245 AKDT Mar 24
Cordova          1250 AKDT Mar 24
Sand Point       1310 AKDT Mar 24
Homer            1335 AKDT Mar 24
Cold Bay         1350 AKDT Mar 24


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 and within tsunami
advisory 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.

If you are in a tsunami warning or 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 warning and
```

in the advisory 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.

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.

If you are in a tsunami warning or advisory area;

* 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.

$$
```

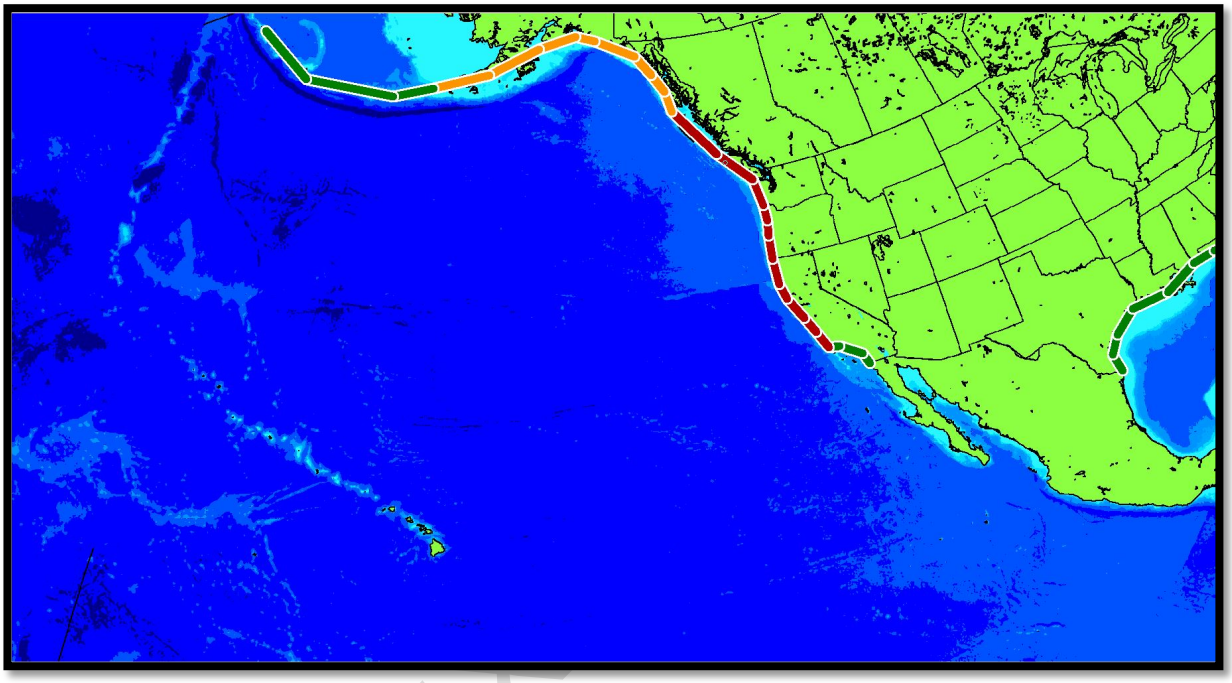

Figure D1: Watch/Warning/Advisory areas for NTWC Bulletin 1 (red is warning, orange is advisory, and green is information only)

NTWC Bulletin #2

```
WEAK51 PAAQ 261731
TSUAK1

BULLETIN
Public Tsunami Message Number 2
NWS National Tsunami Warning Center Palmer AK
1031 AM PDT Wed Mar 24 2021

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


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


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

Tsunami Warning in Effect for;

* CALIFORNIA, The coast from Point Conception, California 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

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

Tsunami Advisory in Effect for;

* 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)

For other US and Canadian Pacific coasts in North America, the level of tsunami danger is being evaluated. Further information will be provided in supplementary messages.

PRELIMINARY EARTHQUAKE PARAMETERS

* The following parameters are based on a rapid preliminary assessment of the earthquake and changes may occur.

* Magnitude 8.5
* Origin Time 0900 AKDT Mar 24 2021
  1000 PDT Mar 24 2021
  1700 UTC Mar 24 2021
* Coordinates 50.0 North 127.5 West
* Depth 9 miles
* Location 20 miles SW of Port Alice, British Columbia
  290 miles NW of Seattle, Washington

FORECASTS OF TSUNAMI ACTIVITY

* Tsunami activity is forecasted to start at the following locations at the specified times.

FORECAST

SITE	START OF TSUNAMI
* British Columbia	
Tofino	1010 PDT Mar 24
Langara	1110 PDT Mar 24
* Washington	
La Push	1050 PDT Mar 24
Neah Bay	1050 PDT Mar 24
Moclips	1105 PDT Mar 24
Long Beach	1105 PDT Mar 24
Westport	1110 PDT Mar 24
Port Angeles	1110 PDT Mar 24
Port Townsend	1135 PDT Mar 24
* Oregon	
Seaside	1115 PDT Mar 24
Charleston	1125 PDT Mar 24
Port Orford	1125 PDT Mar 24
Newport	1125 PDT Mar 24
Brookings	1140 PDT Mar 24
* California	
Crescent City	1145 PDT Mar 24
Fort Bragg	1200 PDT Mar 24
Monterey	1235 PDT Mar 24
San Francisco	1255 PDT Mar 24
Port San Luis	1300 PDT Mar 24
* Alaska	
Sitka	1055 AKDT Mar 24
Elfin Cove	1105 AKDT Mar 24
Craig	1125 AKDT Mar 24
Yakutat	1155 AKDT Mar 24
Seward	1230 AKDT Mar 24
Kodiak	1230 AKDT Mar 24
Valdez	1245 AKDT Mar 24
Cordova	1250 AKDT Mar 24
Sand Point	1310 AKDT Mar 24
Homer	1335 AKDT Mar 24
Cold Bay	1350 AKDT Mar 24

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
Winter Harbour BC	1021 PDT Mar 24	2.5ft
DART 46404 US	1020 PDT Mar 24	2.3ft

RECOMMENDED ACTIONS

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

If you are in a tsunami warning or 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 warning and
in the advisory 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.

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.

If you are in a tsunami warning or advisory area;

 * 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.

$$
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NTWC Bulletin #3

```
WEAK51 PAAQ 261802
TSUAK1

BULLETIN
```

Public Tsunami Message Number 3
NWS National Tsunami Warning Center Palmer AK
1102 AM PDT Wed Mar 24 2021

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

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

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

Tsunami Warning in Effect for;

* OREGON, The coast from Douglas/Lane Line, Oregon (10 miles SW of Florence) 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

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

Tsunami Advisory in Effect for;

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

* OREGON, The coast from The Oregon/Cal. Border to Douglas/Lane Line, Oregon (10 miles SW of Florence)

* 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)

For other US and Canadian Pacific coasts in North America, the level of tsunami danger is being evaluated. Further information will be provided in supplementary messages.

FORECASTS OF TSUNAMI ACTIVITY
---
* Tsunami activity is forecasted to start at the following

locations at the specified times.

SITE	FORECAST START OF TSUNAMI
* British Columbia	
Tofino	1010 PDT Mar 24
Langara	1110 PDT Mar 24
* Washington	
La Push	1050 PDT Mar 24
Neah Bay	1050 PDT Mar 24
Moclips	1105 PDT Mar 24
Long Beach	1105 PDT Mar 24
Westport	1110 PDT Mar 24
Port Angeles	1110 PDT Mar 24
Port Townsend	1135 PDT Mar 24
* Oregon	
Seaside	1115 PDT Mar 24
Charleston	1125 PDT Mar 24
Port Orford	1125 PDT Mar 24
Newport	1125 PDT Mar 24
Brookings	1140 PDT Mar 24
* California	
Crescent City	1145 PDT Mar 24
Fort Bragg	1200 PDT Mar 24
Monterey	1235 PDT Mar 24
San Francisco	1255 PDT Mar 24
Port San Luis	1300 PDT Mar 24
* Alaska	
Sitka	1055 AKDT Mar 24
Elfin Cove	1105 AKDT Mar 24
Craig	1125 AKDT Mar 24
Yakutat	1155 AKDT Mar 24
Seward	1230 AKDT Mar 24
Kodiak	1230 AKDT Mar 24
Valdez	1245 AKDT Mar 24
Cordova	1250 AKDT Mar 24
Sand Point	1310 AKDT Mar 24
Homer	1335 AKDT Mar 24
Cold Bay	1350 AKDT Mar 24

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
Winter Harbour BC	1021 PDT Mar 24	2.5ft
Tofino British Columbia	1040 PDT Mar 24	0.8ft

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 DART 46404  US               1020  PDT Mar 24          2.3ft
 DART 46409  US               1041  PDT Mar 24          0.7ft


PRELIMINARY EARTHQUAKE PARAMETERS
---------------------------------

 * Magnitude      8.5
 * Origin Time    0900 AKDT Mar 24 2021
                  1000  PDT Mar 24 2021
                  1700  UTC Mar 24 2021
 * Coordinates    50.0 North 127.5 West
 * Depth          9 miles
 * Location       20 miles SW of Port Alice, British Columbia
                  290 miles NW of Seattle, Washington


RECOMMENDED ACTIONS
-------------------
Actions to protect human life and property will
vary within tsunami warning areas and within tsunami
advisory 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.

If you are in a tsunami warning or 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 warning and in the advisory 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.

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.

If you are in a tsunami warning or advisory area;

* 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.

$$
```

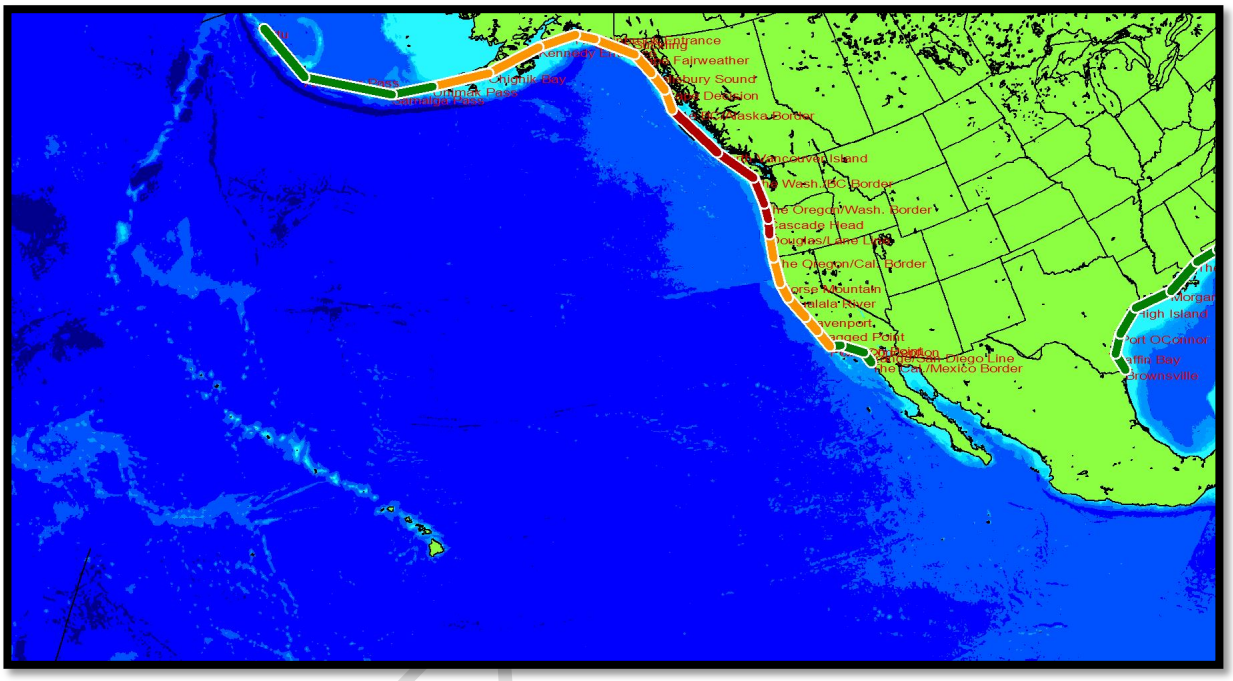

Figure D2: Revised Warning/Advisory areas for Bulletin 3 (red is warning, orange is advisory, and green is information only).

NTWC Bulletin #4

```
WEAK51 PAAQ 261831
TSUAK1

BULLETIN
Public Tsunami Message Number 4
NWS National Tsunami Warning Center Palmer AK
1131 AM PDT Wed Mar 24 2021

UPDATES
-------
 * Updated observations


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


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

Tsunami Warning in Effect for;

 * OREGON, The coast from Douglas/Lane Line, Oregon (10 miles SW of Florence) 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

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

Tsunami Advisory in Effect for;

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

 * OREGON, The coast from The Oregon/Cal. Border to Douglas/Lane Line, Oregon (10 miles SW of Florence)

 * 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)

For other US and Canadian Pacific coasts in North America, the level of tsunami danger is being evaluated. Further information will be provided in supplementary messages.

FORECASTS OF TSUNAMI ACTIVITY
---

 * Tsunami activity is forecasted to start at the following locations at the specified times.

SITE	FORECAST START OF TSUNAMI	
* British Columbia		
Langara	1110	PDT Mar 24
* Washington		
La Push	1050	PDT Mar 24
Neah Bay	1050	PDT Mar 24
Moclips	1105	PDT Mar 24
Long Beach	1105	PDT Mar 24
Westport	1110	PDT Mar 24
Port Angeles	1110	PDT Mar 24

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Port Townsend    1135  PDT Mar 24

 * Oregon
Seaside          1115  PDT Mar 24
Charleston       1125  PDT Mar 24
Port Orford      1125  PDT Mar 24
Newport          1125  PDT Mar 24
Brookings        1140  PDT Mar 24

 * California
Crescent City    1145  PDT Mar 24
Fort Bragg       1200  PDT Mar 24
Monterey         1235  PDT Mar 24
San Francisco    1255  PDT Mar 24
Port San Luis    1300  PDT Mar 24

 * Alaska
Sitka            1055 AKDT Mar 24
Elfin Cove       1105 AKDT Mar 24
Craig            1125 AKDT Mar 24
Yakutat          1155 AKDT Mar 24
Seward           1230 AKDT Mar 24
Kodiak           1230 AKDT Mar 24
Valdez           1245 AKDT Mar 24
Cordova          1250 AKDT Mar 24
Sand Point       1310 AKDT Mar 24
Homer            1335 AKDT Mar 24
Cold Bay         1350 AKDT Mar 24


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
Winter Harbour BC	1021 PDT Mar 24	2.5ft
Tofino British Columbia	1040 PDT Mar 24	0.8ft
DART 46404 US	1020 PDT Mar 24	2.3ft
Neah Bay Washington	1102 PDT Mar 24	1.6ft
DART 46410 US	1117 PDT Mar 24	0.4ft
DART 46409 US	1041 PDT Mar 24	0.7ft

