

## 2021 World Tsunami Awareness Day

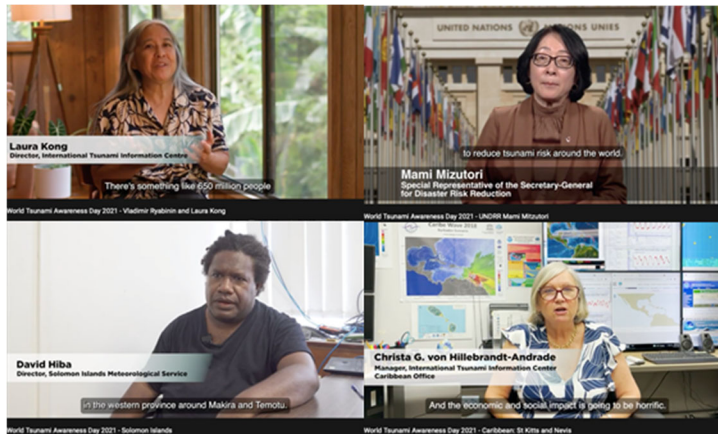
By Stephanie Soto, Christa von Hillebrandt-Andrade, and Carolina Hincapie  
 NOAA UNESCO IOC International Tsunami Information Center

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World Tsunami Awareness Day (WTAD), designated as November 5, was adopted in 2015 by the United Nations through the UN Resolution 70/203. This day aligns with the International Day for Disaster Reduction (October 13) and every year promotes one of the seven global targets of the Sendai Framework. For 2021 the focus was on substantially enhancing international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of the present Framework by 2030.

The Special Representative of the Secretary-General for Disaster Risk Reduction, Mami Mizutori, offered an [invitational message](#) to celebrate WTAD 2021. She proclaimed the UN Decade for Ocean Science for Sustainable Development, 2021-2030, a once-in-a-lifetime opportunity to reduce tsunami risk globally. Ms. Mizutori highlighted the Tsunami Programme adopted by the UNESCO IOC Member States to contribute to the UN Decade Safe Ocean outcome. Transformative improvements in tsunami detection, forecasting, and warning, along with global-scale coastal community resilience-building, are envisioned. An aim will be to make 100% of communities at risk of tsunamis prepared and resilient to tsunamis by 2030 through the UNESCO-IOC Tsunami Ready Programme and other initiatives.



World Tsunami Awareness Day [videos](#) by UNDRR in collaboration with UNESCO IOC.

Global and regional events organized by the UNDRR and UNESCO IOC, in collaboration with other UN agencies and external partners, were conducted to raise awareness on tsunamis. Dr. Laura Kong, Director of the International Tsunami Information Center (ITIC), participated as the US panelist in the International Cooperation for Tsunami Warning and Mitigation in Pacific Island Countries webinar, while Christa von Hillebrandt-Andrade, ITIC Caribbean Office, participated in a virtual panel hosted by Ecuador focusing on Tsunami Ready. Short [videos](#) created by the UNDRR in collaboration with UNESCO IOC showcased the importance of



# TsuInfo Alert

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**NATIONAL TSUNAMI HAZARD MITIGATION PROGRAM LIBRARY CATALOG:**

<http://d92019.eos-intl.net/D92019/OPAC/Index.aspx>

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## 2021 World Tsunami Awareness Day

By Stephanie Soto, Christa von Hillebrandt-Andrade, and Carolina Hincapie  
NOAA UNESCO IOC International Tsunami Information Center

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international cooperation and its contributions to and from countries and partners around the world working together to save lives from tsunamis. Both [Laura Kong](#) and [Christa von Hillebrandt](#) were featured in two of the videos. ITIC also prepared [Tsunami Ready shout-outs](#) with participants across the Pacific Region. Several agencies joined WTAD by holding exercises, educational events and thru campaigns over on their social media platforms. The United States Virgin Islands chose this day for the renewal of their TsunamiReady status, while in Puerto Rico a nighttime tsunami evacuation walk took place in Mayagüez. WTAD is a key contribution to implementing the Sendai Framework and Tsunami Ready Programme to improve tsunami preparedness and resilience in every ocean. For more WTAD 2021 information and videos, please visit the [International Tsunami Information Center](#) website.

