Exercise PACIFEX24

Participant Handbook

A Continental U.S. and Canadian Pacific Coast
Tsunami Warning Exercise
May 23, 2024

US National Tsunami Hazard Mitigation Program

NOTE: The contents of this handbook are patterned after previous PACIFEX and CARIBE WAVE Exercises (e.g., Commission Océanographique Intergouvernementale. *Exercise Caribe Wave 11. A Caribbean Tsunami Warning Exercise, 23 March 2011*, IOC Technical Series No. 93, Paris, UNESCO, 2011 (English/ French/ Spanish), Intergovernmental Oceanographic Commission *Exercise Caribe Wave/Lantex 13, A Caribbean Tsunami Warning Exercise, 20 March 2013, Volume 1: Participant Handbook, IOC Technical Series No. 101, Paris, UNESCO, 2012* and Intergovernmental Oceanographic commission. 2013., Exercise Caribe Wave/Lantex 14. A Caribbean and Northwestern Atlantic Tsunami Warning Exercise, 26 March 2014. Volume 1: Participant Handbook. IOC Technical Series, 109 vol. 1. Paris: UNESCO. (English and Spanish)). These CARIBE WAVE handbooks followed the Pacific Wave 08 manual published by the Intergovernmental Oceanographic Commission (*Exercise Pacific Wave 08, A Pacific-wide Tsunami Warning and Communication Exercise, 28-30 October 2008*, IOC Technical Series No. 82, Paris, UNESCO, 2008). The UNESCO How to Plan, Conduct and Evaluate Tsunami Wave Exercises. IOC Manuals and Guides No. 58 rev., Paris: UNESCO, 2013 (English, Spanish) is another important reference.

Table of Contents

1. Executive Summary

The NOAA/NWS U.S. National Tsunami Warning Center (NTWC) provides tsunami alerts for the coasts of the United States and Canada. Its annual PACIFEX exercise focuses on tsunami preparedness for the continental Pacific coasts of these countries. The exercise aims to be realistic and interactive through a careful assessment of which information is anticipated to be available at any given time, and by providing NTWC decision support throughout the exercise that mirrors the support provided during a real event.

The scenario for this exercise involves a shallow M8.7 earthquake located along the northern Tonga Trench at 14.5ºS, 174.7ºW occurring at 16:30 UTC / 9:30a PDT on May 23, 2024, which is initially assessed as M8.2. For this scenario, as in a real event, information will be issued to all of the U.S. continental Pacific Coast states and Canada. This is an example of a scenario that initially prompts recurring Tsunami Information Statements with potential danger evaluation for the U.S. and Canadian West Coasts, but is upgraded to Warning and Advisory alerts once water level observations permit a constrained forecast. NTWC encourages partner interaction from all primary customers in real time for this exercise and at any time during a real event.

Highlights

- A distant source location that provides a point of comparison to recent events and probes the response to aspects of NTWC messaging that would benefit from partner feedback.
- NTWC release of multiple messages at realistic timing, with other periods of compressed time and fast forwards to compress the exercise into a reasonable time period for live play
- Four conference calls hosted by NTWC scientists for primary customers
- NTWC live support in NWSChat 2.0 room for NTWC core partners

NTWC will continue NWSChat support in the partners-only Pacific Coast Slack channel for core partners up through the exercise cancellation bulletin. All emergency response partners interested in using this support tool should request and confirm their access prior to the day of the exercise. NWSchat terms of service will be adhered to. Sign up for NWSchat on Slack here and select Partner Registration and “AAQ”, add a note for “Pacifex24”.

To get in touch with NTWC or be added to the exercise email list, please see the contact list in **Section 4.5** or email ntwc@noaa.gov. A post-exercise survey will be circulated to the list in the days following the exercise. NTWC welcomes your questions and feedback and looks forward to working with you.

Exercise Timeline

The following represents a complete timeline of events for this scenario. Please use the Dissemination column to note which steps will or won’t be exercised by NTWC.

TWC Message Abbreviations: Warn (Tsunami Warning), Adv.(Tsunami Advisory), Watch (Tsunami Watch), TIS (Tsunami Information Statement), Can. (Alert cancellation), Notif. for Conf. Call (Info message for partners alerting recipient to upcoming conference call)

Scenario Date (UTC)	Scenario Time (UTC)	Actual Time 05/23 (PDT)	Event	Msg #	Distribution
05/23/2024	1630	**930**	Exercise start / CommsTest		See Table 2 p.19
05/23/2024	1638	**938**	TIS: US & Can West Coast	1	Email
05/23/2024	1649	**949**	Notif. for Conf. Call		Email
05/23/2024	1710	**1010**	TIS: US & Can West Coast	2	Email
05/23/2024	1730	**1030**	Conf. Call #1		Phone
05/23/2024	1740	**1040**	TIS: US & Can West Coast	3	Email
05/23/2024	1800	**1100**	Notif. for Conf. Call		Email
05/23/2024	1830	**1130**	Conf. Call #2		Phone
05/23/2024	1840	**1140**	Warn. & Adv.: US & Can West Coast	4	Email
FAST FORWARD ~7 HR IN SCENARIO & ACCELERATE TIME					
05/24/2024	0240	**1155**	W. Aleutians to Adv., Warn. & Adv. continued	12	Email
05/24/2024	0340	**1205**	Warn. & Adv. continued	13	Email
05/24/2024	0440	**1215**	Warn. & Adv. continued	14	Email
05/24/2024	0540	**1225**	Can. SE AK & BC, Warn. & Adv. continued	15	Email
05/24/2024	0600	**1235**	Notif. for Conf. Call		Email
05/24/2024	0630	**1245**	Conf. Call #3		Phone
05/24/2024	0640	**1255**	Partial Can. Aleutians, Partial CA Warn. to Adv., Warn. & Adv. contin.	16	Email
FAST FORWARD ~1 HR IN SCENARIO, CONTINUE IN ACTUAL TIME (PDT)					
05/24/2024	0800	**1310**	Notif. for Conf. Call		Email
05/24/2024	0830	**1320**	Conf. Call #4		Phone
05/24/2024	0840	**1330**	Partial Can. Aleutians, S.Cal, WA, OR; Warn. to Adv., Adv. continued	18	Email
FAST FORWARD ~1 HR IN SCENARIO, CONTINUE IN ACTUAL TIME (PDT)					
05/24/2024	0940	**1345**	Partial Can. N.Cal., Adv. continued	19	Email
FAST FORWARD ~2 HR IN SCENARIO, CONTINUE IN ACTUAL TIME (PDT)					
05/24/2024	1140	**1400**	Can. Aleutians, S.Cal.; Partial Can. N.Cal.	21	Email
FAST FORWARD ~2 HR IN SCENARIO, CONTINUE IN ACTUAL TIME (PDT)					
05/24/2024	1340	**1415**	Partial Can. N.Cal.	23	Email
FAST FORWARD ~3 HR IN SCENARIO, CONTINUE IN ACTUAL TIME (PDT)					
05/24/2024	1640	**1430**	Cancellation	26	Email

2. Exercise Concept

2.1 Purpose

The purpose of the exercise is to improve Tsunami Warning System effectiveness along the U.S. and Canadian Pacific coasts. It provides an opportunity for emergency management organizations throughout the region and other National Tsunami Warning Center (NTWC) core partners 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 impacted emergency management organization (EMO) is encouraged to participate. Additionally, the exercise offers an opportunity to learn about local tsunami hazards and the National Tsunami Warning Center's event timeline and process. Our goal is to increase understanding of the following during tsunami alerts: 1) messaging and communications, 2) detection, observing, and forecasting, and 3) cancellation criteria.

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 NTWC to primary customers.
- Test tsunami response plans for EMOs that have developed plans, and provide a catalyst for EMOs that have not developed plans.
- EMOs review, discuss, and evaluate the various communication alternatives for receiving and disseminating tsunami messages.
- EMOs review, discuss, and evaluate potential response actions and challenges.
- Improve understanding of tsunami science and operational response timelines and constraints
- Exercise NTWC tsunami decision support and encourage partner feedback.

3. Background

NOAA and the U.S. National Tsunami Hazard Mitigation Program (NTHMP) are providing the framework for the PACIFEX24 tsunami exercise, which is being conducted to assist tsunami preparedness efforts throughout the Pacific region. Recent earthquakes and their associated tsunamis, such as those in Haiti-2010, Japan-2011, Chile-2015, and Tonga-2022, attest to the importance of proper planning for tsunami response. Similar recent exercises in the Pacific and Caribbean Basins have proven effective in strengthening preparedness levels of emergency management organizations.

3.1 Tsunami Warning System

Tsunami warning services for the continental United States and Canada are provided by the NTWC in Palmer, Alaska. The Pacific Tsunami Warning Center (PTWC) in Pearl Harbor, Hawaii, provides services for domestic Pacific island locations and territories, domestic Caribbean territories and other international partners. These Centers issue messages approximately three to seven minutes after the detection of an earthquake. Domestic messages include warnings, advisories, watches, and information statements.

Primary recipients of Tsunami Warning Center messages ("core partners") include national tsunami warning focal points, National Weather Service Weather Forecast Offices (WFO), state/territory emergency operation centers, national Coast Guards and military contacts, and other US Federal partners. These agencies disseminate the messages to people within their service jurisdictions who may be impacted by a tsunami.

3.1.1 Alert Levels

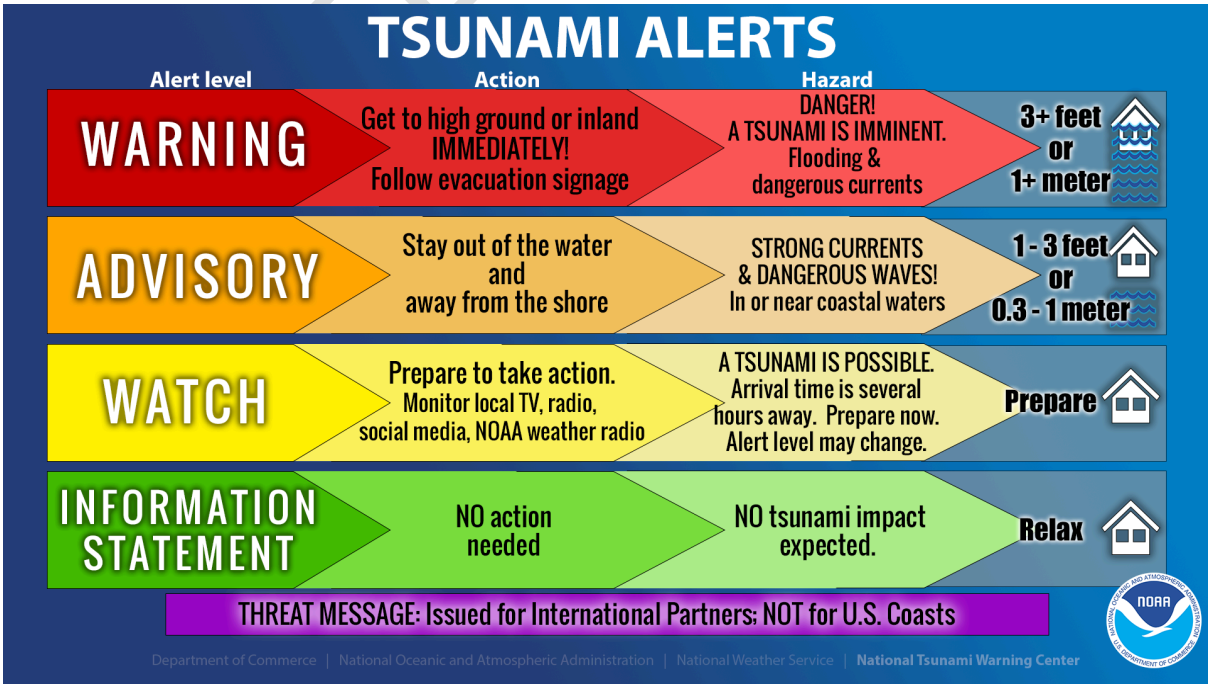


Figure 1: U.S. Tsunami Warning System alert levels.

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 Advisory - A tsunami advisory is issued when a tsunami with the potential to generate strong currents or waves dangerous to those in or very near the water is imminent, expected, or occurring. The threat may continue for several hours after initial arrival, but significant inundation is not expected for areas under an advisory.

Along with 1-3 foot water level fluctuations, Advisory-level events come with strong tsunami currents and eddies that can greatly impact the maritime community, both through difficult navigation and damage to docks, boats, and marinas.

Additional resources on Tsunami Maritime Guidance from the NTHMP can be found at: calema.maps.arcgis.com. Appropriate actions for local officials during a Tsunami Advisory may include: closing beaches, evacuating harbors and marinas, and repositioning ships to deep waters with time to safely do so. Advisories are normally updated to add observation or forecast information and continue the advisory, expand or reduce the alert area, upgrade to a warning, or cancel the advisory.

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 for local officials during a Tsunami Warning may include: the evacuation of low-lying coastal areas, repositioning ships to deep waters with time to safely do so. Warnings may be updated to: expand or reduce the alert area, downgraded, or canceled. To provide the earliest possible alert, initial warnings are normally based only on seismic information.

3.1.2 NTWC Event Timeline and Process

Whether the tsunami is generated from an earthquake, landslide, volcano, or a meteorological event, NTWC's general process and the event timeline steps remain the same: alert, detect, observe, forecast, and cancel.

Initial alert

An initial tsunami alert is issued within about 5 minutes of significant earthquake detection for a domestic source, and ***before*** a tsunami has been detected. The two Tsunami Warning Centers agree on a set of preliminary earthquake parameters based on who has warning responsibility for the area the earthquake occurred in. The initial set of earthquake information available (magnitude, location, and depth)

doesn't provide considerable information regarding whether a tsunami has formed or how large any tsunami may be. Earthquake shaking may also trigger landslides that become additional tsunami sources. Therefore, initial tsunami alerts are conservative in order to maximize warning time for people and communities in need. Alerts can also be issued upon detection of a tsunami threat from a landslide or volcanic event. NTWC does not issue alerts for meteotsunamis, but upon detection, works with NWS WFOs for those offices to alert their public through Special Weather Statements.

Alert messaging and communications

Bulletins

Once an alert is issued, tsunami bulletins are automatically disseminated through NWS Gateway, NOAA weather radio, Wireless Emergency Alerts (WEA), and the Emergency Alert System (EAS). Messages are also posted to NTWC's X (Twitter) and Facebook pages, and all information is provided on tsunami.gov. Each bulletin contains the latest information on the alert areas, earthquake parameters, estimated times of arrival (ETAs), and provides calls to action. During alerts for the domestic U.S. or Canadian coastline, tsunami bulletins are updated every 30 minutes or as new information warrants.

Conference Calls

NTWC provides routine conference calls with core partners as soon as possible during an event, generally within the first hour after an alert is issued. Conference call notifications are sent out as an official NWS product (NOAK78) through the NWS Telecommunication Gateway and emailed to subscribed partners. During conference calls, the latest information is briefed including information on initial earthquake parameters, expected tsunami impacts, arrival times, observations, and forecasting with any upcoming modifications to the alert level. An opportunity for partners to ask impact-related questions is included at the end of the conference call for Federal and State Warning Points.*

**While this exercise is open to a wide variety of users to fully understand the tsunami event management chain, in an actual tsunami, the NTWC conference call audience is limited to Federal and State warning points (not local communities, who are served through their States and local information dissemination points).*

Tsunami.gov

NTWC and PTWC host official messages and event-based information on tsunami.gov. All event bulletins are provided in a table on the front page. Alert areas are shown on a map and with an icon indicating the tsunami source region. Estimated times of arrival, tsunami observations, and forecasted wave heights are posted with event messages in the drop-down box on the right-hand side of the table.

Chat

NTWC, like the rest of the National Weather Service, intends to use the new NWSChat 2.0 platform on Slack for ongoing event discussions with operational partners. The **"nws-tsunami-ntwc-pacific-partners"** channel will support a common operating picture for verified Pacific partners and provide a vehicle for

follow-up questions and quick graphical communication or document sharing to improve communication.

NTWC core partners who believe they need access to the NWSChat channel should contact NTWC prior to the day of the exercise.

Phone
If at any time a core partner needs additional information or to talk with someone on the NTWC operations floor, use the unlisted number for WFOs/Emergency Managers.

Social Media
During a real tsunami event, bulletins are automatically posted to NTWC's Facebook account. Content may also be posted to NTWC's X (Twitter), and YouTube accounts. The use of social media adds additional context, clarification, and confirmation for partners and the public. Social media updates may include additional contextual information about a tsunami event that will support official NTWC messages and alerts.

Facebook: https://www.facebook.com/NWSNTWC
X (Twitter): https://twitter.com/NWS_NTWC
YouTube: https://www.youtube.com/@USTsunamiWarningCenter

Tsunami Detection, Observing, and Forecasting

DART Network
Tsunami detection can occur before a wave reaches the coast through the DART (Deep Ocean Assessment and Reporting of Tsunamis) network. The DART network uses Bottom Pressure Recorder (BPR) instruments located on the seafloor in the deep ocean. BPRs detect changes in the pressure of the water column above as a tsunami wave propagates over the sensor, as well as often recording the pressure changes from the passage of earthquake and atmospheric waves. The National Data Buoy Center (NDBC) is responsible for maintaining the DART network. Due to the need to separate earthquake shaking signals from tsunami signals, DART observation interpretation is best left to tsunami experts. Tsunami wave measurement and detection will not be displayed clearly from the NDBC DART webpage.

Tide Gauges
Tsunamis are also detected using coastal tide gauges. During tsunami events, tide gauges operated by the National Ocean Service (NOS), Ocean Networks Canada, and other groups around the world are used to monitor water levels in real time. Observed water levels at both DARTs and coastal tide gauges must have the tidal signal removed in order to accurately measure tsunami amplitudes. U.S. tsunami-capable gauges are available at: https://tidesandcurrents.noaa.gov/tsunami/

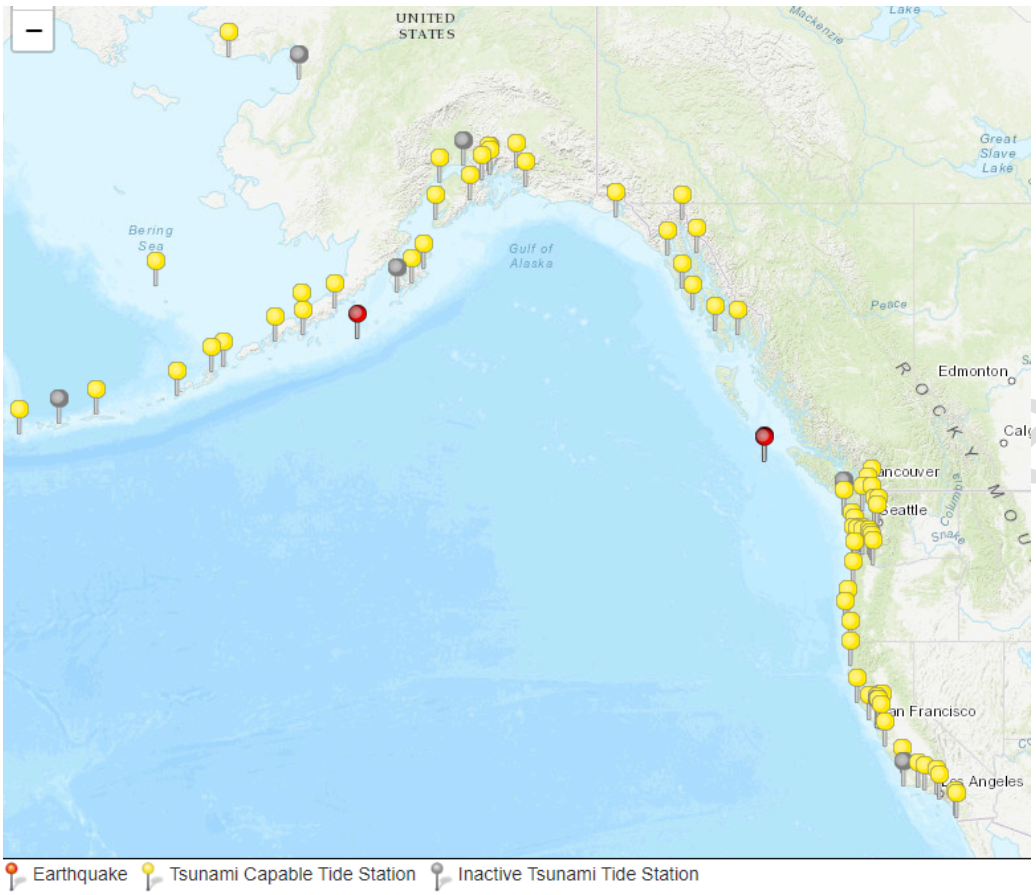


Figure 2. U.S. tsunami-capable tide gauges operated by the NOS Center for Operational Oceanographic Products and Services (CO-OPS).

Observing & Forecasting

Tsunamis are very long waves, often with periods of 15 to 60 minutes. When monitoring water levels, NTWC must therefore wait 15 to 30 minutes after a tsunami is detected for the observation to reach a maximum wave height. DART data take even longer to incorporate into real-time tsunami forecasting, requiring nearly a full wave cycle before they can be assimilated into tsunami forecast models. Forecasting accuracy improves with additional observations. Therefore, the observing and forecasting process requires time and multiple updates as more data is added.

For initial guidance, and until tsunami observations are available, NTWC uses "best-fit" pre-computed tsunami models for preliminary forecasts. Once a real-time forecast with tsunami observations has been achieved, the forecasted wave heights for coastal locations are published to tsunami.gov. A subset of these wave heights is provided in NTWC bulletins. For a list of sites where NTWC provides ETAs and forecasted wave heights, see **Appendix C**, NTWC Pacific Forecast Locations.

Cancellation Criteria

After a significant tsunami has been recorded, NTWC will monitor water levels and downgrade a coastal section from a Warning to an Advisory once wave height observations have diminished below the Warning threshold (3 ft) for at least 3 hours. NTWC will cancel the alert for a coastal section after wave height observations have remained below Advisory threshold (1 ft) for 3 hours.

3.2 PACIFEX24 Tsunami Scenario

The PACIFEX24 tsunami scenario is based on a tsunami generated by a magnitude 8.7 earthquake along the Tonga-Kermadec Subduction Zone at 14.5ºS, 174.7ºW, and a depth of 15 km.

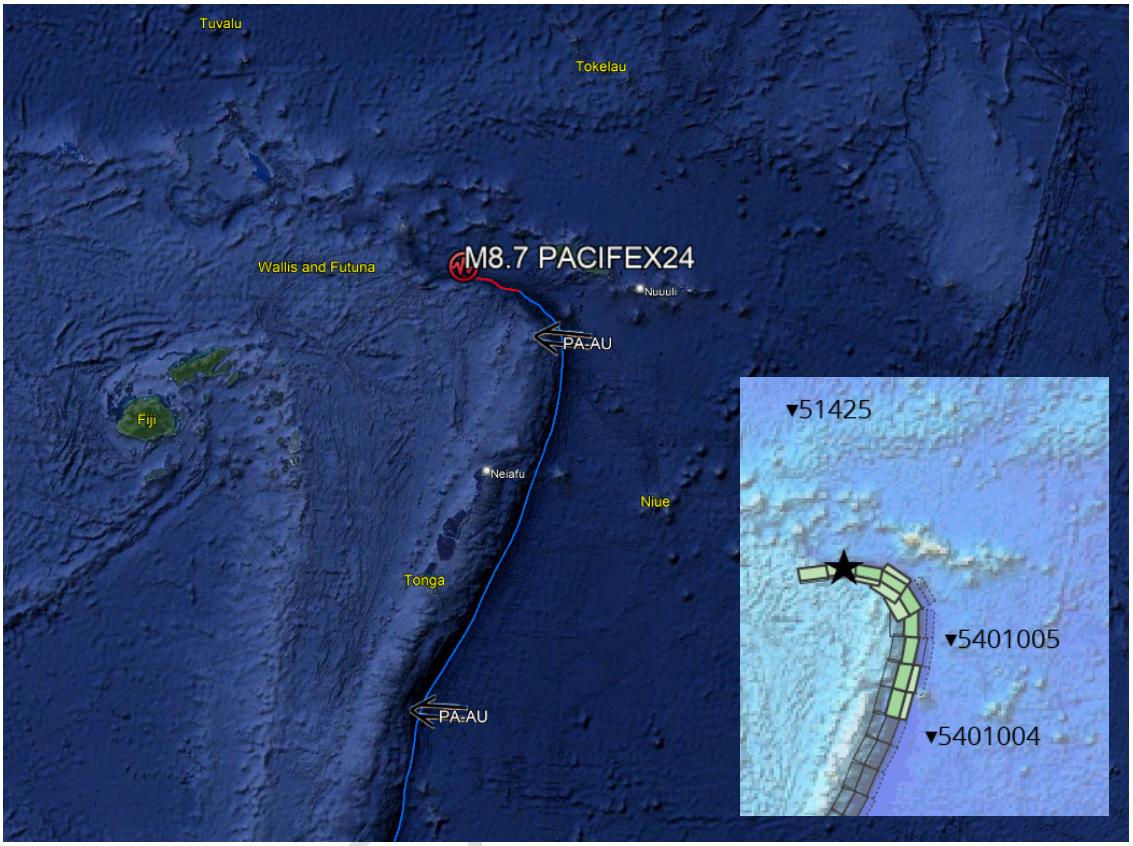


Figure 3: 2024 exercise event epicenter and arrows showing the direction of the Pacific Plate with respect to the Australian Plate. Inset shows source distribution of fault slip (greener patches show more slip) and locations of nearest DART instruments (upside-down triangles).

Tectonic Setting: Tonga-Kermadec Subduction Zone

The epicenter for the PACIFEX24 event is located south of Samoa and west of American Samoa in the east-west oriented Vitiaz Trench, and earthquake slip extends eastward onto the adjoining north-south trending Tonga Trench. The Tonga-Kermadec and Vitiaz Trenches form a boundary between very fast-moving tectonic plates. The Pacific Plate, east of the Tonga Trench and north of the Vitiaz Trench, forms a deep trench in the seafloor as it dives under the Australian Plate at a rate of about 86mm (3.4 inches) a year. The exercise scenario places the quake below an ocean depth of nearly 6100 meters (20,000 feet). Counter-clockwise rotation of the Australian Plate, high-speed subduction of the Pacific Plate, and significant back arc extension create a complex trench-arc-backarc system in the Tonga-Samoa-Fiji region.