```
PRELIMINARY EARTHQUAKE PARAMETERS
---------------------------------

 * Magnitude      8.5
 * Origin Time    0900 AKDT Mar 24 2021
                  1000  PDT Mar 24 2021
                  1700  UTC Mar 24 2021
 * Coordinates    50.0 North 127.5 West
 * Depth          9 miles
 * Location       20 miles SW of Port Alice, British Columbia
                  290 miles NW of Seattle, Washington
```

RECOMMENDED ACTIONS

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

If you are in a tsunami warning or 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 warning and in the advisory 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.

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.

If you are in a tsunami warning or advisory area;

* 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.

$$

NTWC Bulletin #5

WEAK51 PAAQ 261902
TSUAK1

BULLETIN
Public Tsunami Message Number 5
NWS National Tsunami Warning Center Palmer AK
1202 PM PDT Wed Mar 24 2021

UPDATES
---
 * Updated observations
 * Revised alert areas

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

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

Tsunami Warning in Effect for;

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

 * BRITISH COLUMBIA, The outer west coast of Vancouver Island and the Juan de Fuca strait coast

Tsunami Advisory in Effect for;

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

 * OREGON, The coast from The Oregon/Cal. Border to Douglas/Lane Line, Oregon (10 miles SW of Florence)

 * OREGON, The coast from Douglas/Lane Line, Oregon (10 miles SW of Florence) to The Oregon/Wash. Border

 * BRITISH COLUMBIA, The north coast and Haida Gwaii and the central coast and northeast Vancouver Island

 * 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)

For other US and Canadian Pacific coasts in North America, the level of tsunami danger is being evaluated. Further information will be provided in supplementary messages.

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
* British Columbia			
Langara	1110 PDT Mar 24		less than 1ft
* Washington			
Moclips	1105 PDT Mar 24	9 hrs	0.8- 1.6 ft
Long Beach	1105 PDT Mar 24		less than 1ft
Westport	1110 PDT Mar 24		less than 1ft
Port Angeles	1110 PDT Mar 24	15 hrs	1.0- 1.8 ft
Port Townsend	1135 PDT Mar 24		less than 1ft
* Oregon			
Seaside	1115 PDT Mar 24		
Charleston	1125 PDT Mar 24		less than 1ft
Port Orford	1125 PDT Mar 24		less than 1ft
Newport	1125 PDT Mar 24		
Brookings	1140 PDT Mar 24		less than 1ft
* California			
Crescent City	1145 PDT Mar 24	9 hrs	0.8- 1.5 ft
Fort Bragg	1200 PDT Mar 24		less than 1ft
Monterey	1235 PDT Mar 24		less than 1ft
San Francisco	1255 PDT Mar 24		less than 1ft
Port San Luis	1300 PDT Mar 24		less than 1ft
* Alaska			
Sitka	1055 AKDT Mar 24		less than 1ft
Elfin Cove	1105 AKDT Mar 24		less than 1ft
Craig	1125 AKDT Mar 24		
Yakutat	1155 AKDT Mar 24		less than 1ft
Seward	1230 AKDT Mar 24		less than 1ft
Kodiak	1230 AKDT Mar 24		less than 1ft
Valdez	1245 AKDT Mar 24		less than 1ft
Cordova	1250 AKDT Mar 24		less than 1ft
Sand Point	1310 AKDT Mar 24		less than 1ft
Homer	1335 AKDT Mar 24		less than 1ft
Cold Bay	1350 AKDT Mar 24		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
Winter Harbour BC	1021 PDT Mar 24	2.5ft
Tofino British Columbia	1159 PDT Mar 24	1.0ft
DART 46404 US	1020 PDT Mar 24	2.3ft
Neah Bay Washington	1102 PDT Mar 24	1.6ft
Port Angeles Washington	1151 PDT Mar 24	1.1ft
Charleston Oregon	1130 PDT Mar 24	0.9ft
Port Orford Oregon	1145 PDT Mar 24	0.3ft
Crescent City CA	1134 PDT Mar 24	0.6ft
DART 46410 US	1117 PDT Mar 24	0.4ft
DART 46409 US	1041 PDT Mar 24	0.7ft

PRELIMINARY EARTHQUAKE PARAMETERS

* Magnitude 8.5
* Origin Time 0900 AKDT Mar 24 2021
  1000 PDT Mar 24 2021
  1700 UTC Mar 24 2021
* Coordinates 50.0 North 127.5 West
* Depth 9 miles
* Location 20 miles SW of Port Alice, British Columbia
  290 miles NW of Seattle, Washington

RECOMMENDED ACTIONS

* See message number 4 for recommended actions.

IMPACTS

* See message number 4 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 60 minutes.

$$

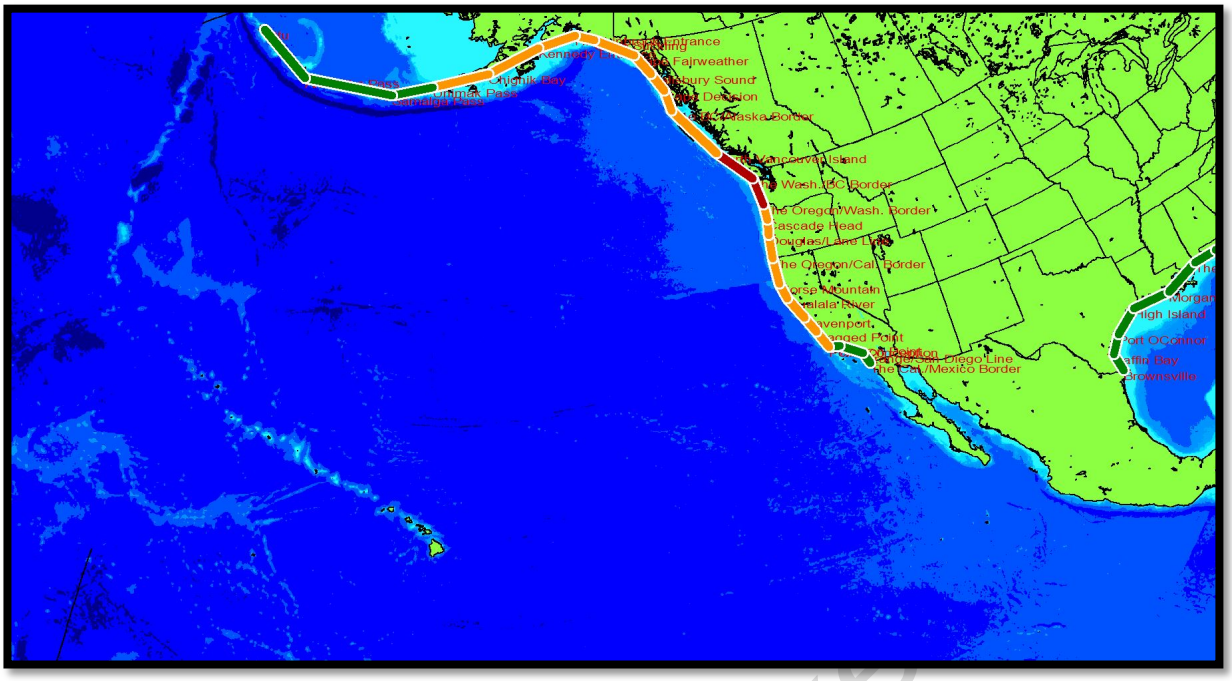

Figure D3: Revised Warning/Advisory areas for Bulletin 5 (red is warning, orange is advisory, and green is information only).

NTWC Bulletin #6

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WEAK51 PAAQ 262002
TSUAK1

BULLETIN
Public Tsunami Message Number 6
NWS National Tsunami Warning Center Palmer AK
102 PM PDT Wed Mar 24 2021

UPDATES
-------
 * Updated observations


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


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


Tsunami Warning in Effect for;

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

 * BRITISH COLUMBIA, The outer west coast of Vancouver Island
   and the Juan de Fuca strait coast


Tsunami Advisory in Effect for;
```

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

* OREGON, The coast from The Oregon/Cal. Border to The Oregon/Wash. Border

* BRITISH COLUMBIA, The north coast and Haida Gwaii and the central coast and northeast Vancouver Island

* 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)

For other US and Canadian Pacific coasts in North America, the level of tsunami danger is being evaluated. Further information will be provided in supplementary messages.

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
* California			
Monterey	1235 PDT Mar 24		less than 1ft
San Francisco	1255 PDT Mar 24		less than 1ft
Port San Luis	1300 PDT Mar 24		less than 1ft
* Alaska			
Elfin Cove	1105 AKDT Mar 24		less than 1ft
Craig	1125 AKDT Mar 24		
Yakutat	1155 AKDT Mar 24		less than 1ft
Seward	1230 AKDT Mar 24		less than 1ft
Kodiak	1230 AKDT Mar 24		less than 1ft
Valdez	1245 AKDT Mar 24		less than 1ft
Cordova	1250 AKDT Mar 24		less than 1ft
Sand Point	1310 AKDT Mar 24		less than 1ft
Homer	1335 AKDT Mar 24		less than 1ft
Cold Bay	1350 AKDT Mar 24		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
Winter Harbour BC	1021 PDT Mar 24	2.5ft
Tofino British Columbia	1159 PDT Mar 24	1.0ft
DART 46404 US	1020 PDT Mar 24	2.3ft
Neah Bay Washington	1249 PDT Mar 24	2.0ft
Port Angeles Washington	1151 PDT Mar 24	1.1ft
Charleston Oregon	1130 PDT Mar 24	0.9ft
Port Orford Oregon	1145 PDT Mar 24	0.3ft
Crescent City CA	1245 PDT Mar 24	1.0ft
Humboldt Bay California	1201 PDT Mar 24	0.8ft
Sitka Alaska	1219 PDT Mar 24	0.6ft
DART 46410 US	1117 PDT Mar 24	0.4ft
Elfin Cove Alaska	1227 PDT Mar 24	0.5ft
Arena Cove California	1204 PDT Mar 24	0.4ft
Seattle Washington	1245 PDT Mar 24	1.1ft
DART 46409 US	1041 PDT Mar 24	0.7ft
Point Reyes California	1217 PDT Mar 24	0.4ft
Bolinas Lagoon CA	1253 PDT Mar 24	0.4ft
Port San Luis CA	1251 PDT Mar 24	0.4ft
DART 46412 US	1222 PDT Mar 24	0.2ft
DART 46413 US	1222 PDT Mar 24	0.2ft

PRELIMINARY EARTHQUAKE PARAMETERS

* Magnitude 8.5
* Origin Time 0900 AKDT Mar 24 2021
  1000 PDT Mar 24 2021
  1700 UTC Mar 24 2021
* Coordinates 50.0 North 127.5 West
* Depth 9 miles
* Location 20 miles SW of Port Alice, British Columbia
  290 miles NW of Seattle, Washington

RECOMMENDED ACTIONS

* See message number 4 for recommended actions.

IMPACTS

* See message number 4 for possible impacts.

ADDITIONAL INFORMATION AND NEXT UPDATE

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

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 * 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 60 minutes.

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NTWC Bulletin #7

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WEAK51 PAAQ 262102
TSUAK1

BULLETIN
Public Tsunami Message Number 7
NWS National Tsunami Warning Center Palmer AK
202 PM PDT Wed Mar 24 2021

UPDATES
-------
 * Updated observations


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


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


Tsunami Warning in Effect for;

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

 * BRITISH COLUMBIA, The outer west coast of Vancouver Island
   and the Juan de Fuca strait coast


Tsunami Advisory in Effect for;

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

 * OREGON, The coast from The Oregon/Cal. Border  to The
   Oregon/Wash. Border

 * BRITISH COLUMBIA, The north coast and Haida Gwaii and the
   central coast and northeast Vancouver Island

 * 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)
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For other US and Canadian Pacific coasts in North America,
the level of tsunami danger is being evaluated. Further
information will be provided in supplementary messages.

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			
Seward	1230 AKDT Mar 24		less than 1ft
Kodiak	1230 AKDT Mar 24		less than 1ft
Valdez	1245 AKDT Mar 24		less than 1ft
Cordova	1250 AKDT Mar 24		less than 1ft
Sand Point	1310 AKDT Mar 24		less than 1ft
Homer	1335 AKDT Mar 24		less than 1ft
Cold Bay	1350 AKDT Mar 24		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
Winter Harbour BC	1021 PDT Mar 24	2.5ft
Tofino British Columbia	1343 PDT Mar 24	1.9ft
DART 46404 US	1020 PDT Mar 24	2.3ft
Neah Bay Washington	1306 PDT Mar 24	2.2ft
DART 46407 US	1337 PDT Mar 24	0.2ft
Westport South Bay WA	1320 PDT Mar 24	0.3ft
Port Angeles Washington	1331 PDT Mar 24	1.3ft
Charleston Oregon	1308 PDT Mar 24	1.0ft
Port Orford Oregon	1145 PDT Mar 24	0.3ft
Port Townsend WA	1324 PDT Mar 24	1.0ft
Crescent City CA	1245 PDT Mar 24	1.0ft
Humboldt Bay California	1323 PDT Mar 24	1.4ft
Sitka Alaska	1353 PDT Mar 24	1.0ft
DART 46410 US	1117 PDT Mar 24	0.4ft

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 Elfin Cove  Alaska           1227  PDT Mar 24          0.5ft
 Arena Cove  California       1204  PDT Mar 24          0.4ft
 Seattle  Washington          1245  PDT Mar 24          1.1ft
 DART 46409  US               1041  PDT Mar 24          0.7ft
 Point Reyes  California      1342  PDT Mar 24          1.1ft
 Monterey  California         1324  PDT Mar 24          0.4ft
 Bolinas Lagoon  CA           1253  PDT Mar 24          0.4ft
 San Francisco  CA            1302  PDT Mar 24          0.4ft
 Yakutat  Alaska              1312  PDT Mar 24          0.6ft
 Port San Luis  CA            1251  PDT Mar 24          0.4ft
 DART 46412  US               1222  PDT Mar 24          0.2ft
 Santa Barbara  CA            1335  PDT Mar 24          0.5ft
 Seward  Alaska               1339  PDT Mar 24          0.8ft
 Kodiak  Alaska               1359  PDT Mar 24          0.7ft
 Ventura  California          1355  PDT Mar 24          0.2ft
 DART 46408  US               1302  PDT Mar 24          0.2ft
 DART 46413  US               1222  PDT Mar 24          0.2ft


PRELIMINARY EARTHQUAKE PARAMETERS
---------------------------------

 * Magnitude      8.5
 * Origin Time    0900 AKDT Mar 24 2021
                  1000  PDT Mar 24 2021
                  1700  UTC Mar 24 2021
 * Coordinates    50.0 North 127.5 West
 * Depth          9 miles
 * Location       20 miles SW of Port Alice, British Columbia
                  290 miles NW of Seattle, Washington


RECOMMENDED ACTIONS
-------------------
 * See message number 4 for recommended actions.


IMPACTS
-------
 * See message number 4 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 60 minutes.

$$
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NTWC Bulletin #8

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WEAK51 PAAQ 262201
TSUAK1
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BULLETIN
Public Tsunami Message Number 8
NWS National Tsunami Warning Center Palmer AK
301 PM PDT Wed Mar 24 2021

UPDATES
---
* Updated observations
* Revised alert areas

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

Tsunami Advisory in Effect for;

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

* OREGON, The coast from The Oregon/Cal. Border to The Oregon/Wash. Border

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

* BRITISH COLUMBIA, The outer west coast of Vancouver Island and the Juan de Fuca strait coast

* BRITISH COLUMBIA, The north coast and Haida Gwaii and the central coast and northeast Vancouver Island

* 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)

For other US and Canadian Pacific coasts in North America, the level of tsunami danger is being evaluated. Further information will be provided in supplementary messages.