**WORLD  
TSUNAMI  
AWARENESS  
5 NOVEMBER  
2021 DAY**



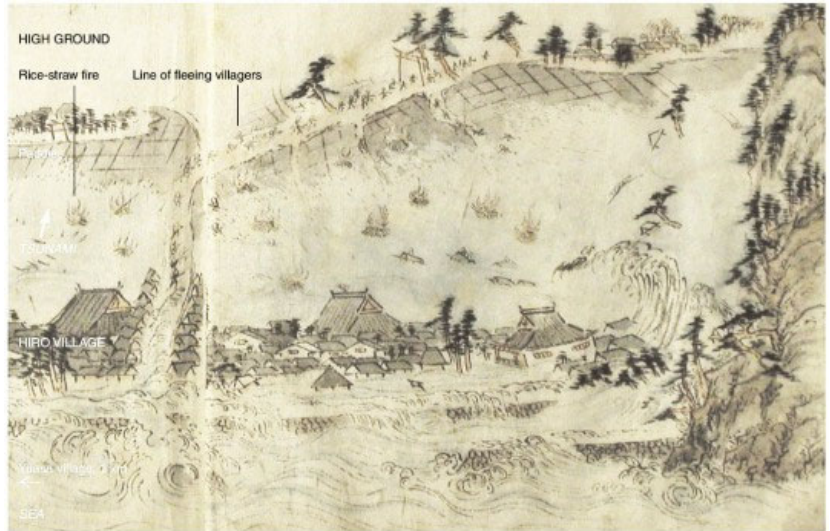
# WORLD TSUNAMI AWARENESS DAY

## World Tsunami Awareness Day 2021

By Lori Dengler/For the Times-Standard October 31, 2021

The United Nations designates November 5th World Tsunami Awareness Day. It is a day to salute people whose actions protected their families and communities from tsunamis. Anyone, including the old and the young, can be a tsunami hero or heroine with a bit of education.

November 5th was chosen to honor an old man who saved his village because he knew that tsunamis could follow earthquakes. In the early winter of 1854, a magnitude 8.4 earthquake struck Japan's Kii Peninsula off the coast of central Japan. After the earthquake, Goryo Hamaguchi, set fire to piled sheaves of newly harvested rice to get the attention of villagers near the coast and guide them to high ground in the darkness. The 1854 tsunami caused damage and casualties, but his actions saved many in Hiro. It became part of Japanese folklore and was recounted by Lafcadio Hearn in 1897 in one of the earliest stories about Japan in the English language.



The Rice Sheaf Fire was painted by Furuta Shōemon soon after the 1854 tsunami

My introduction to the Rice Sheaf fire and Hiro tsunami was at a meeting of the National Tsunami Hazard Mitigation (NTHMP) program. The NTHMP was founded in 1996 in large part of concerns over tsunamis on the Cascadia subduction zone following our 1992 Cape Mendocino earthquake. We were a small group then - two representatives from the five Pacific states and members from NOAA, the USGS, and FEMA.

In those early NTHMP days, we collected as much tsunami educational material as we could find and one of the Oregon reps had found a 7-minute video "The Wave: A Japanese Folk Tale" that animated a children's book about an old man (Ojiisan) and his grandson who saved his village by igniting the rice crop. We were given copies and I incorporated it into our first school curriculum project.

I loved the simple graphics and the positive message of the video. I showed it to my daughter's second grade class. Two years later, after the Papua New Guinea tsunami, I was preparing to leave on my first post-tsunami field survey. Clara said that it was too bad there wasn't an old man to warn the people to go to high ground. The Ojiisan story had stuck in her memory.

Nine years later I learned that it wasn't just a folk tale. It really happened. Brian Atwater, now emeritus at the USGS, spent a sabbatical in Japan in the early 2000s looking for historic evidence of the 1700 Cascadia tsunami in Japan. The result is a fabulous book "[The orphan tsunami of 1700—Japanese clues to a parent earthquake in North America](#)" that lays out the evidence for the last great earthquake in the Cascadia subduction zone.