This region can generate many different types and depths of earthquakes, and these variations in earthquake properties have a large influence on tsunami generation.

Curvature of the trench system also affects tsunami propagation, determining the direction of tsunami energy. Historically significant earthquakes in the Tonga-Kermadec Subduction Zone include: M8.0 (1917), M8.2 (1917), M8.1 (1919), M8.0 (1976), M8.0 (2006), and M8.1 (2009). The epicenter of the 2009 M8.1 quake was east of the PACIFEX24 exercise epicenter, and the quake ruptured through some of the same area. Studies of that event indicate that it involved both a normal-fault rupture on or near the outer rise of the subducting Pacific plate and at least one additional thrust-faulting sub-event of a similar size, located to the southwest of the first source and within the Tonga-Kermadec subduction zone. That earthquake generated a damaging tsunami to Samoa, American Samoa, Tonga, and other South Pacific islands and killed at least 180 people.

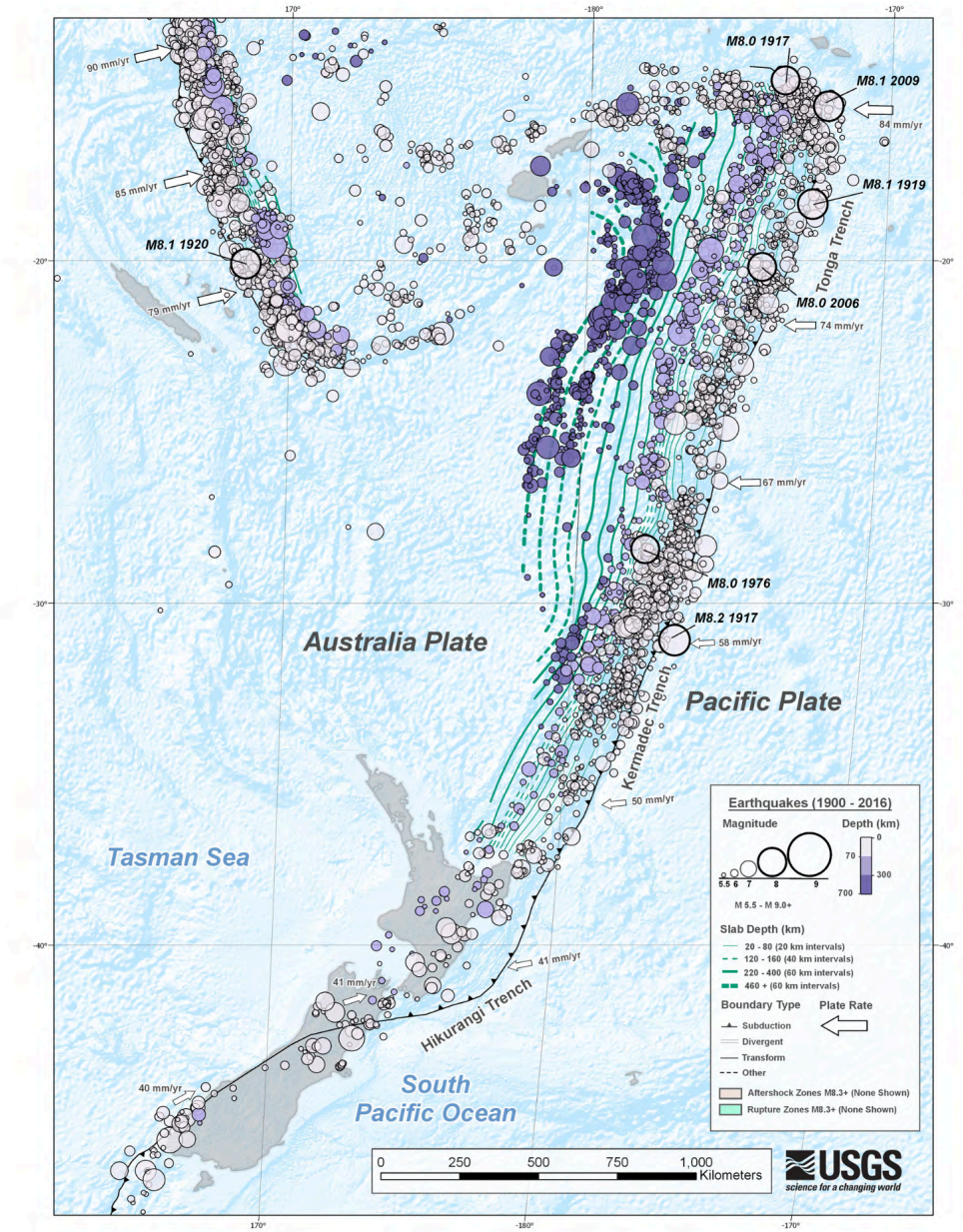
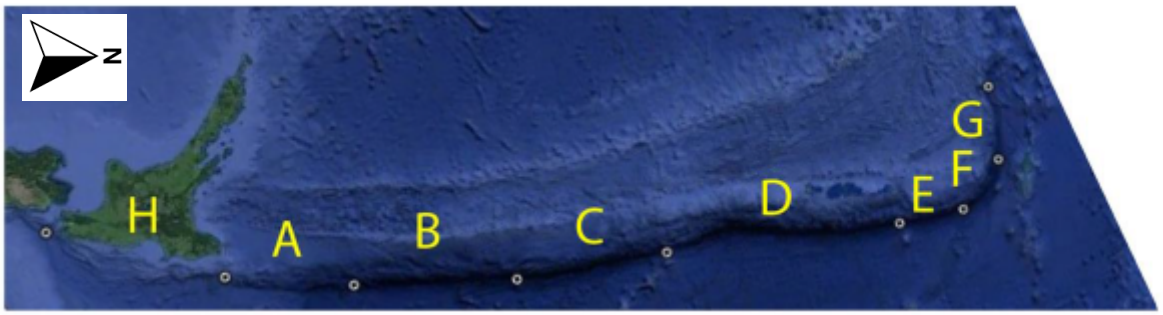


Figure 4: Map displays the tectonics of the region and all recorded M5.5+ earthquakes in the area from 1900-2016. Figure from USGS.

While the probability of a >M8.2 earthquake from this region is unlikely in any given year, the purpose of this scenario is to test and exercise event response for uncommonly large earthquakes. The PACIFEX24 exercise source is based on a multi-fault segment scenario identified in a 2018 IOC expert meeting on the Tonga-Kermadec subduction zone, modified to have less slip in the area of the complex 2009 Samoa Islands event. The exercise source will consist of a rupture of the meeting's sources E, F, and G, totaling a magnitude 8.7 after slip is reduced in the 2009 rupture area.



Relevant references:

UNESCO/IOC, 2020. Expert meeting on tsunami sources, hazards, risk and uncertainties associated with the Tonga-Kermadec Subduction Zone. Wellington, New Zealand, 29 October–3 November 2018. Paris, UNESCO (Workshop Report no 289).

USGS Event Page-M 8.1 - 168 km SSW of Matavai, Samoa: Tectonic Summary. https://earthquake.usgs.gov/earthquakes/eventpage/usp000h1ys/region-info

Tsunami Hazard and Impacts

The United States and Territories National Tsunami Hazard Assessment Historical Record and Sources for Waves - Update (2016) identifies the general tsunami hazard for both Alaska and the U.S. West Coast as "**high to very high**" due to the proximity of these regions to major subduction zones.

Alerting, Observation, and Forecasting Considerations

Earthquakes of M8.5+ in the Pacific generally produce tsunamis with basin-wide impacts. In this exercise scenario, a large earthquake preliminarily assessed as M8.2 initiates a series of hourly Tsunami Information Statements that include a potential danger evaluation. Information Statements continue even with more complete earthquake analysis prompts a magnitude revision to M8.7 in the second message. This operational procedure is due to the large amount of time (>6 hours) until potential wave arrivals in the NTWC Designated Service Area, during which a tsunami can be observed and a water level-constrained forecast made. This helps prevent unnecessary alerts and increases confidence in the initial alert areas. This

M8.7 scenario is a plausible event in the region, despite having a presumed long recurrence time.

A local tsunami would be able to be detected and confirmed using nearby coastal gauges at Wallis Island, Samoa, and American Samoa within half an hour. For modeling and forecasting of far field impacts, deep ocean systems are necessary to measure a wave signal free from the effects of coastal conditions.

For this scenario, which assumes that the nearest DARTs (51425, 5401004/ New Zealand H, and 5401005/ New Zealand I) are all operational, a high confidence forecast can be made by about an hour and a half after earthquake origin time. The arrival time at the two nearest New Zealand DARTs is estimated within about 15 minutes, but waiting longer for DART 51425 is necessary to provide enough azimuthal coverage to accurately model the tsunami source. A full wavelength of the tsunami must then be measured at each sensor, inverted for the best fitting source, and the source model run with high resolution inundation forecasts. This high confidence forecast is released with the accompanying initial coastal alerts in Tsunami Message Number 4. At that point, based on the forecast values from two different models, two relatively small stretches of coastline in Alaska and California are placed under a Tsunami Warning, the majority of the U.S. and Canadian Pacific coastline is placed under Tsunami Advisory, and a stretch of coastline along southcentral Alaska is assessed to have no alerts necessary.

4. Exercise Outline

4.1 General

Tsunami Warning, Advisory, Watch, and Information messages for this exercise are issued by the NTWC based on a hypothetical earthquake with the following hypocenter parameters, which in turn generates a tsunami:

Origin Time	16:30:00 UTC May 23, 2024	
	Preliminary	**Final**
Latitude	14.4° S	14.5° S
Longitude	174.9° W	174.7° W
Magnitude	Mwp 8.2	Mw 8.7
Depth	20 km	15 km

Similar to a real event, the first bulletin will contain slightly different earthquake parameters than the others and a lower magnitude, as the true size of an earthquake greater than magnitude 8 usually takes over 15 minutes to determine. NTWC modifies their earthquake parameters for an event once the authoritative information becomes available from the U.S. Geological Survey (USGS), usually in bulletin 2.

Expected impacts for this exercise event are guided by tsunami forecast models and historical analogues. The models indicate variable impacts along the U.S. and Canadian West Coasts, with some Warning-level waves, many areas with Advisory-level waves, and some areas with no significant impacts.

Initially, NTWC issues a Tsunami Information Statement with a Potential Danger evaluation for all other coastlines within their Pacific Designated Service Area, because the earliest arrival times within the area are well over 6 hours away. Information messages continue despite a magnitude increase until a water level-constrained tsunami forecast can be made, about 2 hours after earthquake origin time. At that point, some smaller sections of the coastline are put into a Tsunami Warning, and the majority of the coastline is placed into a Tsunami Advisory. Alert level definitions are provided in **Section 3.1.1**.

Message Dissemination

NTWC will issue messages over various broadcast dissemination channels through the exercise. An initial communication test message will start the exercise at 1630 UTC on May 23, 2024. This test message will be circulated via the transmission methods in **Table 2**. From then on, participants should follow the schedule in **Table 1** to know when to expect new messages. These messages will be emailed from the NTWC Service Account, ntwc@noaa.gov. To be added to the exercise email list, please email the recipient email information to ntwc@noaa.gov or the NTWC Science Officer (contact information in **Section 4.5**) prior to the exercise date.

Table 1 contains the message timeline as would be issued by the NTWC in a real event. The messages can be used by EMOs to drive exercise timing if the group is not playing along with NTWC in real time. The messages (as shown in **Appendix A**)

cover an approximately 24 hour scenario timeline, but have been condensed to 5 hours in actual time for the purpose of this exercise. The World Meteorological Organization (WMO) and Advanced Weather Interactive Processing System (AWIPS) headers used in the test message are listed in **Table 2**.

NTWC issues three official products each time a message is issued. The messages provided in **Appendix A** are known as the public message and do not contain codes or text intended for automated alert systems. English (**Appendix A**) and Spanish (**Appendix B**) versions of each message are provided for this exercise. The other message not shown in **Appendix A** is the segmented message. This message includes encoded NWS zones grouped in segments, Valid Time Event Codes (VTEC), and their associated level of threat. The segmentation is used for automated processing systems which parse NWS products. NTWC issues additional graphical and web-based products to its website and social media.

Participants may elect to use 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 A**, will facilitate this approach. More ideas on exercise approaches and a sample tabletop exercise can be found in **Appendices D and E**.

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.

4.2 Master Schedule (Exercise Script)

Table 1: Scenario Timeline

A tsunami is triggered by a major earthquake with preliminary magnitude of M8.2, soon upgraded to M8.7, and revised to an epicentral location at 14.5ºS, 174.7ºW, in the Samoa Islands Region occurring on May 23, 2024 at 1630 UTC.

```
* Magnitude      8.2
* Origin Time    0830 AKDT May 23 2024
                 0930  PDT May 23 2024
                 1630  UTC May 23 2024
* Coordinates    14.4 South 174.9 West
* Depth          12 miles
* Location       in the Samoa Islands region
```

The initial test message will kick off the exercise at that time. The exercise message bulletins and notifications for conference calls will follow by email only. In the event of a National Weather Service Critical Weather Day on exercise day, the test message will also only be disseminated by email. NTWC will continue chat support to partners through NWSChat2.0 up through the exercise cancellation bulletin.

The following represents a complete timeline of events for this scenario. Please use the Dissemination column to note which steps will or won't be exercised by NTWC.

Scenario Date (UTC)	Scenario Time (UTC)	Actual Time 05/23 (PDT)	Event	Msg #	Distribution
05/23/2024	1630	930	Exercise start / CommsTest		See Table 2 p.19
05/23/2024	1638	938	TIS: US & Can West Coast	1	Email
05/23/2024	1649	949	Notif. for Conf. Call		Email
05/23/2024	1710	1010	TIS: US & Can West Coast	2	Email
05/23/2024	1730	1030	Conf. Call #1		Phone
05/23/2024	1740	1040	TIS: US & Can West Coast	3	Email
05/23/2024	1800	1100	Notif. for Conf. Call		Email
05/23/2024	1830	1130	Conf. Call #2		Phone
05/23/2024	1840	1140	Warn. & Adv.: US & Can West Coast	4	Email
FAST FORWARD ~7 HR IN SCENARIO & ACCELERATE TIME					
05/24/2024	0240	1155	W. Aleutians to Adv., Warn. & Adv. continued	12	Email
05/24/2024	0340	1205	Warn. & Adv. continued	13	Email
05/24/2024	0440	1215	Warn. & Adv. continued	14	Email
05/24/2024	0540	1225	Can. SE AK & BC, Warn. & Adv. continued	15	Email
05/24/2024	0600	1235	Notif. for Conf. Call		Email
05/24/2024	0630	1245	Conf. Call #3		Phone
05/24/2024	0640	1255	Partial Can. Aleutians, Partial CA Warn. to Adv., Warn. & Adv. contin.	16	Email
FAST FORWARD ~1 HR IN SCENARIO, CONTINUE IN ACTUAL TIME (PDT)					
05/24/2024	0800	1310	Notif. for Conf. Call		Email
05/24/2024	0830	1320	Conf. Call #4		Phone
05/24/2024	0840	1330	Partial Can. Aleutians, S.Cal, WA, OR; Warn. to Adv., Adv. continued	18	Email
FAST FORWARD ~1 HR IN SCENARIO, CONTINUE IN ACTUAL TIME (PDT)					
05/24/2024	0940	1345	Partial Can. N.Cal., Adv. continued	19	Email
FAST FORWARD ~2 HR IN SCENARIO, CONTINUE IN ACTUAL TIME (PDT)					
05/24/2024	1140	1400	Can. Aleutians, S.Cal.; Partial Can. N.Cal.	21	Email
FAST FORWARD ~2 HR IN SCENARIO, CONTINUE IN ACTUAL TIME (PDT)					
05/24/2024	1340	1415	Partial Can. N.Cal.	23	Email
FAST FORWARD ~3 HR IN SCENARIO, CONTINUE IN ACTUAL TIME (PDT)					
05/24/2024	1640	1430	Cancellation	26	Email

TWC Messages:

Warn	Tsunami Warning
Adv	Tsunami Advisory
Watch	Tsunami Watch
TIS	Tsunami Information Statement
Can	Alert cancellation
Notif. for Conf. Call	Info message for partners alerting recipient to upcoming conference call

The initial test message will be disseminated over all standard TWC broadcast channels listed in **Table 2**. This is being issued to test communications with EMOs, and to start the exercise. If you typically receive NTWC monthly communications tests, please respond as you normally would. If you do not typically receive NTWC monthly communications tests, no action is needed from you if you receive the test message.

Table 2: Product Types

Product Types Issued for Test Message 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 Managers Weather Information Network
AISR	Aeronautical Information System Replacement

4.3 Actions in Case of a Real Event

In the case of a real event occurring during the exercise, the NTWC will issue their normal messages for the event. Such messages will be given full priority and a decision will be made by the NTWC on whether to issue the test 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 "**PACIFEX24"** and "**Exercise**." The test message will include the word "**Test**." All verbal communication from NTWC will begin and end with "**This is an Exercise**."

4.4 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.

In the event of a communication error or misinterpreted exercise message, NTWC will follow established internal procedures to mitigate public and media confusion.

Again, all verbal communications from NTWC will begin and end with "**This is an Exercise**."

All NTWC messages will include **TEST** and/or **EXERCISE** in the content and headlines.

4.5 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
Summer Ohlendorf, NTWC Science Officer	907-745-4212	summer.ohlendorf@noaa.gov
Dave Snider, NTWC Warning Coordinator	907-223-9988	david.snider@noaa.gov
Anthony Picasso, ADHSEM	907-428-7046	Anthony.Picasso@alaska.gov
Martin Caldwell, BC EMCR	250-419-8674	Martin.Caldwell@gov.bc.ca
Paul Brandson, BC EMCR	250-580-5982	Paul.Brandson@gov.bc.ca
Maximilian Dixon, WA EMD Tsunami PM	253-273-3395	Maximilian.Dixon@mil.wa.gov
Althea Rizzo, OR OEM Tsunami PM	971-719-0796	Althea.Rizzo@oem.oregon.gov
Yvette LaDuke, CalOES, Tsunami PM	916-715-2243	Yvette.LaDuke@caloes.ca.gov
Charles McCreery, PTWC Director	808-725-6380	charles.mccreery@noaa.gov

4.6 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 coast 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. For all levels of exercising but especially for those communities executing full-scale and functional exercises, the media can also provide support in building awareness leading up to the Exercise. The media should be provided with available informational brochures prepared by the local, regional and international agencies. **Appendix F** contains a sample press release which can be adapted as necessary.

In an actual tsunami event, Media are encouraged to reach out to Dave Snider, NTWC Warning Coordinator, and their local NWS Weather Forecast Office Warning Coordination Meteorologist, or NOAA Public Affairs to coordinate event information for mass media.

5 Post-Exercise Evaluation

All participating agencies are requested to provide brief feedback on the exercise. This feedback will assist NTHMP and NOAA in the development of subsequent exercises. A post-exercise survey form will be emailed to the exercise email list within a week of exercise completion, and any exercise participants who do not receive one may request the form link by emailing ntwc@noaa.gov. Comments on the exercise, and proposed improvements to the messages may also be sent to this address. Any other items related to the tsunami warning system can be addressed to the persons listed in **Section 4.5**.

Appendix A. NTWC English Exercise Messages

The following messages, created for the PACIFEX24 tsunami exercise, are representative of the official standard products issued by the NTWC during a tsunami which is generated by a magnitude 8.7 earthquake located along the Tonga-Kermadec Subduction Zone, at 14.5ºS, 174.7ºW. During a real event, the NTWC would also issue graphical and html-based products to the tsunami.gov website and via RSS. Users will additionally be able to find more detailed forecast and observation information than contained in the text products, via pull-down menus in the Messages table.

NTWC Bulletin #1

```
WEAK53 PAAQ 231638
TIBAK1

Tsunami Information Statement Number 1
NWS National Tsunami Warning Center Palmer AK
938 AM PDT Thu May 23 2024

...THIS IS A TSUNAMI INFORMATION STATEMENT FOR ALASKA, BRITISH
   COLUMBIA, WASHINGTON, OREGON AND CALIFORNIA...

EVALUATION
----------
 * Earthquakes of this size are known to generate tsunamis
   potentially dangerous to coasts outside the source region.

 * The U.S. National Tsunami Warning Center is analyzing
   the event to determine the level of danger.

 * More information will be issued as it becomes available.

 * This earthquake has the potential to generate a destructive
   tsunami in the source region.


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

 * Magnitude      8.2
 * Origin Time    0830 AKDT May 23 2024
                  0930  PDT May 23 2024
                  1630  UTC May 23 2024
 * Coordinates    14.4 South 174.9 West
 * Depth          12 miles
 * Location       in the Samoa Islands region


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.

 * Messages will be issued hourly to keep you informed of the
   progress of this event.

$$
```

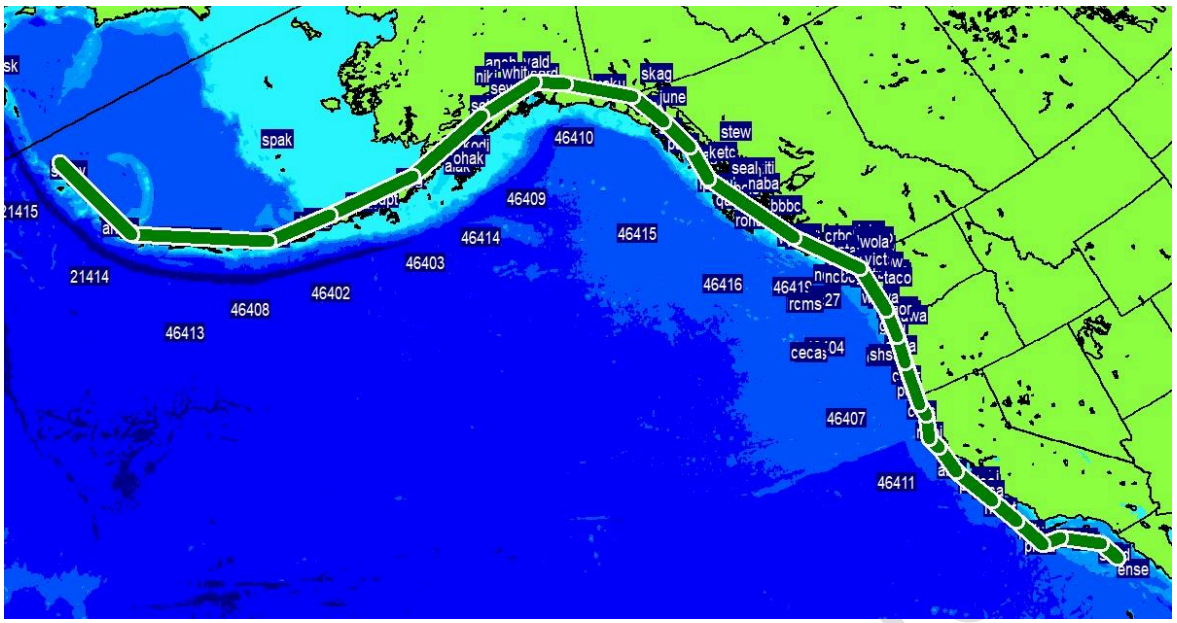


Figure A1: Coastal Alert Areas after Bulletin 1. White text shows water level observation sites.

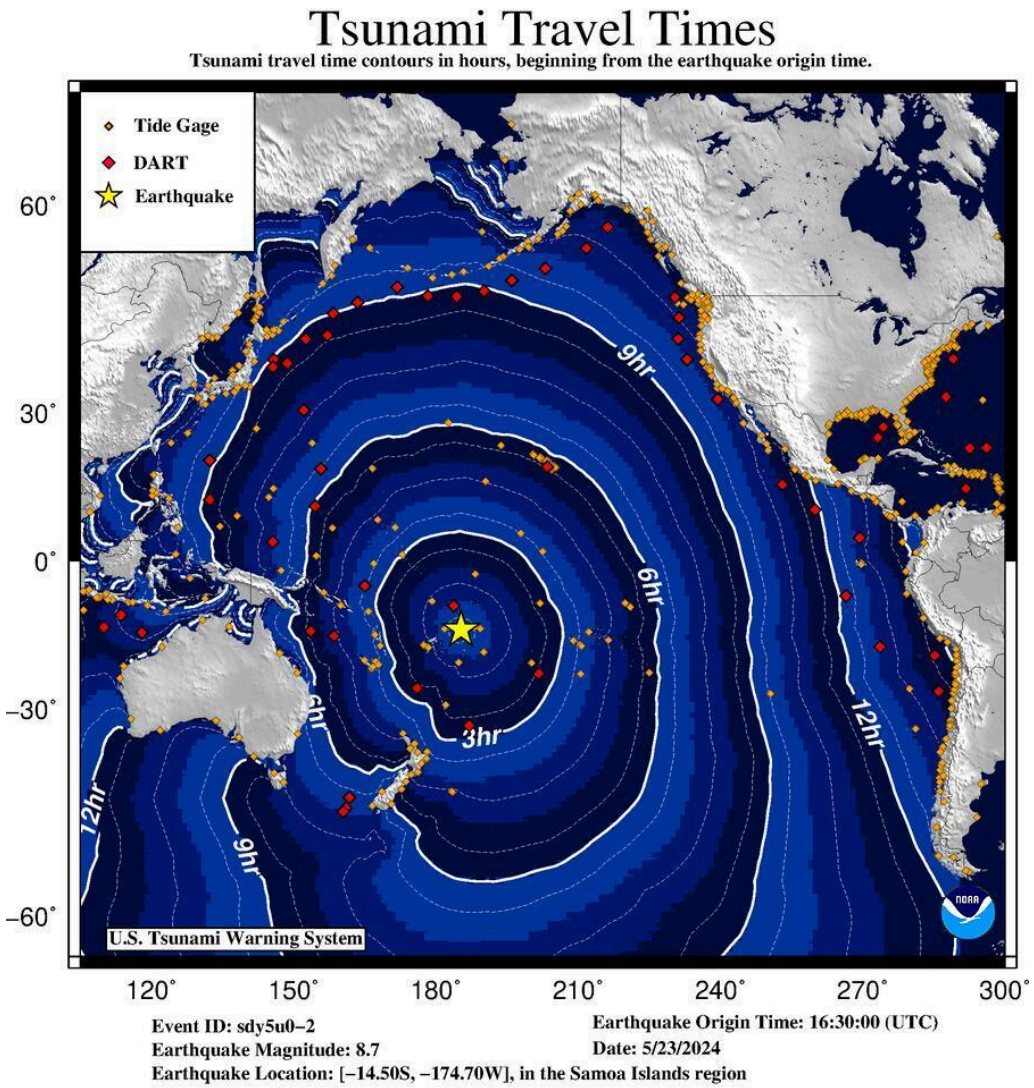


Figure A2: Hypothetical Tsunami Travel Times in hourly contours.