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			
Sand Point	1310 AKDT Mar 24		less than 1ft
Homer	1335 AKDT Mar 24		less than 1ft
Cold Bay	1350 AKDT Mar 24		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
Winter Harbour BC	1021 PDT Mar 24	2.5ft
Tofino British Columbia	1343 PDT Mar 24	1.9ft
DART 46404 US	1020 PDT Mar 24	2.3ft
Neah Bay Washington	1306 PDT Mar 24	2.2ft
DART 46407 US	1337 PDT Mar 24	0.2ft
Westport South Bay WA	1320 PDT Mar 24	0.3ft
Port Angeles Washington	1331 PDT Mar 24	1.3ft
Charleston Oregon	1308 PDT Mar 24	1.0ft
Port Orford Oregon	1145 PDT Mar 24	0.3ft
Port Townsend WA	1324 PDT Mar 24	1.0ft
DART 46411 US	1413 PDT Mar 24	0.1ft
Crescent City CA	1245 PDT Mar 24	1.0ft
Humboldt Bay California	1440 PDT Mar 24	2.2ft
Sitka Alaska	1353 PDT Mar 24	1.0ft
DART 46410 US	1117 PDT Mar 24	0.4ft
Elfin Cove Alaska	1403 PDT Mar 24	0.6ft
Arena Cove California	1204 PDT Mar 24	0.4ft
Seattle Washington	1423 PDT Mar 24	2.2ft
DART 46409 US	1041 PDT Mar 24	0.7ft
Point Reyes California	1342 PDT Mar 24	1.1ft
Monterey California	1436 PDT Mar 24	1.1ft
Bolinas Lagoon CA	1404 PDT Mar 24	1.0ft
San Francisco CA	1421 PDT Mar 24	1.1ft
Yakutat Alaska	1312 PDT Mar 24	0.6ft
Port San Luis CA	1251 PDT Mar 24	0.4ft
DART 46412 US	1222 PDT Mar 24	0.2ft
Alameda California	1405 PDT Mar 24	0.3ft
Santa Barbara CA	1442 PDT Mar 24	1.9ft
Seward Alaska	1339 PDT Mar 24	0.8ft
Kodiak Alaska	1359 PDT Mar 24	0.7ft
Santa Monica California	1412 PDT Mar 24	0.5ft
Ventura California	1355 PDT Mar 24	0.2ft
Los Angeles Harbor CA	1404 PDT Mar 24	0.2ft
Valdez Alaska	1424 PDT Mar 24	0.4ft
San Diego Harbor Ent. CA	1420 PDT Mar 24	0.2ft

Cordova Alaska	1443	PDT Mar 24	0.6ft
La Jolla California	1418	PDT Mar 24	0.2ft
DART 46408 US	1302	PDT Mar 24	0.2ft
Sand Point Alaska	1447	PDT Mar 24	0.7ft
Nikolski Alaska	1445	PDT Mar 24	0.1ft
DART 46413 US	1222	PDT Mar 24	0.2ft
Seldovia Alaska	1451	PDT Mar 24	0.2ft

PRELIMINARY EARTHQUAKE PARAMETERS
---

* Magnitude 8.5
* Origin Time 0900 AKDT Mar 24 2021
  1000 PDT Mar 24 2021
  1700 UTC Mar 24 2021
* Coordinates 50.0 North 127.5 West
* Depth 9 miles
* Location 20 miles SW of Port Alice, British Columbia
  290 miles NW of Seattle, Washington

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 60 minutes.

$$

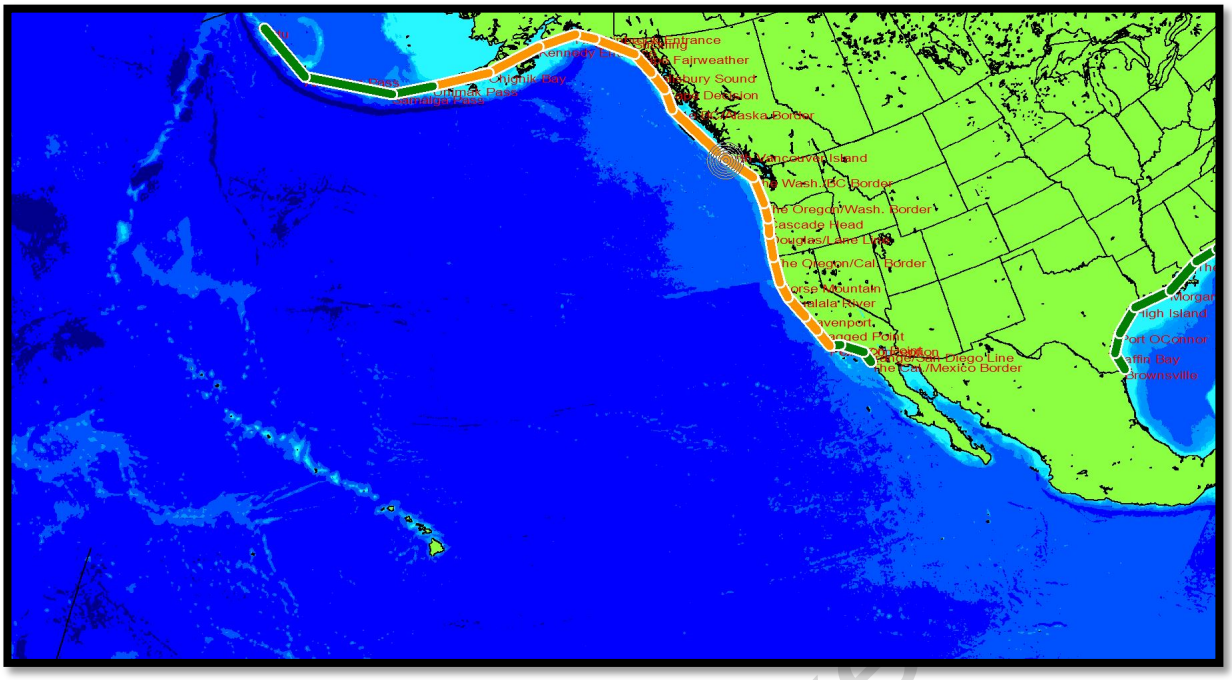

Figure D4: Cancellation of Warning areas for Bulletin 8 (orange is advisory and green is information only).

NTWC Bulletin #9

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WEAK51 PAAQ 262301
TSUAK1

BULLETIN
Public Tsunami Message Number 9
NWS National Tsunami Warning Center Palmer AK
401 PM PDT Wed Mar 24 2021

UPDATES
-------
 * Updated observations


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



Tsunami Advisory in Effect for;

 * CALIFORNIA, The coast from Point Conception, California 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

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

* 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)

For other US and Canadian Pacific coasts in North America, the level of tsunami danger is being evaluated. Further information will be provided in supplementary messages.

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
Winter Harbour BC	1021 PDT Mar 24	2.5ft
Tofino British Columbia	1343 PDT Mar 24	1.9ft
DART 46419 US	1543 PDT Mar 24	3.9ft
DART 46404 US	1020 PDT Mar 24	2.3ft
Neah Bay Washington	1306 PDT Mar 24	2.2ft
DART 46407 US	1337 PDT Mar 24	0.2ft
Westport South Bay WA	1520 PDT Mar 24	0.7ft
Port Angeles Washington	1521 PDT Mar 24	1.5ft
Charleston Oregon	1308 PDT Mar 24	1.0ft
Port Orford Oregon	1145 PDT Mar 24	0.3ft
Port Townsend WA	1523 PDT Mar 24	1.3ft
DART 46411 US	1413 PDT Mar 24	0.1ft
Crescent City CA	1518 PDT Mar 24	1.1ft
Humboldt Bay California	1440 PDT Mar 24	2.2ft
Sitka Alaska	1353 PDT Mar 24	1.0ft
DART 46410 US	1117 PDT Mar 24	0.4ft
Elfin Cove Alaska	1403 PDT Mar 24	0.6ft
Arena Cove California	1204 PDT Mar 24	0.4ft
Seattle Washington	1423 PDT Mar 24	2.2ft
DART 46409 US	1041 PDT Mar 24	0.7ft
Point Reyes California	1535 PDT Mar 24	1.2ft
Monterey California	1436 PDT Mar 24	1.1ft
Bolinas Lagoon CA	1509 PDT Mar 24	1.1ft
DART 46403 US	1555 PDT Mar 24	3.1ft
San Francisco CA	1421 PDT Mar 24	1.1ft
Yakutat Alaska	1554 PDT Mar 24	1.8ft
Port San Luis CA	1528 PDT Mar 24	0.9ft
DART 46412 US	1222 PDT Mar 24	0.2ft
Alameda California	1405 PDT Mar 24	0.3ft
Santa Barbara CA	1442 PDT Mar 24	1.9ft
DART 46402 US	1547 PDT Mar 24	1.5ft
Seward Alaska	1339 PDT Mar 24	0.8ft

Kodiak Alaska	1500	PDT Mar 24	0.9ft
Santa Monica California	1519	PDT Mar 24	1.0ft
Ventura California	1524	PDT Mar 24	0.6ft
Los Angeles Harbor CA	1404	PDT Mar 24	0.2ft
Valdez Alaska	1424	PDT Mar 24	0.4ft
San Diego Harbor Ent. CA	1420	PDT Mar 24	0.2ft
Cordova Alaska	1443	PDT Mar 24	0.6ft
La Jolla California	1542	PDT Mar 24	0.3ft
DART 46408 US	1302	PDT Mar 24	0.2ft
San Diego California	1543	PDT Mar 24	0.3ft
Sand Point Alaska	1447	PDT Mar 24	0.7ft
Akutan Alaska	1521	PDT Mar 24	0.1ft
Nikolski Alaska	1550	PDT Mar 24	0.2ft
DART 46413 US	1222	PDT Mar 24	0.2ft
Seldovia Alaska	1557	PDT Mar 24	0.4ft
Adak Alaska	1514	PDT Mar 24	0.1ft
Haleiwa Hawaii	1552	PDT Mar 24	5.6ft
Hilo Hawaii	1546	PDT Mar 24	0.9ft
Kahului Hawaii	1558	PDT Mar 24	0.7ft
Honolulu Hawaii	1556	PDT Mar 24	4.4ft
Kawaihae Hawaii	1554	PDT Mar 24	3.9ft
Midway Island UM	1504	PDT Mar 24	0.2ft
DART 52401 West Pacific	1543	PDT Mar 25	0.1ft

PRELIMINARY EARTHQUAKE PARAMETERS

* Magnitude 8.5
* Origin Time 0900 AKDT Mar 24 2021
  1000 PDT Mar 24 2021
  1700 UTC Mar 24 2021
* Coordinates 50.0 North 127.5 West
* Depth 9 miles
* Location 20 miles SW of Port Alice, British Columbia
  290 miles NW of Seattle, Washington

RECOMMENDED ACTIONS

* See message number 8 for recommended actions.

IMPACTS

* See message number 8 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 60 minutes.

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NTWC Bulletin #10

WEAK51 PAAQ 270003
TSUAK1

BULLETIN
Public Tsunami Message Number 10
NWS National Tsunami Warning Center Palmer AK
503 PM PDT Wed Mar 24 2021

...THE TSUNAMI ADVISORY IS CANCELLED...

* The Tsunami Advisory is canceled for the coastal areas of California, Oregon, Washington, British Columbia, Southeast Alaska and 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
Winter Harbour BC	1021 PDT Mar 24	2.5ft
Tofino British Columbia	1343 PDT Mar 24	1.9ft
DART 46419 US	1605 PDT Mar 24	7.5ft
DART 46404 US	1020 PDT Mar 24	2.3ft
Neah Bay Washington	1306 PDT Mar 24	2.2ft
DART 46407 US	1337 PDT Mar 24	0.2ft
Westport South Bay WA	1520 PDT Mar 24	0.7ft
Port Angeles Washington	1645 PDT Mar 24	1.5ft
Charleston Oregon	1308 PDT Mar 24	1.0ft
Port Orford Oregon	1145 PDT Mar 24	0.3ft
Port Townsend WA	1523 PDT Mar 24	1.3ft
DART 46411 US	1413 PDT Mar 24	0.1ft
Crescent City CA	1518 PDT Mar 24	1.1ft
Humboldt Bay California	1440 PDT Mar 24	2.2ft
Sitka Alaska	1600 PDT Mar 24	1.2ft
DART 46410 US	1117 PDT Mar 24	0.4ft
Elfin Cove Alaska	1403 PDT Mar 24	0.6ft
Arena Cove California	1204 PDT Mar 24	0.4ft
Seattle Washington	1610 PDT Mar 24	3.1ft
DART 46409 US	1041 PDT Mar 24	0.7ft
Point Reyes California	1646 PDT Mar 24	1.5ft
Monterey California	1436 PDT Mar 24	1.1ft
Bolinas Lagoon CA	1621 PDT Mar 24	1.5ft
DART 46403 US	1654 PDT Mar 24	4.3ft
San Francisco CA	1645 PDT Mar 24	1.4ft
Yakutat Alaska	1554 PDT Mar 24	1.8ft
Port San Luis CA	1528 PDT Mar 24	0.9ft
DART 46412 US	1222 PDT Mar 24	0.2ft
Alameda California	1630 PDT Mar 24	0.4ft
Santa Barbara CA	1442 PDT Mar 24	1.9ft
DART 46402 US	1612 PDT Mar 24	3.0ft

Seward Alaska	1339 PDT Mar 24		0.8ft
Kodiak Alaska	1500 PDT Mar 24		0.9ft
Santa Monica California	1519 PDT Mar 24		1.0ft
Ventura California	1524 PDT Mar 24		0.6ft
Los Angeles Harbor CA	1601 PDT Mar 24		0.3ft
Valdez Alaska	1424 PDT Mar 24		0.4ft
San Diego Harbor Ent. CA	1420 PDT Mar 24		0.2ft
Cordova Alaska	1443 PDT Mar 24		0.6ft
La Jolla California	1542 PDT Mar 24		0.3ft
DART 46408 US	1302 PDT Mar 24		0.2ft
San Diego California	1543 PDT Mar 24		0.3ft
Sand Point Alaska	1447 PDT Mar 24		0.7ft
Akutan Alaska	1521 PDT Mar 24		0.1ft
King Cove Alaska	1606 PDT Mar 24		0.3ft
Nikolski Alaska	1550 PDT Mar 24		0.2ft
DART 46413 US	1222 PDT Mar 24		0.2ft
Seldovia Alaska	1557 PDT Mar 24		0.4ft
Adak Alaska	1602 PDT Mar 24		0.3ft
Shemya Alaska	1610 PDT Mar 24		0.1ft
Haleiwa Hawaii	1552 PDT Mar 24		5.6ft
Nawiliwili Hawaii	1643 PDT Mar 24		0.8ft
Hilo Hawaii	1623 PDT Mar 24		1.5ft
Kahului Hawaii	1558 PDT Mar 24		0.7ft
Honolulu Hawaii	1638 PDT Mar 24		5.7ft
Kawaihae Hawaii	1554 PDT Mar 24		3.9ft
Midway Island UM	1504 PDT Mar 24		0.2ft
DART 52401 West Pacific	1543 PDT Mar 25		0.1ft

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

IMPACTS - UPDATED
---

* 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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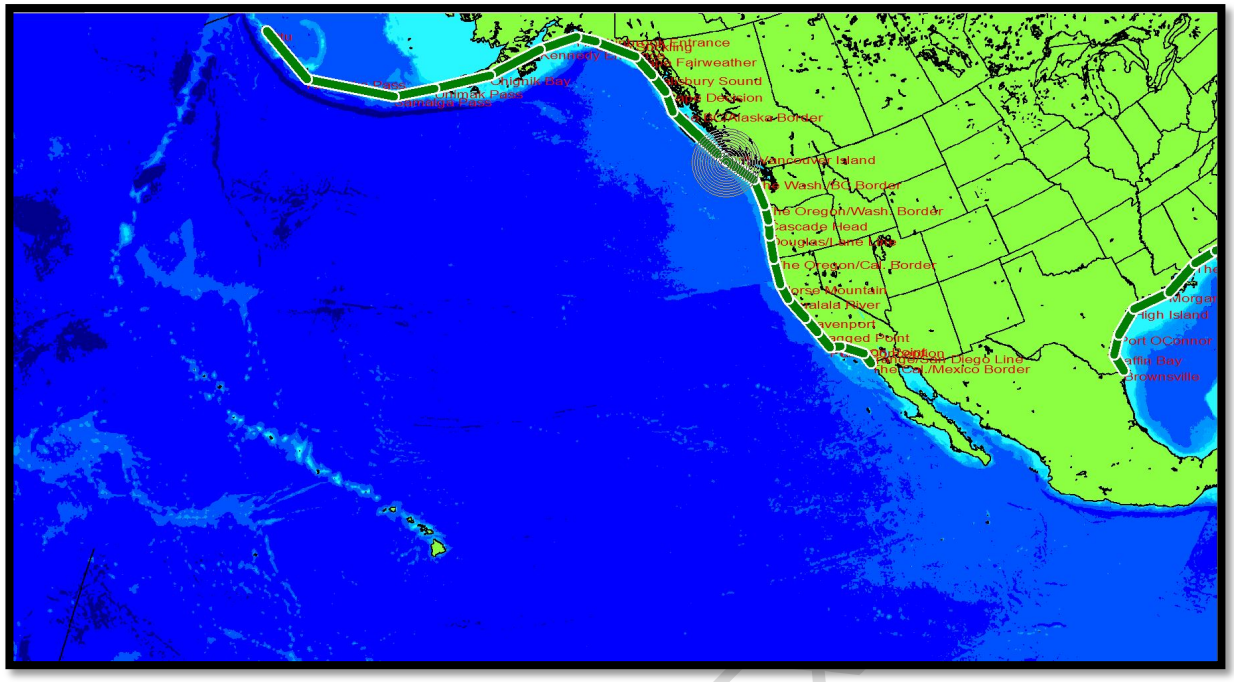

Figure D5: Cancellation of Advisory areas for Bulletin 10 (green is information only).