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# WORLD TSUNAMI AWARENESS DAY

## World Tsunami Awareness Day 2021

By Lori Dengler/For the Times-Standard October 31, 2021

(Continued from page 3)

An orphan tsunami is one that arrives without feeling an earthquake. Japan is one of the most tsunami-prone regions of the world and the majority of tsunamis are home grown – caused by large earthquakes that people feel and shortly followed by a series of tsunami surges. The term orphan tsunami refers to one with no parent earthquake – the tsunami surges just suddenly arrived. In March 2011, we experienced such an orphan in California when the Great East Japan earthquake produced a tsunami that was large enough to cause damage in Crescent City and other West Coast harbors.

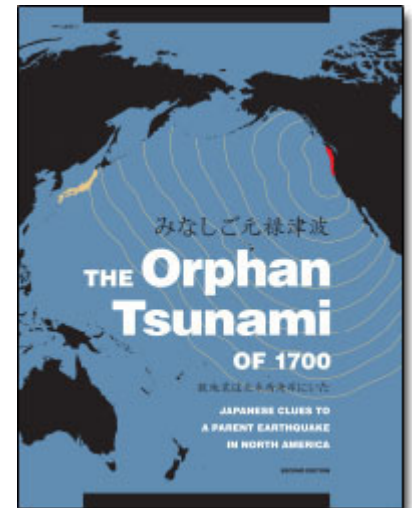
One of the accounts Brian and colleagues found of the Cascadia orphan tsunami was from the village of Hiro. In researching the Hiro story, they came across the 1854 story of Goryo Hamaguchi. They even tracked down a painting done by a witness to the tsunami. The actual earthquake occurred in December on our calendar but on November 5th using the traditional Japanese calendar.

I have a special fondness for this day. Rather than focus on a horrific disaster, it elevates an action that reduced impacts and saved lives. The first UN World Tsunami Day was in 2015, on the very same day that the first edition of the book “The Extraordinary Voyage of Kamome, A Tsunami Boat Comes Home” was published.

The Kamome story is a bilingual Japanese – English book that I coauthored with Amy Miller. The wonderful illustrations by Amy Uyeki are very much in the spirit of World Tsunami Day. It is a book about how bad things can happen but can also bring out the best in people, that kindness matters and, despite differences in language and culture, we are far more alike than we are different.

The Kamome book, like the Ojisan story, is not scary. Both deal with a frightening subject but in a way that is positive and will make you smile. We’ve created a new web page <https://rctwg.humboldt.edu/world-tsunami-awarenessday> where you can explore the origins of World Tsunami Day, access the Kamome story and view the Japanese Folk Tale video. There’s a video lecture on California tsunami hazards, stories of other tsunami heroes and heroines, and links to curriculum activities.

Take a moment to think about your family and what actions you could take to protect them. Even if you don’t live near the coast or in a tsunami zone, any visitor to the beach is possibly at risk. If you are a coastal resident, support your community’s efforts to establish tsunami evacuation routes and practice how to evacuate. We’ve included info on how to hold a drill on the website. Looking forward, we hope to hold a tsunami evacuation drill in Manila and Samoa during California’s Tsunami Week in March. We will be looking for Peninsula residents to help us organize the drill.



Link to original article: <https://www.times-standard.com/2021/10/31/lori-denglerworld-tsunami-awareness-day-2021/>

# NTHMP PARTNER UPDATES

## What's New with TsunamiZone.org?

Newly added pages for Puerto Rico, promotion of World Tsunami Awareness Day (November 5), and improvements to the TsunamiZone registration form

By Jason Ballmann, TsunamiZone.org

Imagine a day at the coast where suddenly the ground shakes and minutes later, the hills are ablaze. In a panic, people are rushing up to put out the flames, trying to save months – even years – of hard, grueling farm work. It may sound like a double-disaster scene from a Hollywood movie, but it's actually a [tale of tsunami safety](#). In a Japanese seaside village during the 1850s, strong shaking was felt, but villagers did not immediately evacuate to higher ground. A remarkably wise and clever leader knew that the villagers would at least try to go high ground if they saw their precious rice harvest on fire, so leader burned the sheaves and watched as people did [just what was expected](#): go uphill to fight the fire (and get out of the impending tsunami's way)!