NTWC Bulletin #2

WEAK53 PAAQ 231710
TIBAK1

Tsunami Information Statement Number 2
NWS National Tsunami Warning Center Palmer AK
1010 AM PDT Thu May 23 2024

UPDATES
---
* A tsunami has been confirmed and some impacts are expected
* Revised magnitude

...THIS IS A TSUNAMI INFORMATION STATEMENT FOR ALASKA, BRITISH COLUMBIA, WASHINGTON, OREGON AND CALIFORNIA...

EVALUATION
---
* A tsunami has been generated that could potentially impact the U.S. West Coast, British Columbia, or Alaska.

* The U.S. National Tsunami Warning Center is analyzing the event to determine the level of danger.

* More information will be issued as it becomes available.

* This earthquake has the potential to generate a destructive tsunami in the source region.

PRELIMINARY EARTHQUAKE PARAMETERS - UPDATED
---

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

* Magnitude 8.7
* Origin Time 0830 AKDT May 23 2024
  0930 PDT May 23 2024
  1630 UTC May 23 2024
* Coordinates 14.5 South 174.7 West
* Depth 9 miles
* Location in the Samoa Islands region

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
Mata-Utu Wallis Island FR	0951 PDT May 23	10.0ft

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.

 * Messages will be issued hourly to keep you informed of the
   progress of this event.

$$
```

NTWC Bulletin #3

```
WEAK53 PAAQ 231740
TIBAK1

Tsunami Information Statement Number 3
NWS National Tsunami Warning Center Palmer AK
1040 AM PDT Thu May 23 2024

UPDATES
-------
 * Updated observations

...THIS IS A TSUNAMI INFORMATION STATEMENT FOR ALASKA, BRITISH
   COLUMBIA, WASHINGTON, OREGON AND CALIFORNIA...

EVALUATION
----------
 * A tsunami has been generated that could potentially impact
   the U.S. West Coast, British Columbia, or Alaska.

 * The U.S. National Tsunami Warning Center is analyzing
   the event to determine the level of danger.

 * More information will be issued as it becomes available.

 * This earthquake has the potential to generate a destructive
   tsunami in the source region.


PRELIMINARY EARTHQUAKE PARAMETERS
---------------------------------
 * Magnitude      8.7
 * Origin Time    0830 AKDT May 23 2024
                  0930  PDT May 23 2024
                  1630  UTC May 23 2024
 * Coordinates    14.5 South 174.7 West
 * Depth          9 miles
 * Location       in the Samoa Islands region


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.

                                    TIME                OBSERVED MAX
 SITE                            OF MEASUREMENT         TSUNAMI HEIGHT
 ----------------------------- ----------------       --------------
 Mata-Utu  Wallis Island  FR  0951  PDT May 23            10.0ft
 Pago Pago  US                1013  PDT May 23            11.9ft

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.

* Messages will be issued hourly to keep you informed of the
  progress of this event.

$$
```

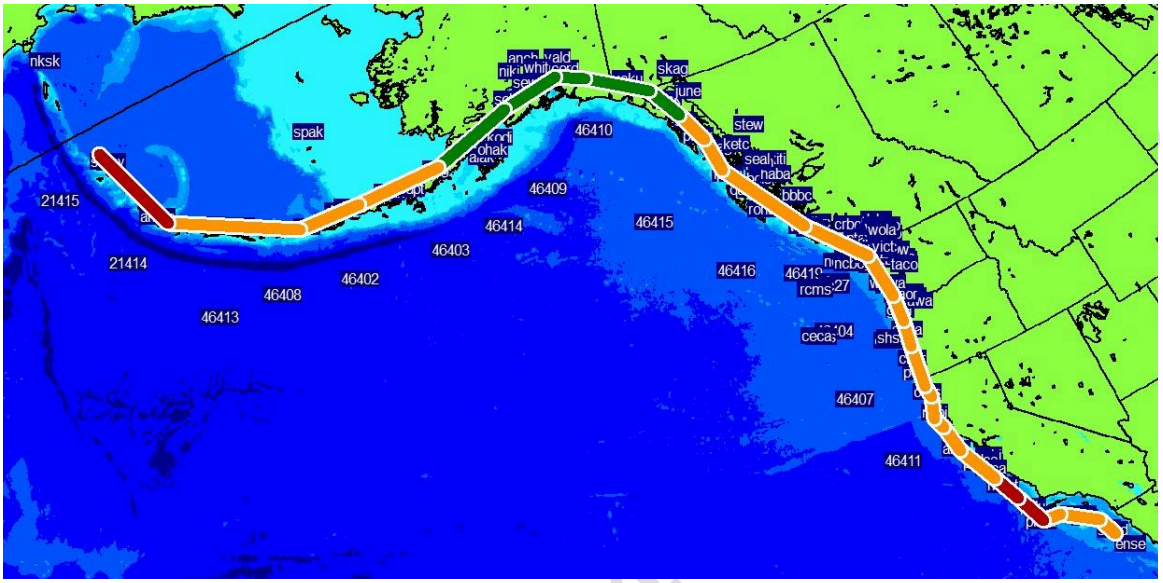


Figure A3: Coastal Alert Areas after Bulletin 4. White text shows water level observation sites.

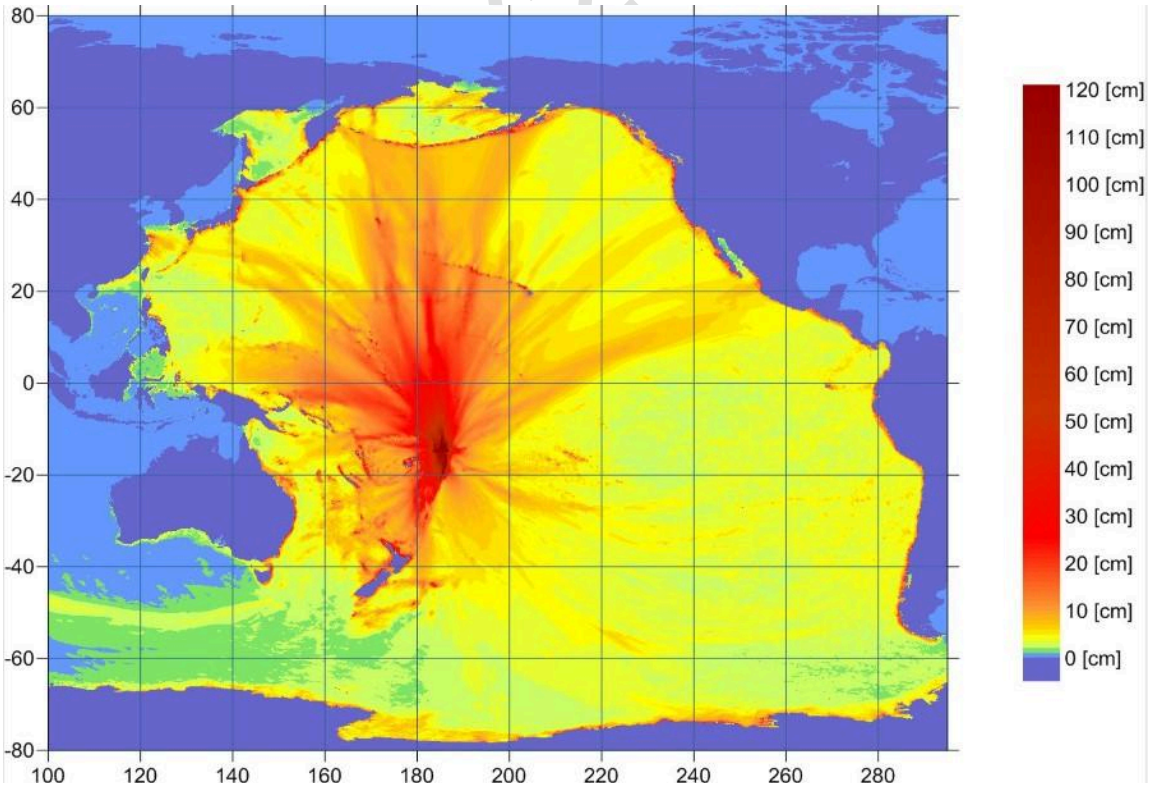


Figure A4. Best-fitting propagation forecast from the Alaska Tsunami Forecast Model (ATFM).

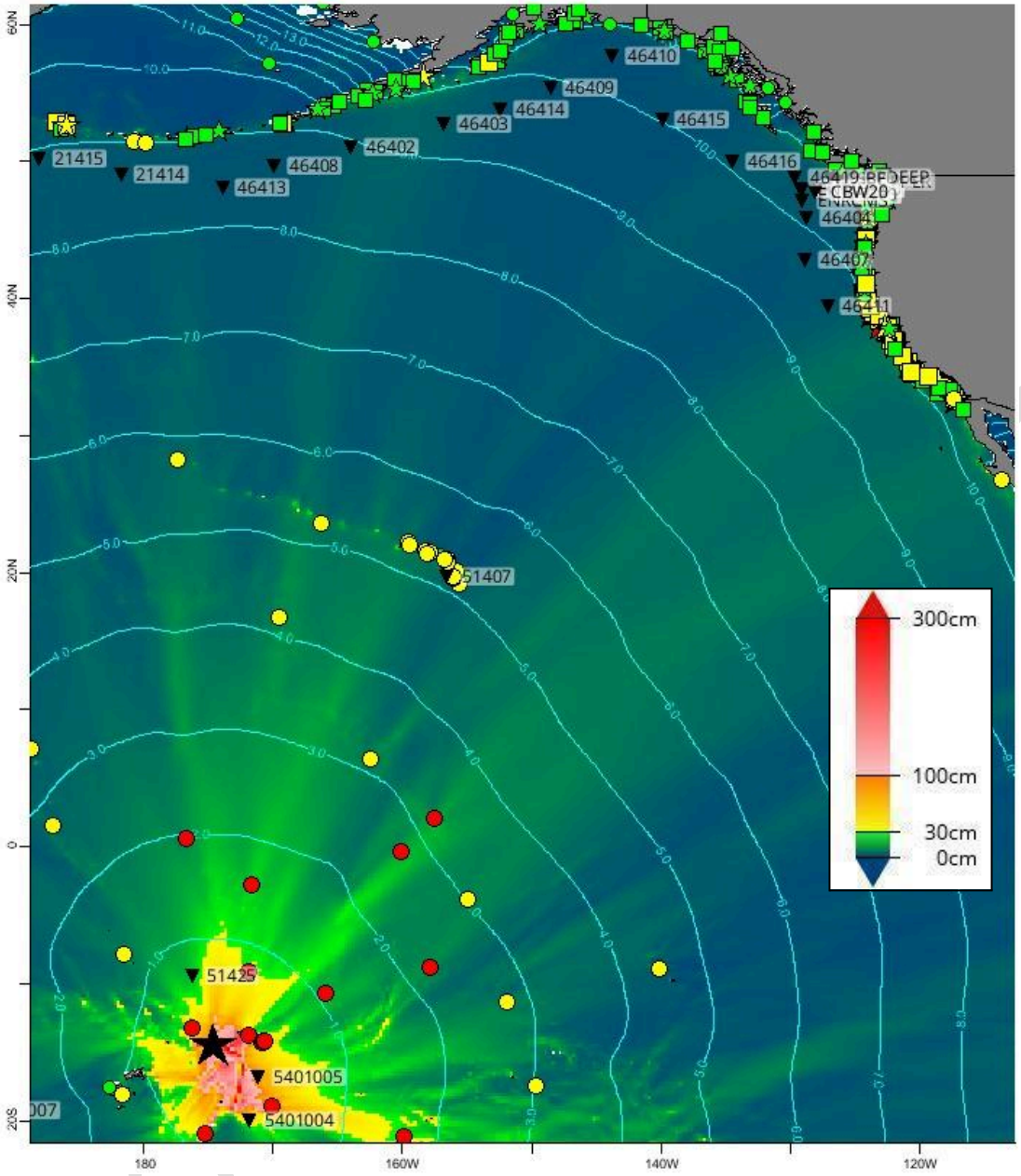


Figure A5. SIFT Event Forecast with Bulletin 4 after inverting simulated data from DARTs 51425, 5401004, and 5401005. PACIFEX24 source location (black star) near the Tonga Trench. "Splash" color scale shows predicted tsunami wave amplitudes. Teal contours show 1 hour increments of tsunami travel time. Black inverted triangles show locations of Deep Ocean Assessment and Reporting of Tsunamis (DART) buoy systems. Symbols of circles, squares and stars are showing preliminary forecasted wave heights: green < 1ft, 1ft < yellow < 3ft, red > 3 ft.

NTWC Bulletin #4

```
WEAK51 PAAQ 231840
TSUAK1

BULLETIN
Public Tsunami Message Number 4
NWS National Tsunami Warning Center Palmer AK
1140 AM PDT Thu May 23 2024
```

UPDATES
----
 * Updated observations
 * Revised alert areas
 * Revised forecast information

...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 Davenport, California (10 miles NW of Santa Cruz)

 * ALEUTIAN ISLANDS, Amchitka Pass, Alaska (125 miles W of Adak) to Attu, Alaska

Tsunami Advisory in Effect for;

 * CALIFORNIA, The coast from The Cal./Mexico Border to Point Conception, California

 * CALIFORNIA, The coast from Davenport, California (10 miles NW of Santa Cruz) 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

 * SOUTHEAST ALASKA, The inner and outer coast from The BC/Alaska Border to Salisbury Sound, Alaska

 * SOUTH ALASKA AND THE ALASKA PENINSULA, Pacific coasts from Chignik Bay, Alaska to Unimak Pass, Alaska (80 miles NE of Unalaska)

 * ALEUTIAN ISLANDS, Unimak Pass, Alaska (80 miles NE of Unalaska) to Amchitka Pass, Alaska (125 miles W of Adak) including the Pribilof Islands

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

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

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

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

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

SITE	FORECAST START OF TSUNAMI	FORECAST TSUNAMI DURATION	FORECAST MAX TSUNAMI HEIGHT
* Alaska			
Shemya	1800 AKDT May 23	20 hrs	1.7- 3.2 ft
Sitka	1945 AKDT May 23		less than 1ft
Craig	2030 AKDT May 23		
* California			
Fort Bragg	1930 PDT May 23		less than 1ft
Monterey	1935 PDT May 23	15 hrs	1.1- 2.0 ft
Port San Luis	1945 PDT May 23	40 hrs	3.7- 6.8 ft
Santa Barbara	1950 PDT May 23	15 hrs	1.3- 2.3 ft
Crescent City	1955 PDT May 23	20 hrs	1.8- 3.3 ft
Los Angeles Harb	1955 PDT May 23	9 hrs	0.8- 1.5 ft
Oceanside	1955 PDT May 23	9 hrs	0.8- 1.4 ft
La Jolla	1955 PDT May 23	9 hrs	0.8- 1.5 ft
Newport Beach	2000 PDT May 23		less than 1ft
San Francisco	2005 PDT May 23	9 hrs	0.7- 1.3 ft
* Oregon			
Port Orford	1950 PDT May 23	15 hrs	0.9- 1.8 ft
Brookings	1955 PDT May 23	9 hrs	0.8- 1.4 ft
Charleston	2005 PDT May 23		less than 1ft
Newport	2025 PDT May 23		
Seaside	2040 PDT May 23		
* British Columbia			
Langara	2025 PDT May 23		less than 1ft
Tofino	2045 PDT May 23		less than 1ft
* Washington			
Long Beach	2030 PDT May 23	9 hrs	0.8- 1.6 ft
La Push	2040 PDT May 23		
Westport	2045 PDT May 23	9 hrs	0.8- 1.6 ft
Neah Bay	2045 PDT May 23		less than 1ft
Moclips	2050 PDT May 23	15 hrs	1.1- 2.0 ft
Port Angeles	2125 PDT May 23		less than 1ft
Port Townsend	2150 PDT May 23		less than 1ft
Bellingham	2220 PDT May 23		less than 1ft
Tacoma	2305 PDT May 23		

OBSERVATIONS OF TSUNAMI ACTIVITY - UPDATED

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

SITE	TIME OF MEASUREMENT	OBSERVED MAX TSUNAMI HEIGHT
Mata-Utu Wallis Island FR	0951 PDT May 23	10.0ft
Pago Pago US	1013 PDT May 23	11.9ft
Nukualofa Tonga	1102 PDT May 23	9.3ft
Suva Fiji	1124 PDT May 23	2.5ft

PRELIMINARY EARTHQUAKE PARAMETERS
---

* Magnitude 8.7
* Origin Time 0830 AKDT May 23 2024
  0930 PDT May 23 2024
  1630 UTC May 23 2024
* Coordinates 14.5 South 174.7 West
* Depth 9 miles
* Location in the Samoa Islands region

RECOMMENDED ACTIONS - UPDATED

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 60 minutes.

$$

NTWC Bulletin #12

WEAK51 PAAQ 240240
TSUAK1

BULLETIN
Public Tsunami Message Number 12
NWS National Tsunami Warning Center Palmer AK
740 PM PDT Thu May 23 2024

UPDATES
----
 * Updated observations
 * Revised alert areas

...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
   Davenport, California (10 miles NW of Santa Cruz)

Tsunami Advisory in Effect for;

 * CALIFORNIA, The coast from The Cal./Mexico Border to Point
   Conception, California

 * CALIFORNIA, The coast from Davenport, California (10 miles
   NW of Santa Cruz) 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

 * SOUTHEAST ALASKA, The inner and outer coast from The
   BC/Alaska Border to Salisbury Sound, Alaska

 * SOUTH ALASKA AND THE ALASKA PENINSULA, Pacific coasts from
   Chignik Bay, Alaska to Unimak Pass, Alaska (80 miles NE of
   Unalaska)

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

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

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

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

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

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

SITE	FORECAST START OF TSUNAMI	FORECAST TSUNAMI DURATION	FORECAST MAX TSUNAMI HEIGHT
* California			
Fort Bragg	1930 PDT May 23		less than 1ft
Monterey	1935 PDT May 23	15 hrs	1.1- 2.0 ft
Port San Luis	1945 PDT May 23	40 hrs	3.7- 6.8 ft
Santa Barbara	1950 PDT May 23	15 hrs	1.3- 2.3 ft
Crescent City	1955 PDT May 23	20 hrs	1.8- 3.3 ft
Los Angeles Harb	1955 PDT May 23	9 hrs	0.8- 1.5 ft
Oceanside	1955 PDT May 23	9 hrs	0.8- 1.4 ft
La Jolla	1955 PDT May 23	9 hrs	0.8- 1.5 ft
Newport Beach	2000 PDT May 23		less than 1ft
San Francisco	2005 PDT May 23	9 hrs	0.7- 1.3 ft
* Oregon			
Port Orford	1950 PDT May 23	15 hrs	0.9- 1.8 ft
Brookings	1955 PDT May 23	9 hrs	0.8- 1.4 ft
Charleston	2005 PDT May 23		less than 1ft
Newport	2025 PDT May 23		
Seaside	2040 PDT May 23		
* British Columbia			
Langara	2025 PDT May 23		less than 1ft
Tofino	2045 PDT May 23		less than 1ft
* Washington			
Long Beach	2030 PDT May 23	9 hrs	0.8- 1.6 ft
La Push	2040 PDT May 23		
Westport	2045 PDT May 23	9 hrs	0.8- 1.6 ft
Neah Bay	2045 PDT May 23		less than 1ft
Moclips	2050 PDT May 23	15 hrs	1.1- 2.0 ft
Port Angeles	2125 PDT May 23		less than 1ft
Port Townsend	2150 PDT May 23		less than 1ft
Bellingham	2220 PDT May 23		less than 1ft
Tacoma	2305 PDT May 23		
* Alaska			
Sitka	1945 AKDT May 23		less than 1ft
Craig	2030 AKDT May 23		

OBSERVATIONS OF TSUNAMI ACTIVITY - UPDATED

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

SITE	TIME OF MEASUREMENT	OBSERVED MAX TSUNAMI HEIGHT
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Mata-Utu Wallis Island FR	0951 PDT May 23	10.0ft
Pago Pago US	1013 PDT May 23	11.9ft
Nukualofa Tonga	1102 PDT May 23	9.3ft
Suva Fiji	1124 PDT May 23	2.5ft
Wake Island UM	1502 PDT May 23	1.0ft
Hilo Hawaii	1527 PDT May 23	0.8ft
Kahului Hawaii	1558 PDT May 23	1.3ft
Guam Apra Harbor Guam	1658 PDT May 23	0.4ft

```
PRELIMINARY EARTHQUAKE PARAMETERS - UPDATED
-------------------------------------------
 * Magnitude      8.7
 * Origin Time    0830 AKDT May 23 2024
                  0930  PDT May 23 2024
                  1630  UTC May 23 2024
 * Coordinates    14.5 South 174.7 West
 * Depth          9 miles
 * Location       in the Samoa Islands region

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.

$$
```

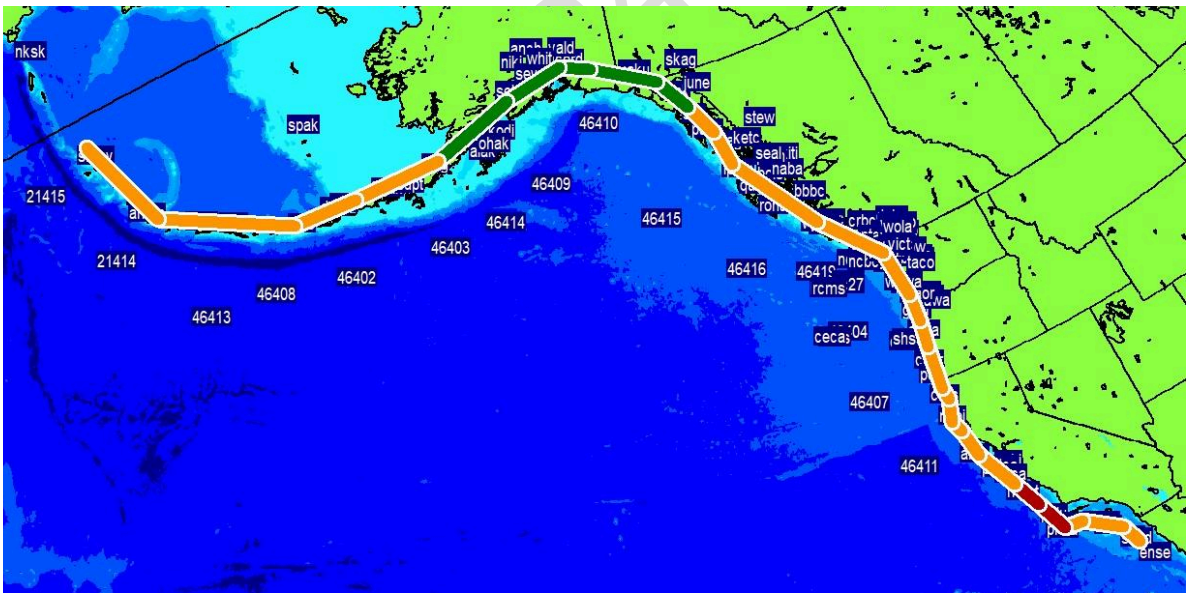


Figure A6: Coastal Alert Areas after Bulletin 12. White text shows water level observation sites.

NTWC Bulletin #13