NTWC Spanish Bulletin #1

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WEAK61 PAAQ 261702
TSUSPN

BULLETIN
Mensaje de Tsunami numero 1
NWS Centro Nacional de Alerta de Tsunami Palmer AK
1002 AM PDT Wed Mar 24 2021

...UN AVISO DE TSUNAMI ESTA AHORA EN EFECTO...


...UNA ADVERTENCIA DE TSUNAMI ESTA AHORA EN EFECTO...


Aviso de Tsunami en Efecto para;

 * CALIFORNIA, Areas costeras desde Point Conception,
   California hasta The Oregon/Cal. Border  incluso la bahia
   de San Francisco

 * OREGON, Areas costeras desde The Oregon/Cal. Border  hasta
   The Oregon/Wash. Border  incluso la costa de el estuario de
   Rio de Colombia

 * WASHINGTON, la costa exterior de la frontera de
   Oregon/Washington a Slip Point, la costa de el estuario de
   Rio de Colombia, y la costa del estrecho de la Juan de Fuca

 * BRITISH COLUMBIA, La costa del norte y Haida Gwaii... la
   costa central y Isla de Vancouver de nordeste... la costa
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de oeste exteror de Isla de Vancouver... la costa del Estrecho de la Juan de Fuca

Advertencia de Tsunami en Efecto para;

* SOUTHEAST ALASKA, La costa interior y exterior desde The BC/Alaska Border hasta Cape Fairweather, Alaska (80 miles SE of Yakutat)

* SOUTH ALASKA AND THE ALASKA PENINSULA, Costas Pacificas desde Cape Fairweather, Alaska (80 miles SE of Yakutat) hasta Unimak Pass, Alaska (80 miles NE of Unalaska)

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, el nivel de amenaza de tsunami esta siendo evaluado. Se proveera informacion adicional en mensajeS suplementarios.

PARAMETROS PRELIMINARES DEL TERREMOTO

* LOS SIGUIENTES PARAMETROS ESTAN BASADOS EN UNA EVALUACION PRELIMINAR RAPIDA Y PUEDEN VARIAR.

* Magnitud	8.5
* Tiempo de Origen	0900 AKDT Mar 24 2021
	1000 PDT Mar 24 2021
	1700 UTC Mar 24 2021
* Coordenadas	50.0 Norte 127.5 Oeste
* Profundidad	9 millas
* Localizacion	20 millas SW de Port Alice, British Columbia
	290 millas NW de Seattle, Washington

PRONOSTICOS DEL TSUNAMI

* Se pronostica que la actividad del tsunami comience en los siguientes puntos a loas horas indicadas.

LUGAR	LLEGADA PRONOSTICADA DEL TSUNAMI
* British Columbia	
Tofino	1010 PDT Mar 24
Langara	1110 PDT Mar 24
* Washington	
La Push	1050 PDT Mar 24
Neah Bay	1050 PDT Mar 24
Moclips	1105 PDT Mar 24
Long Beach	1105 PDT Mar 24
Westport	1110 PDT Mar 24
Port Angeles	1110 PDT Mar 24

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Port Townsend    1135  PDT Mar 24

 * Oregon
Seaside          1115  PDT Mar 24
Charleston       1125  PDT Mar 24
Port Orford      1125  PDT Mar 24
Newport          1125  PDT Mar 24
Brookings        1140  PDT Mar 24

 * California
Crescent City    1145  PDT Mar 24
Fort Bragg       1200  PDT Mar 24
Monterey         1235  PDT Mar 24
San Francisco    1255  PDT Mar 24
Port San Luis    1300  PDT Mar 24

 * Alaska
Sitka            1055 AKDT Mar 24
Elfin Cove       1105 AKDT Mar 24
Craig            1125 AKDT Mar 24
Yakutat          1155 AKDT Mar 24
Seward           1230 AKDT Mar 24
Kodiak           1230 AKDT Mar 24
Valdez           1245 AKDT Mar 24
Cordova          1250 AKDT Mar 24
Sand Point       1310 AKDT Mar 24
Homer            1335 AKDT Mar 24
Cold Bay         1350 AKDT Mar 24


OBSERVACIONES DEL TSUNAMI
-------------------------
 * No hay observaciones del tsunami disponibles para reportar.


ACCIONES RECOMENDADAS
---------------------
Las acciones para proteger la vida y propiedad pueden
variar dentro de las areas de aviso y las areas de
advertencia de tsunami.

Si usted esta en un area de aviso;

 * Desaloje tierra adentro o a un lugar alto fuera de la zona
   de inundacion por tsunami o muevase a un piso alto de un
   edificio multipiso segun sea su situacion.

Si usted esta en un area de aviso o advertencia;

 * Salgase del agua, de la playa y alejese de puertos,
   marinas, bahias, ensenadas y rompeolas.

 * Este alerta y siga las instrucciones de los oficiales
   locales de manejo de emergencia ya que ellos pueden tener
   informacion mas detallada o especifica para su ubicacion.

 * Si siente un terremoto fuerte y/o  prolongado tome
   inmediatamente acciones de seguridad como moverse tierra
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adentro y/o hacia un lugar alto preferiblemente a pie.

* Operadores de botes,
    * Cuando el tiempo y las condiciones lo permitan mueva su bote mar adentro a una profundidad de al menos 180 pies.

    * Si esta navegando evite entrar a aguas someras/llanas, puertos, marinas, bahias, y ensenadas para evitar corrientes fuertes y objetos flotantes o sumergidos.

* No vaya a la costa para observar el tsunami.

* No regrese a la costa hasta que los oficiales locales de manejo de emergencia local indiquen que es seguro hacerlo.

IMPACTOS

Los impactos pueden variar en diferentes lugares dentro de las areas de aviso y las areas de advertencia.

Si usted esta en un area de aviso;

* Es posible un tsunami con olas destructivas y corrientes fuertes.

* Posibles inundaciones costeras repetidas cuando las olas lleguen a la costa, se mueven tierra adentro, y retroceden al oceano.

* Olas fuertes e inusuales, corrientes e inundaciones pueden ahogar o herir personas y debilitar o destruir estructuras en tierra y dentro del agua.

* Agua con objetos flotantes o sumergidos pueden herir o causar la muerte a personas o destruir edificios y puentes.

* Corrientes y olas fuertes e inusuales en puertos, marinas, bahias, y ensenadas pueden ser especialmente destructivas.

Si usted esta en un area de advertencia;

* Un tsunami con olas y corrientes fuertes puede ser posible.

* Olas y corrientes pueden ahogar o herir personas que se encuentran en el agua.

* Corrientes en playas y puertos, marinas, bahias, y ensenadas pueden ser especialmente peligrosas.

Si usted esta en un area de aviso o advertencia;

* Algunos impactos pueden continuar por muchas horas hasta dias luego de la llegada de la primera ola.

* La primera ola puede no ser la mas grande las olas

posteriores si.

* Cada ola puede durar de 5 a 45 minutos entre su embate y retroceso.

* Costas con frente en todas las direcciones pueden estar en peligro porque las olas pueden dar la vuelta a islas y entrar a bahias.

* Movimiento fuerte y/o prolongado del suelo indica que un terremoto ha ocurrido un tsunami puede haber sido generado y su llegada inminente.

* Un rapido retroceso de la linea de costa, olas y sonidos inusiales, y fuertes corrientes son senales de un tsunami.

* El tsunami puede aparecer como agua moviendose rapidamente hacia mar adentro, una marea suave que se eleva rapidamente sin olas rompientes, como una serie de olas rompientes, o una pared de agua espumosa.

INFORMACION ADICIONAL Y PROXIMA ACTUALIZACION
---

* Para acceder a informacion adicional consulte el sitio de internet tsunami.gov.

* Regiones costeras del Pacifico fuera de California, Oregon, Washington, Columbia Britanica y Alaska deben referirse a los mensanjes del Centro de Alerta de Tsunami del Pacifico en tsunami.gov.

* Este mensaje sera actualizado en 30 minutos.

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NTWC Spanish Bulletin #2

WEAK61 PAAQ 261731
TSUSPN

BULLETIN
Mensaje de Tsunami numero 2
NWS Centro Nacional de Alerta de Tsunami Palmer AK
1031 AM PDT Wed Mar 24 2021

ACTUALIZACIONES
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* Un tsunami ha sido confirmado y se esperan algunas impactos
* Nuevas observaciones

...EL AVISO DE TSUNAMI PERMANECE EN EFECTO...

...LA ADVERTENCIA DE TSUNAMI PERMANECE EN EFECTO...

Aviso de Tsunami en Efecto para;

* CALIFORNIA, Areas costeras desde Point Conception, California hasta The Oregon/Cal. Border incluso la bahia de San Francisco

* OREGON, Areas costeras desde The Oregon/Cal. Border hasta The Oregon/Wash. Border incluso la costa de el estuario de Rio de Colombia

* WASHINGTON, la costa exterior de la frontera de Oregon/Washington a Slip Point, la costa de el estuario de Rio de Colombia, y la costa del estrecho de la Juan de Fuca

* BRITISH COLUMBIA, La costa del norte y Haida Gwaii... la costa central y Isla de Vancouver de nordeste... la costa de oeste exteror de Isla de Vancouver... la costa del Estrecho de la Juan de Fuca

Advertencia de Tsunami en Efecto para;

* SOUTHEAST ALASKA, La costa interior y exterior desde The BC/Alaska Border hasta Cape Fairweather, Alaska (80 miles SE of Yakutat)

* SOUTH ALASKA AND THE ALASKA PENINSULA, Costas Pacificas desde Cape Fairweather, Alaska (80 miles SE of Yakutat) hasta Unimak Pass, Alaska (80 miles NE of Unalaska)

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, el nivel de amenaza de tsunami esta siendo evaluado. Se proveera informacion adicional en mensajeS suplementarios.

PARAMETROS PRELIMINARES DEL TERREMOTO
---

* LOS SIGUIENTES PARAMETROS ESTAN BASADOS EN UNA EVALUACION PRELIMINAR RAPIDA Y PUEDEN VARIAR.

* Magnitud	8.5
* Tiempo de Origen	0900 AKDT Mar 24 2021
	1000 PDT Mar 24 2021
	1700 UTC Mar 24 2021
* Coordenadas	50.0 Norte 127.5 Oeste
* Profundidad	9 millas
* Localizacion	20 millas SW de Port Alice, British Columbia
	290 millas NW de Seattle, Washington

PRONOSTICOS DEL TSUNAMI
---

* Se pronostica que la actividad del tsunami comience en los siguientes puntos a loas horas indicadas.

LUGAR	LLEGADA PRONOSTICADA DEL TSUNAMI
* British Columbia	
Tofino	1010 PDT Mar 24
Langara	1110 PDT Mar 24
* Washington	
La Push	1050 PDT Mar 24
Neah Bay	1050 PDT Mar 24
Moclips	1105 PDT Mar 24
Long Beach	1105 PDT Mar 24
Westport	1110 PDT Mar 24
Port Angeles	1110 PDT Mar 24
Port Townsend	1135 PDT Mar 24
* Oregon	
Seaside	1115 PDT Mar 24
Charleston	1125 PDT Mar 24
Port Orford	1125 PDT Mar 24
Newport	1125 PDT Mar 24
Brookings	1140 PDT Mar 24
* California	
Crescent City	1145 PDT Mar 24
Fort Bragg	1200 PDT Mar 24
Monterey	1235 PDT Mar 24
San Francisco	1255 PDT Mar 24
Port San Luis	1300 PDT Mar 24
* Alaska	
Sitka	1055 AKDT Mar 24
Elfin Cove	1105 AKDT Mar 24
Craig	1125 AKDT Mar 24
Yakutat	1155 AKDT Mar 24
Seward	1230 AKDT Mar 24
Kodiak	1230 AKDT Mar 24
Valdez	1245 AKDT Mar 24
Cordova	1250 AKDT Mar 24
Sand Point	1310 AKDT Mar 24
Homer	1335 AKDT Mar 24
Cold Bay	1350 AKDT Mar 24

OBSERVACIONES DEL TSUNAMI - ACTUALIZADAS

* La altura maxima observada del tsunami es el nivel de agua mas alto registrado sobre el nivel de la marea hasta la emision de este mensaje.

LUGAR	HORA DE LA MEDICION	ALTURA MAX OBSERVADA DEL TSUNAMI
Winter Harbour BC	1021 PDT Mar 24	2.5ft
DART 46404 US	1020 PDT Mar 24	2.3ft

ACCIONES RECOMENDADAS

Las acciones para proteger la vida y propiedad pueden variar dentro de las areas de aviso y las areas de advertencia de tsunami.

Si usted esta en un area de aviso;

* Desaloje tierra adentro o a un lugar alto fuera de la zona de inundacion por tsunami o muevase a un piso alto de un edificio multipiso segun sea su situacion.

Si usted esta en un area de aviso o advertencia;

* Salgase del agua, de la playa y alejese de puertos, marinas, bahias, ensenadas y rompeolas.

* Este alerta y siga las instrucciones de los oficiales locales de manejo de emergencia ya que ellos pueden tener informacion mas detallada o especifica para su ubicacion.

* Si siente un terremoto fuerte y/o prolongado tome inmediatamente acciones de seguridad como moverse tierra adentro y/o hacia un lugar alto preferiblemente a pie.

* Operadores de botes,
    * Cuando el tiempo y las condiciones lo permitan mueva su bote mar adentro a una profundidad de al menos 180 pies.

    * Si esta navegando evite entrar a aguas someras/llanas, puertos, marinas, bahias, y ensenadas para evitar corrientes fuertes y objetos flotantes o sumergidos.

* No vaya a la costa para observar el tsunami.

* No regrese a la costa hasta que los oficiales locales de manejo de emergencia local indiquen que es seguro hacerlo.

IMPACTOS

Los impactos pueden variar en diferentes lugares dentro de las areas de aviso y las areas de advertencia.

Si usted esta en un area de aviso;

* Es posible un tsunami con olas destructivas y corrientes fuertes.