This is also the story that inspired [World Tsunami Awareness Day](#), in addition to the [Sendai Framework](#). World Tsunami Awareness Day is a [United Nations Observance](#) that takes place each year on November 5. TsunamiZone.org's [social media](#) and [email channels](#) spent two weeks leading up to #TsunamiDay promoting this history and inspiration, how people can prepare to survive and recover from tsunamis, and the latest in tsunami news. Visit [@TheTsunamiZone on Twitter](#) and read an email update sent to [Puerto Rico](#) and [California](#) residents to see some examples of sharing on [World Tsunami Awareness Day!](#) The Redwood Coast Tsunami Work Group ([RCTWG](#)) [released a fantastic page](#) for [World Tsunami Awareness Day](#) too, with insightful, entertaining, and educational facts, stories, and media you can only find there. After an expectedly busy October with [ShakeOut](#), [World Tsunami Awareness Day](#) was also a nice opportunity for Puerto Rico residents to see their new TsunamiZone pages go live at [TsunamiZone.org/puertorico](#), too ([Spanish](#) and [English](#)).



Sample tweet from [@TheTsunamiZone](#) promoting [World Tsunami Awareness Day's](#) history.

As we continue on the [TsunamiZone.org](#) mission, now is the time to check on [your region's TsunamiZone pages](#). Just head to [TsunamiZone.org](#) and choose from the "[TsunamiZone Regions](#)" to see what your pages have (or don't have yet!). Then [email Jason Ballmann](#) at the [Southern California Earthquake Center](#) for any changes, such as new campaigns, resources, and other edits. Have you also checked to make sure you and your agency are [registered on TsunamiZone.org](#) to participate in 2022? Oftentimes as leaders, we're busy leading and forget to take simple actions like this! Be one of the first to be shown at [TsunamiZone.org/whoisparticipating](#) (and delight in those that might already be registered for your region). Speaking of registration, TsunamiZone.org's [registration form](#) has made a few improvements, largely simplifying and clarifying the types of ways you can participate and confirming if your participation is a part of a regional campaign.

On behalf of TsunamiZone.org organizers, we wish you a safe, calm, and joyous holiday season! Again, reach out if anything is needed between now and until we all talk again in the New Year: [ballmann@usc.edu](mailto:ballmann@usc.edu). Happy Holidays!

[TsunamiZone.org](#) is managed by the Southern California Earthquake Center ([SCEC](#)) at the University of Southern California ([USC](#)), with funding from the National Oceanic and Atmospheric Administration ([NOAA](#)) via the National Tsunami Hazard Mitigation Program ([NTHMP](#)) and the California Governor's Office of Emergency Services ([Cal OES](#)).

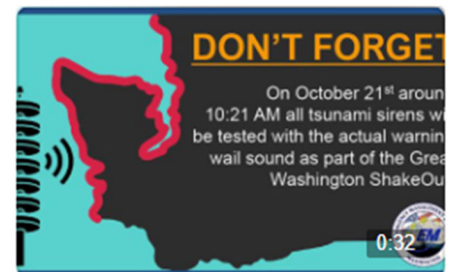
# GREAT SHAKEOUT

## Lessons Learned from Washington's 10th Annual Great ShakeOut

By Elyssa Tappero, Washington Emergency Management Division

**Washington State is earthquake country and that means the annual Great Washington ShakeOut is a big deal.**

With an understandably low turnout in 2020, the Washington Emergency Management Division's (WA EMD) Hazards and Outreach team sought to make 2021's event – which also happened to be the 10th anniversary of the state's participation in the Great ShakeOut – bigger and better than ever. ShakeOut in Washington includes both an earthquake and tsunami drill, as well as a test of the state's network of coastal tsunami sirens with the actual wailing sound of a tsunami warning. The months leading up to ShakeOut were filled with outreach activities and stakeholder support of all kinds: Facebook and Twitter Live videos, radio and TV interviews, planning meetings, outreach to past participants, and a targeted ad campaign across print, TV, radio, and social media.



The result of these efforts was over *1.3 million registered participants* (17.5% of the state's total population!) and an impressive social and traditional media buzz the day-of; visits to the WA EMD Facebook page more than doubled on the day of ShakeOut and visits to related WA EMD websites tripled. Below are some lessons our team learned during the ShakeOut bonanza which can easily be applied to ShakeOut events in other states, territories, and countries, as well as in other hazard and preparedness outreach in general.