```
WEAK51 PAAQ 240340
TSUAK1

BULLETIN
Public Tsunami Message Number 13
NWS National Tsunami Warning Center Palmer AK
840 PM PDT Thu May 23 2024
```

UPDATES
----
 * 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
   Davenport, California (10 miles NW of Santa Cruz)

Tsunami Advisory in Effect for;

 * CALIFORNIA, The coast from The Cal./Mexico Border to Point
   Conception, California

 * CALIFORNIA, The coast from Davenport, California (10 miles
   NW of Santa Cruz) 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

 * SOUTHEAST ALASKA, The inner and outer coast from The
   BC/Alaska Border to Salisbury Sound, Alaska

 * SOUTH ALASKA AND THE ALASKA PENINSULA, Pacific coasts from
   Chignik Bay, Alaska to Unimak Pass, Alaska (80 miles NE of
   Unalaska)

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

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

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

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

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

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

SITE	FORECAST START OF TSUNAMI	FORECAST TSUNAMI DURATION	FORECAST MAX TSUNAMI HEIGHT
* California			
Fort Bragg	1930 PDT May 23		less than 1ft
Monterey	1935 PDT May 23	15 hrs	1.1- 2.0 ft
Port San Luis	1945 PDT May 23	40 hrs	3.7- 6.8 ft
Santa Barbara	1950 PDT May 23	15 hrs	1.3- 2.3 ft
Crescent City	1955 PDT May 23	20 hrs	1.8- 3.3 ft
Los Angeles Harb	1955 PDT May 23	9 hrs	0.8- 1.5 ft
Oceanside	1955 PDT May 23	9 hrs	0.8- 1.4 ft
La Jolla	1955 PDT May 23	9 hrs	0.8- 1.5 ft
Newport Beach	2000 PDT May 23		less than 1ft
San Francisco	2005 PDT May 23	9 hrs	0.7- 1.3 ft
* Oregon			
Port Orford	1950 PDT May 23	15 hrs	0.9- 1.8 ft
Brookings	1955 PDT May 23	9 hrs	0.8- 1.4 ft
Charleston	2005 PDT May 23		less than 1ft
Newport	2025 PDT May 23		
Seaside	2040 PDT May 23		
* British Columbia			
Langara	2025 PDT May 23		less than 1ft
Tofino	2045 PDT May 23		less than 1ft
* Washington			
Long Beach	2030 PDT May 23	9 hrs	0.8- 1.6 ft
La Push	2040 PDT May 23		
Westport	2045 PDT May 23	9 hrs	0.8- 1.6 ft
Neah Bay	2045 PDT May 23		less than 1ft
Moclips	2050 PDT May 23	15 hrs	1.1- 2.0 ft
Port Angeles	2125 PDT May 23		less than 1ft
Port Townsend	2150 PDT May 23		less than 1ft
Bellingham	2220 PDT May 23		less than 1ft
Tacoma	2305 PDT May 23		
* Alaska			
Sitka	1945 AKDT May 23		less than 1ft
Craig	2030 AKDT May 23		

OBSERVATIONS OF TSUNAMI ACTIVITY - UPDATED

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

SITE	TIME OF MEASUREMENT	OBSERVED MAX TSUNAMI HEIGHT
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Arena Cove California	1953 PDT May 23	1.8ft
Point Reyes California	2025 PDT May 23	3.0ft
Monterey California	2022 PDT May 23	2.1ft
Unalaska Alaska	2010 PDT May 23	1.4ft
Humboldt Bay California	2008 PDT May 23	0.9ft
Port San Luis CA	2026 PDT May 23	4.6ft
Santa Barbara CA	2028 PDT May 23	1.8ft
Port Orford Oregon	2021 PDT May 23	1.3ft
Crescent City CA	2022 PDT May 23	2.9ft

Los Angeles Harbor CA	2032	PDT	May 23	2.2ft
La Jolla California	2030	PDT	May 23	1.1ft
King Cove Alaska	2016	PDT	May 23	1.0ft
Ventura California	2029	PDT	May 23	2.0ft
Sand Point Alaska	2020	PDT	May 23	0.9ft
Charleston Oregon	2030	PDT	May 23	1.2ft
San Francisco CA	2026	PDT	May 23	1.1ft
Mata-Utu Wallis Island FR	0951	PDT	May 23	10.0ft
Pago Pago US	1013	PDT	May 23	11.9ft
Nukualofa Tonga	1102	PDT	May 23	9.3ft
Suva Fiji	1124	PDT	May 23	2.5ft
Wake Island UM	1502	PDT	May 23	1.0ft
Hilo Hawaii	1527	PDT	May 23	0.8ft
Kahului Hawaii	1558	PDT	May 23	1.3ft
Guam Apra Harbor Guam	1658	PDT	May 23	0.4ft

PRELIMINARY EARTHQUAKE PARAMETERS
---
* Magnitude 8.7
* Origin Time 0830 AKDT May 23 2024
0930 PDT May 23 2024
1630 UTC May 23 2024
* Coordinates 14.5 South 174.7 West
* Depth 9 miles
* Location in the Samoa Islands region

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.

$$

NTWC Bulletin #14

WEAK51 PAAQ 240440
TSUAK1

BULLETIN
Public Tsunami Message Number 14
NWS National Tsunami Warning Center Palmer AK
940 PM PDT Thu May 23 2024

UPDATES
---
* 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 Davenport, California (10 miles NW of Santa Cruz)

Tsunami Advisory in Effect for;

* CALIFORNIA, The coast from The Cal./Mexico Border to Point Conception, California
* CALIFORNIA, The coast from Davenport, California (10 miles NW of Santa Cruz) 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
* SOUTHEAST ALASKA, The inner and outer coast from The BC/Alaska Border to Salisbury Sound, Alaska
* SOUTH ALASKA AND THE ALASKA PENINSULA, Pacific coasts from Chignik Bay, Alaska to Unimak Pass, Alaska (80 miles NE of Unalaska)
* ALEUTIAN ISLANDS, Unimak Pass, Alaska (80 miles NE of Unalaska) to Attu, Alaska including the Pribilof Islands

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

FORECASTS OF TSUNAMI ACTIVITY
---

* A tsunami has been generated. The first waves are forecasted to arrive at the following locations and specified times.
* Forecast tsunami duration is the approximate length of time which the tsunami may produce dangerous currents and waves.
* Forecast max tsunami height is the highest expected water level above the tide.
* Forecasts are not provided for sites which have been impacted more than an hour prior to the time of this message.

SITE	FORECAST START OF TSUNAMI	FORECAST TSUNAMI DURATION	FORECAST MAX TSUNAMI HEIGHT
* Oregon			
Newport	2025 PDT May 23		

Seaside	2040	PDT	May 23		
* British Columbia					
Langara	2025	PDT	May 23		less than 1ft
Tofino	2045	PDT	May 23		less than 1ft
* Washington					
Long Beach	2030	PDT	May 23	9 hrs	0.8- 1.6 ft
La Push	2040	PDT	May 23		
Westport	2045	PDT	May 23	9 hrs	0.8- 1.6 ft
Neah Bay	2045	PDT	May 23		less than 1ft
Moclips	2050	PDT	May 23	15 hrs	1.1- 2.0 ft
Port Angeles	2125	PDT	May 23		less than 1ft
Port Townsend	2150	PDT	May 23		less than 1ft
Bellingham	2220	PDT	May 23		less than 1ft
Tacoma	2305	PDT	May 23		
* Alaska					
Sitka	1945	AKDT	May 23		less than 1ft
Craig	2030	AKDT	May 23		

OBSERVATIONS OF TSUNAMI ACTIVITY - UPDATED

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

SITE	TIME OF MEASUREMENT	OBSERVED MAX TSUNAMI HEIGHT
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Arena Cove California	1953 PDT May 23	1.8ft
Point Reyes California	2025 PDT May 23	3.0ft
Monterey California	2022 PDT May 23	2.1ft
Unalaska Alaska	2010 PDT May 23	1.4ft
Humboldt Bay California	2008 PDT May 23	0.9ft
Port San Luis CA	2026 PDT May 23	4.6ft
Santa Barbara CA	2028 PDT May 23	1.8ft
Port Orford Oregon	2021 PDT May 23	1.3ft
Crescent City CA	2022 PDT May 23	2.9ft
Los Angeles Harbor CA	2032 PDT May 23	2.2ft
La Jolla California	2030 PDT May 23	1.1ft
King Cove Alaska	2016 PDT May 23	1.0ft
Ventura California	2029 PDT May 23	2.0ft
Sand Point Alaska	2020 PDT May 23	0.9ft
Charleston Oregon	2030 PDT May 23	1.2ft
San Francisco CA	2026 PDT May 23	1.1ft
San Diego California	2038 PDT May 23	1.4ft
Alameda California	2045 PDT May 23	0.5ft
Winter Harbour BC	2053 PDT May 23	0.6ft
Newport Oregon	2050 PDT May 23	1.0ft
Langara BC	2042 PDT May 23	0.4ft
Garibaldi Oregon	2051 PDT May 23	1.3ft
La Push Washington	2059 PDT May 23	0.5ft
Port Alexander Alaska	2057 PDT May 23	0.9ft
Kodiak Alaska	2100 PDT May 23	0.8ft
Elfin Cove Alaska	2104 PDT May 23	0.2ft
Sitka Alaska	2108 PDT May 23	0.8ft
Westport South Bay WA	2110 PDT May 23	1.2ft
Tofino British Columbia	2107 PDT May 23	1.0ft
Astoria Oregon	2119 PDT May 23	0.5ft
Seward Alaska	2116 PDT May 23	0.4ft

Yakutat	Alaska	2128	PDT May 23	0.8ft
Mata-Utu	Wallis Island FR	0951	PDT May 23	10.0ft
Pago Pago	US	1013	PDT May 23	11.9ft
Nukualofa	Tonga	1102	PDT May 23	9.3ft
Suva	Fiji	1124	PDT May 23	2.5ft
Wake Island	UM	1502	PDT May 23	1.0ft
Hilo	Hawaii	1527	PDT May 23	0.8ft
Kahului	Hawaii	1558	PDT May 23	1.3ft
Guam Apra Harbor	Guam	1658	PDT May 23	0.4ft

PRELIMINARY EARTHQUAKE PARAMETERS
---
* Magnitude 8.7
* Origin Time 0830 AKDT May 23 2024
0930 PDT May 23 2024
1630 UTC May 23 2024
* Coordinates 14.5 South 174.7 West
* Depth 9 miles
* Location in the Samoa Islands region

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.

$$

NTWC Bulletin #15

WEAK51 PAAQ 240540
TSUAK1

BULLETIN
Public Tsunami Message Number 15
NWS National Tsunami Warning Center Palmer AK
1040 PM PDT Thu May 23 2024

UPDATES
---
* Updated observations
* Revised alert areas

...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 Davenport, California (10 miles NW of Santa Cruz)

Tsunami Advisory in Effect for;

* CALIFORNIA, The coast from The Cal./Mexico Border to Point Conception, California
* CALIFORNIA, The coast from Davenport, California (10 miles NW of Santa Cruz) 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
* SOUTH ALASKA AND THE ALASKA PENINSULA, Pacific coasts from Chignik Bay, Alaska to Unimak Pass, Alaska (80 miles NE of Unalaska)
* ALEUTIAN ISLANDS, Unimak Pass, Alaska (80 miles NE of Unalaska) to Attu, Alaska including the Pribilof Islands

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

* The Tsunami Advisory is canceled for the coastal areas of British Columbia and Southeast Alaska from The Wash./BC Border to Salisbury Sound, Alaska

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

FORECASTS OF TSUNAMI ACTIVITY
---

* A tsunami has been generated. The first waves are forecasted to arrive at the following locations and specified times.
* Forecast tsunami duration is the approximate length of time which the tsunami may produce dangerous currents and waves.
* Forecast max tsunami height is the highest expected water level above the tide.
* Forecasts are not provided for sites which have been impacted more than an hour prior to the time of this message.

SITE	FORECAST START OF TSUNAMI	FORECAST TSUNAMI DURATION	FORECAST MAX TSUNAMI HEIGHT
* Washington			
Port Angeles	2125 PDT May 23		less than 1ft
Port Townsend	2150 PDT May 23		less than 1ft
Bellingham	2220 PDT May 23		less than 1ft
Tacoma	2305 PDT May 23		

OBSERVATIONS OF TSUNAMI ACTIVITY - UPDATED

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

SITE	TIME OF MEASUREMENT	OBSERVED MAX TSUNAMI HEIGHT
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Arena Cove California	1953 PDT May 23	1.8ft
Point Reyes California	2025 PDT May 23	3.0ft
Monterey California	2022 PDT May 23	2.1ft
Unalaska Alaska	2010 PDT May 23	1.4ft
Humboldt Bay California	2008 PDT May 23	0.9ft
Port San Luis CA	2026 PDT May 23	4.6ft
Santa Barbara CA	2028 PDT May 23	1.8ft
Port Orford Oregon	2021 PDT May 23	1.3ft
Crescent City CA	2022 PDT May 23	2.9ft
Los Angeles Harbor CA	2032 PDT May 23	2.2ft
La Jolla California	2030 PDT May 23	1.1ft
King Cove Alaska	2016 PDT May 23	1.2ft
Ventura California	2029 PDT May 23	2.0ft
Sand Point Alaska	2020 PDT May 23	0.9ft
Charleston Oregon	2030 PDT May 23	1.2ft
San Francisco CA	2026 PDT May 23	1.1ft
San Diego California	2038 PDT May 23	1.4ft
Alameda California	2045 PDT May 23	0.5ft
Winter Harbour BC	2053 PDT May 23	0.6ft
Newport Oregon	2050 PDT May 23	1.0ft
Langara BC	2042 PDT May 23	0.4ft
Garibaldi Oregon	2051 PDT May 23	1.3ft
La Push Washington	2059 PDT May 23	0.5ft
Port Alexander Alaska	2057 PDT May 23	0.9ft
Kodiak Alaska	2100 PDT May 23	0.8ft
Elfin Cove Alaska	2104 PDT May 23	0.2ft
Sitka Alaska	2108 PDT May 23	0.8ft
Westport South Bay WA	2110 PDT May 23	1.2ft
Tofino British Columbia	2107 PDT May 23	1.0ft
Astoria Oregon	2119 PDT May 23	0.5ft
Seward Alaska	2116 PDT May 23	0.4ft
Yakutat Alaska	2128 PDT May 23	0.8ft
Victoria Harbor BC	2150 PDT May 23	0.7ft
Ketchikan Alaska	2142 PDT May 23	0.7ft
Valdez Alaska	2140 PDT May 23	0.1ft
Port Angeles Washington	2146 PDT May 23	0.8ft
Mata-Utu Wallis Island FR	0951 PDT May 23	10.0ft
Pago Pago US	1013 PDT May 23	11.9ft
Nukualofa Tonga	1102 PDT May 23	9.3ft
Suva Fiji	1124 PDT May 23	2.5ft
Wake Island UM	1502 PDT May 23	1.0ft
Hilo Hawaii	1527 PDT May 23	0.8ft
Kahului Hawaii	1558 PDT May 23	1.3ft
Guam Apra Harbor Guam	1658 PDT May 23	0.4ft

PRELIMINARY EARTHQUAKE PARAMETERS

* Magnitude 8.7
* Origin Time 0830 AKDT May 23 2024
  0930 PDT May 23 2024
  1630 UTC May 23 2024

```
 * Coordinates     14.5 South 174.7 West
 * Depth           9 miles
 * Location        in the Samoa Islands region

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.
$$
```

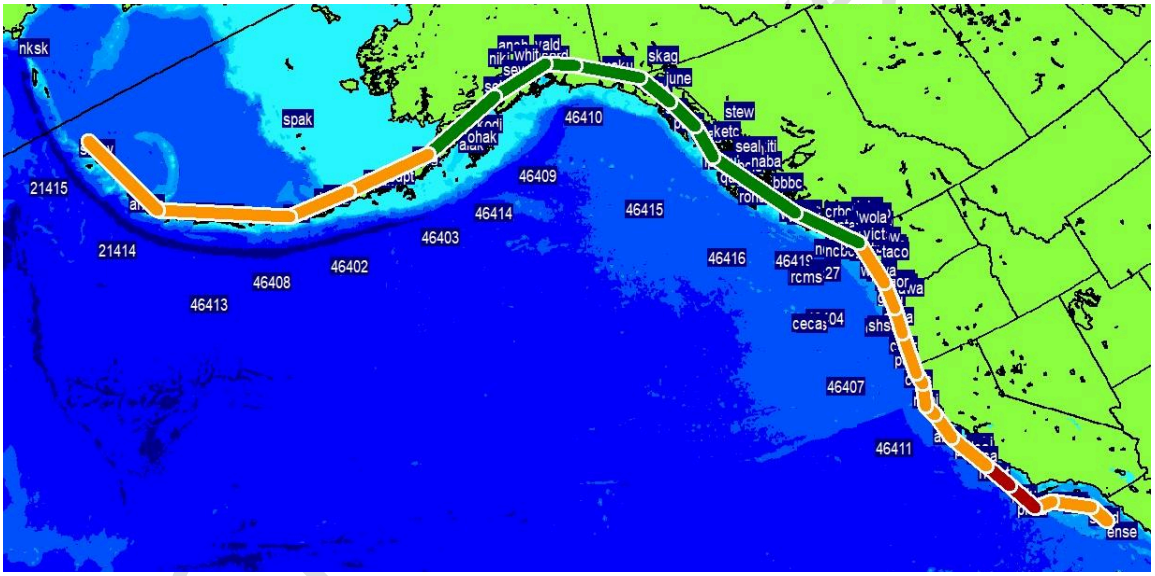


Figure A7: Coastal Alert Areas after Bulletin 15. White text shows water level observation sites.

NTWC Bulletin #16

```
WEAK51 PAAQ 2405640
TSUAK1

BULLETIN
Public Tsunami Message Number 16
NWS National Tsunami Warning Center Palmer AK
1140 PM PDT Thu May 23 2024

UPDATES
-------
 * Updated observations
 * Revised alert areas

...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 Ragged Point, California (50 miles NW of San Luis Obispo)

Tsunami Advisory in Effect for;

* CALIFORNIA, The coast from The Cal./Mexico Border to Point Conception, California
* CALIFORNIA, The coast from Ragged Point, California (50 miles NW of San Luis Obispo) to Davenport, California (10 miles NW of Santa Cruz)
* CALIFORNIA, The coast from Davenport, California (10 miles NW of Santa Cruz) 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
* ALEUTIAN ISLANDS, Unimak Pass, Alaska (80 miles NE of Unalaska) to Attu, Alaska including the Pribilof Islands

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

* The Tsunami Advisory is canceled for the coastal areas of South Alaska and the Alaska Peninsula from Chignik Bay, Alaska to Unimak Pass, Alaska (80 miles NE of Unalaska)

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

FORECASTS OF TSUNAMI ACTIVITY

* A tsunami has been generated. The first waves are forecasted to arrive at the following locations and specified times.
* Forecast tsunami duration is the approximate length of time which the tsunami may produce dangerous currents and waves.
* Forecast max tsunami height is the highest expected water level above the tide.
* Forecasts are not provided for sites which have been impacted more than an hour prior to the time of this message.

SITE	FORECAST START OF TSUNAMI	FORECAST TSUNAMI DURATION	FORECAST MAX TSUNAMI HEIGHT
* Washington			
Port Townsend	2150 PDT May 23		less than 1ft
Bellingham	2220 PDT May 23		less than 1ft
Tacoma	2305 PDT May 23		

OBSERVATIONS OF TSUNAMI ACTIVITY - UPDATED

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

SITE	TIME OF MEASUREMENT	OBSERVED MAX TSUNAMI HEIGHT
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Nikolski Alaska	2150 PDT May 23	1.0ft
Arena Cove California	1953 PDT May 23	1.8ft
Point Reyes California	2025 PDT May 23	3.0ft
Monterey California	2022 PDT May 23	2.1ft
Unalaska Alaska	2010 PDT May 23	1.4ft
Humboldt Bay California	2008 PDT May 23	0.9ft
Port San Luis CA	2026 PDT May 23	4.6ft
Santa Barbara CA	2028 PDT May 23	1.8ft
Port Orford Oregon	2021 PDT May 23	1.3ft
Crescent City CA	2022 PDT May 23	2.9ft
Los Angeles Harbor CA	2032 PDT May 23	2.2ft
La Jolla California	2030 PDT May 23	1.1ft
King Cove Alaska	2016 PDT May 23	1.2ft
Ventura California	2029 PDT May 23	2.0ft
Santa Monica California	2320 PDT May 23	1.5ft
Sand Point Alaska	2020 PDT May 23	0.9ft
Charleston Oregon	2030 PDT May 23	1.2ft
San Francisco CA	2026 PDT May 23	1.1ft
San Diego California	2038 PDT May 23	1.4ft
Alameda California	2045 PDT May 23	0.5ft
Winter Harbour BC	2053 PDT May 23	0.6ft
Newport Oregon	2050 PDT May 23	1.0ft
Langara BC	2042 PDT May 23	0.4ft
Garibaldi Oregon	2051 PDT May 23	1.3ft
La Push Washington	2059 PDT May 23	0.5ft
Port Alexander Alaska	2057 PDT May 23	0.9ft
Kodiak Alaska	2100 PDT May 23	0.8ft
Elfin Cove Alaska	2104 PDT May 23	0.2ft
Sitka Alaska	2108 PDT May 23	0.8ft
Westport South Bay WA	2110 PDT May 23	1.2ft
Tofino British Columbia	2107 PDT May 23	1.0ft
Astoria Oregon	2119 PDT May 23	0.5ft
Seward Alaska	2116 PDT May 23	0.4ft
Yakutat Alaska	2128 PDT May 23	0.8ft
Victoria Harbor BC	2150 PDT May 23	0.7ft
Ketchikan Alaska	2142 PDT May 23	0.7ft
Valdez Alaska	2140 PDT May 23	0.1ft
Port Angeles Washington	2146 PDT May 23	0.8ft
Mata-Utu Wallis Island FR	0951 PDT May 23	10.0ft
Pago Pago US	1013 PDT May 23	11.9ft
Nukualofa Tonga	1102 PDT May 23	9.3ft
Suva Fiji	1124 PDT May 23	2.5ft
Wake Island UM	1502 PDT May 23	1.0ft
Hilo Hawaii	1527 PDT May 23	0.8ft
Kahului Hawaii	1558 PDT May 23	1.3ft
Guam Apra Harbor Guam	1658 PDT May 23	0.4ft

PRELIMINARY EARTHQUAKE PARAMETERS

* Magnitude 8.7
* Origin Time 0830 AKDT May 23 2024

```
                  0930  PDT May 23 2024
                  1630  UTC May 23 2024
 * Coordinates    14.5 South 174.7 West
 * Depth          9 miles
 * Location       in the Samoa Islands region

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.

$$
```

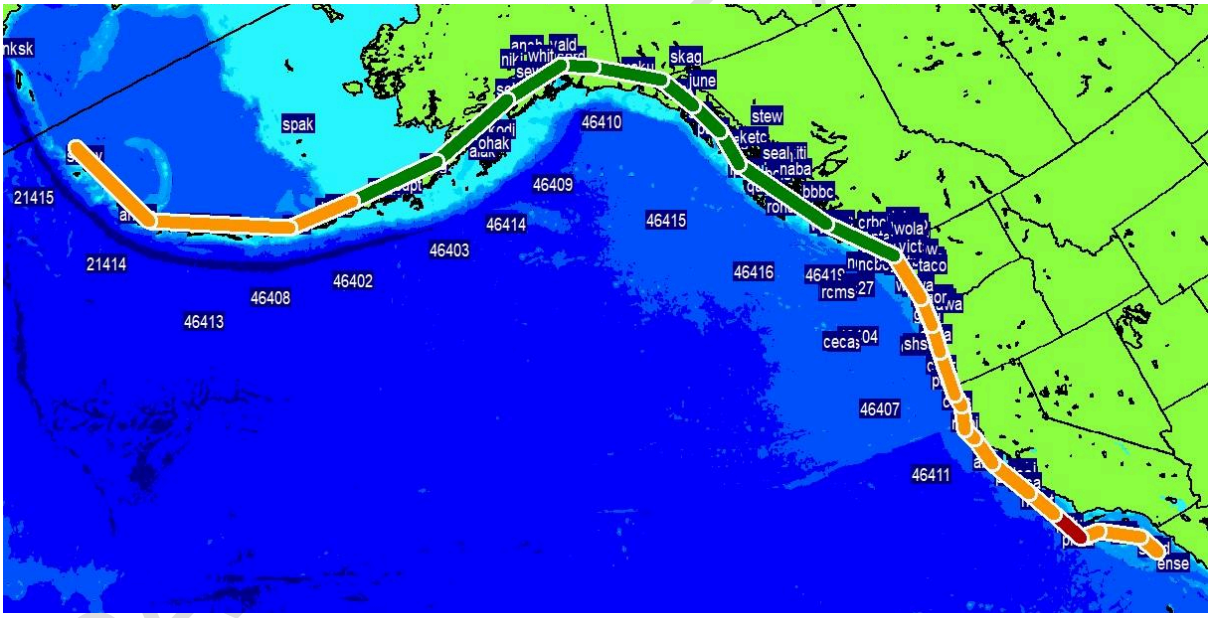


Figure A8: Coastal Alert Areas after Bulletin 16. White text shows water level observation sites.