* Posibles inundaciones costeras repetidas cuando las olas lleguen a la costa, se mueven tierra adentro, y retroceden al oceano.

* Olas fuertes e inusuales, corrientes e inundaciones pueden ahogar o herir personas y debilitar o destruir estructuras en tierra y dentro del agua.

* Agua con objetos flotantes o sumergidos pueden herir o causar la muerte a personas o destruir edificios y puentes.

* Corrientes y olas fuertes e inusuales en puertos, marinas, bahias, y ensenadas pueden ser especialmente destructivas.

Si usted esta en un area de advertencia;

* Un tsunami con olas y corrientes fuertes puede ser posible.

* Olas y corrientes pueden ahogar o herir personas que se encuentran en el agua.

* Corrientes en playas y puertos, marinas, bahias, y ensenadas pueden ser especialmente peligrosas.

Si usted esta en un area de aviso o advertencia;

* Algunos impactos pueden continuar por muchas horas hasta dias luego de la llegada de la primera ola.

* La primera ola puede no ser la mas grande las olas posteriores si.

* Cada ola puede durar de 5 a 45 minutos entre su embate y retroceso.

* Costas con frente en todas las direcciones pueden estar en peligro porque las olas pueden dar la vuelta a islas y entrar a bahias.

* Movimiento fuerte y/o prolongado del suelo indica que un terremoto ha ocurrido un tsunami puede haber sido generado y su llegada inminente.

* Un rapido retroceso de la linea de costa, olas y sonidos inusiales, y fuertes corrientes son senales de un tsunami.

* El tsunami puede aparecer como agua moviendose rapidamente hacia mar adentro, una marea suave que se eleva rapidamente sin olas rompientes, como una serie de olas rompientes, o una pared de agua espumosa.

INFORMACION ADICIONAL Y PROXIMA ACTUALIZACION
---

* Para acceder a informacion adicional consulte el sitio de internet tsunami.gov.

* Regiones costeras del Pacifico fuera de California, Oregon, Washington, Columbia Britanica y Alaska deben referirse a los mensanjes del Centro de Alerta de Tsunami del Pacifico en tsunami.gov.

* Este mensaje sera actualizado en 30 minutos.

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NTWC Spanish Bulletin #3

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WEAK61 PAAQ 261802
TSUSPN

BULLETIN
Mensaje de Tsunami numero 3
NWS Centro Nacional de Alerta de Tsunami Palmer AK
1102 AM PDT Wed Mar 24 2021

ACTUALIZACIONES
---------------
 * Un tsunami ha sido confirmado y se esperan algunas impactos
 * Nuevas observaciones
 * Modifica las regiones bajo alerta


...EL AVISO DE TSUNAMI PERMANECE EN EFECTO...


...LA ADVERTENCIA DE TSUNAMI PERMANECE EN EFECTO...


Aviso de Tsunami en Efecto para;

 * OREGON, Areas costeras desde Douglas/Lane Line, Oregon (10
   miles SW of Florence) hasta The Oregon/Wash. Border
    incluso la costa de el estuario de Rio de Colombia

 * WASHINGTON, la costa exterior de la frontera de
   Oregon/Washington a Slip Point, la costa de el estuario de
   Rio de Colombia, y la costa del estrecho de la Juan de Fuca

 * BRITISH COLUMBIA, La costa del norte y Haida Gwaii... la
   costa central y Isla de Vancouver de nordeste... la costa
   de oeste exteror de Isla de Vancouver... la costa del
   Estrecho de la Juan de Fuca


Advertencia de Tsunami en Efecto para;

 * CALIFORNIA, Areas costeras desde Point Conception,
   California hasta The Oregon/Cal. Border  incluso la bahia
   de San Francisco

 * OREGON, Areas costeras desde The Oregon/Cal. Border  hasta
   Douglas/Lane Line, Oregon (10 miles SW of Florence)

 * SOUTHEAST ALASKA, La costa interior y exterior desde The
   BC/Alaska Border  hasta Cape Fairweather, Alaska (80 miles
   SE of Yakutat)

 * SOUTH ALASKA AND THE ALASKA PENINSULA, Costas Pacificas
   desde Cape Fairweather, Alaska (80 miles SE of Yakutat)
   hasta Unimak Pass, Alaska (80 miles NE of Unalaska)
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Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, el nivel de amenaza de tsunami esta siendo evaluado. Se proveera informacion adicional en mensajeS suplementarios.

PRONOSTICOS DEL TSUNAMI
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* Se pronostica que la actividad del tsunami comience en los siguientes puntos a loas horas indicadas.

LUGAR	LLEGADA PRONOSTICADA DEL TSUNAMI
* British Columbia	
Tofino	1010 PDT Mar 24
Langara	1110 PDT Mar 24
* Washington	
La Push	1050 PDT Mar 24
Neah Bay	1050 PDT Mar 24
Moclips	1105 PDT Mar 24
Long Beach	1105 PDT Mar 24
Westport	1110 PDT Mar 24
Port Angeles	1110 PDT Mar 24
Port Townsend	1135 PDT Mar 24
* Oregon	
Seaside	1115 PDT Mar 24
Charleston	1125 PDT Mar 24
Port Orford	1125 PDT Mar 24
Newport	1125 PDT Mar 24
Brookings	1140 PDT Mar 24
* California	
Crescent City	1145 PDT Mar 24
Fort Bragg	1200 PDT Mar 24
Monterey	1235 PDT Mar 24
San Francisco	1255 PDT Mar 24
Port San Luis	1300 PDT Mar 24
* Alaska	
Sitka	1055 AKDT Mar 24
Elfin Cove	1105 AKDT Mar 24
Craig	1125 AKDT Mar 24
Yakutat	1155 AKDT Mar 24
Seward	1230 AKDT Mar 24
Kodiak	1230 AKDT Mar 24
Valdez	1245 AKDT Mar 24
Cordova	1250 AKDT Mar 24
Sand Point	1310 AKDT Mar 24
Homer	1335 AKDT Mar 24
Cold Bay	1350 AKDT Mar 24

OBSERVACIONES DEL TSUNAMI - ACTUALIZADAS
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* La altura maxima observada del tsunami es el nivel de agua mas alto registrado sobre el nivel de la marea hasta la emision de este mensaje.

LUGAR	HORA DE LA MEDICION	ALTURA MAX OBSERVADA DEL TSUNAMI
Winter Harbour BC	1021 PDT Mar 24	2.5ft
Tofino British Columbia	1040 PDT Mar 24	0.8ft
DART 46404 US	1020 PDT Mar 24	2.3ft
DART 46409 US	1041 PDT Mar 24	0.7ft

PARAMETROS PRELIMINARES DEL TERREMOTO
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* Magnitud 8.5
* Tiempo de Origen 0900 AKDT Mar 24 2021
  1000 PDT Mar 24 2021
  1700 UTC Mar 24 2021
* Coordenadas 50.0 Norte 127.5 Oeste
* Profundidad 9 millas
* Localizacion 20 millas SW de Port Alice, British Columbia
  290 millas NW de Seattle, Washington

ACCIONES RECOMENDADAS

Las acciones para proteger la vida y propiedad pueden variar dentro de las areas de aviso y las areas de advertencia de tsunami.

Si usted esta en un area de aviso;

* Desaloje tierra adentro o a un lugar alto fuera de la zona de inundacion por tsunami o muevase a un piso alto de un edificio multipiso segun sea su situacion.

Si usted esta en un area de aviso o advertencia;

* Salgase del agua, de la playa y alejese de puertos, marinas, bahias, ensenadas y rompeolas.

* Este alerta y siga las instrucciones de los oficiales locales de manejo de emergencia ya que ellos pueden tener informacion mas detallada o especifica para su ubicacion.

* Si siente un terremoto fuerte y/o prolongado tome inmediatamente acciones de seguridad como moverse tierra adentro y/o hacia un lugar alto preferiblemente a pie.

* Operadores de botes,
  * Cuando el tiempo y las condiciones lo permitan mueva su bote mar adentro a una profundidad de al menos 180 pies.

    * Si esta navegando evite entrar a aguas someras/llanas, puertos, marinas, bahias, y ensenadas para evitar corrientes fuertes y objetos flotantes o sumergidos.

 * No vaya a la costa para observar el tsunami.

 * No regrese a la costa hasta que los oficiales locales de manejo de emergencia local indiquen que es seguro hacerlo.

IMPACTOS

Los impactos pueden variar en diferentes lugares dentro de las areas de aviso y las areas de advertencia.

Si usted esta en un area de aviso;

 * Es posible un tsunami con olas destructivas y corrientes fuertes.

 * Posibles inundaciones costeras repetidas cuando las olas lleguen a la costa, se mueven tierra adentro, y retroceden al oceano.

 * Olas fuertes e inusuales, corrientes e inundaciones pueden ahogar o herir personas y debilitar o destruir estructuras en tierra y dentro del agua.

 * Agua con objetos flotantes o sumergidos pueden herir o causar la muerte a personas o destruir edificios y puentes.

 * Corrientes y olas fuertes e inusuales en puertos, marinas, bahias, y ensenadas pueden ser especialmente destructivas.

Si usted esta en un area de advertencia;

 * Un tsunami con olas y corrientes fuertes puede ser posible.

 * Olas y corrientes pueden ahogar o herir personas que se encuentran en el agua.

 * Corrientes en playas y puertos, marinas, bahias, y ensenadas pueden ser especialmente peligrosas.

Si usted esta en un area de aviso o advertencia;

 * Algunos impactos pueden continuar por muchas horas hasta dias luego de la llegada de la primera ola.

 * La primera ola puede no ser la mas grande las olas posteriores si.

 * Cada ola puede durar de 5 a 45 minutos entre su embate y retroceso.

 * Costas con frente en todas las direcciones pueden estar en peligro porque las olas pueden dar la vuelta a islas

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   y entrar a bahias.

 * Movimiento fuerte y/o prolongado del suelo indica que un
   terremoto ha ocurrido un tsunami puede haber sido
   generado y su llegada inminente.

 * Un rapido retroceso de la linea de costa, olas y sonidos
   inusiales, y fuertes corrientes son senales de un tsunami.

 * El tsunami puede aparecer como agua moviendose rapidamente
   hacia mar adentro, una marea suave que se eleva  rapidamente
   sin olas rompientes, como una serie de olas rompientes,
   o una pared de agua espumosa.


INFORMACION ADICIONAL Y PROXIMA ACTUALIZACION
---------------------------------------------
 * Para acceder a informacion adicional consulte el sitio de
   internet tsunami.gov.

 * Regiones costeras del Pacifico fuera de California, Oregon,
   Washington, Columbia Britanica y Alaska deben referirse
   a los mensanjes del Centro de Alerta de Tsunami del Pacifico
   en tsunami.gov.

 * Este mensaje sera actualizado en 30 minutos.

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NTWC Spanish Bulletin #4

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WEAK61 PAAQ 261831
TSUSPN

BULLETIN
Mensaje de Tsunami numero 4
NWS Centro Nacional de Alerta de Tsunami Palmer AK
1131 AM PDT Wed Mar 24 2021

ACTUALIZACIONES
---------------
 * Nuevas observaciones


...EL AVISO DE TSUNAMI PERMANECE EN EFECTO...


...LA ADVERTENCIA DE TSUNAMI PERMANECE EN EFECTO...


Aviso de Tsunami en Efecto para;

 * OREGON, Areas costeras desde Douglas/Lane Line, Oregon (10
   miles SW of Florence) hasta The Oregon/Wash. Border
    incluso la costa de el estuario de Rio de Colombia

 * WASHINGTON, la costa exterior de la frontera de
   Oregon/Washington a Slip Point, la costa de el estuario de
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Rio de Colombia, y la costa del estrecho de la Juan de Fuca

* BRITISH COLUMBIA, La costa del norte y Haida Gwaii... la costa central y Isla de Vancouver de nordeste... la costa de oeste exteror de Isla de Vancouver... la costa del Estrecho de la Juan de Fuca

Advertencia de Tsunami en Efecto para;

* CALIFORNIA, Areas costeras desde Point Conception, California hasta The Oregon/Cal. Border incluso la bahia de San Francisco

* OREGON, Areas costeras desde The Oregon/Cal. Border hasta Douglas/Lane Line, Oregon (10 miles SW of Florence)

* SOUTHEAST ALASKA, La costa interior y exterior desde The BC/Alaska Border hasta Cape Fairweather, Alaska (80 miles SE of Yakutat)

* SOUTH ALASKA AND THE ALASKA PENINSULA, Costas Pacificas desde Cape Fairweather, Alaska (80 miles SE of Yakutat) hasta Unimak Pass, Alaska (80 miles NE of Unalaska)

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, el nivel de amenaza de tsunami esta siendo evaluado. Se proveera informacion adicional en mensajeS suplementarios.

PRONOSTICOS DEL TSUNAMI

* Se pronostica que la actividad del tsunami comience en los siguientes puntos a loas horas indicadas.

LUGAR	LLEGADA PRONOSTICADA DEL TSUNAMI
* British Columbia	
Langara	1110 PDT Mar 24
* Washington	
La Push	1050 PDT Mar 24
Neah Bay	1050 PDT Mar 24
Moclips	1105 PDT Mar 24
Long Beach	1105 PDT Mar 24
Westport	1110 PDT Mar 24
Port Angeles	1110 PDT Mar 24
Port Townsend	1135 PDT Mar 24
* Oregon	
Seaside	1115 PDT Mar 24
Charleston	1125 PDT Mar 24
Port Orford	1125 PDT Mar 24

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Newport          1125  PDT Mar 24
Brookings        1140  PDT Mar 24

 * California
Crescent City    1145  PDT Mar 24
Fort Bragg       1200  PDT Mar 24
Monterey         1235  PDT Mar 24
San Francisco    1255  PDT Mar 24
Port San Luis    1300  PDT Mar 24

 * Alaska
Sitka            1055 AKDT Mar 24
Elfin Cove       1105 AKDT Mar 24
Craig            1125 AKDT Mar 24
Yakutat          1155 AKDT Mar 24
Seward           1230 AKDT Mar 24
Kodiak           1230 AKDT Mar 24
Valdez           1245 AKDT Mar 24
Cordova          1250 AKDT Mar 24
Sand Point       1310 AKDT Mar 24
Homer            1335 AKDT Mar 24
Cold Bay         1350 AKDT Mar 24


OBSERVACIONES DEL TSUNAMI - ACTUALIZADAS
----------------------------------------
 * La altura maxima observada del tsunami es el nivel de agua
   mas alto registrado sobre el nivel de la marea hasta la
   emision de este mensaje.

                                  HORA            ALTURA MAX OBSERVADA
 LUGAR                          DE LA MEDICION         DEL TSUNAMI
 ---------------------------- ----------------       --------------
 Winter Harbour  BC           1021  PDT Mar 24           2.5ft
 Tofino  British Columbia     1040  PDT Mar 24           0.8ft
 DART 46404  US               1020  PDT Mar 24           2.3ft
 Neah Bay  Washington         1102  PDT Mar 24           1.6ft
 DART 46410  US               1117  PDT Mar 24           0.4ft
 DART 46409  US               1041  PDT Mar 24           0.7ft


PARAMETROS PRELIMINARES DEL TERREMOTO
-------------------------------------

 * Magnitud          8.5
 * Tiempo de Origen  0900 AKDT Mar 24 2021
                     1000  PDT Mar 24 2021
                     1700  UTC Mar 24 2021
 * Coordenadas       50.0 Norte 127.5 Oeste
 * Profundidad       9 millas
 * Localizacion      20 millas SW de Port Alice, British Columbia
                     290 millas NW de Seattle, Washington


ACCIONES RECOMENDADAS
---------------------
Las acciones para proteger la vida y propiedad pueden
variar dentro de las areas de aviso y las areas de
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advertencia de tsunami.