Don't forget ShakeOut Oct 21

2 weeks ago · 102K Views

827

### Get Creative with Outreach

Our team here at WA EMD is always looking for new ways to engage a public already saturated with hazard messaging – and we're not afraid to embarrass ourselves in the process! For ShakeOut this year we leaned heavily into social media by creating a suite of ShakeOut-themed memes to share on Twitter and eye-catching graphics for use by our local partners. We also experimented with a new outreach format by offering a Facebook Live series leading up to ShakeOut, streaming one live video a week starting the first week of September. These live events covered a range of



topics related to earthquakes, tsunamis, and preparedness, and provided a chance for the public to get to know the ShakeOut team at WA EMD and ask us questions in real-time. We even streamed our WA EMD ShakeOut drill itself over Facebook so people could see us “walk the walk” and not just “talk the talk”.

Based on both viewer engagement during the filming itself and the total number of views for each video, the Facebook Lives were a hit. With thousands of views each (and a tsunami-specific one with a whopping 21,000+ views) these videos were an easy way to reach a wide audience. Longer videos like these are perfect to mix with shorter ones that get straight to the point but

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# GREAT SHAKEOUT

## Lessons Learned from Washington's 10th Annual Great ShakeOut

By Elyssa Tappero, Washington Emergency Management Division

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don't offer a chance for viewers to ask questions. For example, a brief 30-second Facebook video about the tsunami siren test which occurs during the ShakeOut drill was viewed 102,000 times and shared over 1,600 times!

Using memes and live social media interactions like these not only help dispel earthquake/tsunami myths, they also put faces and personalities to what can feel like an otherwise monolithic government entity. This builds trust in us and our safety messages by allowing opportunities for personalized replies to questions from viewers. Facebook Live events are a fun, low-pressure way to get your message out to the public and also serve as a great practice for more structured interviews with the media.



Check out all of WA EMD's Facebook videos here: <https://www.facebook.com/pg/WashEMD/videos/>

### Hone Your Messaging

From the sheer amount of feedback, questions, and comments we received through email and social media, it's clear ShakeOut messaging reached more people in Washington than ever before. Based on some of the common themes in this feedback, it's also clear we have some areas in which we need to further hone our messaging next year. For example, many people expected to hear the tsunami siren wailing sound during the test despite not actually living near a siren or even directly on the coast. This shows that our siren test messaging reached a ton of people (great!) but that it wasn't specific enough regarding how someone can check if they are in a tsunami inundation zone and have a siren in their community (less great). Another example is the people who assumed a statewide drill meant they would receive some sort of alert during ShakeOut regardless of whether they registered for the event or whether their employer was participating. Obviously, our messaging about ShakeOut being a *voluntary* drill for which you or your organization take part on your own needs to be clearer next year.

Some of these messaging miscommunications are ones we encounter each ShakeOut, which gives us ongoing opportunities to further tweak our language and see if that improves audience reception. When you don't have the ability to repeatedly experiment with a message it's good to come at it with fresh eyes or from a fresh angle to see how many ways it could possibly be (mis)interpreted by someone who isn't familiar with the information. Every piece of media, whether it's an ad, a video, or a tweet, should have a central message with an actionable step for the viewer. Once you feel confident you have your message down you can then decide what forms it will take. Everyone's attention is caught by something different; that's where the creativity comes in!

As you're fine-tuning your messaging or spicing up your outreach, don't forget you can always phone a friend. Our team at WA EMD loves providing feedback or teaming up on a project, so don't hesitate to give us a shout! Our team can be reached at [public.education@mil.wa.gov](mailto:public.education@mil.wa.gov).

# GREAT SHAKEOUT

## ShakeOut 'Tsunami Saunter'

By Kathleen Reiter, Clallam County Emergency Management Volunteer

This year, for the third time, Clallam County Emergency Management organized a Port Angeles "Tsunami Saunter" Exercise as part of The Great Washington ShakeOut. The exercise was planned with these goals in mind:

- To test the effectiveness of Tsunami Evacuation Zone signs as they are currently posted in the city of Port Angeles.
- To establish true data on the amount of time it might take a typical survivor to reach a safe zone, from the waterfront area of Port Angeles.
- To create a training opportunity, allowing members of several different volunteer programs and agencies to participate in an activity that would further cooperation and familiarity among the groups.
- Give participants a chance to practice radio communication skills, which will be important in the event of an actual emergency.