NTWC Bulletin #18

```
WEAK51 PAAQ 240840
TSUAK1

BULLETIN
Public Tsunami Message Number 18
NWS National Tsunami Warning Center Palmer AK
140 AM PDT Fri May 24 2024

UPDATES
-------
 * Revised alert areas
```

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

Tsunami Advisory in Effect for;

* CALIFORNIA, The coast from Orange/San Diego Line, California (45 miles SE of L.A.) to Point Conception, California
* CALIFORNIA, The coast from Point Conception, California to Ragged Point, California (50 miles NW of San Luis Obispo)
* CALIFORNIA, The coast from Ragged Point, California (50 miles NW of San Luis Obispo) to The Oregon/Cal. Border including San Francisco Bay
* ALEUTIAN ISLANDS, Samalga Pass, Alaska (30 miles SW of Nikolski) to Attu, Alaska including the Pribilof Islands

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

* The Tsunami Advisory is canceled for the coastal areas of California from The Cal./Mexico Border to Orange/San Diego Line, California (45 miles SE of L.A.)
* The Tsunami Advisory is canceled for the coastal areas of Oregon and Washington from The Oregon/Cal. Border to The Wash./BC Border
* The Tsunami Advisory is canceled for the coastal areas of Aleutian Islands from Unimak Pass, Alaska (80 miles NE of Unalaska) to Samalga Pass, Alaska (30 miles SW of Nikolski)

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

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
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Nikolski Alaska	2150 PDT May 23	1.0ft
Arena Cove California	1953 PDT May 23	1.8ft
Point Reyes California	2025 PDT May 23	3.0ft
Monterey California	2022 PDT May 23	2.1ft
Unalaska Alaska	2010 PDT May 23	1.4ft
Humboldt Bay California	2008 PDT May 23	0.9ft
Port San Luis CA	2026 PDT May 23	4.6ft
Santa Barbara CA	2028 PDT May 23	1.8ft
Port Orford Oregon	2021 PDT May 23	1.3ft
Crescent City CA	2022 PDT May 23	2.9ft
Los Angeles Harbor CA	2032 PDT May 23	2.2ft
La Jolla California	2030 PDT May 23	1.1ft
King Cove Alaska	2016 PDT May 23	1.2ft
Ventura California	2029 PDT May 23	2.0ft
Santa Monica California	2320 PDT May 23	1.5ft

Sand Point Alaska	2020	PDT	May 23	0.9ft
Charleston Oregon	2030	PDT	May 23	1.2ft
San Francisco CA	2026	PDT	May 23	1.1ft
San Diego California	2038	PDT	May 23	1.4ft
Alameda California	2045	PDT	May 23	0.5ft
Winter Harbour BC	2053	PDT	May 23	0.6ft
Newport Oregon	2050	PDT	May 23	1.0ft
Langara BC	2042	PDT	May 23	0.4ft
Garibaldi Oregon	2051	PDT	May 23	1.3ft
La Push Washington	2059	PDT	May 23	0.5ft
Port Alexander Alaska	2057	PDT	May 23	0.9ft
Kodiak Alaska	2100	PDT	May 23	0.8ft
Elfin Cove Alaska	2104	PDT	May 23	0.2ft
Sitka Alaska	2108	PDT	May 23	0.8ft
Westport South Bay WA	2110	PDT	May 23	1.2ft
Tofino British Columbia	2107	PDT	May 23	1.0ft
Astoria Oregon	2119	PDT	May 23	0.5ft
Seward Alaska	2116	PDT	May 23	0.4ft
Yakutat Alaska	2128	PDT	May 23	0.8ft
Victoria Harbor BC	2150	PDT	May 23	0.7ft
Ketchikan Alaska	2142	PDT	May 23	0.7ft
Valdez Alaska	2140	PDT	May 23	0.1ft
Port Angeles Washington	2146	PDT	May 23	0.8ft
Mata-Utu Wallis Island FR	0951	PDT	May 23	10.0ft
Pago Pago US	1013	PDT	May 23	11.9ft
Nukualofa Tonga	1102	PDT	May 23	9.3ft
Suva Fiji	1124	PDT	May 23	2.5ft
Wake Island UM	1502	PDT	May 23	1.0ft
Hilo Hawaii	1527	PDT	May 23	0.8ft
Kahului Hawaii	1558	PDT	May 23	1.3ft
Guam Apra Harbor Guam	1658	PDT	May 23	0.4ft

PRELIMINARY EARTHQUAKE PARAMETERS
---

* Magnitude 8.7
* Origin Time 0830 AKDT May 23 2024
  0930 PDT May 23 2024
  1630 UTC May 23 2024
* Coordinates 14.5 South 174.7 West
* Depth 9 miles
* Location in the Samoa Islands region

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.

$$
```

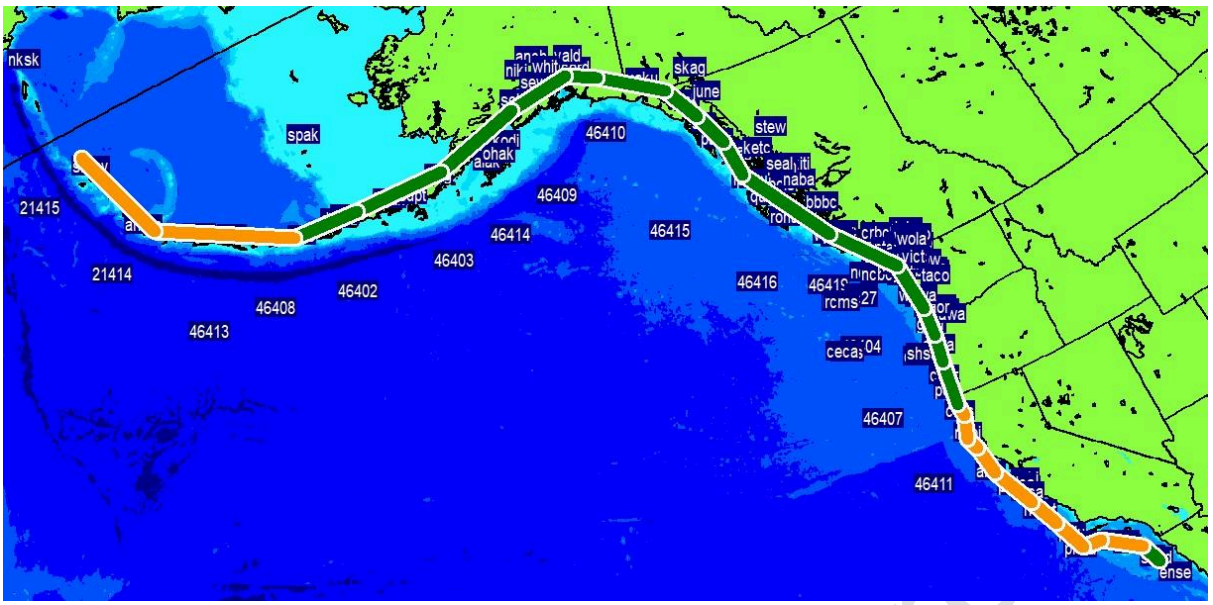


Figure A9: Coastal Alert Areas after Bulletin 18. White text shows water level observation sites.

NTWC Bulletin #19

```
WEAK51 PAAQ 240940
TSUAK1

BULLETIN
Public Tsunami Message Number 19
NWS National Tsunami Warning Center Palmer AK
240 AM PDT Fri May 24 2024

UPDATES
-------
 * Revised alert areas

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

Tsunami Advisory in Effect for;

 * CALIFORNIA, The coast from Orange/San Diego Line,
   California (    45 miles SE of L.A.) to Mendo/Hum County
   Line, California (55 miles SW of Eureka) including San
   Francisco Bay

 * CALIFORNIA, The coast from Humboldt/Del Norte Line,
   California to The Oregon/Cal. Border

 * ALEUTIAN ISLANDS, Samalga Pass, Alaska (30 miles SW of
   Nikolski) to Attu, Alaska including the Pribilof Islands

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

 * The Tsunami Advisory is canceled for the coastal areas of
   California from Mendo/Hum County Line, California (55 miles
   SW of Eureka) to Humboldt/Del Norte Line, California

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

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
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Nikolski Alaska	2150 PDT May 23	1.0ft
Arena Cove California	1953 PDT May 23	1.8ft
Point Reyes California	2025 PDT May 23	3.0ft
Monterey California	2022 PDT May 23	2.1ft
Unalaska Alaska	2010 PDT May 23	1.4ft
Humboldt Bay California	2008 PDT May 23	0.9ft
Port San Luis CA	2026 PDT May 23	4.6ft
Santa Barbara CA	2028 PDT May 23	1.8ft
Port Orford Oregon	2021 PDT May 23	1.3ft
Crescent City CA	2022 PDT May 23	2.9ft
Los Angeles Harbor CA	2032 PDT May 23	2.2ft
La Jolla California	2030 PDT May 23	1.1ft
King Cove Alaska	2016 PDT May 23	1.2ft
Ventura California	2029 PDT May 23	2.0ft
Santa Monica California	2320 PDT May 23	1.5ft
Sand Point Alaska	2020 PDT May 23	0.9ft
Charleston Oregon	2030 PDT May 23	1.2ft
San Francisco CA	2026 PDT May 23	1.1ft
San Diego California	2038 PDT May 23	1.4ft
Alameda California	2045 PDT May 23	0.5ft
Winter Harbour BC	2053 PDT May 23	0.6ft
Newport Oregon	2050 PDT May 23	1.0ft
Langara BC	2042 PDT May 23	0.4ft
Garibaldi Oregon	2051 PDT May 23	1.3ft
La Push Washington	2059 PDT May 23	0.5ft
Port Alexander Alaska	2057 PDT May 23	0.9ft
Kodiak Alaska	2100 PDT May 23	0.8ft
Elfin Cove Alaska	2104 PDT May 23	0.2ft
Sitka Alaska	2108 PDT May 23	0.8ft
Westport South Bay WA	2110 PDT May 23	1.2ft
Tofino British Columbia	2107 PDT May 23	1.0ft
Astoria Oregon	2119 PDT May 23	0.5ft
Seward Alaska	2116 PDT May 23	0.4ft
Yakutat Alaska	2128 PDT May 23	0.8ft
Victoria Harbor BC	2150 PDT May 23	0.7ft
Ketchikan Alaska	2142 PDT May 23	0.7ft
Valdez Alaska	2140 PDT May 23	0.1ft
Port Angeles Washington	2146 PDT May 23	0.8ft
Mata-Utu Wallis Island FR	0951 PDT May 23	10.0ft
Pago Pago US	1013 PDT May 23	11.9ft
Nukualofa Tonga	1102 PDT May 23	9.3ft
Suva Fiji	1124 PDT May 23	2.5ft
Wake Island UM	1502 PDT May 23	1.0ft
Hilo Hawaii	1527 PDT May 23	0.8ft
Kahului Hawaii	1558 PDT May 23	1.3ft
Guam Apra Harbor Guam	1658 PDT May 23	0.4ft

PRELIMINARY EARTHQUAKE PARAMETERS

* Magnitude 8.7
* Origin Time 0830 AKDT May 23 2024

```
                  0930  PDT May 23 2024
                  1630  UTC May 23 2024
 * Coordinates    14.5 South 174.7 West
 * Depth          9 miles
 * Location       in the Samoa Islands region

RECOMMENDED ACTIONS
-------------------
 * See message number 18 for recommended actions.

IMPACTS
-------
 * See message number 18 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.

$$
```

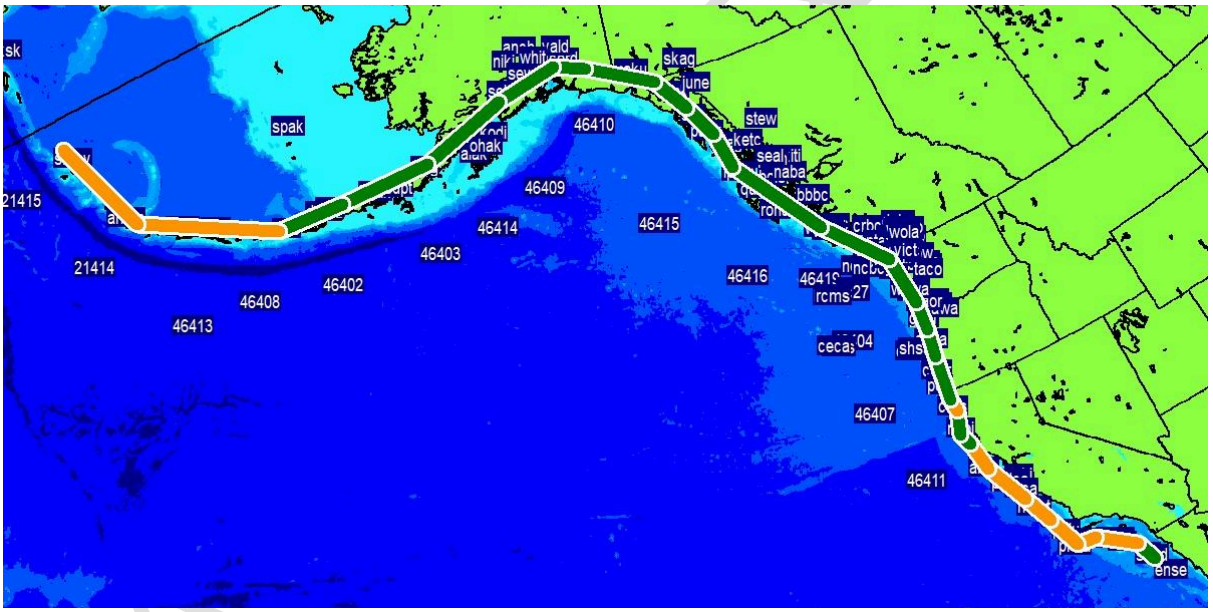


Figure A10: Coastal Alert Areas after Bulletin 19. White text shows water level observation sites.

NTWC Bulletin #21

```
WEAK51 PAAQ 241140
TSUAK1

BULLETIN
Public Tsunami Message Number 21
NWS National Tsunami Warning Center Palmer AK
440 AM PDT Fri May 24 2024

UPDATES
-------
 * Revised alert areas
```

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

Tsunami Advisory in Effect for;

* CALIFORNIA, The coast from Point Conception, California to Ragged Point, California (50 miles NW of San Luis Obispo)

* CALIFORNIA, The coast from Humboldt/Del Norte Line, California to The Oregon/Cal. Border

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

* The Tsunami Advisory is canceled for the coastal areas of California from Orange/San Diego Line, California (45 miles SE of L.A.) to Point Conception, California

* The Tsunami Advisory is canceled for the coastal areas of California from Ragged Point, California (50 miles NW of San Luis Obispo) to Mendo/Hum County Line, California (55 miles SW of Eureka)

* The Tsunami Advisory is canceled for the coastal areas of Aleutian Islands from Samalga Pass, Alaska (30 miles SW of Nikolski) to Attu, Alaska

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

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
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Nikolski Alaska	2150 PDT May 23	1.0ft
Arena Cove California	1953 PDT May 23	1.8ft
Point Reyes California	2025 PDT May 23	3.0ft
Monterey California	2022 PDT May 23	2.1ft
Unalaska Alaska	2010 PDT May 23	1.4ft
Humboldt Bay California	2008 PDT May 23	0.9ft
Port San Luis CA	2026 PDT May 23	4.6ft
Santa Barbara CA	2028 PDT May 23	1.8ft
Port Orford Oregon	2021 PDT May 23	1.3ft
Crescent City CA	2022 PDT May 23	2.9ft
Los Angeles Harbor CA	2032 PDT May 23	2.2ft
La Jolla California	2030 PDT May 23	1.1ft
King Cove Alaska	2016 PDT May 23	1.2ft
Ventura California	2029 PDT May 23	2.0ft
Santa Monica California	2320 PDT May 23	1.5ft
Sand Point Alaska	2020 PDT May 23	0.9ft
Charleston Oregon	2030 PDT May 23	1.2ft
San Francisco CA	2026 PDT May 23	1.1ft
San Diego California	2038 PDT May 23	1.4ft
Alameda California	2045 PDT May 23	0.5ft
Winter Harbour BC	2053 PDT May 23	0.6ft

Newport	Oregon	2050	PDT May 23	1.0ft
Langara	BC	2042	PDT May 23	0.4ft
Garibaldi	Oregon	2051	PDT May 23	1.3ft
La Push	Washington	2059	PDT May 23	0.5ft
Port Alexander	Alaska	2057	PDT May 23	0.9ft
Kodiak	Alaska	2100	PDT May 23	0.8ft
Elfin Cove	Alaska	2104	PDT May 23	0.2ft
Sitka	Alaska	2108	PDT May 23	0.8ft
Westport South Bay	WA	2110	PDT May 23	1.2ft
Tofino	British Columbia	2107	PDT May 23	1.0ft
Astoria	Oregon	2119	PDT May 23	0.5ft
Seward	Alaska	2116	PDT May 23	0.4ft
Yakutat	Alaska	2128	PDT May 23	0.8ft
Victoria Harbor	BC	2150	PDT May 23	0.7ft
Ketchikan	Alaska	2142	PDT May 23	0.7ft
Valdez	Alaska	2140	PDT May 23	0.1ft
Port Angeles	Washington	2146	PDT May 23	0.8ft
Mata-Utu	Wallis Island FR	0951	PDT May 23	10.0ft
Pago Pago	US	1013	PDT May 23	11.9ft
Nukualofa	Tonga	1102	PDT May 23	9.3ft
Suva	Fiji	1124	PDT May 23	2.5ft
Wake Island	UM	1502	PDT May 23	1.0ft
Hilo	Hawaii	1527	PDT May 23	0.8ft
Kahului	Hawaii	1558	PDT May 23	1.3ft
Guam Apra Harbor	Guam	1658	PDT May 23	0.4ft

PRELIMINARY EARTHQUAKE PARAMETERS
---

* Magnitude 8.7
* Origin Time 0830 AKDT May 23 2024
  0930 PDT May 23 2024
  1630 UTC May 23 2024
* Coordinates 14.5 South 174.7 West
* Depth 9 miles
* Location in the Samoa Islands region

RECOMMENDED ACTIONS
---

* See message number 18 for recommended actions.

IMPACTS
---

* See message number 18 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.

$$

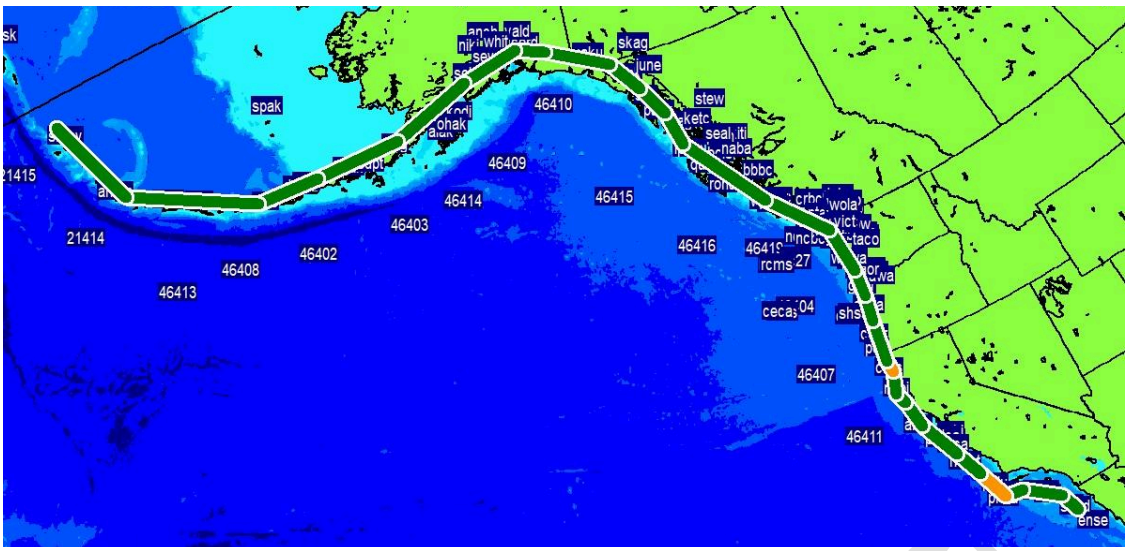


Figure A11: Coastal Alert Areas after Bulletin 21. White text shows water level observation sites.

NTWC Bulletin #23

```
WEAK51 PAAQ 241340
TSUAK1

BULLETIN
Public Tsunami Message Number 23
NWS National Tsunami Warning Center Palmer AK
640 AM PDT Fri May 24 2024

UPDATES
-------
 * Revised alert areas

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

Tsunami Advisory in Effect for;

 * CALIFORNIA, The coast from Point Conception, California to
   Ragged Point, California (50 miles NW of San Luis Obispo)

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

 * The Tsunami Advisory is canceled for the coastal areas of
   California from Humboldt/Del Norte Line, California to The
   Oregon/Cal. Border

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


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.

                                  TIME                OBSERVED MAX
 SITE                          OF MEASUREMENT         TSUNAMI HEIGHT
 ----------------------------  ----------------       --------------
 Atka  Alaska                  1904  PDT May 23           2.3ft
```

Adak	Alaska	1919	PDT May 23	1.8ft
Nikolski	Alaska	2150	PDT May 23	1.0ft
Arena Cove	California	1953	PDT May 23	1.8ft
Point Reyes	California	2025	PDT May 23	3.0ft
Monterey	California	2022	PDT May 23	2.1ft
Unalaska	Alaska	2010	PDT May 23	1.4ft
Humboldt Bay	California	2008	PDT May 23	0.9ft
Port San Luis	CA	2026	PDT May 23	4.6ft
Santa Barbara	CA	2028	PDT May 23	1.8ft
Port Orford	Oregon	2021	PDT May 23	1.3ft
Crescent City	CA	2022	PDT May 23	2.9ft
Los Angeles Harbor	CA	2032	PDT May 23	2.2ft
La Jolla	California	2030	PDT May 23	1.1ft
King Cove	Alaska	2016	PDT May 23	1.2ft
Ventura	California	2029	PDT May 23	2.0ft
Santa Monica	California	2320	PDT May 23	1.5ft
Sand Point	Alaska	2020	PDT May 23	0.9ft
Charleston	Oregon	2030	PDT May 23	1.2ft
San Francisco	CA	2026	PDT May 23	1.1ft
San Diego	California	2038	PDT May 23	1.4ft
Alameda	California	2045	PDT May 23	0.5ft
Winter Harbour	BC	2053	PDT May 23	0.6ft
Newport	Oregon	2050	PDT May 23	1.0ft
Langara	BC	2042	PDT May 23	0.4ft
Garibaldi	Oregon	2051	PDT May 23	1.3ft
La Push	Washington	2059	PDT May 23	0.5ft
Port Alexander	Alaska	2057	PDT May 23	0.9ft
Kodiak	Alaska	2100	PDT May 23	0.8ft
Elfin Cove	Alaska	2104	PDT May 23	0.2ft
Sitka	Alaska	2108	PDT May 23	0.8ft
Westport South Bay	WA	2110	PDT May 23	1.2ft
Tofino	British Columbia	2107	PDT May 23	1.0ft
Astoria	Oregon	2119	PDT May 23	0.5ft
Seward	Alaska	2116	PDT May 23	0.4ft
Yakutat	Alaska	2128	PDT May 23	0.8ft
Victoria Harbor	BC	2150	PDT May 23	0.7ft
Ketchikan	Alaska	2142	PDT May 23	0.7ft
Valdez	Alaska	2140	PDT May 23	0.1ft
Port Angeles	Washington	2146	PDT May 23	0.8ft
Mata-Utu	Wallis Island FR	0951	PDT May 23	10.0ft
Pago Pago	US	1013	PDT May 23	11.9ft
Nukualofa	Tonga	1102	PDT May 23	9.3ft
Suva	Fiji	1124	PDT May 23	2.5ft
Wake Island	UM	1502	PDT May 23	1.0ft
Hilo	Hawaii	1527	PDT May 23	0.8ft
Kahului	Hawaii	1558	PDT May 23	1.3ft
Guam Apra Harbor	Guam	1658	PDT May 23	0.4ft

PRELIMINARY EARTHQUAKE PARAMETERS
---

* Magnitude 8.7
* Origin Time 0830 AKDT May 23 2024
  0930 PDT May 23 2024
  1630 UTC May 23 2024
* Coordinates 14.5 South 174.7 West
* Depth 9 miles
* Location in the Samoa Islands region

RECOMMENDED ACTIONS
---

* See message number 18 for recommended actions.

```
IMPACTS
-------
 * See message number 18 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.

$$
```

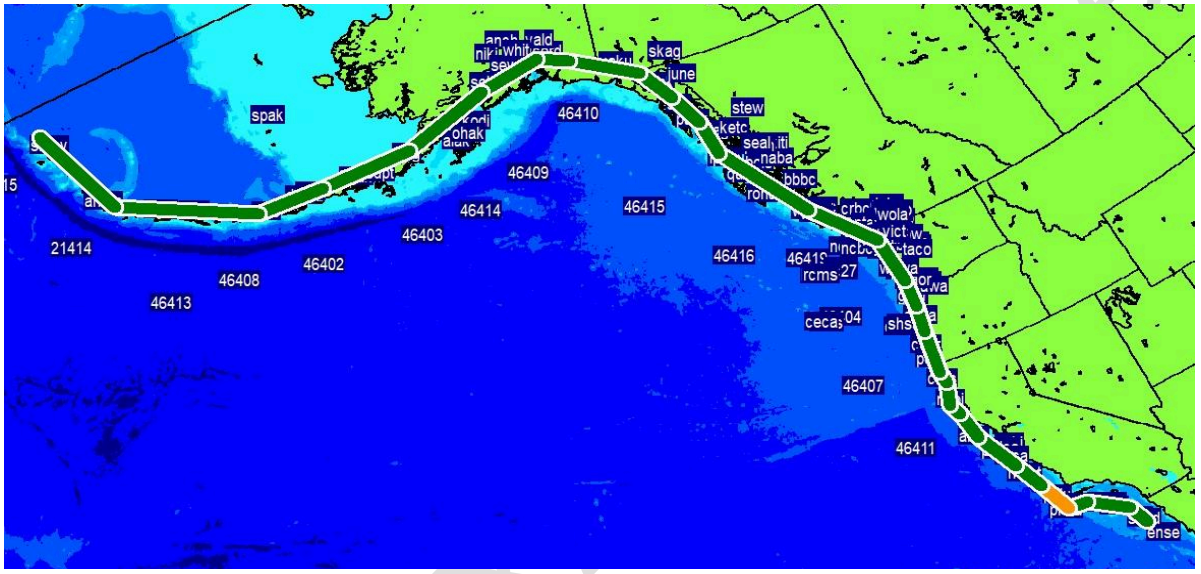


Figure A12: Coastal alert areas after Bulletin 23. White text shows water level observation sites.

NTWC Bulletin #26

```
WEAK51 PAAQ 241640
TSUAK1

BULLETIN
Public Tsunami Message Number 26
NWS National Tsunami Warning Center Palmer AK
940 AM PDT Fri May 24 2024

...THE TSUNAMI ADVISORY IS CANCELLED...

 * The Tsunami Advisory is canceled for the coastal areas of
   California

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.

                                   TIME                OBSERVED MAX
 SITE                            OF MEASUREMENT         TSUNAMI HEIGHT
 ------------------------------ ----------------       --------------
 Atka  Alaska                    1904  PDT May 23            2.3ft
```

Adak	Alaska	1919	PDT May 23	1.8ft
Nikolski	Alaska	2150	PDT May 23	1.0ft
Arena Cove	California	1953	PDT May 23	1.8ft
Point Reyes	California	2025	PDT May 23	3.0ft
Monterey	California	2022	PDT May 23	2.1ft
Unalaska	Alaska	2010	PDT May 23	1.4ft
Humboldt Bay	California	2008	PDT May 23	0.9ft
Port San Luis	CA	2026	PDT May 23	4.6ft
Santa Barbara	CA	2028	PDT May 23	1.8ft
Port Orford	Oregon	2021	PDT May 23	1.3ft
Crescent City	CA	2022	PDT May 23	2.9ft
Los Angeles Harbor	CA	2032	PDT May 23	2.2ft
La Jolla	California	2030	PDT May 23	1.1ft
King Cove	Alaska	2016	PDT May 23	1.2ft
Ventura	California	2029	PDT May 23	2.0ft
Santa Monica	California	2320	PDT May 23	1.5ft
Sand Point	Alaska	2020	PDT May 23	0.9ft
Charleston	Oregon	2030	PDT May 23	1.2ft
San Francisco	CA	2026	PDT May 23	1.1ft
San Diego	California	2038	PDT May 23	1.4ft
Alameda	California	2045	PDT May 23	0.5ft
Winter Harbour	BC	2053	PDT May 23	0.6ft
Newport	Oregon	2050	PDT May 23	1.0ft
Langara	BC	2042	PDT May 23	0.4ft
Garibaldi	Oregon	2051	PDT May 23	1.3ft
La Push	Washington	2059	PDT May 23	0.5ft
Port Alexander	Alaska	2057	PDT May 23	0.9ft
Kodiak	Alaska	2100	PDT May 23	0.8ft
Elfin Cove	Alaska	2104	PDT May 23	0.2ft
Sitka	Alaska	2108	PDT May 23	0.8ft
Westport South Bay	WA	2110	PDT May 23	1.2ft
Tofino	British Columbia	2107	PDT May 23	1.0ft
Astoria	Oregon	2119	PDT May 23	0.5ft
Seward	Alaska	2116	PDT May 23	0.4ft
Yakutat	Alaska	2128	PDT May 23	0.8ft
Victoria Harbor	BC	2150	PDT May 23	0.7ft
Ketchikan	Alaska	2142	PDT May 23	0.7ft
Valdez	Alaska	2140	PDT May 23	0.1ft
Port Angeles	Washington	2146	PDT May 23	0.8ft
Mata-Utu	Wallis Island FR	0951	PDT May 23	10.0ft
Pago Pago	US	1013	PDT May 23	11.9ft
Nukualofa	Tonga	1102	PDT May 23	9.3ft
Suva	Fiji	1124	PDT May 23	2.5ft
Wake Island	UM	1502	PDT May 23	1.0ft
Hilo	Hawaii	1527	PDT May 23	0.8ft
Kahului	Hawaii	1558	PDT May 23	1.3ft
Guam Apra Harbor	Guam	1658	PDT May 23	0.4ft

RECOMMENDED ACTIONS - UPDATED
---

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

IMPACTS - UPDATED
---

* Tsunami activity has subsided along the coasts of the U.S. west coast states, British Columbia, and Alaska.