Si usted esta en un area de aviso;

* Desaloje tierra adentro o a un lugar alto fuera de la zona de inundacion por tsunami o muevase a un piso alto de un edificio multipiso segun sea su situacion.

Si usted esta en un area de aviso o advertencia;

* Salgase del agua, de la playa y alejese de puertos, marinas, bahias, ensenadas y rompeolas.

* Este alerta y siga las instrucciones de los oficiales locales de manejo de emergencia ya que ellos pueden tener informacion mas detallada o especifica para su ubicacion.

* Si siente un terremoto fuerte y/o prolongado tome inmediatamente acciones de seguridad como moverse tierra adentro y/o hacia un lugar alto preferiblemente a pie.

* Operadores de botes,
    * Cuando el tiempo y las condiciones lo permitan mueva su bote mar adentro a una profundidad de al menos 180 pies.

    * Si esta navegando evite entrar a aguas someras/llanas, puertos, marinas, bahias, y ensenadas para evitar corrientes fuertes y objetos flotantes o sumergidos.

* No vaya a la costa para observar el tsunami.

* No regrese a la costa hasta que los oficiales locales de manejo de emergencia local indiquen que es seguro hacerlo.

IMPACTOS

Los impactos pueden variar en diferentes lugares dentro de las areas de aviso y las areas de advertencia.

Si usted esta en un area de aviso;

* Es posible un tsunami con olas destructivas y corrientes fuertes.

* Posibles inundaciones costeras repetidas cuando las olas lleguen a la costa, se mueven tierra adentro, y retroceden al oceano.

* Olas fuertes e inusuales, corrientes e inundaciones pueden ahogar o herir personas y debilitar o destruir estructuras en tierra y dentro del agua.

* Agua con objetos flotantes o sumergidos pueden herir o causar la muerte a personas o destruir edificios y puentes.

* Corrientes y olas fuertes e inusuales en puertos,

marinas, bahias, y ensenadas pueden ser especialmente destructivas.

Si usted esta en un area de advertencia;

* Un tsunami con olas y corrientes fuertes puede ser posible.

* Olas y corrientes pueden ahogar o herir personas que se encuentran en el agua.

* Corrientes en playas y puertos, marinas, bahias, y ensenadas pueden ser especialmente peligrosas.

Si usted esta en un area de aviso o advertencia;

* Algunos impactos pueden continuar por muchas horas hasta dias luego de la llegada de la primera ola.

* La primera ola puede no ser la mas grande las olas posteriores si.

* Cada ola puede durar de 5 a 45 minutos entre su embate y retroceso.

* Costas con frente en todas las direcciones pueden estar en peligro porque las olas pueden dar la vuelta a islas y entrar a bahias.

* Movimiento fuerte y/o prolongado del suelo indica que un terremoto ha ocurrido un tsunami puede haber sido generado y su llegada inminente.

* Un rapido retroceso de la linea de costa, olas y sonidos inusiales, y fuertes corrientes son senales de un tsunami.

* El tsunami puede aparecer como agua moviendose rapidamente hacia mar adentro, una marea suave que se eleva rapidamente sin olas rompientes, como una serie de olas rompientes, o una pared de agua espumosa.

INFORMACION ADICIONAL Y PROXIMA ACTUALIZACION
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* Para acceder a informacion adicional consulte el sitio de internet tsunami.gov.

* Regiones costeras del Pacifico fuera de California, Oregon, Washington, Columbia Britanica y Alaska deben referirse a los mensanjes del Centro de Alerta de Tsunami del Pacifico en tsunami.gov.

* Este mensaje sera actualizado en 30 minutos.

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NTWC Spanish Bulletin #5

WEAK61 PAAQ 261902

TSUSPN

BULLETIN
Mensaje de Tsunami numero 5
NWS Centro Nacional de Alerta de Tsunami Palmer AK
1202 PM PDT Wed Mar 24 2021

ACTUALIZACIONES
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* Nuevas observaciones
* Modifica las regiones bajo alerta

...EL AVISO DE TSUNAMI PERMANECE EN EFECTO...

...LA ADVERTENCIA DE TSUNAMI PERMANECE EN EFECTO...

Aviso de Tsunami en Efecto para;

* WASHINGTON, la costa exterior de la frontera de Oregon/Washington a Slip Point, la costa de el estuario de Rio de Colombia, y la costa del estrecho de la Juan de Fuca

* BRITISH COLUMBIA, La costa de oeste exterior de Isla de Vancouver... la costa del Estrecho de la Juan de Fuca...

Advertencia de Tsunami en Efecto para;

* CALIFORNIA, Areas costeras desde Point Conception, California hasta The Oregon/Cal. Border incluso la bahia de San Francisco

* OREGON, Areas costeras desde The Oregon/Cal. Border hasta Douglas/Lane Line, Oregon (10 miles SW of Florence)

* OREGON, Areas costeras desde Douglas/Lane Line, Oregon (10 miles SW of Florence) hasta The Oregon/Wash. Border

* BRITISH COLUMBIA, La costa del norte y Haida Gwaii... la costa central y Isla de Vancouver de nordeste...

* SOUTHEAST ALASKA, La costa interior y exterior desde The BC/Alaska Border hasta Cape Fairweather, Alaska (80 miles SE of Yakutat)

* SOUTH ALASKA AND THE ALASKA PENINSULA, Costas Pacificas desde Cape Fairweather, Alaska (80 miles SE of Yakutat) hasta Unimak Pass, Alaska (80 miles NE of Unalaska)

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, el nivel de amenaza de tsunami esta siendo evaluado. Se proveera informacion adicional en mensajeS suplementarios.

PRONOSTICOS DEL TSUNAMI
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* Se ha generado un tsunami. las primeras olas del tsunami estan pronosticadas para llegar a los siguientes puntos a las horas indicadas.

* La duracion pronosticada del tsunami es el periodo aproximado de tiempo que se espera que el tsunami puede producir corrientes y olas peligrosas.

* La altura maxima de ola pronosticada es el nivel de agua mas alto esperado sobre el nivel de la marea.

* No se dan pronosticos para puntos que han sido impactados a mas de una hora antes de la emision de este mensaje.

LUGAR	LLEGADA PRONOSTICADA DEL TSUNAMI	PRONOSTICO DE DURACION DEL TSUNAMI	ALTURA MAX PRONOSTICADA DEL TSUNAMI
* British Columbia			
Langara	1110 PDT Mar 24		menos de 1pie
* Washington			
Moclips	1105 PDT Mar 24	9 hrs	0.8- 1.6 pie
Long Beach	1105 PDT Mar 24		menos de 1pie
Westport	1110 PDT Mar 24		menos de 1pie
Port Angeles	1110 PDT Mar 24	15 hrs	1.0- 1.8 pie
Port Townsend	1135 PDT Mar 24		menos de 1pie
* Oregon			
Seaside	1115 PDT Mar 24		
Charleston	1125 PDT Mar 24		menos de 1pie
Port Orford	1125 PDT Mar 24		menos de 1pie
Newport	1125 PDT Mar 24		
Brookings	1140 PDT Mar 24		menos de 1pie
* California			
Crescent City	1145 PDT Mar 24	9 hrs	0.8- 1.5 pie
Fort Bragg	1200 PDT Mar 24		menos de 1pie
Monterey	1235 PDT Mar 24		menos de 1pie
San Francisco	1255 PDT Mar 24		menos de 1pie
Port San Luis	1300 PDT Mar 24		menos de 1pie
* Alaska			
Sitka	1055 AKDT Mar 24		menos de 1pie
Elfin Cove	1105 AKDT Mar 24		menos de 1pie
Craig	1125 AKDT Mar 24		
Yakutat	1155 AKDT Mar 24		menos de 1pie
Seward	1230 AKDT Mar 24		menos de 1pie
Kodiak	1230 AKDT Mar 24		menos de 1pie
Valdez	1245 AKDT Mar 24		menos de 1pie
Cordova	1250 AKDT Mar 24		menos de 1pie
Sand Point	1310 AKDT Mar 24		menos de 1pie
Homer	1335 AKDT Mar 24		menos de 1pie
Cold Bay	1350 AKDT Mar 24		menos de 1pie

OBSERVACIONES DEL TSUNAMI - ACTUALIZADAS
---

* La altura maxima observada del tsunami es el nivel de agua mas alto registrado sobre el nivel de la marea hasta la emision de este mensaje.

LUGAR	HORA DE LA MEDICION	ALTURA MAX OBSERVADA DEL TSUNAMI
Winter Harbour BC	1021 PDT Mar 24	2.5ft
Tofino British Columbia	1159 PDT Mar 24	1.0ft
DART 46404 US	1020 PDT Mar 24	2.3ft
Neah Bay Washington	1102 PDT Mar 24	1.6ft
Port Angeles Washington	1151 PDT Mar 24	1.1ft
Charleston Oregon	1130 PDT Mar 24	0.9ft
Port Orford Oregon	1145 PDT Mar 24	0.3ft
Crescent City CA	1134 PDT Mar 24	0.6ft
DART 46410 US	1117 PDT Mar 24	0.4ft
DART 46409 US	1041 PDT Mar 24	0.7ft

PARAMETROS PRELIMINARES DEL TERREMOTO
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* Magnitud 8.5
* Tiempo de Origen 0900 AKDT Mar 24 2021
  1000 PDT Mar 24 2021
  1700 UTC Mar 24 2021
* Coordenadas 50.0 Norte 127.5 Oeste
* Profundidad 9 millas
* Localizacion 20 millas SW de Port Alice, British Columbia
  290 millas NW de Seattle, Washington

ACCIONES RECOMENDADAS
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* Ver mensaje numero 4 para acciones recomendadas.

IMPACTOS
---

* Ver mensaje numero 4 para posibles impactos.

INFORMACION ADICIONAL Y PROXIMA ACTUALIZACION
---

* Para acceder a informacion adicional consulte el sitio de internet tsunami.gov.

* Regiones costeras del Pacifico fuera de California, Oregon, Washington, Columbia Britanica y Alaska deben referirse a los mensanjes del Centro de Alerta de Tsunami del Pacifico en tsunami.gov.

* Este mensaje sera actualizado en 60 minutos.

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NTWC Spanish Bulletin #6

WEAK61 PAAQ 262002
TSUSPN

BULLETIN
Mensaje de Tsunami numero 6
NWS Centro Nacional de Alerta de Tsunami Palmer AK
102 PM PDT Wed Mar 24 2021

ACTUALIZACIONES
---
 * Nuevas observaciones

...EL AVISO DE TSUNAMI PERMANECE EN EFECTO...

...LA ADVERTENCIA DE TSUNAMI PERMANECE EN EFECTO...

Aviso de Tsunami en Efecto para;

 * WASHINGTON, la costa exterior de la frontera de
   Oregon/Washington a Slip Point, la costa de el estuario de
   Rio de Colombia, y la costa del estrecho de la Juan de Fuca

 * BRITISH COLUMBIA, La costa de oeste exterior de Isla de
   Vancouver... la costa del Estrecho de la Juan de Fuca...

Advertencia de Tsunami en Efecto para;

 * CALIFORNIA, Areas costeras desde Point Conception,
   California hasta The Oregon/Cal. Border incluso la bahia
   de San Francisco

 * OREGON, Areas costeras desde The Oregon/Cal. Border hasta
   The Oregon/Wash. Border

 * BRITISH COLUMBIA, La costa del norte y Haida Gwaii... la
   costa central y Isla de Vancouver de nordeste...

 * SOUTHEAST ALASKA, La costa interior y exterior desde The
   BC/Alaska Border hasta Cape Fairweather, Alaska (80 miles
   SE of Yakutat)

 * SOUTH ALASKA AND THE ALASKA PENINSULA, Costas Pacificas
   desde Cape Fairweather, Alaska (80 miles SE of Yakutat)
   hasta Unimak Pass, Alaska (80 miles NE of Unalaska)

Para otras costas del Pacifico de los Estados Unidos y Canada
en Norte America, el nivel de amenaza de tsunami esta siendo
evaluado. Se proveera informacion adicional en mensajeS
suplementarios.

PRONOSTICOS DEL TSUNAMI
---

* Se ha generado un tsunami. las primeras olas del tsunami estan pronosticadas para llegar a los siguientes puntos a las horas indicadas.

* La duracion pronosticada del tsunami es el periodo aproximado de tiempo que se espera que el tsunami puede producir corrientes y olas peligrosas.

* La altura maxima de ola pronosticada es el nivel de agua mas alto esperado sobre el nivel de la marea.

* No se dan pronosticos para puntos que han sido impactados a mas de una hora antes de la emision de este mensaje.

LUGAR	LLEGADA PRONOSTICADA DEL TSUNAMI	PRONOSTICO DE DURACION DEL TSUNAMI	ALTURA MAX PRONOSTICADA DEL TSUNAMI
* California			
Monterey	1235 PDT Mar 24		menos de 1pie
San Francisco	1255 PDT Mar 24		menos de 1pie
Port San Luis	1300 PDT Mar 24		menos de 1pie
* Alaska			
Elfin Cove	1105 AKDT Mar 24		menos de 1pie
Craig	1125 AKDT Mar 24		
Yakutat	1155 AKDT Mar 24		menos de 1pie
Seward	1230 AKDT Mar 24		menos de 1pie
Kodiak	1230 AKDT Mar 24		menos de 1pie
Valdez	1245 AKDT Mar 24		menos de 1pie
Cordova	1250 AKDT Mar 24		menos de 1pie
Sand Point	1310 AKDT Mar 24		menos de 1pie
Homer	1335 AKDT Mar 24		menos de 1pie
Cold Bay	1350 AKDT Mar 24		menos de 1pie

OBSERVACIONES DEL TSUNAMI - ACTUALIZADAS
---

* La altura maxima observada del tsunami es el nivel de agua mas alto registrado sobre el nivel de la marea hasta la emision de este mensaje.

LUGAR	HORA DE LA MEDICION	ALTURA MAX OBSERVADA DEL TSUNAMI
Winter Harbour BC	1021 PDT Mar 24	2.5ft
Tofino British Columbia	1159 PDT Mar 24	1.0ft
DART 46404 US	1020 PDT Mar 24	2.3ft
Neah Bay Washington	1249 PDT Mar 24	2.0ft
Port Angeles Washington	1151 PDT Mar 24	1.1ft
Charleston Oregon	1130 PDT Mar 24	0.9ft
Port Orford Oregon	1145 PDT Mar 24	0.3ft
Crescent City CA	1245 PDT Mar 24	1.0ft

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 Humboldt Bay  California     1201  PDT Mar 24          0.8ft
 Sitka  Alaska                1219  PDT Mar 24          0.6ft
 DART 46410  US               1117  PDT Mar 24          0.4ft
 Elfin Cove  Alaska           1227  PDT Mar 24          0.5ft
 Arena Cove  California       1204  PDT Mar 24          0.4ft
 Seattle  Washington          1245  PDT Mar 24          1.1ft
 DART 46409  US               1041  PDT Mar 24          0.7ft
 Point Reyes  California      1217  PDT Mar 24          0.4ft
 Bolinas Lagoon  CA           1253  PDT Mar 24          0.4ft
 Port San Luis  CA            1251  PDT Mar 24          0.4ft
 DART 46412  US               1222  PDT Mar 24          0.2ft
 DART 46413  US               1222  PDT Mar 24          0.2ft


PARAMETROS PRELIMINARES DEL TERREMOTO
-------------------------------------

 * Magnitud          8.5
 * Tiempo de Origen  0900 AKDT Mar 24 2021
                     1000  PDT Mar 24 2021
                     1700  UTC Mar 24 2021
 * Coordenadas       50.0 Norte 127.5 Oeste
 * Profundidad       9 millas
 * Localizacion      20 millas SW de Port Alice, British Columbia
                     290 millas NW de Seattle, Washington


ACCIONES RECOMENDADAS
---------------------
 * Ver mensaje numero 4 para acciones recomendadas.