On October 17th, all the participants gathered in the Clallam County Emergency Operations Center (EOC) for a COVID screening check, followed by a safety briefing with coffee and cookies. Volunteers were given FRS radios for exercise

accountability and coordination, then divided into three separate teams. Each team was assigned a different route to follow from various waterfront sites to gathering places which would be safe distances from possible tsunami impact. Each team was given a map with the probable evacuation route to an identified assembly point marked, where an EOC staff member was waiting to check the time it took for them to arrive. And just to make it more interesting, they were also given envelopes containing Complication Cards, to be opened at particular points along their routes. These cards held details, such as *damage to the road surface that required a change of route*, or *individuals encountered who needed help*. Teams had to make choices that might impact their survival and decide among themselves what the best choice would be in each situation. They also had note cards to record their thoughts and findings, which were used during the "Hot Wash" meeting back at the EOC. Together again, everyone enjoyed snacks and warm beverages while they discussed their various routes and some of the changes they felt would improve each one and make it easier for pedestrians to reach safety in a real disaster.

The participants were a good mix of people, aged between 40 and 85 years, some of whom had significant physical challenges. One volunteer was blind, and had to rely on his team members to be sure he was always heading in the safest direction, while the tsunami hazard sirens confused the senses he normally relied upon. That team commented that not being able to see tsunami evacuation route signs in some areas could be a real problem.

One of the teams accepted the challenge of starting their evacuation trek at a waterside point along the Olympic Discovery Trail, a popular hiking and biking trail used by thousands of visitors to the Olympic Peninsula, and the location



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# GREAT SHAKEOUT

## ShakeOut 'Tsunami Saunter'

By Kathleen Reiter, Clallam County Emergency Management Volunteer

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every summer of the North Olympic Discovery Marathon. They discovered that the message broadcasted by the distant sirens was not understandable, and that without a map with their marked route, they would not have been able to choose the fastest route to safety.

Since some of the participants were from Sequim and Joyce and therefore not as familiar with the geography of Port Angeles, the exercise was a good test of the evacuation route signs, and they provided excellent feedback about some of the proposed Assembly Points. The main question from many volunteers was "How do we know how far we need to go to be safe?", as there are no signs informing the public that they are leaving the tsunami hazard zone, as there are in many other communities.

In conjunction with the "Tsunami Saunter", EOC volunteers visited the businesses in downtown Port Angeles over several days prior to the exercise and distributed flyers about the Great Washington ShakeOut, explaining that the tsunami hazard sirens would sound the actual alert noise on the 17th. They left flyers about the yearly drill that the proprietors could pass out to customers, thus alleviating any fears that the sirens might cause. This added step was especially appreciated by the Blackball Ferry Agency, with their passengers coming in from Canada, and a small cruise ship line that was docked in Port Angeles for a few days while visitors from all over the country toured the beautiful Olympic Peninsula.

The planning and coordination that went into the exercise has been paid back in great feedback from the public and from all the participants. We have identified some of the gaps we need to fill and even have next steps delineated. There will likely be volunteers sauntering through Port Angeles again next October, and perhaps through some of the other coastal communities of Clallam County too.

## ShakeOut Promotes Tsunami Safety

By Lori Dengler/For the Times-Standard October 24, 2021

Thursday October 21st, 2021 was the Great ShakeOut and more than 7.6 million Californians were registered participants. Our North Coast tally was just under 53,000 – kudos to all of you who practiced Drop, Cover, and Hold On drills whether at home, at work, at school or in another location.

Getting under that table or desk is only one part of ShakeOut. It was also an opportunity to test emergency notification systems. I received three alerts. The first was from the Humboldt County Everbridge notification system, followed a few seconds later by a MyShake alert, and then a notice from Humboldt State University's campus system.