* Ongoing activity may persist in some areas causing strong currents dangerous to swimmers and boats.

```
 * 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.

$$
```

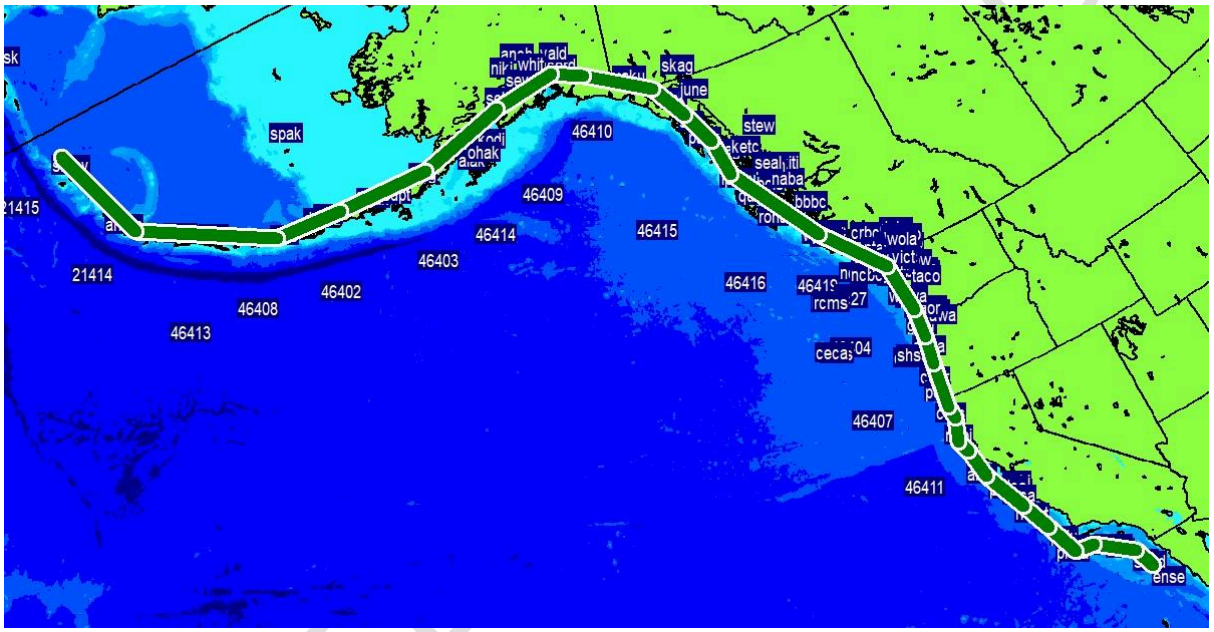


Figure A13: Alert areas at cancellation with Bulletin 26. White text shows water level observation sites.

Appendix B. NTWC Spanish Public Messages

NTWC Spanish Bulletin #1

```
WEAK63 PAAQ 231638
TIBSPN

Boletin Informativo de Tsunami Numero 1
NWS Centro Nacional de Alerta de Tsunami Palmer AK
938 AM PDT Thu May 23 2024

...ESTE ES UN MENSAJE INFORMATIVO DE TSUNAMI PARA ALASKA,
   COLUMBIA BRITANICA, WASHINGTON, OREGON Y CALIFORNIA...

EVALUACION
----------
 * Se conoce que terremotos de este tamano pueden generar tsunamis
   potencialmente peligrosos para costas fuera del lugar de origen.

 * El Centro Nacional de Alerta de Tsunamis esta analizando
   el evento para determinar el nivel de peligrosidad.

 * Informacion adicional sera emitida cuando este disponible.

 * Este terremoto tiene el potencial de generar un tsunami
   destructivo en el lugar de origen.


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

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

 * Magnitud          8.2
 * Tiempo de Origen  0830 AKDT May 23 2024
                     0930  PDT May 23 2024
                     1630  UTC May 23 2024
 * Coordenadas       14.4 Sur 174.9 Oeste
 * Profundidad       12 millas
 * Localizacion      en la region de las Islas Samoa


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.

 * Se emitiran mensajes cada hora para informar sobre la evolucion
   del evento.

$$
```

NTWC Spanish Bulletin #2

WEAK63 PAAQ 231710
TIBSPN

Boletin Informativo de Tsunami Numero 2
NWS Centro Nacional de Alerta de Tsunami Palmer AK
1010 AM PDT Thu May 23 2024

ACTUALIZACIONES
---
* Un tsunami ha sido confirmado y se esperan algunas impactos
* Magnitud revisada

...ESTE ES UN MENSAJE INFORMATIVO DE TSUNAMI PARA ALASKA,
COLUMBIA BRITANICA, WASHINGTON, OREGON Y CALIFORNIA...

EVALUACION
---
* Un tsunami ha sido generado que pudiera impactar
las areas indicadas arriba.

* El Centro Nacional de Alerta de Tsunamis esta analizando
el evento para determinar el nivel de peligrosidad.

* Informacion adicional sera emitida cuando este disponible.

* Este terremoto tiene el potencial de generar un tsunami
destructivo en el lugar de origen.

PARAMETROS PRELIMINARES DEL TERREMOTO - ACTUALIZADOS
---

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

* Magnitud	8.7
* Tiempo de Origen	0830 AKDT May 23 2024
	0930 PDT May 23 2024
	1630 UTC May 23 2024
* Coordenadas	14.5 Sur 174.7 Oeste
* Profundidad	9 millas
* Localizacion	en la region de las Islas Samoa

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
Mata-Utu Wallis Island FR	0951 PDT May 23	10.0ft

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.

* Se emitiran mensajes cada hora para informar sobre la evolucion del evento.

$$

NTWC Spanish Bulletin #3

WEAK63 PAAQ 231740
TIBSPN

Boletin Informativo de Tsunami Numero 3
NWS Centro Nacional de Alerta de Tsunami Palmer AK
1040 AM PDT Thu May 23 2024

ACTUALIZACIONES
---

* Nuevas observaciones

...ESTE ES UN MENSAJE INFORMATIVO DE TSUNAMI PARA ALASKA, COLUMBIA BRITANICA, WASHINGTON, OREGON Y CALIFORNIA...

EVALUACION
---

* Un tsunami ha sido generado que pudiera impactar las areas indicadas arriba.

* El Centro Nacional de Alerta de Tsunamis esta analizando el evento para determinar el nivel de peligrosidad.

* Informacion adicional sera emitida cuando este disponible.

* Este terremoto tiene el potencial de generar un tsunami destructivo en el lugar de origen.

PARAMETROS PRELIMINARES DEL TERREMOTO
---

* Magnitud 8.7
* Tiempo de Origen 0830 AKDT May 23 2024
  0930 PDT May 23 2024
  1630 UTC May 23 2024
* Coordenadas 14.5 Sur 174.7 Oeste
* Profundidad 9 millas
* Localizacion en la region de las Islas Samoa

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
Mata-Utu Wallis Island FR	0951 PDT May 23	10.0ft
Pago Pago US	1013 PDT May 23	11.9ft

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.

* Se emitiran mensajes cada hora para informar sobre la evolucion del evento.

$$

NTWC Spanish Bulletin #4

WEAK61 PAAQ 231840
TSUSPN

BULLETIN
Mensaje de Tsunami numero 4
NWS Centro Nacional de Alerta de Tsunami Palmer AK
1140 AM PDT Thu May 23 2024

ACTUALIZACIONES
---

* Nuevas observaciones
* Modifica las regiones bajo alerta
* Informacion de pronostico revisada

...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 Davenport, California (10 miles NW of Santa Cruz)

* ALEUTIAN ISLANDS, Amchitka Pass, Alaska (125 miles W of Adak) hasta Attu, Alaska

Advertencia de Tsunami en Efecto para;

* CALIFORNIA, Areas costeras desde The Cal./Mexico Border hasta Point Conception, California

* CALIFORNIA, Areas costeras desde Davenport, California (10 miles NW of Santa Cruz) 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 Columbia

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

* BRITISH COLUMBIA, La costa norte y Haida Gwaii, la costa central y la isla noreste de Vancouver, la costa oeste exterior de la isla de Vancouver, la costa del Estrecho de Juan de Fuca

* SOUTHEAST ALASKA, La costa interior y exterior desde The BC/Alaska Border hasta Salisbury Sound, Alaska

* SOUTH ALASKA AND THE ALASKA PENINSULA, Costas Pacificas desde Chignik Bay, Alaska hasta Unimak Pass, Alaska (80 miles NE of Unalaska)

* ALEUTIAN ISLANDS, Unimak Pass, Alaska (80 miles NE of Unalaska) hasta Amchitka Pass, Alaska (125 miles W of Adak) incluso las Islas Pribilof

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, no existe amenaza de tsunami.

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			
Shemya	1800 AKDT May 23	20 hrs	1.7- 3.2 pie
Sitka	1945 AKDT May 23		menos de 1pie
Craig	2030 AKDT May 23		
* California			
Fort Bragg	1930 PDT May 23		menos de 1pie
Monterey	1935 PDT May 23	15 hrs	1.1- 2.0 pie
Port San Luis	1945 PDT May 23	40 hrs	3.7- 6.8 pie
Santa Barbara	1950 PDT May 23	15 hrs	1.3- 2.3 pie
Crescent City	1955 PDT May 23	20 hrs	1.8- 3.3 pie
Los Angeles Harb	1955 PDT May 23	9 hrs	0.8- 1.5 pie
Oceanside	1955 PDT May 23	9 hrs	0.8- 1.4 pie
La Jolla	1955 PDT May 23	9 hrs	0.8- 1.5 pie
Newport Beach	2000 PDT May 23		menos de 1pie
San Francisco	2005 PDT May 23	9 hrs	0.7- 1.3 pie
* Oregon			
Port Orford	1950 PDT May 23	15 hrs	0.9- 1.8 pie
Brookings	1955 PDT May 23	9 hrs	0.8- 1.4 pie
Charleston	2005 PDT May 23		menos de 1pie
Newport	2025 PDT May 23		
Seaside	2040 PDT May 23		

```
 * British Columbia
Langara          2025  PDT May 23           menos de 1pie
Tofino           2045  PDT May 23           menos de 1pie

 * Washington
Long Beach       2030  PDT May 23   9 hrs    0.8- 1.6 pie
La Push          2040  PDT May 23
Westport         2045  PDT May 23   9 hrs    0.8- 1.6 pie
Neah Bay         2045  PDT May 23           menos de 1pie
Moclips          2050  PDT May 23  15 hrs    1.1- 2.0 pie
Port Angeles     2125  PDT May 23           menos de 1pie
Port Townsend    2150  PDT May 23           menos de 1pie
Bellingham       2220  PDT May 23           menos de 1pie
Tacoma           2305  PDT May 23
```

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
Mata-Utu Wallis Island FR	0951 PDT May 23	10.0ft
Pago Pago US	1013 PDT May 23	11.9ft
Nukualofa Tonga	1102 PDT May 23	9.3ft
Suva Fiji	1124 PDT May 23	2.5ft

PARAMETROS PRELIMINARES DEL TERREMOTO

* Magnitud 8.7
* Tiempo de Origen 0830 AKDT May 23 2024
  0930 PDT May 23 2024
  1630 UTC May 23 2024
* Coordenadas 14.5 Sur 174.7 Oeste
* Profundidad 9 millas
* Localizacion en la region de las Islas Samoa

ACCIONES RECOMENDADAS - ACTUALIZADAS

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 60 minutos.

$$

NTWC Spanish Bulletin #12

WEAK61 PAAQ 240240
TSUSPN

BULLETIN
Mensaje de Tsunami numero 12
NWS Centro Nacional de Alerta de Tsunami Palmer AK
740 PM PDT Thu May 23 2024

ACTUALIZACIONES
---
* Nuevas observaciones
* Modifica las regiones bajo alerta

...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 Davenport, California (10 miles NW of Santa Cruz)

Advertencia de Tsunami en Efecto para;

* CALIFORNIA, Areas costeras desde The Cal./Mexico Border hasta Point Conception, California
* CALIFORNIA, Areas costeras desde Davenport, California (10 miles NW of Santa Cruz) 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 Columbia

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

* BRITISH COLUMBIA, La costa norte y Haida Gwaii, la costa central y la isla noreste de Vancouver, la costa oeste exterior de la isla de Vancouver, la costa del Estrecho de Juan de Fuca

* SOUTHEAST ALASKA, La costa interior y exterior desde The BC/Alaska Border hasta Salisbury Sound, Alaska

* SOUTH ALASKA AND THE ALASKA PENINSULA, Costas Pacificas desde Chignik Bay, Alaska hasta Unimak Pass, Alaska (80 miles NE of Unalaska)

* ALEUTIAN ISLANDS, Unimak Pass, Alaska (80 miles NE of Unalaska) hasta Attu, Alaska incluso las Islas Pribilof

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, no existe amenaza de tsunami.

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			
Fort Bragg	1930 PDT May 23		menos de 1pie
Monterey	1935 PDT May 23	15 hrs	1.1- 2.0 pie
Port San Luis	1945 PDT May 23	40 hrs	3.7- 6.8 pie
Santa Barbara	1950 PDT May 23	15 hrs	1.3- 2.3 pie
Crescent City	1955 PDT May 23	20 hrs	1.8- 3.3 pie
Los Angeles Harb	1955 PDT May 23	9 hrs	0.8- 1.5 pie
Oceanside	1955 PDT May 23	9 hrs	0.8- 1.4 pie
La Jolla	1955 PDT May 23	9 hrs	0.8- 1.5 pie
Newport Beach	2000 PDT May 23		menos de 1pie
San Francisco	2005 PDT May 23	9 hrs	0.7- 1.3 pie
* Oregon			
Port Orford	1950 PDT May 23	15 hrs	0.9- 1.8 pie
Brookings	1955 PDT May 23	9 hrs	0.8- 1.4 pie
Charleston	2005 PDT May 23		menos de 1pie
Newport	2025 PDT May 23		
Seaside	2040 PDT May 23		
* British Columbia			
Langara	2025 PDT May 23		menos de 1pie
Tofino	2045 PDT May 23		menos de 1pie

```
 * Washington
Long Beach       2030  PDT May 23   9 hrs    0.8- 1.6 pie
La Push          2040  PDT May 23
Westport         2045  PDT May 23   9 hrs    0.8- 1.6 pie
Neah Bay         2045  PDT May 23            menos de 1pie
Moclips          2050  PDT May 23  15 hrs    1.1- 2.0 pie
Port Angeles     2125  PDT May 23            menos de 1pie
Port Townsend    2150  PDT May 23            menos de 1pie
Bellingham       2220  PDT May 23            menos de 1pie
Tacoma           2305  PDT May 23

 * Alaska
Sitka            1945 AKDT May 23            menos de 1pie
Craig            2030 AKDT May 23


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
 ------------------------------ ----------------       --------------
 Atka  Alaska                    1904  PDT May 23           2.3ft
 Adak  Alaska                    1919  PDT May 23           1.8ft
 Mata-Utu  Wallis Island  FR     0951  PDT May 23          10.0ft
 Pago Pago  US                   1013  PDT May 23          11.9ft
 Nukualofa  Tonga                1102  PDT May 23           9.3ft
 Suva  Fiji                      1124  PDT May 23           2.5ft
 Wake Island  UM                 1502  PDT May 23           1.0ft
 Hilo  Hawaii                    1527  PDT May 23           0.8ft
 Kahului  Hawaii                 1558  PDT May 23           1.3ft
 Guam Apra Harbor  Guam          1658  PDT May 23           0.4ft


PARAMETROS PRELIMINARES DEL TERREMOTO - ACTUALIZADOS
----------------------------------------------------
 * Magnitud          8.7
 * Tiempo de Origen  0830 AKDT May 23 2024
                     0930  PDT May 23 2024
                     1630  UTC May 23 2024
 * Coordenadas       14.5 Sur 174.7 Oeste
 * Profundidad       9 millas
 * Localizacion      en la region de las Islas Samoa

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.

$$

NTWC Spanish Bulletin #13

WEAK61 PAAQ 240340
TSUSPN

BULLETIN
Mensaje de Tsunami numero 13
NWS Centro Nacional de Alerta de Tsunami Palmer AK
840 PM PDT Thu May 23 2024

ACTUALIZACIONES
---
* 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 Davenport, California (10 miles NW of Santa Cruz)

Advertencia de Tsunami en Efecto para;

* CALIFORNIA, Areas costeras desde The Cal./Mexico Border hasta Point Conception, California
* CALIFORNIA, Areas costeras desde Davenport, California (10 miles NW of Santa Cruz) 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 Columbia
* WASHINGTON, la costa exterior de la frontera de Oregon/Washington a Slip Point, la costa del estuario del Rio Columbia, y la costa del Estrecho de Juan de Fuca
* BRITISH COLUMBIA, La costa norte y Haida Gwaii, la costa central y la isla noreste de Vancouver, la costa oeste exterior de la isla de Vancouver, la costa del Estrecho de Juan de Fuca
* SOUTHEAST ALASKA, La costa interior y exterior desde The BC/Alaska Border hasta Salisbury Sound, Alaska
* SOUTH ALASKA AND THE ALASKA PENINSULA, Costas Pacificas desde Chignik Bay, Alaska hasta Unimak Pass, Alaska (80 miles NE of Unalaska)
* ALEUTIAN ISLANDS, Unimak Pass, Alaska (80 miles NE of Unalaska) hasta Attu, Alaska incluso las Islas Pribilof

Para otras costas del Pacifico de los Estados Unidos y Canada
en Norte America, no existe amenaza de tsunami.

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			
Fort Bragg	1930 PDT May 23		menos de 1pie
Monterey	1935 PDT May 23	15 hrs	1.1- 2.0 pie
Port San Luis	1945 PDT May 23	40 hrs	3.7- 6.8 pie
Santa Barbara	1950 PDT May 23	15 hrs	1.3- 2.3 pie
Crescent City	1955 PDT May 23	20 hrs	1.8- 3.3 pie
Los Angeles Harb	1955 PDT May 23	9 hrs	0.8- 1.5 pie
Oceanside	1955 PDT May 23	9 hrs	0.8- 1.4 pie
La Jolla	1955 PDT May 23	9 hrs	0.8- 1.5 pie
Newport Beach	2000 PDT May 23		menos de 1pie
San Francisco	2005 PDT May 23	9 hrs	0.7- 1.3 pie
* Oregon			
Port Orford	1950 PDT May 23	15 hrs	0.9- 1.8 pie
Brookings	1955 PDT May 23	9 hrs	0.8- 1.4 pie
Charleston	2005 PDT May 23		menos de 1pie
Newport	2025 PDT May 23		
Seaside	2040 PDT May 23		
* British Columbia			
Langara	2025 PDT May 23		menos de 1pie
Tofino	2045 PDT May 23		menos de 1pie
* Washington			
Long Beach	2030 PDT May 23	9 hrs	0.8- 1.6 pie
La Push	2040 PDT May 23		
Westport	2045 PDT May 23	9 hrs	0.8- 1.6 pie
Neah Bay	2045 PDT May 23		menos de 1pie
Moclips	2050 PDT May 23	15 hrs	1.1- 2.0 pie
Port Angeles	2125 PDT May 23		menos de 1pie
Port Townsend	2150 PDT May 23		menos de 1pie
Bellingham	2220 PDT May 23		menos de 1pie
Tacoma	2305 PDT May 23		
* Alaska			
Sitka	1945 AKDT May 23		menos de 1pie
Craig	2030 AKDT May 23		

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
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Arena Cove California	1953 PDT May 23	1.8ft
Point Reyes California	2025 PDT May 23	3.0ft
Monterey California	2022 PDT May 23	2.1ft
Unalaska Alaska	2010 PDT May 23	1.4ft
Humboldt Bay California	2008 PDT May 23	0.9ft
Port San Luis CA	2026 PDT May 23	4.6ft
Santa Barbara CA	2028 PDT May 23	1.8ft
Port Orford Oregon	2021 PDT May 23	1.3ft
Crescent City CA	2022 PDT May 23	2.9ft
Los Angeles Harbor CA	2032 PDT May 23	2.2ft
La Jolla California	2030 PDT May 23	1.1ft
King Cove Alaska	2016 PDT May 23	1.0ft
Ventura California	2029 PDT May 23	2.0ft
Sand Point Alaska	2020 PDT May 23	0.9ft
Charleston Oregon	2030 PDT May 23	1.2ft
San Francisco CA	2026 PDT May 23	1.1ft
Mata-Utu Wallis Island FR	0951 PDT May 23	10.0ft
Pago Pago US	1013 PDT May 23	11.9ft
Nukualofa Tonga	1102 PDT May 23	9.3ft
Suva Fiji	1124 PDT May 23	2.5ft
Wake Island UM	1502 PDT May 23	1.0ft
Hilo Hawaii	1527 PDT May 23	0.8ft
Kahului Hawaii	1558 PDT May 23	1.3ft
Guam Apra Harbor Guam	1658 PDT May 23	0.4ft

PARAMETROS PRELIMINARES DEL TERREMOTO
---

* Magnitud 8.7
* Tiempo de Origen 0830 AKDT May 23 2024
  0930 PDT May 23 2024
  1630 UTC May 23 2024
* Coordenadas 14.5 Sur 174.7 Oeste
* Profundidad 9 millas
* Localizacion en la region de las Islas Samoa

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.

$$

NTWC Spanish Bulletin #14

WEAK61 PAAQ 240440
TSUSPN

BULLETIN
Mensaje de Tsunami numero 14
NWS Centro Nacional de Alerta de Tsunami Palmer AK
940 PM PDT Thu May 23 2024

ACTUALIZACIONES
---
* 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 Davenport, California (10 miles NW of Santa Cruz)

Advertencia de Tsunami en Efecto para;

* CALIFORNIA, Areas costeras desde The Cal./Mexico Border hasta Point Conception, California
* CALIFORNIA, Areas costeras desde Davenport, California (10 miles NW of Santa Cruz) 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 Columbia
* WASHINGTON, la costa exterior de la frontera de Oregon/Washington a Slip Point, la costa del estuario del Rio Columbia, y la costa del Estrecho de Juan de Fuca
* BRITISH COLUMBIA, La costa norte y Haida Gwaii, la costa central y la isla noreste de Vancouver, la costa oeste exterior de la isla de Vancouver, la costa del Estrecho de Juan de Fuca
* SOUTHEAST ALASKA, La costa interior y exterior desde The BC/Alaska Border hasta Salisbury Sound, Alaska
* SOUTH ALASKA AND THE ALASKA PENINSULA, Costas Pacificas desde Chignik Bay, Alaska hasta Unimak Pass, Alaska (80 miles NE of Unalaska)
* ALEUTIAN ISLANDS, Unimak Pass, Alaska (80 miles NE of Unalaska) hasta Attu, Alaska incluso las Islas Pribilof

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, no existe amenaza de tsunami.

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
* Oregon			
Newport	2025 PDT May 23		
Seaside	2040 PDT May 23		
* British Columbia			
Langara	2025 PDT May 23		menos de 1pie
Tofino	2045 PDT May 23		menos de 1pie
* Washington			
Long Beach	2030 PDT May 23	9 hrs	0.8- 1.6 pie
La Push	2040 PDT May 23		
Westport	2045 PDT May 23	9 hrs	0.8- 1.6 pie
Neah Bay	2045 PDT May 23		menos de 1pie
Moclips	2050 PDT May 23	15 hrs	1.1- 2.0 pie
Port Angeles	2125 PDT May 23		menos de 1pie
Port Townsend	2150 PDT May 23		menos de 1pie
Bellingham	2220 PDT May 23		menos de 1pie
Tacoma	2305 PDT May 23		
* Alaska			
Sitka	1945 AKDT May 23		menos de 1pie
Craig	2030 AKDT May 23		

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
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Arena Cove California	1953 PDT May 23	1.8ft
Point Reyes California	2025 PDT May 23	3.0ft
Monterey California	2022 PDT May 23	2.1ft
Unalaska Alaska	2010 PDT May 23	1.4ft
Humboldt Bay California	2008 PDT May 23	0.9ft
Port San Luis CA	2026 PDT May 23	4.6ft
Santa Barbara CA	2028 PDT May 23	1.8ft
Port Orford Oregon	2021 PDT May 23	1.3ft
Crescent City CA	2022 PDT May 23	2.9ft
Los Angeles Harbor CA	2032 PDT May 23	2.2ft

La Jolla	California	2030	PDT May 23	1.1ft
King Cove	Alaska	2016	PDT May 23	1.0ft
Ventura	California	2029	PDT May 23	2.0ft
Sand Point	Alaska	2020	PDT May 23	0.9ft
Charleston	Oregon	2030	PDT May 23	1.2ft
San Francisco	CA	2026	PDT May 23	1.1ft
San Diego	California	2038	PDT May 23	1.4ft
Alameda	California	2045	PDT May 23	0.5ft
Winter Harbour	BC	2053	PDT May 23	0.6ft
Newport	Oregon	2050	PDT May 23	1.0ft
Langara	BC	2042	PDT May 23	0.4ft
Garibaldi	Oregon	2051	PDT May 23	1.3ft
La Push	Washington	2059	PDT May 23	0.5ft
Port Alexander	Alaska	2057	PDT May 23	0.9ft
Kodiak	Alaska	2100	PDT May 23	0.8ft
Elfin Cove	Alaska	2104	PDT May 23	0.2ft
Sitka	Alaska	2108	PDT May 23	0.8ft
Westport South Bay	WA	2110	PDT May 23	1.2ft
Tofino	British Columbia	2107	PDT May 23	1.0ft
Astoria	Oregon	2119	PDT May 23	0.5ft
Seward	Alaska	2116	PDT May 23	0.4ft
Yakutat	Alaska	2128	PDT May 23	0.8ft
Mata-Utu	Wallis Island FR	0951	PDT May 23	10.0ft
Pago Pago	US	1013	PDT May 23	11.9ft
Nukualofa	Tonga	1102	PDT May 23	9.3ft
Suva	Fiji	1124	PDT May 23	2.5ft
Wake Island	UM	1502	PDT May 23	1.0ft
Hilo	Hawaii	1527	PDT May 23	0.8ft
Kahului	Hawaii	1558	PDT May 23	1.3ft
Guam Apra Harbor	Guam	1658	PDT May 23	0.4ft

PARAMETROS PRELIMINARES DEL TERREMOTO
---

* Magnitud 8.7
* Tiempo de Origen 0830 AKDT May 23 2024
  0930 PDT May 23 2024
  1630 UTC May 23 2024
* Coordenadas 14.5 Sur 174.7 Oeste
* Profundidad 9 millas
* Localizacion en la region de las Islas Samoa

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.

$$

NTWC Spanish Bulletin #15

WEAK61 PAAQ 240540
TSUSPN

BULLETIN
Mensaje de Tsunami numero 15
NWS Centro Nacional de Alerta de Tsunami Palmer AK
1040 PM PDT Thu May 23 2024
ACTUALIZACIONES
---
* 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;

* CALIFORNIA, Areas costeras desde Point Conception, California hasta Davenport, California (10 miles NW of Santa Cruz)

Advertencia de Tsunami en Efecto para;

* CALIFORNIA, Areas costeras desde The Cal./Mexico Border hasta Point Conception, California
* CALIFORNIA, Areas costeras desde Davenport, California (10 miles NW of Santa Cruz) 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 Columbia
* WASHINGTON, la costa exterior de la frontera de Oregon/Washington a Slip Point, la costa del estuario del Rio Columbia, y la costa del Estrecho de Juan de Fuca
* SOUTH ALASKA AND THE ALASKA PENINSULA, Costas Pacificas desde Chignik Bay, Alaska hasta Unimak Pass, Alaska (80 miles NE of Unalaska)
* ALEUTIAN ISLANDS, Unimak Pass, Alaska (80 miles NE of Unalaska) hasta Attu, Alaska incluso las Islas Pribilof

Alertas en las siguientes areas han sido canceladas porque se ha definido mejor la amenaza en base a informacion y analisis adicional.

* Advisory de Tsunami ha sido Cancelado para areas costeras de British Columbia y Southeast Alaska desde The Wash./BC Border hasta Salisbury Sound, Alaska

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, no existe amenaza de tsunami.

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
* Washington			
Port Angeles	2125 PDT May 23		menos de 1pie
Port Townsend	2150 PDT May 23		menos de 1pie
Bellingham	2220 PDT May 23		menos de 1pie
Tacoma	2305 PDT May 23		

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
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Arena Cove California	1953 PDT May 23	1.8ft
Point Reyes California	2025 PDT May 23	3.0ft
Monterey California	2022 PDT May 23	2.1ft
Unalaska Alaska	2010 PDT May 23	1.4ft
Humboldt Bay California	2008 PDT May 23	0.9ft
Port San Luis CA	2026 PDT May 23	4.6ft
Santa Barbara CA	2028 PDT May 23	1.8ft
Port Orford Oregon	2021 PDT May 23	1.3ft
Crescent City CA	2022 PDT May 23	2.9ft
Los Angeles Harbor CA	2032 PDT May 23	2.2ft
La Jolla California	2030 PDT May 23	1.1ft
King Cove Alaska	2016 PDT May 23	1.2ft
Ventura California	2029 PDT May 23	2.0ft
Sand Point Alaska	2020 PDT May 23	0.9ft
Charleston Oregon	2030 PDT May 23	1.2ft
San Francisco CA	2026 PDT May 23	1.1ft
San Diego California	2038 PDT May 23	1.4ft
Alameda California	2045 PDT May 23	0.5ft
Winter Harbour BC	2053 PDT May 23	0.6ft
Newport Oregon	2050 PDT May 23	1.0ft
Langara BC	2042 PDT May 23	0.4ft
Garibaldi Oregon	2051 PDT May 23	1.3ft
La Push Washington	2059 PDT May 23	0.5ft
Port Alexander Alaska	2057 PDT May 23	0.9ft
Kodiak Alaska	2100 PDT May 23	0.8ft
Elfin Cove Alaska	2104 PDT May 23	0.2ft

Sitka Alaska	2108	PDT	May 23	0.8ft
Westport South Bay WA	2110	PDT	May 23	1.2ft
Tofino British Columbia	2107	PDT	May 23	1.0ft
Astoria Oregon	2119	PDT	May 23	0.5ft
Seward Alaska	2116	PDT	May 23	0.4ft
Yakutat Alaska	2128	PDT	May 23	0.8ft
Victoria Harbor BC	2150	PDT	May 23	0.7ft
Ketchikan Alaska	2142	PDT	May 23	0.7ft
Valdez Alaska	2140	PDT	May 23	0.1ft
Port Angeles Washington	2146	PDT	May 23	0.8ft
Mata-Utu Wallis Island FR	0951	PDT	May 23	10.0ft
Pago Pago US	1013	PDT	May 23	11.9ft
Nukualofa Tonga	1102	PDT	May 23	9.3ft
Suva Fiji	1124	PDT	May 23	2.5ft
Wake Island UM	1502	PDT	May 23	1.0ft
Hilo Hawaii	1527	PDT	May 23	0.8ft
Kahului Hawaii	1558	PDT	May 23	1.3ft
Guam Apra Harbor Guam	1658	PDT	May 23	0.4ft

PARAMETROS PRELIMINARES DEL TERREMOTO
---
* Magnitud 8.7
* Tiempo de Origen 0830 AKDT May 23 2024
  0930 PDT May 23 2024
  1630 UTC May 23 2024
* Coordenadas 14.5 Sur 174.7 Oeste
* Profundidad 9 millas
* Localizacion en la region de las Islas Samoa

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.

$$

NTWC Spanish Bulletin #16

WEAK61 PAAQ 240640
TSUSPN

BULLETIN
Mensaje de Tsunami numero 16
NWS Centro Nacional de Alerta de Tsunami Palmer AK
1140 PM PDT Thu May 23 2024

ACTUALIZACIONES
---

* 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;

* CALIFORNIA, Areas costeras desde Point Conception, California hasta Ragged Point, California (50 miles NW of San Luis Obispo)

Advertencia de Tsunami en Efecto para;

* CALIFORNIA, Areas costeras desde The Cal./Mexico Border hasta Point Conception, California
* CALIFORNIA, Areas costeras desde Ragged Point, California (50 miles NW of San Luis Obispo) hasta Davenport, California (10 miles NW of Santa Cruz)
* CALIFORNIA, Areas costeras desde Davenport, California (10 miles NW of Santa Cruz) 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 Columbia
* WASHINGTON, la costa exterior de la frontera de Oregon/Washington a Slip Point, la costa del estuario del Rio Columbia, y la costa del Estrecho de Juan de Fuca
* ALEUTIAN ISLANDS, Unimak Pass, Alaska (80 miles NE of Unalaska) hasta Attu, Alaska incluso las Islas Pribilof

Alertas en las siguientes areas han sido canceladas porque se ha definido mejor la amenaza en base a informacion y analisis adicional.

* Advisory de Tsunami ha sido Cancelado para areas costeras de South Alaska and the Alaska Peninsula desde Chignik Bay, Alaska hasta Unimak Pass, Alaska (80 miles NE of Unalaska)

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, no existe amenaza de tsunami.

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
* Washington			
Port Townsend	2150 PDT May 23		menos de 1pie
Bellingham	2220 PDT May 23		menos de 1pie
Tacoma	2305 PDT May 23		

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
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Nikolski Alaska	2150 PDT May 23	1.0ft
Arena Cove California	1953 PDT May 23	1.8ft
Point Reyes California	2025 PDT May 23	3.0ft
Monterey California	2022 PDT May 23	2.1ft
Unalaska Alaska	2010 PDT May 23	1.4ft
Humboldt Bay California	2008 PDT May 23	0.9ft
Port San Luis CA	2026 PDT May 23	4.6ft
Santa Barbara CA	2028 PDT May 23	1.8ft
Port Orford Oregon	2021 PDT May 23	1.3ft
Crescent City CA	2022 PDT May 23	2.9ft
Los Angeles Harbor CA	2032 PDT May 23	2.2ft
La Jolla California	2030 PDT May 23	1.1ft
King Cove Alaska	2016 PDT May 23	1.2ft
Ventura California	2029 PDT May 23	2.0ft
Santa Monica California	2320 PDT May 23	1.5ft
Sand Point Alaska	2020 PDT May 23	0.9ft
Charleston Oregon	2030 PDT May 23	1.2ft
San Francisco CA	2026 PDT May 23	1.1ft
San Diego California	2038 PDT May 23	1.4ft
Alameda California	2045 PDT May 23	0.5ft
Winter Harbour BC	2053 PDT May 23	0.6ft
Newport Oregon	2050 PDT May 23	1.0ft
Langara BC	2042 PDT May 23	0.4ft
Garibaldi Oregon	2051 PDT May 23	1.3ft
La Push Washington	2059 PDT May 23	0.5ft
Port Alexander Alaska	2057 PDT May 23	0.9ft
Kodiak Alaska	2100 PDT May 23	0.8ft
Elfin Cove Alaska	2104 PDT May 23	0.2ft
Sitka Alaska	2108 PDT May 23	0.8ft
Westport South Bay WA	2110 PDT May 23	1.2ft
Tofino British Columbia	2107 PDT May 23	1.0ft
Astoria Oregon	2119 PDT May 23	0.5ft
Seward Alaska	2116 PDT May 23	0.4ft
Yakutat Alaska	2128 PDT May 23	0.8ft
Victoria Harbor BC	2150 PDT May 23	0.7ft
Ketchikan Alaska	2142 PDT May 23	0.7ft