IMPACTOS
--------
 * Ver mensaje numero 4 para posibles impactos.


INFORMACION ADICIONAL Y PROXIMA ACTUALIZACION
---------------------------------------------
 * Para acceder a informacion adicional consulte el sitio de
   internet tsunami.gov.

 * Regiones costeras del Pacifico fuera de California, Oregon,
   Washington, Columbia Britanica y Alaska deben referirse
   a los mensanjes del Centro de Alerta de Tsunami del Pacifico
   en tsunami.gov.

 * Este mensaje sera actualizado en 60 minutos.

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NTWC Spanish Bulletin #7

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WEAK61 PAAQ 262102
TSUSPN

BULLETIN
Mensaje de Tsunami numero 7
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NWS Centro Nacional de Alerta de Tsunami Palmer AK
202 PM PDT Wed Mar 24 2021

ACTUALIZACIONES
---
* Nuevas observaciones

...EL AVISO DE TSUNAMI PERMANECE EN EFECTO...

...LA ADVERTENCIA DE TSUNAMI PERMANECE EN EFECTO...

Aviso de Tsunami en Efecto para;

* WASHINGTON, la costa exterior de la frontera de Oregon/Washington a Slip Point, la costa de el estuario de Rio de Colombia, y la costa del estrecho de la Juan de Fuca

* BRITISH COLUMBIA, La costa de oeste exterior de Isla de Vancouver... la costa del Estrecho de la Juan de Fuca...

Advertencia de Tsunami en Efecto para;

* CALIFORNIA, Areas costeras desde Point Conception, California hasta The Oregon/Cal. Border incluso la bahia de San Francisco

* OREGON, Areas costeras desde The Oregon/Cal. Border hasta The Oregon/Wash. Border

* BRITISH COLUMBIA, La costa del norte y Haida Gwaii... la costa central y Isla de Vancouver de nordeste...

* SOUTHEAST ALASKA, La costa interior y exterior desde The BC/Alaska Border hasta Cape Fairweather, Alaska (80 miles SE of Yakutat)

* SOUTH ALASKA AND THE ALASKA PENINSULA, Costas Pacificas desde Cape Fairweather, Alaska (80 miles SE of Yakutat) hasta Unimak Pass, Alaska (80 miles NE of Unalaska)

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, el nivel de amenaza de tsunami esta siendo evaluado. Se proveera informacion adicional en mensajeS suplementarios.

PRONOSTICOS DEL TSUNAMI
---
* Se ha generado un tsunami. las primeras olas del tsunami estan pronosticadas para llegar a los siguientes puntos a las horas indicadas.

* La duracion pronosticada del tsunami es el periodo aproximado

de tiempo que se espera que el tsunami puede producir corrientes y olas peligrosas.

* La altura maxima de ola pronosticada es el nivel de agua mas alto esperado sobre el nivel de la marea.

* No se dan pronosticos para puntos que han sido impactados a mas de una hora antes de la emision de este mensaje.

LUGAR	LLEGADA PRONOSTICADA DEL TSUNAMI	PRONOSTICO DE DURACION DEL TSUNAMI	ALTURA MAX PRONOSTICADA DEL TSUNAMI
* Alaska			
Seward	1230 AKDT Mar 24		menos de 1pie
Kodiak	1230 AKDT Mar 24		menos de 1pie
Valdez	1245 AKDT Mar 24		menos de 1pie
Cordova	1250 AKDT Mar 24		menos de 1pie
Sand Point	1310 AKDT Mar 24		menos de 1pie
Homer	1335 AKDT Mar 24		menos de 1pie
Cold Bay	1350 AKDT Mar 24		menos de 1pie

OBSERVACIONES DEL TSUNAMI - ACTUALIZADAS

* La altura maxima observada del tsunami es el nivel de agua mas alto registrado sobre el nivel de la marea hasta la emision de este mensaje.

LUGAR	HORA DE LA MEDICION	ALTURA MAX OBSERVADA DEL TSUNAMI
Winter Harbour BC	1021 PDT Mar 24	2.5ft
Tofino British Columbia	1343 PDT Mar 24	1.9ft
DART 46404 US	1020 PDT Mar 24	2.3ft
Neah Bay Washington	1306 PDT Mar 24	2.2ft
DART 46407 US	1337 PDT Mar 24	0.2ft
Westport South Bay WA	1320 PDT Mar 24	0.3ft
Port Angeles Washington	1331 PDT Mar 24	1.3ft
Charleston Oregon	1308 PDT Mar 24	1.0ft
Port Orford Oregon	1145 PDT Mar 24	0.3ft
Port Townsend WA	1324 PDT Mar 24	1.0ft
Crescent City CA	1245 PDT Mar 24	1.0ft
Humboldt Bay California	1323 PDT Mar 24	1.4ft
Sitka Alaska	1353 PDT Mar 24	1.0ft
DART 46410 US	1117 PDT Mar 24	0.4ft
Elfin Cove Alaska	1227 PDT Mar 24	0.5ft
Arena Cove California	1204 PDT Mar 24	0.4ft
Seattle Washington	1245 PDT Mar 24	1.1ft
DART 46409 US	1041 PDT Mar 24	0.7ft
Point Reyes California	1342 PDT Mar 24	1.1ft
Monterey California	1324 PDT Mar 24	0.4ft
Bolinas Lagoon CA	1253 PDT Mar 24	0.4ft
San Francisco CA	1302 PDT Mar 24	0.4ft
Yakutat Alaska	1312 PDT Mar 24	0.6ft
Port San Luis CA	1251 PDT Mar 24	0.4ft
DART 46412 US	1222 PDT Mar 24	0.2ft

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 Santa Barbara  CA            1335  PDT Mar 24          0.5ft
 Seward  Alaska               1339  PDT Mar 24          0.8ft
 Kodiak  Alaska               1359  PDT Mar 24          0.7ft
 Ventura  California          1355  PDT Mar 24          0.2ft
 DART 46408  US               1302  PDT Mar 24          0.2ft
 DART 46413  US               1222  PDT Mar 24          0.2ft


PARAMETROS PRELIMINARES DEL TERREMOTO
-------------------------------------

 * Magnitud          8.5
 * Tiempo de Origen  0900 AKDT Mar 24 2021
                     1000  PDT Mar 24 2021
                     1700  UTC Mar 24 2021
 * Coordenadas       50.0 Norte 127.5 Oeste
 * Profundidad       9 millas
 * Localizacion      20 millas SW de Port Alice, British Columbia
                     290 millas NW de Seattle, Washington


ACCIONES RECOMENDADAS
---------------------
 * Ver mensaje numero 4 para acciones recomendadas.


IMPACTOS
--------
 * Ver mensaje numero 4 para posibles impactos.


INFORMACION ADICIONAL Y PROXIMA ACTUALIZACION
---------------------------------------------
 * Para acceder a informacion adicional consulte el sitio de
   internet tsunami.gov.

 * Regiones costeras del Pacifico fuera de California, Oregon,
   Washington, Columbia Britanica y Alaska deben referirse
   a los mensanjes del Centro de Alerta de Tsunami del Pacifico
   en tsunami.gov.

 * Este mensaje sera actualizado en 60 minutos.

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NTWC Spanish Bulletin #8

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WEAK61 PAAQ 262201
TSUSPN

BULLETIN
Mensaje de Tsunami numero 8
NWS Centro Nacional de Alerta de Tsunami Palmer AK
301 PM PDT Wed Mar 24 2021

ACTUALIZACIONES
---------------
 * Nuevas observaciones
```

* Modifica las regiones bajo alerta

...LA ADVERTENCIA DE TSUNAMI PERMANECE EN EFECTO...

Advertencia de Tsunami en Efecto para;

* CALIFORNIA, Areas costeras desde Point Conception, California hasta The Oregon/Cal. Border incluso la bahia de San Francisco

* OREGON, Areas costeras desde The Oregon/Cal. Border hasta The Oregon/Wash. Border

* WASHINGTON, la costa exterior de la frontera de Oregon/Washington a Slip Point, la costa de el estuario de Rio de Colombia, y la costa del estrecho de la Juan de Fuca

* BRITISH COLUMBIA, La costa de oeste exterior de Isla de Vancouver... la costa del Estrecho de la Juan de Fuca...

* BRITISH COLUMBIA, La costa del norte y Haida Gwaii... la costa central y Isla de Vancouver de nordeste...

* SOUTHEAST ALASKA, La costa interior y exterior desde The BC/Alaska Border hasta Cape Fairweather, Alaska (80 miles SE of Yakutat)

* SOUTH ALASKA AND THE ALASKA PENINSULA, Costas Pacificas desde Cape Fairweather, Alaska (80 miles SE of Yakutat) hasta Unimak Pass, Alaska (80 miles NE of Unalaska)

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, el nivel de amenaza de tsunami esta siendo evaluado. Se proveera informacion adicional en mensajeS suplementarios.

PRONOSTICOS DEL TSUNAMI
---

* Se ha generado un tsunami. las primeras olas del tsunami estan pronosticadas para llegar a los siguientes puntos a las horas indicadas.

* La duracion pronosticada del tsunami es el periodo aproximado de tiempo que se espera que el tsunami puede producir corrientes y olas peligrosas.

* La altura maxima de ola pronosticada es el nivel de agua mas alto esperado sobre el nivel de la marea.

* No se dan pronosticos para puntos que han sido impactados a mas de una hora antes de la emision de este mensaje.

	LLEGADA	PRONOSTICO	ALTURA MAX

LUGAR	PRONOSTICADA DEL TSUNAMI	DE DURACION DEL TSUNAMI	PRONOSTICADA DEL TSUNAMI
* Alaska			
Sand Point	1310 AKDT Mar 24		menos de 1pie
Homer	1335 AKDT Mar 24		menos de 1pie
Cold Bay	1350 AKDT Mar 24		menos de 1pie

OBSERVACIONES DEL TSUNAMI - ACTUALIZADAS

* La altura maxima observada del tsunami es el nivel de agua mas alto registrado sobre el nivel de la marea hasta la emision de este mensaje.

LUGAR	HORA DE LA MEDICION	ALTURA MAX OBSERVADA DEL TSUNAMI
Winter Harbour BC	1021 PDT Mar 24	2.5ft
Tofino British Columbia	1343 PDT Mar 24	1.9ft
DART 46404 US	1020 PDT Mar 24	2.3ft
Neah Bay Washington	1306 PDT Mar 24	2.2ft
DART 46407 US	1337 PDT Mar 24	0.2ft
Westport South Bay WA	1320 PDT Mar 24	0.3ft
Port Angeles Washington	1331 PDT Mar 24	1.3ft
Charleston Oregon	1308 PDT Mar 24	1.0ft
Port Orford Oregon	1145 PDT Mar 24	0.3ft
Port Townsend WA	1324 PDT Mar 24	1.0ft
DART 46411 US	1413 PDT Mar 24	0.1ft
Crescent City CA	1245 PDT Mar 24	1.0ft
Humboldt Bay California	1440 PDT Mar 24	2.2ft
Sitka Alaska	1353 PDT Mar 24	1.0ft
DART 46410 US	1117 PDT Mar 24	0.4ft
Elfin Cove Alaska	1403 PDT Mar 24	0.6ft
Arena Cove California	1204 PDT Mar 24	0.4ft
Seattle Washington	1423 PDT Mar 24	2.2ft
DART 46409 US	1041 PDT Mar 24	0.7ft
Point Reyes California	1342 PDT Mar 24	1.1ft
Monterey California	1436 PDT Mar 24	1.1ft
Bolinas Lagoon CA	1404 PDT Mar 24	1.0ft
San Francisco CA	1421 PDT Mar 24	1.1ft
Yakutat Alaska	1312 PDT Mar 24	0.6ft
Port San Luis CA	1251 PDT Mar 24	0.4ft
DART 46412 US	1222 PDT Mar 24	0.2ft
Alameda California	1405 PDT Mar 24	0.3ft
Santa Barbara CA	1442 PDT Mar 24	1.9ft
Seward Alaska	1339 PDT Mar 24	0.8ft
Kodiak Alaska	1359 PDT Mar 24	0.7ft
Santa Monica California	1412 PDT Mar 24	0.5ft
Ventura California	1355 PDT Mar 24	0.2ft
Los Angeles Harbor CA	1404 PDT Mar 24	0.2ft
Valdez Alaska	1424 PDT Mar 24	0.4ft
San Diego Harbor Ent. CA	1420 PDT Mar 24	0.2ft
Cordova Alaska	1443 PDT Mar 24	0.6ft
La Jolla California	1418 PDT Mar 24	0.2ft
DART 46408 US	1302 PDT Mar 24	0.2ft
Sand Point Alaska	1447 PDT Mar 24	0.7ft

Nikolski Alaska	1445	PDT Mar 24	0.1ft
DART 46413 US	1222	PDT Mar 24	0.2ft
Seldovia Alaska	1451	PDT Mar 24	0.2ft

PARAMETROS PRELIMINARES DEL TERREMOTO
---

* Magnitud 8.5
* Tiempo de Origen 0900 AKDT Mar 24 2021
  1000 PDT Mar 24 2021
  1700 UTC Mar 24 2021
* Coordenadas 50.0 Norte 127.5 Oeste
* Profundidad 9 millas
* Localizacion 20 millas SW de Port Alice, British Columbia
  290 millas NW de Seattle, Washington

ACCIONES RECOMENDADAS - ACTUALIZADAS

Las acciones para proteger la vida y propiedad pueden variar dentro de las areas de advertencia de tsunami.

Si usted esta en un area de advertencia;

* Salgase del agua, de la playa y alejese de puertos, marinas, bahias, ensenadas y rompeolas.

* Este alerta y siga las instrucciones de los oficiales locales de manejo de emergencia ya que ellos pueden tener informacion mas detallada o especifica para su ubicacion.

* Si siente un terremoto fuerte y/o prolongado tome inmediatamente acciones de seguridad como moverse tierra adentro y/o hacia un lugar alto preferiblemente a pie.

* Operadores de botes,
  * Cuando el tiempo y las condiciones lo permitan mueva su bote mar adentro a una profundidad de al menos 180 pies.

  * Si esta navegando evite entrar a aguas someras/llanas, puertos, marinas, bahias, y ensenadas para evitar corrientes fuertes y objetos flotantes o sumergidos.

* No vaya a la costa para observar el tsunami.

* No regrese a la costa hasta que los oficiales locales de manejo de emergencia local indiquen que es seguro hacerlo.

IMPACTOS

Los impactos pueden variar en diferentes lugares dentro de las areas de advertencia.

Si usted esta en un area de advertencia;

* Un tsunami con olas y corrientes fuertes puede ser posible.

* Olas y corrientes pueden ahogar o herir personas que se encuentran en el agua.

* Corrientes en playas y puertos, marinas, bahias, y ensenadas pueden ser especialmente peligrosas.

* Algunos impactos pueden continuar por muchas horas hasta dias luego de la llegada de la primera ola.

* La primera ola puede no ser la mas grande las olas posteriores si.

* Cada ola puede durar de 5 a 45 minutos entre su embate y retroceso.

* Costas con frente en todas las direcciones pueden estar en peligro porque las olas pueden dar la vuelta a islas y entrar a bahias.

* Movimiento fuerte y/o prolongado del suelo indica que un terremoto ha ocurrido un tsunami puede haber sido generado y su llegada inminente.

* Un rapido retroceso de la linea de costa, olas y sonidos inusiales, y fuertes corrientes son senales de un tsunami.

* El tsunami puede aparecer como agua moviendose rapidamente hacia mar adentro, una marea suave que se eleva rapidamente sin olas rompientes, como una serie de olas rompientes, o una pared de agua espumosa.

INFORMACION ADICIONAL Y PROXIMA ACTUALIZACION
---

* Para acceder a informacion adicional consulte el sitio de internet tsunami.gov.

* Regiones costeras del Pacifico fuera de California, Oregon, Washington, Columbia Britanica y Alaska deben referirse a los mensanjes del Centro de Alerta de Tsunami del Pacifico en tsunami.gov.

* Este mensaje sera actualizado en 60 minutos.

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NTWC Spanish Bulletin #9

WEAK61 PAAQ 262301
TSUSPN

BULLETIN
Mensaje de Tsunami numero 9
NWS Centro Nacional de Alerta de Tsunami Palmer AK
401 PM PDT Wed Mar 24 2021

ACTUALIZACIONES
---
* Nuevas observaciones

...LA ADVERTENCIA DE TSUNAMI PERMANECE EN EFECTO...

Advertencia de Tsunami en Efecto para;

* CALIFORNIA, Areas costeras desde Point Conception, California hasta The Oregon/Cal. Border incluso la bahia de San Francisco

* OREGON, Areas costeras desde The Oregon/Cal. Border hasta The Oregon/Wash. Border incluso la costa de el estuario de Rio de Colombia

* WASHINGTON, la costa exterior de la frontera de Oregon/Washington a Slip Point, la costa de el estuario de Rio de Colombia, y la costa del estrecho de la Juan de Fuca

* BRITISH COLUMBIA, La costa del norte y Haida Gwaii... la costa central y Isla de Vancouver de nordeste... la costa de oeste exteror de Isla de Vancouver... la costa del Estrecho de la Juan de Fuca

* SOUTHEAST ALASKA, La costa interior y exterior desde The BC/Alaska Border hasta Cape Fairweather, Alaska (80 miles SE of Yakutat)

* SOUTH ALASKA AND THE ALASKA PENINSULA, Costas Pacificas desde Cape Fairweather, Alaska (80 miles SE of Yakutat) hasta Unimak Pass, Alaska (80 miles NE of Unalaska)

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, el nivel de amenaza de tsunami esta siendo evaluado. Se proveera informacion adicional en mensajeS suplementarios.

OBSERVACIONES DEL TSUNAMI - ACTUALIZADAS
---
* La altura maxima observada del tsunami es el nivel de agua mas alto registrado sobre el nivel de la marea hasta la emision de este mensaje.

LUGAR	HORA DE LA MEDICION	ALTURA MAX OBSERVADA DEL TSUNAMI
Winter Harbour BC	1021 PDT Mar 24	2.5ft
Tofino British Columbia	1343 PDT Mar 24	1.9ft
DART 46419 US	1543 PDT Mar 24	3.9ft
DART 46404 US	1020 PDT Mar 24	2.3ft
Neah Bay Washington	1306 PDT Mar 24	2.2ft
DART 46407 US	1337 PDT Mar 24	0.2ft

Westport South Bay WA	1520	PDT Mar 24	0.7ft
Port Angeles Washington	1521	PDT Mar 24	1.5ft
Charleston Oregon	1308	PDT Mar 24	1.0ft
Port Orford Oregon	1145	PDT Mar 24	0.3ft
Port Townsend WA	1523	PDT Mar 24	1.3ft
DART 46411 US	1413	PDT Mar 24	0.1ft
Crescent City CA	1518	PDT Mar 24	1.1ft
Humboldt Bay California	1440	PDT Mar 24	2.2ft
Sitka Alaska	1353	PDT Mar 24	1.0ft
DART 46410 US	1117	PDT Mar 24	0.4ft
Elfin Cove Alaska	1403	PDT Mar 24	0.6ft
Arena Cove California	1204	PDT Mar 24	0.4ft
Seattle Washington	1423	PDT Mar 24	2.2ft
DART 46409 US	1041	PDT Mar 24	0.7ft
Point Reyes California	1535	PDT Mar 24	1.2ft
Monterey California	1436	PDT Mar 24	1.1ft
Bolinas Lagoon CA	1509	PDT Mar 24	1.1ft
DART 46403 US	1555	PDT Mar 24	3.1ft
San Francisco CA	1421	PDT Mar 24	1.1ft
Yakutat Alaska	1554	PDT Mar 24	1.8ft
Port San Luis CA	1528	PDT Mar 24	0.9ft
DART 46412 US	1222	PDT Mar 24	0.2ft
Alameda California	1405	PDT Mar 24	0.3ft
Santa Barbara CA	1442	PDT Mar 24	1.9ft
DART 46402 US	1547	PDT Mar 24	1.5ft
Seward Alaska	1339	PDT Mar 24	0.8ft
Kodiak Alaska	1500	PDT Mar 24	0.9ft
Santa Monica California	1519	PDT Mar 24	1.0ft
Ventura California	1524	PDT Mar 24	0.6ft
Los Angeles Harbor CA	1404	PDT Mar 24	0.2ft
Valdez Alaska	1424	PDT Mar 24	0.4ft
San Diego Harbor Ent. CA	1420	PDT Mar 24	0.2ft
Cordova Alaska	1443	PDT Mar 24	0.6ft
La Jolla California	1542	PDT Mar 24	0.3ft
DART 46408 US	1302	PDT Mar 24	0.2ft
San Diego California	1543	PDT Mar 24	0.3ft
Sand Point Alaska	1447	PDT Mar 24	0.7ft
Akutan Alaska	1521	PDT Mar 24	0.1ft
Nikolski Alaska	1550	PDT Mar 24	0.2ft
DART 46413 US	1222	PDT Mar 24	0.2ft
Seldovia Alaska	1557	PDT Mar 24	0.4ft
Adak Alaska	1514	PDT Mar 24	0.1ft
Haleiwa Hawaii	1552	PDT Mar 24	5.6ft
Hilo Hawaii	1546	PDT Mar 24	0.9ft
Kahului Hawaii	1558	PDT Mar 24	0.7ft
Honolulu Hawaii	1556	PDT Mar 24	4.4ft
Kawaihae Hawaii	1554	PDT Mar 24	3.9ft
Midway Island UM	1504	PDT Mar 24	0.2ft
DART 52401 West Pacific	1543	PDT Mar 25	0.1ft

PARAMETROS PRELIMINARES DEL TERREMOTO
---

* Magnitud 8.5
* Tiempo de Origen 0900 AKDT Mar 24 2021
  1000 PDT Mar 24 2021
  1700 UTC Mar 24 2021