All of these systems have one thing in common – you need to opt into them to get notified. If you did not receive any alerts last Thursday, there are two reasons. First, you aren't currently in the system. Every county in California has a notification system, but they aren't automatic. You need to enroll in order to get text, email, or phone alerts. You can sign up for Humboldt's system at <https://humboldt.gov.org/2014/Emergency-Notifications> or phone the County OES (707)268-2500.

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# GREAT SHAKEOUT

## ShakeOut Promotes Tsunami Safety

By Lori Dengler/For the Times-Standard October 24, 2021

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The Humboldt alert was sent to over 67,000 contacts. 22% confirmed that the message was received. In a real emergency, it is important to verify receipt as the system will continue to contact you until it knows it got to you. The ShakeOut test showed a new problem. Many phones have spam filters on them and blocked the calls or labeled them “Potential Spam” and people ignored them. The County is working with Everbridge to code the messages in a way that people will recognize.



ShakeOut originally focused on earthquakes and shaking hazards. We began including tsunami awareness several years ago because feeling an earthquake is the natural warning that a tsunami may soon follow. This year, the community of Fairhaven on the Samoa Peninsula went a step further and held a tsunami evacuation drill.

Fairhaven is the southernmost community on the Peninsula and is home to about 200 people. It's been a community of concern since we first became aware of the Cascadia tsunami threat. Unlike Samoa and Manila, there are no high dunes near Fairhaven and the first State tsunami maps identified the nearest safe high ground a 45-minute walk away. Fairhaven is exploring a vertical evacuation structure, but the costs have so far put that project out of site.

Last year, new tsunami maps were issued for Humboldt County (<https://rctwg.humboldt.edu/tsunami-hazard-maps>). The new maps used far more precise land elevation data. The more detailed topography was able to incorporate the dune topography and revealed that several dunes near Fairhaven exceed 40 feet in elevation and one reaches 46 feet.

If you've seen tsunami movies or read some media accounts, this might not sound very high. Recent tsunamis have exceeded 100 feet in some areas. But tsunamis are not like bathtubs and can't be described as a single elevation line. The height of a tsunami on land is a function of many things including the character of the source, the shape and depth of the sea floor, and coastal topography. Shallower water in the source area can mean a much smaller tsunami even when earthquake slip is large.

The California Geological Survey put all of these factors together in determining how large a tsunami would be produced by a magnitude 9 earthquake on the Cascadia subduction zone. In most of Humboldt County, the new tsunami maps were very similar to the previous ones but there were a few areas of more flooding and some, where more safe areas have emerged.

Yesterday morning, we put the new maps to good use. The Redwood Coast Tsunami Work Group coordinated an evacuation drill to the newly identified high dune, and even in the pouring rain, about ten percent of the community walked from their homes to the evacuation site. The primary purpose of this drill was to familiarize residents with the location of the site and how to get there. But it also served to time how long it takes to walk the route and where evacuation route signs need to be placed.

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# GREAT SHAKEOUT & NTHMP PARTNER UPDATES

## ShakeOut Promotes Tsunami Safety

By Lori Dengler/For the Times-Standard October 24, 2021

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Why walk? A natural inclination is to jump in the car and drive to Eureka or Arcata. That works fine for tsunamis coming from far away when several hours elapse between notification and the first surges. But this drill focused on the big earthquake beneath our feet, the earthquake that damages roads, drops powerlines and produces a tsunami that arrives very quickly. The highway goes through many low areas before reaching high ground and, even if the road is still passable, is much more vulnerable to a tsunami strike than the high dunes.

Ten minutes is our target time to get people to safety after a Cascadia earthquake. People in most parts of the community were able to reach the high dune in that time at a comfortable walking pace. But the drill did identify several issues. It took one family 15 minutes just to coordinate their young children and leave the house. We call this milling – the time it takes to prepare before action occurs.

I fully understand the issues of getting kids dressed and out the door, especially on a rainy day. There are ways to address this. First, hold frequent drills so that everyone in the family knows exactly what to do. Storing coats, shoes, snacks, and other necessary supplies in go kits by the door can also help. And third, community help - identifying people with young children or the elderly who need assistance ahead of time. Nearby neighbors can give them a hand when an emergency occurs.