```
 Valdez  Alaska               2140  PDT May 23          0.1ft
 Port Angeles  Washington     2146  PDT May 23          0.8ft
 Mata-Utu  Wallis Island  FR  0951  PDT May 23         10.0ft
 Pago Pago  US                1013  PDT May 23         11.9ft
 Nukualofa  Tonga             1102  PDT May 23          9.3ft
 Suva  Fiji                   1124  PDT May 23          2.5ft
 Wake Island  UM              1502  PDT May 23          1.0ft
 Hilo  Hawaii                 1527  PDT May 23          0.8ft
 Kahului  Hawaii              1558  PDT May 23          1.3ft
 Guam Apra Harbor  Guam       1658  PDT May 23          0.4ft

PARAMETROS PRELIMINARES DEL TERREMOTO
-------------------------------------
 * Magnitud          8.7
 * Tiempo de Origen  0830 AKDT May 23 2024
                     0930  PDT May 23 2024
                     1630  UTC May 23 2024
 * Coordenadas       14.5 Sur 174.7 Oeste
 * Profundidad       9 millas
 * Localizacion      en la region de las Islas Samoa

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.

$$
```

NTWC Spanish Bulletin #18

```
WEAK61 PAAQ 240840
TSUSPN

BULLETIN
Mensaje de Tsunami numero 18
NWS Centro Nacional de Alerta de Tsunami Palmer AK
140 AM PDT Fri May 24 2024

ACTUALIZACIONES
---------------
 * Modifica las regiones bajo alerta

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

Advertencia de Tsunami en Efecto para;

* CALIFORNIA, Areas costeras desde Orange/San Diego Line, California (45 miles SE of L.A.) hasta Point Conception, California
* CALIFORNIA, Areas costeras desde Point Conception, California hasta Ragged Point, California (50 miles NW of San Luis Obispo)
* CALIFORNIA, Areas costeras desde Ragged Point, California (50 miles NW of San Luis Obispo) hasta The Oregon/Cal. Border incluso la bahia de San Francisco
* ALEUTIAN ISLANDS, Samalga Pass, Alaska (30 miles SW of Nikolski) hasta Attu, Alaska incluso las Islas Pribilof

Alertas en las siguientes areas han sido canceladas porque se ha definido mejor la amenaza en base a informacion y analisis adicional.

* Advisory de Tsunami ha sido Cancelado para areas costeras de California desde The Cal./Mexico Border hasta Orange/San Diego Line, California (45 miles SE of L.A.)
* Advisory de Tsunami ha sido Cancelado para areas costeras de Oregon y Washington desde The Oregon/Cal. Border hasta The Wash./BC Border
* Advisory de Tsunami ha sido Cancelado para areas costeras de Aleutian Islands desde Unimak Pass, Alaska (80 miles NE of Unalaska) hasta Samalga Pass, Alaska (30 miles SW of Nikolski)

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, no existe amenaza de tsunami.

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
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Nikolski Alaska	2150 PDT May 23	1.0ft
Arena Cove California	1953 PDT May 23	1.8ft
Point Reyes California	2025 PDT May 23	3.0ft
Monterey California	2022 PDT May 23	2.1ft
Unalaska Alaska	2010 PDT May 23	1.4ft
Humboldt Bay California	2008 PDT May 23	0.9ft
Port San Luis CA	2026 PDT May 23	4.6ft
Santa Barbara CA	2028 PDT May 23	1.8ft
Port Orford Oregon	2021 PDT May 23	1.3ft
Crescent City CA	2022 PDT May 23	2.9ft
Los Angeles Harbor CA	2032 PDT May 23	2.2ft
La Jolla California	2030 PDT May 23	1.1ft
King Cove Alaska	2016 PDT May 23	1.2ft
Ventura California	2029 PDT May 23	2.0ft
Santa Monica California	2320 PDT May 23	1.5ft

Sand Point Alaska	2020	PDT	May 23	0.9ft
Charleston Oregon	2030	PDT	May 23	1.2ft
San Francisco CA	2026	PDT	May 23	1.1ft
San Diego California	2038	PDT	May 23	1.4ft
Alameda California	2045	PDT	May 23	0.5ft
Winter Harbour BC	2053	PDT	May 23	0.6ft
Newport Oregon	2050	PDT	May 23	1.0ft
Langara BC	2042	PDT	May 23	0.4ft
Garibaldi Oregon	2051	PDT	May 23	1.3ft
La Push Washington	2059	PDT	May 23	0.5ft
Port Alexander Alaska	2057	PDT	May 23	0.9ft
Kodiak Alaska	2100	PDT	May 23	0.8ft
Elfin Cove Alaska	2104	PDT	May 23	0.2ft
Sitka Alaska	2108	PDT	May 23	0.8ft
Westport South Bay WA	2110	PDT	May 23	1.2ft
Tofino British Columbia	2107	PDT	May 23	1.0ft
Astoria Oregon	2119	PDT	May 23	0.5ft
Seward Alaska	2116	PDT	May 23	0.4ft
Yakutat Alaska	2128	PDT	May 23	0.8ft
Victoria Harbor BC	2150	PDT	May 23	0.7ft
Ketchikan Alaska	2142	PDT	May 23	0.7ft
Valdez Alaska	2140	PDT	May 23	0.1ft
Port Angeles Washington	2146	PDT	May 23	0.8ft
Mata-Utu Wallis Island FR	0951	PDT	May 23	10.0ft
Pago Pago US	1013	PDT	May 23	11.9ft
Nukualofa Tonga	1102	PDT	May 23	9.3ft
Suva Fiji	1124	PDT	May 23	2.5ft
Wake Island UM	1502	PDT	May 23	1.0ft
Hilo Hawaii	1527	PDT	May 23	0.8ft
Kahului Hawaii	1558	PDT	May 23	1.3ft
Guam Apra Harbor Guam	1658	PDT	May 23	0.4ft

PARAMETROS PRELIMINARES DEL TERREMOTO
---

* Magnitud 8.7
* Tiempo de Origen 0830 AKDT May 23 2024
  0930 PDT May 23 2024
  1630 UTC May 23 2024
* Coordenadas 14.5 Sur 174.7 Oeste
* Profundidad 9 millas
* Localizacion en la region de las Islas Samoa

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.

$$

NTWC Spanish Bulletin #19

WEAK61 PAAQ 240940
TSUSPN

BULLETIN
Mensaje de Tsunami numero 19
NWS Centro Nacional de Alerta de Tsunami Palmer AK
0240 AM PDT Fri May 24 2024

ACTUALIZACIONES
---
* Modifica las regiones bajo alerta

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

Advertencia de Tsunami en Efecto para;

* CALIFORNIA, Areas costeras desde Orange/San Diego Line, California (45 miles SE of L.A.) hasta Mendo/Hum County Line, California (55 miles SW of Eureka) incluso la bahia de San Francisco

* CALIFORNIA, Areas costeras desde Humboldt/Del Norte Line, California hasta The Oregon/Cal. Border

* ALEUTIAN ISLANDS, Samalga Pass, Alaska (30 miles SW of Nikolski) hasta Attu, Alaska incluso las Islas Pribilof

Alertas en las siguientes areas han sido canceladas porque se ha definido mejor la amenaza en base a informacion y analisis adicional.

* Advisory de Tsunami ha sido Cancelado para areas costeras de California desde Mendo/Hum County Line, California (55 miles SW of Eureka) hasta Humboldt/Del Norte Line, California

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, no existe amenaza de tsunami.

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
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Nikolski Alaska	2150 PDT May 23	1.0ft
Arena Cove California	1953 PDT May 23	1.8ft
Point Reyes California	2025 PDT May 23	3.0ft
Monterey California	2022 PDT May 23	2.1ft
Unalaska Alaska	2010 PDT May 23	1.4ft
Humboldt Bay California	2008 PDT May 23	0.9ft
Port San Luis CA	2026 PDT May 23	4.6ft
Santa Barbara CA	2028 PDT May 23	1.8ft
Port Orford Oregon	2021 PDT May 23	1.3ft
Crescent City CA	2022 PDT May 23	2.9ft

Los Angeles Harbor CA	2032	PDT	May 23	2.2ft
La Jolla California	2030	PDT	May 23	1.1ft
King Cove Alaska	2016	PDT	May 23	1.2ft
Ventura California	2029	PDT	May 23	2.0ft
Santa Monica California	2320	PDT	May 23	1.5ft
Sand Point Alaska	2020	PDT	May 23	0.9ft
Charleston Oregon	2030	PDT	May 23	1.2ft
San Francisco CA	2026	PDT	May 23	1.1ft
San Diego California	2038	PDT	May 23	1.4ft
Alameda California	2045	PDT	May 23	0.5ft
Winter Harbour BC	2053	PDT	May 23	0.6ft
Newport Oregon	2050	PDT	May 23	1.0ft
Langara BC	2042	PDT	May 23	0.4ft
Garibaldi Oregon	2051	PDT	May 23	1.3ft
La Push Washington	2059	PDT	May 23	0.5ft
Port Alexander Alaska	2057	PDT	May 23	0.9ft
Kodiak Alaska	2100	PDT	May 23	0.8ft
Elfin Cove Alaska	2104	PDT	May 23	0.2ft
Sitka Alaska	2108	PDT	May 23	0.8ft
Westport South Bay WA	2110	PDT	May 23	1.2ft
Tofino British Columbia	2107	PDT	May 23	1.0ft
Astoria Oregon	2119	PDT	May 23	0.5ft
Seward Alaska	2116	PDT	May 23	0.4ft
Yakutat Alaska	2128	PDT	May 23	0.8ft
Victoria Harbor BC	2150	PDT	May 23	0.7ft
Ketchikan Alaska	2142	PDT	May 23	0.7ft
Valdez Alaska	2140	PDT	May 23	0.1ft
Port Angeles Washington	2146	PDT	May 23	0.8ft
Mata-Utu Wallis Island FR	0951	PDT	May 23	10.0ft
Pago Pago US	1013	PDT	May 23	11.9ft
Nukualofa Tonga	1102	PDT	May 23	9.3ft
Suva Fiji	1124	PDT	May 23	2.5ft
Wake Island UM	1502	PDT	May 23	1.0ft
Hilo Hawaii	1527	PDT	May 23	0.8ft
Kahului Hawaii	1558	PDT	May 23	1.3ft
Guam Apra Harbor Guam	1658	PDT	May 23	0.4ft

PARAMETROS PRELIMINARES DEL TERREMOTO
---

* Magnitud 8.7
* Tiempo de Origen 0830 AKDT May 23 2024
  0930 PDT May 23 2024
  1630 UTC May 23 2024
* Coordenadas 14.5 Sur 174.7 Oeste
* Profundidad 9 millas
* Localizacion en la region de las Islas Samoa

ACCIONES RECOMENDADAS
---

* Ver mensaje numero 18 para acciones recomendadas.

IMPACTOS
---

* Ver mensaje numero 18 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.

$$

NTWC Spanish Bulletin #21

WEAK61 PAAQ 241140
TSUSPN

BULLETIN
Mensaje de Tsunami numero 21
NWS Centro Nacional de Alerta de Tsunami Palmer AK
440 AM PDT Fri May 24 2024

ACTUALIZACIONES
---

* 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 Ragged Point, California (50 miles NW of San Luis Obispo)

* CALIFORNIA, Areas costeras desde Humboldt/Del Norte Line, California hasta The Oregon/Cal. Border

Alertas en las siguientes areas han sido canceladas porque se ha definido mejor la amenaza en base a informacion y analisis adicional.

* Advisory de Tsunami ha sido Cancelado para areas costeras de California desde Orange/San Diego Line, California (45 miles SE of L.A.) hasta Point Conception, California

* Advisory de Tsunami ha sido Cancelado para areas costeras de California desde Ragged Point, California (50 miles NW of San Luis Obispo) hasta Mendo/Hum County Line, California (55 miles SW of Eureka)

* Advisory de Tsunami ha sido Cancelado para areas costeras de Aleutian Islands desde Samalga Pass, Alaska (30 miles SW of Nikolski) hasta Attu, Alaska

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, no existe amenaza de tsunami.

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

Atka	Alaska	1904	PDT May 23	2.3ft
Adak	Alaska	1919	PDT May 23	1.8ft
Nikolski	Alaska	2150	PDT May 23	1.0ft
Arena Cove	California	1953	PDT May 23	1.8ft
Point Reyes	California	2025	PDT May 23	3.0ft
Monterey	California	2022	PDT May 23	2.1ft
Unalaska	Alaska	2010	PDT May 23	1.4ft
Humboldt Bay	California	2008	PDT May 23	0.9ft
Port San Luis	CA	2026	PDT May 23	4.6ft
Santa Barbara	CA	2028	PDT May 23	1.8ft
Port Orford	Oregon	2021	PDT May 23	1.3ft
Crescent City	CA	2022	PDT May 23	2.9ft
Los Angeles Harbor	CA	2032	PDT May 23	2.2ft
La Jolla	California	2030	PDT May 23	1.1ft
King Cove	Alaska	2016	PDT May 23	1.2ft
Ventura	California	2029	PDT May 23	2.0ft
Santa Monica	California	2320	PDT May 23	1.5ft
Sand Point	Alaska	2020	PDT May 23	0.9ft
Charleston	Oregon	2030	PDT May 23	1.2ft
San Francisco	CA	2026	PDT May 23	1.1ft
San Diego	California	2038	PDT May 23	1.4ft
Alameda	California	2045	PDT May 23	0.5ft
Winter Harbour	BC	2053	PDT May 23	0.6ft
Newport	Oregon	2050	PDT May 23	1.0ft
Langara	BC	2042	PDT May 23	0.4ft
Garibaldi	Oregon	2051	PDT May 23	1.3ft
La Push	Washington	2059	PDT May 23	0.5ft
Port Alexander	Alaska	2057	PDT May 23	0.9ft
Kodiak	Alaska	2100	PDT May 23	0.8ft
Elfin Cove	Alaska	2104	PDT May 23	0.2ft
Sitka	Alaska	2108	PDT May 23	0.8ft
Westport South Bay	WA	2110	PDT May 23	1.2ft
Tofino	British Columbia	2107	PDT May 23	1.0ft
Astoria	Oregon	2119	PDT May 23	0.5ft
Seward	Alaska	2116	PDT May 23	0.4ft
Yakutat	Alaska	2128	PDT May 23	0.8ft
Victoria Harbor	BC	2150	PDT May 23	0.7ft
Ketchikan	Alaska	2142	PDT May 23	0.7ft
Valdez	Alaska	2140	PDT May 23	0.1ft
Port Angeles	Washington	2146	PDT May 23	0.8ft
Mata-Utu	Wallis Island FR	0951	PDT May 23	10.0ft
Pago Pago	US	1013	PDT May 23	11.9ft
Nukualofa	Tonga	1102	PDT May 23	9.3ft
Suva	Fiji	1124	PDT May 23	2.5ft
Wake Island	UM	1502	PDT May 23	1.0ft
Hilo	Hawaii	1527	PDT May 23	0.8ft
Kahului	Hawaii	1558	PDT May 23	1.3ft
Guam Apra Harbor	Guam	1658	PDT May 23	0.4ft

PARAMETROS PRELIMINARES DEL TERREMOTO
---

* Magnitud	8.7
* Tiempo de Origen	0830 AKDT May 23 2024
	0930 PDT May 23 2024
	1630 UTC May 23 2024
* Coordenadas	14.5 Sur 174.7 Oeste
* Profundidad	9 millas
* Localizacion	en la region de las Islas Samoa

ACCIONES RECOMENDADAS
---

* Ver mensaje numero 18 para acciones recomendadas.

IMPACTOS
----
* Ver mensaje numero 18 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.

$$

NTWC Spanish Bulletin #23

WEAK61 PAAQ 241340
TSUSPN

BULLETIN
Mensaje de Tsunami numero 23
NWS Centro Nacional de Alerta de Tsunami Palmer AK
640 AM PDT Fri May 24 2024

ACTUALIZACIONES
---
* 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 Ragged Point, California (50 miles NW of San Luis Obispo)

Alertas en las siguientes areas han sido canceladas porque se ha definido mejor la amenaza en base a informacion y analisis adicional.

* Advisory de Tsunami ha sido Cancelado para areas costeras de California desde Humboldt/Del Norte Line, California hasta The Oregon/Cal. Border

Para otras costas del Pacifico de los Estados Unidos y Canada en Norte America, no existe amenaza de tsunami.