```
 * Coordenadas       50.0 Norte 127.5 Oeste
 * Profundidad       9 millas
 * Localizacion      20 millas SW de Port Alice, British Columbia
                     290 millas NW de Seattle, Washington


ACCIONES RECOMENDADAS
---------------------
 * Ver mensaje numero 8 para acciones recomendadas.


IMPACTOS
--------
 * Ver mensaje numero 8 para posibles impactos.


INFORMACION ADICIONAL Y PROXIMA ACTUALIZACION
--------------------------------------------
 * Para acceder a informacion adicional consulte el sitio de
   internet tsunami.gov.

 * Regiones costeras del Pacifico fuera de California, Oregon,
   Washington, Columbia Britanica y Alaska deben referirse
   a los mensanjes del Centro de Alerta de Tsunami del Pacifico
   en tsunami.gov.

 * Este mensaje sera actualizado en 60 minutos.

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NTWC Spanish Bulletin #10

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WEAK61 PAAQ 270003
TSUSPN

BULLETIN
Mensaje de Tsunami numero 10
NWS Centro Nacional de Alerta de Tsunami Palmer AK
503 PM PDT Wed Mar 24 2021

...LA ADVERTENCIA DE TSUNAMI HA SIDO CANCELADA...

 * Advisory de Tsunami ha sido Cancelado para areas costeras
   de California, Oregon, Washington, British Columbia,
   Southeast Alaska y South Alaska and the Alaska Peninsula


OBSERVACIONES DEL TSUNAMI - ACTUALIZADAS
----------------------------------------
 * La altura maxima observada del tsunami es el nivel de agua
   mas alto registrado sobre el nivel de la marea hasta la
   emision de este mensaje.

                                    HORA            ALTURA MAX OBSERVADA
 LUGAR                           DE LA MEDICION         DEL TSUNAMI
 ------------------------------ ----------------       --------------
 Winter Harbour  BC             1021  PDT Mar 24           2.5ft
 Tofino  British Columbia       1343  PDT Mar 24           1.9ft
```

DART 46419 US	1605	PDT Mar 24	7.5ft
DART 46404 US	1020	PDT Mar 24	2.3ft
Neah Bay Washington	1306	PDT Mar 24	2.2ft
DART 46407 US	1337	PDT Mar 24	0.2ft
Westport South Bay WA	1520	PDT Mar 24	0.7ft
Port Angeles Washington	1645	PDT Mar 24	1.5ft
Charleston Oregon	1308	PDT Mar 24	1.0ft
Port Orford Oregon	1145	PDT Mar 24	0.3ft
Port Townsend WA	1523	PDT Mar 24	1.3ft
DART 46411 US	1413	PDT Mar 24	0.1ft
Crescent City CA	1518	PDT Mar 24	1.1ft
Humboldt Bay California	1440	PDT Mar 24	2.2ft
Sitka Alaska	1600	PDT Mar 24	1.2ft
DART 46410 US	1117	PDT Mar 24	0.4ft
Elfin Cove Alaska	1403	PDT Mar 24	0.6ft
Arena Cove California	1204	PDT Mar 24	0.4ft
Seattle Washington	1610	PDT Mar 24	3.1ft
DART 46409 US	1041	PDT Mar 24	0.7ft
Point Reyes California	1646	PDT Mar 24	1.5ft
Monterey California	1436	PDT Mar 24	1.1ft
Bolinas Lagoon CA	1621	PDT Mar 24	1.5ft
DART 46403 US	1654	PDT Mar 24	4.3ft
San Francisco CA	1645	PDT Mar 24	1.4ft
Yakutat Alaska	1554	PDT Mar 24	1.8ft
Port San Luis CA	1528	PDT Mar 24	0.9ft
DART 46412 US	1222	PDT Mar 24	0.2ft
Alameda California	1630	PDT Mar 24	0.4ft
Santa Barbara CA	1442	PDT Mar 24	1.9ft
DART 46402 US	1612	PDT Mar 24	3.0ft
Seward Alaska	1339	PDT Mar 24	0.8ft
Kodiak Alaska	1500	PDT Mar 24	0.9ft
Santa Monica California	1519	PDT Mar 24	1.0ft
Ventura California	1524	PDT Mar 24	0.6ft
Los Angeles Harbor CA	1601	PDT Mar 24	0.3ft
Valdez Alaska	1424	PDT Mar 24	0.4ft
San Diego Harbor Ent. CA	1420	PDT Mar 24	0.2ft
Cordova Alaska	1443	PDT Mar 24	0.6ft
La Jolla California	1542	PDT Mar 24	0.3ft
DART 46408 US	1302	PDT Mar 24	0.2ft
San Diego California	1543	PDT Mar 24	0.3ft
Sand Point Alaska	1447	PDT Mar 24	0.7ft
Akutan Alaska	1521	PDT Mar 24	0.1ft
King Cove Alaska	1606	PDT Mar 24	0.3ft
Nikolski Alaska	1550	PDT Mar 24	0.2ft
DART 46413 US	1222	PDT Mar 24	0.2ft
Seldovia Alaska	1557	PDT Mar 24	0.4ft
Adak Alaska	1602	PDT Mar 24	0.3ft
Shemya Alaska	1610	PDT Mar 24	0.1ft
Haleiwa Hawaii	1552	PDT Mar 24	5.6ft
Nawiliwili Hawaii	1643	PDT Mar 24	0.8ft
Hilo Hawaii	1623	PDT Mar 24	1.5ft
Kahului Hawaii	1558	PDT Mar 24	0.7ft
Honolulu Hawaii	1638	PDT Mar 24	5.7ft
Kawaihae Hawaii	1554	PDT Mar 24	3.9ft
Midway Island UM	1504	PDT Mar 24	0.2ft
DART 52401 West Pacific	1543	PDT Mar 25	0.1ft

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ACCIONES RECOMENDADAS - ACTUALIZADAS
------------------------------------
 * No regresen a zonas desalojadas hasta que las autoridades
   locales de manejo de emergencia indiquen que es seguro
   hacerlo.


IMPACTOS - ACTUALIZADOS
-----------------------
 * Un tsunami fue generado durante este evento pero ya no
   representa un peligro.

 * Algunas areas podran seguir viendo pequenos cambios del
   nivel del mar.

 * La determinacion para volver a ocupar zonas de peligro debe
   ser hecha por autoridades locales.


INFORMACION ADICIONAL Y PROXIMA ACTUALIZACION
---------------------------------------------
 * Para acceder a informacion adicional consulte el sitio de
   internet tsunami.gov.

 * Regiones costeras del Pacifico fuera de California, Oregon,
   Washington, Columbia Britanica y Alaska deben referirse
   A los mensanjes del Centro de Alerta de Tsunami del Pacifico
   eb tsunami.gov.

 * Este sera el ultimo boletin proveniente del Centro Nacional
   de Alerta de Tsunami de los Estados Unidos para este evento.

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Appendix E. Sample Press Release for Local Media

TEMPLATE FOR NEWS RELEASE

USE AGENCY MASTHEAD

Contact: (insert name)
(insert phone number)
(insert email address)

FOR IMMEDIATE RELEASE
(insert date)

NORTH PACIFIC TSUNAMI EXERCISE
TO BE CONDUCTED MARCH 24, 2021

(*insert community/county/state name*) will join other localities in the north Pacific as a participant in a tsunami response exercise on March 24, 2021. The purpose of this exercise is to evaluate local tsunami response plans, increase tsunami preparedness, and improve coordination throughout the region.

(*insert a promotional comment from a local official, such as "The 2011 Japan earthquake and tsunami reminded the world again of the urgent need to be more prepared for such events," said (insert name of appropriate official*). "This important exercise will test the current procedures of the Tsunami Warning System and help identify operational strengths and weaknesses in each community." (*Please modify for uniqueness.))*

The exercise, titled PACIFEX21, will simulate a widespread Tsunami Warning, Watch, and Advisory situation along U.S. and Canadian west coasts requiring implementation of local tsunami response plans. The exercise will (*insert "include" or "not include")* public notification.

A major earthquake and tsunami will be simulated with a source 20 miles SW of Port Alice, British Columbia at 10:00 am Pacific Daylight Time (*or appropriate local time*) on March 24, 2021. Exercise participants will be provided with a handbook which describes the scenario and contains tsunami alert messages.

Insert paragraph tailored for specific community. Could identify participating agencies and specific plans. Could describe current early warning program, past tsunami exercises (if any), ongoing mitigation and public education programs, etc. Could describe tsunami threat, history of tsunami hazards, if any.

If any real tsunami threat occurs during the time period of the exercise, the exercise will be terminated.

The exercise is sponsored by the U.S. National Oceanic and Atmospheric Administration (NOAA) and by the U.S. National Tsunami Hazard Mitigation Program (NTHMP – a partnership of 28 states and territories and three federal agencies). For more information on the U.S. tsunami warning system, see www.tsunami.gov. For more information on the NTHMP, see nws.weather.gov/nthmp.

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On the Web:

National Tsunami Warning Center	http://www.tsunami.gov
NOAA Tsunami Program	tsunami.noaa.gov
NTHMP:	nws.weather.gov/nthmp
Insert state/local emergency response URLs	