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
Atka Alaska	1904 PDT May 23	2.3ft

Adak	Alaska	1919	PDT May 23	1.8ft
Nikolski	Alaska	2150	PDT May 23	1.0ft
Arena Cove	California	1953	PDT May 23	1.8ft
Point Reyes	California	2025	PDT May 23	3.0ft
Monterey	California	2022	PDT May 23	2.1ft
Unalaska	Alaska	2010	PDT May 23	1.4ft
Humboldt Bay	California	2008	PDT May 23	0.9ft
Port San Luis	CA	2026	PDT May 23	4.6ft
Santa Barbara	CA	2028	PDT May 23	1.8ft
Port Orford	Oregon	2021	PDT May 23	1.3ft
Crescent City	CA	2022	PDT May 23	2.9ft
Los Angeles Harbor	CA	2032	PDT May 23	2.2ft
La Jolla	California	2030	PDT May 23	1.1ft
King Cove	Alaska	2016	PDT May 23	1.2ft
Ventura	California	2029	PDT May 23	2.0ft
Santa Monica	California	2320	PDT May 23	1.5ft
Sand Point	Alaska	2020	PDT May 23	0.9ft
Charleston	Oregon	2030	PDT May 23	1.2ft
San Francisco	CA	2026	PDT May 23	1.1ft
San Diego	California	2038	PDT May 23	1.4ft
Alameda	California	2045	PDT May 23	0.5ft
Winter Harbour	BC	2053	PDT May 23	0.6ft
Newport	Oregon	2050	PDT May 23	1.0ft
Langara	BC	2042	PDT May 23	0.4ft
Garibaldi	Oregon	2051	PDT May 23	1.3ft
La Push	Washington	2059	PDT May 23	0.5ft
Port Alexander	Alaska	2057	PDT May 23	0.9ft
Kodiak	Alaska	2100	PDT May 23	0.8ft
Elfin Cove	Alaska	2104	PDT May 23	0.2ft
Sitka	Alaska	2108	PDT May 23	0.8ft
Westport South Bay	WA	2110	PDT May 23	1.2ft
Tofino	British Columbia	2107	PDT May 23	1.0ft
Astoria	Oregon	2119	PDT May 23	0.5ft
Seward	Alaska	2116	PDT May 23	0.4ft
Yakutat	Alaska	2128	PDT May 23	0.8ft
Victoria Harbor	BC	2150	PDT May 23	0.7ft
Ketchikan	Alaska	2142	PDT May 23	0.7ft
Valdez	Alaska	2140	PDT May 23	0.1ft
Port Angeles	Washington	2146	PDT May 23	0.8ft
Mata-Utu	Wallis Island FR	0951	PDT May 23	10.0ft
Pago Pago	US	1013	PDT May 23	11.9ft
Nukualofa	Tonga	1102	PDT May 23	9.3ft
Suva	Fiji	1124	PDT May 23	2.5ft
Wake Island	UM	1502	PDT May 23	1.0ft
Hilo	Hawaii	1527	PDT May 23	0.8ft
Kahului	Hawaii	1558	PDT May 23	1.3ft
Guam Apra Harbor	Guam	1658	PDT May 23	0.4ft

PARAMETROS PRELIMINARES DEL TERREMOTO
---

* Magnitud 8.7
* Tiempo de Origen 0830 AKDT May 23 2024
  0930 PDT May 23 2024
  1630 UTC May 23 2024
* Coordenadas 14.5 Sur 174.7 Oeste
* Profundidad 9 millas
* Localizacion en la region de las Islas Samoa

ACCIONES RECOMENDADAS
---

* Ver mensaje numero 18 para acciones recomendadas.

IMPACTOS
----
 * Ver mensaje numero 18 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.

$$

NTWC Spanish Bulletin #26

WEAK61 PAAQ 241640
TSUSPN

BULLETIN
Mensaje de Tsunami numero 26
NWS Centro Nacional de Alerta de Tsunami Palmer AK
940 AM PDT Fri May 24 2024

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

 * Advisory de Tsunami ha sido Cancelado para areas costeras
   de California

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
Atka Alaska	1904 PDT May 23	2.3ft
Adak Alaska	1919 PDT May 23	1.8ft
Nikolski Alaska	2150 PDT May 23	1.0ft
Arena Cove California	1953 PDT May 23	1.8ft
Point Reyes California	2025 PDT May 23	3.0ft
Monterey California	2022 PDT May 23	2.1ft
Unalaska Alaska	2010 PDT May 23	1.4ft
Humboldt Bay California	2008 PDT May 23	0.9ft
Port San Luis CA	2026 PDT May 23	4.6ft
Santa Barbara CA	2028 PDT May 23	1.8ft
Port Orford Oregon	2021 PDT May 23	1.3ft
Crescent City CA	2022 PDT May 23	2.9ft
Los Angeles Harbor CA	2032 PDT May 23	2.2ft
La Jolla California	2030 PDT May 23	1.1ft
King Cove Alaska	2016 PDT May 23	1.2ft
Ventura California	2029 PDT May 23	2.0ft
Santa Monica California	2320 PDT May 23	1.5ft
Sand Point Alaska	2020 PDT May 23	0.9ft
Charleston Oregon	2030 PDT May 23	1.2ft
San Francisco CA	2026 PDT May 23	1.1ft

San Diego	California	2038	PDT May 23	1.4ft
Alameda	California	2045	PDT May 23	0.5ft
Winter Harbour	BC	2053	PDT May 23	0.6ft
Newport	Oregon	2050	PDT May 23	1.0ft
Langara	BC	2042	PDT May 23	0.4ft
Garibaldi	Oregon	2051	PDT May 23	1.3ft
La Push	Washington	2059	PDT May 23	0.5ft
Port Alexander	Alaska	2057	PDT May 23	0.9ft
Kodiak	Alaska	2100	PDT May 23	0.8ft
Elfin Cove	Alaska	2104	PDT May 23	0.2ft
Sitka	Alaska	2108	PDT May 23	0.8ft
Westport South Bay	WA	2110	PDT May 23	1.2ft
Tofino	British Columbia	2107	PDT May 23	1.0ft
Astoria	Oregon	2119	PDT May 23	0.5ft
Seward	Alaska	2116	PDT May 23	0.4ft
Yakutat	Alaska	2128	PDT May 23	0.8ft
Victoria Harbor	BC	2150	PDT May 23	0.7ft
Ketchikan	Alaska	2142	PDT May 23	0.7ft
Valdez	Alaska	2140	PDT May 23	0.1ft
Port Angeles	Washington	2146	PDT May 23	0.8ft
Mata-Utu	Wallis Island FR	0951	PDT May 23	10.0ft
Pago Pago	US	1013	PDT May 23	11.9ft
Nukualofa	Tonga	1102	PDT May 23	9.3ft
Suva	Fiji	1124	PDT May 23	2.5ft
Wake Island	UM	1502	PDT May 23	1.0ft
Hilo	Hawaii	1527	PDT May 23	0.8ft
Kahului	Hawaii	1558	PDT May 23	1.3ft
Guam Apra Harbor	Guam	1658	PDT May 23	0.4ft

ACCIONES RECOMENDADAS - ACTUALIZADAS
---

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

IMPACTOS - ACTUALIZADOS
---

* La actividad del tsunami ha disminuido a lo largo de los estados de la costa oeste de los Estados Unidos, Columbia Britanica y Alaska.

* Actividad en curso puede seguir en algunas areas causando fuertes corrientes peligrosos para nadadores y embarcaciones.

* 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.

$$

Appendix C. NTWC Pacific Forecast Locations

NTWC East Coast and Gulf Forecast Locations (ETA's and Maximum wave height)					
WP_Name	State	Country	Tide Gauge	Breakpoint	Forecast Dissemination
The Cal./Mexico Border		United States		Yes	tsunami.gov
Orange/San Diego Line	California	United States		Yes	tsunami.gov
Rincon Point	California	United States		Yes	tsunami.gov
Point Conception	California	United States		Yes	tsunami.gov
Ragged Point	California	United States		Yes	tsunami.gov
Davenport	California	United States		Yes	tsunami.gov
Gualala River	California	United States		Yes	tsunami.gov
Mendo/Hum County Line	California	United States		Yes	tsunami.gov
Cape Mendocino	California	United States		Yes	tsunami.gov
Humboldt/Del Norte Line	California	United States		Yes	tsunami.gov
The Oregon/Cal. Border		United States		Yes	tsunami.gov
Douglas/Lane Line	Oregon	United States		Yes	tsunami.gov
Cascade Head	Oregon	United States		Yes	tsunami.gov
The Oregon/Wash. Border		United States		Yes	tsunami.gov
The Wash./BC Border		United States		Yes	tsunami.gov
North Vancouver Island	British Columbia	Canada		Yes	tsunami.gov
The BC/Alaska Border		United States		Yes	tsunami.gov
Cape Decision	Alaska	United States		Yes	tsunami.gov
Salisbury Sound	Alaska	United States		Yes	tsunami.gov
Cape Fairweather	Alaska	United States		Yes	tsunami.gov
Cape Suckling	Alaska	United States		Yes	tsunami.gov
Hinchinbrook Entrance	Alaska	United States		Yes	tsunami.gov
Kennedy Entrance	Alaska	United States		Yes	tsunami.gov
Chignik Bay	Alaska	United States	chig	Yes	tsunami.gov
Unimak Pass	Alaska	United States		Yes	tsunami.gov
Samalga Pass	Alaska	United States		Yes	tsunami.gov
Amchitka Pass	Alaska	United States		Yes	tsunami.gov
Attu	Alaska	United States		Yes	Messages & Tsunami.gov
Saint Paul	Alaska	United States	spak	No	Messages & Tsunami.gov
La Jolla	California	United States	lajo	No	Messages & Tsunami.gov
San Francisco	California	United States	fpnt	No	Messages & Tsunami.gov
Crescent City	California	United States	cres	No	Messages & Tsunami.gov
Neah Bay	Washington	United States	neah	No	Messages & Tsunami.gov
Tofino	British Columbia	Canada	tfbc	No	Messages & Tsunami.gov
Sitka	Alaska	United States	sitk	No	Messages & Tsunami.gov
Kodiak	Alaska	United States	kodi	No	Messages & Tsunami.gov
Shemya	Alaska	United States	shmy	No	Messages & Tsunami.gov
Los Angeles Harbor	California	United States	losa	No	Messages & Tsunami.gov
Santa Barbara	California	United States	sanb	No	Messages & Tsunami.gov
Charleston	Oregon	United States	char	No	Messages & Tsunami.gov
Westport South Bay	Washington	United States	wpwa	No	Messages & Tsunami.gov
Langara	British Columbia	Canada	lpbc	No	Messages & Tsunami.gov
Yakutat	Alaska	United States	yaku	No	Messages & Tsunami.gov
Cordova	Alaska	United States	cord	No	Messages & Tsunami.gov
Valdez	Alaska	United States	vald	No	Messages & Tsunami.gov
Seward	Alaska	United States	sewa	No	Messages & Tsunami.gov
Homer	Alaska	United States		No	Messages & Tsunami.gov
Sand Point	Alaska	United States	sdpt	No	Messages & Tsunami.gov
Cold Bay	Alaska	United States		No	Messages & Tsunami.gov
Unalaska	Alaska	United States	dutc	No	Messages & Tsunami.gov
Adak	Alaska	United States	adak	No	Messages & Tsunami.gov
Oceanside	California	United States		No	Messages & Tsunami.gov

Newport Beach	California	United States		No	Messages & Tsunami.gov
Santa Monica	California	United States	sanm	No	Messages & Tsunami.gov
Port San Luis	California	United States	pslu	No	Messages & Tsunami.gov
Point Sur	California	United States		No	Messages & Tsunami.gov
Monterey	California	United States	mont	No	Messages & Tsunami.gov
Point Reyes	California	United States	ptre	No	Messages & Tsunami.gov
Arena Cove	California	United States	aren	No	Messages & Tsunami.gov
Fort Bragg	California	United States		No	Messages & Tsunami.gov
Humboldt Bay	California	United States	nspi	No	Messages & Tsunami.gov
Brookings	Oregon	United States		No	Messages & Tsunami.gov
Port Orford	Oregon	United States	porf	No	Messages & Tsunami.gov
Astoria	Oregon	United States	asto	No	Messages & Tsunami.gov
Clatsop Spit	Oregon	United States		No	Messages & Tsunami.gov
Port Angeles	Washington	United States	pang	No	Messages & Tsunami.gov
Seattle	Washington	United States	ellb	No	Messages & Tsunami.gov
Elfin Cove	Alaska	United States	elak	No	Messages & Tsunami.gov
Perryville	Alaska	United States		No	Messages & Tsunami.gov
King Cove	Alaska	United States	kgak	No	Messages & Tsunami.gov
Akutan	Alaska	United States	akut	No	Messages & Tsunami.gov
Moclips	Washington	United States		No	Messages & Tsunami.gov
Long Beach	Washington	United States		No	Messages & Tsunami.gov
Port Townsend	Washington	United States	ptow	No	Messages & Tsunami.gov
Bellingham	Washington	United States		No	Messages & Tsunami.gov
Bolinas Lagoon	California	United States	blca	No	Messages & Tsunami.gov
Platform Harvest	California	United States	phca	No	Messages & Tsunami.gov
Redwood City	California	United States	rwca	No	Messages & Tsunami.gov
Richmond	California	United States	rdca	No	Messages & Tsunami.gov
Agony Point	Alaska	United States		No	Messages & Tsunami.gov
Alaid Island	Alaska	United States		No	Messages & Tsunami.gov
Alameda	California	United States	alam	No	Messages & Tsunami.gov
Auke Bay	Alaska	United States		No	Messages & Tsunami.gov
Avatanak Island	Alaska	United States		No	Messages & Tsunami.gov
Ballast Point	California	United States		No	Messages & Tsunami.gov
Bastendorf Beach	Oregon	United States		No	Messages & Tsunami.gov
Belkofski	Alaska	United States		No	Messages & Tsunami.gov
Biorka Island	Alaska	United States		No	Messages & Tsunami.gov
Bodega Bay	California	United States		No	Messages & Tsunami.gov
Cannon Beach	Oregon	United States		No	Messages & Tsunami.gov
Manzanita	Oregon	United States		No	Messages & Tsunami.gov
Rockaway Beach	Oregon	United States		No	Messages & Tsunami.gov
Cape Bingham	Alaska	United States		No	Messages & Tsunami.gov
Cape Hinchinbrook	Alaska	United States		No	Messages & Tsunami.gov
Winter Harbour	British Columbia	Canada	whbc	No	Messages & Tsunami.gov
Cape Blanco	Oregon	United States		No	Messages & Tsunami.gov
Carmel	California	United States		No	Messages & Tsunami.gov
Carpinteria	California	United States		No	Messages & Tsunami.gov
Coquille Point	Oregon	United States		No	Messages & Tsunami.gov
Elk	California	United States		No	Messages & Tsunami.gov
Empire	Oregon	United States		No	Messages & Tsunami.gov
Encinitas	California	United States		No	Messages & Tsunami.gov
English Bay	Alaska	United States		No	Messages & Tsunami.gov
Eureka	California	United States		No	Messages & Tsunami.gov
Everett	Washington	United States		No	Messages & Tsunami.gov
False Bay	Alaska	United States		No	Messages & Tsunami.gov
False Pass	Alaska	United States		No	Messages & Tsunami.gov
Gaviota	California	United States		No	Messages & Tsunami.gov

Gull Point	Alaska	United States		No	Messages & Tsunami.gov
Gustavus	Alaska	United States		No	Messages & Tsunami.gov
Half Moon Bay	California	United States		No	Messages & Tsunami.gov
Halibut Cove	Alaska	United States		No	Messages & Tsunami.gov
Hoonah	Alaska	United States		No	Messages & Tsunami.gov
Huntington Beach	California	United States		No	Messages & Tsunami.gov
Icy Bay	Alaska	United States		No	Messages & Tsunami.gov
Ivanof Bay	Alaska	United States		No	Messages & Tsunami.gov
Karab Cove	Alaska	United States		No	Messages & Tsunami.gov
Klamath River Mouth	California	United States		No	Messages & Tsunami.gov
Krestof Island	Alaska	United States		No	Messages & Tsunami.gov
Kruzof Island	Alaska	United States		No	Messages & Tsunami.gov
Laguna Beach	California	United States		No	Messages & Tsunami.gov
Lions Head	California	United States		No	Messages & Tsunami.gov
Malibu	California	United States		No	Messages & Tsunami.gov
Matlahaw Point	British Columbia	Canada		No	Messages & Tsunami.gov
Mendocino	California	United States		No	Messages & Tsunami.gov
Middle Harbor	California	United States		No	Messages & Tsunami.gov
Seal Beach	California	United States		No	Messages & Tsunami.gov
Montague Island	Alaska	United States		No	Messages & Tsunami.gov
Moss Landing	California	United States		No	Messages & Tsunami.gov
Morro Bay	California	United States		No	Messages & Tsunami.gov
Naples	California	United States		No	Messages & Tsunami.gov
Neskowin	Oregon	United States		No	Messages & Tsunami.gov
Yaquina John Point	Oregon	United States		No	Messages & Tsunami.gov
Nikolski	Alaska	United States	niko	No	Messages & Tsunami.gov
Nizki Island	Alaska	United States		No	Messages & Tsunami.gov
North Imperial Beach	California	United States		No	Messages & Tsunami.gov
Oceanside Beach	Oregon	United States		No	Messages & Tsunami.gov
Netarts	Oregon	United States		No	Messages & Tsunami.gov
Nestucca Bay	Oregon	United States		No	Messages & Tsunami.gov
Ouzinkie	Alaska	United States		No	Messages & Tsunami.gov
Pacifica	California	United States		No	Messages & Tsunami.gov
Pismo Beach	California	United States		No	Messages & Tsunami.gov
Point Reyes Beach	California	United States		No	Messages & Tsunami.gov
Port Lions	Alaska	United States		No	Messages & Tsunami.gov
Povorotni Point	Alaska	United States		No	Messages & Tsunami.gov
Redondo Beach	California	United States		No	Messages & Tsunami.gov
Rio Del Mar	California	United States		No	Messages & Tsunami.gov
Samalga Island	Alaska	United States		No	Messages & Tsunami.gov
San Diego	California	United States	sand	No	Messages & Tsunami.gov
Sanak	Alaska	United States		No	Messages & Tsunami.gov
Santa Cruz	California	United States		No	Messages & Tsunami.gov
Santa Cruz Island	California	United States		No	Messages & Tsunami.gov
Sausalito	California	United States		No	Messages & Tsunami.gov
Schooner Beach	Alaska	United States		No	Messages & Tsunami.gov
Sedanka Island	Alaska	United States		No	Messages & Tsunami.gov
Seldovia	Alaska	United States	seld	No	Messages & Tsunami.gov
Selezen Point	Alaska	United States		No	Messages & Tsunami.gov
Siletz Bay	Oregon	United States		No	Messages & Tsunami.gov
Depoe Bay	Oregon	United States		No	Messages & Tsunami.gov
Newport coast	Oregon	United States		No	Messages & Tsunami.gov
Situk River Mouth	Alaska	United States		No	Messages & Tsunami.gov
Siuslaw River Mouth	Oregon	United States		No	Messages & Tsunami.gov
South Spit	California	United States		No	Messages & Tsunami.gov

Surf	California	United States		No	Messages & Tsunami.gov
Tatitlek	Alaska	United States		No	Messages & Tsunami.gov
Ten Mile River Beach	California	United States		No	Messages & Tsunami.gov
Bayocean Peninsula	Oregon	United States		No	Messages & Tsunami.gov
Trinidad	California	United States		No	Messages & Tsunami.gov
Umpqua River Mouth	Oregon	United States		No	Messages & Tsunami.gov
Ventura	California	United States	veca	No	Messages & Tsunami.gov
West Atka Island	Alaska	United States		No	Messages & Tsunami.gov
White Point	British Columbia	Canada		No	Messages & Tsunami.gov
Whittier	Alaska	United States		No	Messages & Tsunami.gov
Yachats	Oregon	United States		No	Messages & Tsunami.gov
Necanicum R. Mouth	Oregon	United States		No	Messages & Tsunami.gov
Russian River Mouth	California	United States		No	Messages & Tsunami.gov
Stinson Beach	California	United States		No	Messages & Tsunami.gov
Oakland Outer Harbor	California	United States		No	Messages & Tsunami.gov
Mare Island	California	United States		No	Messages & Tsunami.gov
Alviso	California	United States		No	Messages & Tsunami.gov
Diablo Canyon	California	United States		No	Messages & Tsunami.gov
Goleta	California	United States		No	Messages & Tsunami.gov
Channel Islands Harbor	California	United States		No	Messages & Tsunami.gov
Port Hueneme	California	United States		No	Messages & Tsunami.gov
Two Harbors	California	United States		No	Messages & Tsunami.gov
Avalon	California	United States		No	Messages & Tsunami.gov
Two Harbors (west)	California	United States		No	Messages & Tsunami.gov
Dana Point	California	United States		No	Messages & Tsunami.gov
Long Beach	California	United States		No	Messages & Tsunami.gov
Bolinas	California	United States		No	Messages & Tsunami.gov
San Carlos	California	United States		No	Messages & Tsunami.gov
Mission Bay	California	United States		No	Messages & Tsunami.gov
Ocean Beach	California	United States		No	Messages & Tsunami.gov
Point Loma	California	United States		No	Messages & Tsunami.gov
North Island	California	United States		No	Messages & Tsunami.gov
K Pier, NAS Coronado	California	United States		No	Messages & Tsunami.gov
Naval Station	California	United States		No	Messages & Tsunami.gov
San Diego Harbor Ent.	California	United States		No	Messages & Tsunami.gov
North San Clemente Is.	California	United States		No	Messages & Tsunami.gov
Treasure Island Marina	California	United States		No	Messages & Tsunami.gov
North Spit coast	California	United States		No	Messages & Tsunami.gov
Lost Coast Shoreline	California	United States		No	Messages & Tsunami.gov
Mattole River	California	United States		No	Messages & Tsunami.gov
Westport	Washington	United States		No	Messages & Tsunami.gov
Waatch	Washington	United States		No	Messages & Tsunami.gov
Hoh	Washington	United States		No	Messages & Tsunami.gov
Queets	Washington	United States		No	Messages & Tsunami.gov
Coos Bay	Oregon	United States		No	tsunami.gov
Longview	Washington	United States	lvwa	No	tsunami.gov
Saint Helens	Oregon	United States	shor	No	tsunami.gov
Skagway	Alaska	United States	skag	No	tsunami.gov
Skamokawa	Washington	United States	skwa	No	tsunami.gov
Vancouver	Washington	United States	vawa	No	tsunami.gov
Seaside	Oregon	United States		No	tsunami.gov
Craig	Alaska	United States	crag	No	tsunami.gov
Newport	Oregon	United States	sbea	No	tsunami.gov
Garibaldi	Oregon	United States	gaor	No	tsunami.gov
Point Grenville	Washington	United States		No	tsunami.gov
La Push	Washington	United States	laph	No	tsunami.gov

Prince Rupert	British Columbia	Canada		No	tsunami.gov
Ketchikan	Alaska	United States	ketc	No	tsunami.gov
Port Alexander	Alaska	United States	paak	No	tsunami.gov
Juneau	Alaska	United States	june	No	tsunami.gov
Old Harbor	Alaska	United States	ohak	No	tsunami.gov
Alitak Bay	Alaska	United States	alak	No	tsunami.gov
Atka	Alaska	United States	atka	No	tsunami.gov
Amchitka	Alaska	United States	amka	No	tsunami.gov
Port Moller	Alaska	United States	pmak	No	tsunami.gov
Dillingham	Alaska	United States		No	tsunami.gov
Cape Newenham	Alaska	United States		No	tsunami.gov
Hooper Bay	Alaska	United States		No	tsunami.gov
Saint Matthew Island	Alaska	United States		No	tsunami.gov
Gambell	Alaska	United States		No	tsunami.gov
Unalakleet	Alaska	United States		No	tsunami.gov
Nome	Alaska	United States	nome	No	tsunami.gov
Little Diomede Island	Alaska	United States		No	tsunami.gov
Anchorage	Alaska	United States	anch	No	tsunami.gov
Cherry Point	Washington	United States	chrp	No	tsunami.gov
Friday Harbor	Washington	United States	frih	No	tsunami.gov
Nikiski	Alaska	United States	niki	No	tsunami.gov
Port Chicago	California	United States	pchi	No	tsunami.gov
Tacoma	Washington	United States	taco	No	tsunami.gov
Gold Beach	Oregon	United States		No	tsunami.gov
Pistol River	Oregon	United States		No	tsunami.gov
Fort Point	California	United States		No	tsunami.gov
Florence	Oregon	United States		No	tsunami.gov
Toke Point	Washington	United States	tpwa	No	tsunami.gov
Seaside City	Oregon	United States		No	tsunami.gov
Port Sonoma Marina	California	United States		No	tsunami.gov
Whidbey Island	Washington	United States		No	tsunami.gov
Indian Island	Washington	United States		No	tsunami.gov
Bella Bella	British Columbia	Canada	bbbc	No	tsunami.gov
Port Alberni	British Columbia	Canada	pabc	No	tsunami.gov
Wauna	Oregon	United States	waor	No	tsunami.gov
Campbell River	British Columbia	Canada	crbc	No	tsunami.gov
Sandy Cove	British Columbia	Canada	scbc	No	tsunami.gov
Bamfield	British Columbia	Canada	bamf	No	tsunami.gov
Hammond	Oregon	United States	haor	No	tsunami.gov
Patricia Bay	British Columbia	Canada	pbbc	No	tsunami.gov
Prince Rupert	British Columbia	Canada	prin	No	tsunami.gov
Port Hardy	British Columbia	Canada	phbc	No	tsunami.gov
Queen Charlotte	British Columbia	Canada	qcbc	No	tsunami.gov
Victoria Harbor	British Columbia	Canada	vibc	No	tsunami.gov

Appendix D. 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 (SOPs). Exercise participants may use their own past multi-hazard drills (e.g. flood, hurricane, tsunami, earthquake, etc.) as a framework to conduct PACIFEX24.

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 E** 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 wks	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

Appendix E. 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 an 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 F. 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)

PACIFIC TSUNAMI EXERCISE TO BE CONDUCTED MAY 23, 2024

(*insert community/county/state name*) will join other localities along the U.S. and Canadian continental Pacific coastline as a participant in a tsunami response exercise on May 23, 2024. 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 "Events such as the 2011 Japan earthquake and tsunamis as well as the 2022 Tonga eruption and tsunami have 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 PACIFEX24, will simulate significant impacts along the West Coast of the continental United States and Canada which require implementation of local tsunami response plans. The exercise will (*insert "include" or "not include")* public notification.

The exercise will simulate a major earthquake and tsunami generated along the Tonga Trench with an epicenter at 14.5ºS, 174.7ºW and occurring at 9:30 am Pacific Daylight Time (*or appropriate local time*) on May 23, 2024. Exercise participants will be provided with a handbook which describes the scenario and contains tsunami messages from the U.S. National Tsunami Warning Center (NTWC). The NTWC is responsible for providing tsunami information to the continental Pacific coasts of the U.S. and Canada.

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 supported by the U.S. National Tsunami Hazard Mitigation Program (NTHMP – a partnership of 29 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.

###

On the Web:

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