Yesterday's drill was just a first step. The evacuation route needs to be improved so that wheelchairs and strollers can navigate it. My aging knees found the last hill a bit of a challenge. The signs aren't permanently installed yet. It's also not a final solution – I'm still hoping a permanent evacuation structure can be built. But this was a big first step and my applause to everyone who participated.

Link to original article: <https://www.times-standard.com/2021/10/24/lori-dengler-shakeout-helps-to-promote-tsunami-safety/>

## Historical Tsunami Data and Inundation Extent Mapping Efforts for the Tsunami Ready Recognition in Jamaica

By Desireé Bayouth García and Christa von Hillebrandt-Andrade,  
UNESCO/IOC – NOAA International Tsunami Information Center, Caribbean Office (ITIC-CAR)

Jamaica is seeking Tsunami Ready recognition for the community Old Harbour Bay, located on the southern coast. The International Tsunami Information Center, Caribbean Office (formerly known as the Caribbean Tsunami Warning Program) received funding from USAID to support the process. One of the tasks was the preparation of the country's National Tsunami Response Plan and Standard Operating Procedures (SOPs). In support of this task, ITIC-CAR prepared a map of historical tsunamis and identified a nationwide preliminary "blue line" indicating potential tsunami hazard zone. The map product was prepared after reviewing the earthquake and tsunami events that have affected the country and the Western Caribbean between 1692 and 2021 (Figure 1).

The data for the map was obtained from: NOAA's National Center for Environmental Information (NCEI), the International Seismological Center – Global Earthquake Model (ISC-GEM) Global Instrumental Earthquake Catalogue,

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# NTHMP PARTNER UPDATES

## Historical Tsunami Data and Inundation Extent Mapping Efforts for the Tsunami Ready Recognition in Jamaica

By Desireé Bayouth García and Christa von Hillebrandt-Andrade,  
UNESCO/IOC – NOAA International Tsunami Information Center, Caribbean Office (ITIC-CAR)

(Continued from page 11)

and the United States Geological Survey (USGS) Earthquake Catalogue. Historical tsunami events with validities of 3 (probable tsunami) and 4 (definite tsunami), and earthquake events with magnitudes greater than 6 and depths of less than 100 kilometers were considered. At least 17 earthquake events were associated with a tsunami, while there were 55 earthquake events recorded in the region that did not generate a tsunami.

Aside from the Western Caribbean historical earthquake and tsunami events map, a preliminary line product that depicts the tsunami inundation extent was mapped for the whole island of Jamaica (Figure 2). During the mapping process, the Intergovernmental Oceanographic Commission of UNESCO Manuals and Guides 82 (IOC MG 82), the United States National Tsunami Hazard Mitigation Program (US NTHMP) Guidelines, historical inundation, run-up, earthquake, and tsunami event data available for the island were reviewed. Jamaica's Office of Disaster Preparedness and Emergency Management (ODPEM) was consulted about the data to be used and specific mapping considerations and parameters. The inundation extent was prepared following a non-numerical modeling approach, the bathtub modeling method (defined in the IOC MG 82 as “a

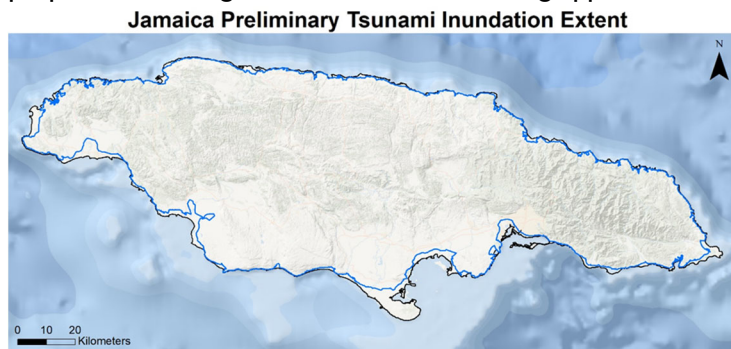


Figure 2: Preliminary tsunami inundation extent (blue line) for Jamaica as of December 6, 2021.

the Caribbean and Old Harbour Bay, a 10 meter elevation (run-up) and a 1.6 km distance (inundation) from the shoreline were considered as final mapping parameters. ArcGIS was then used to prepare the final map. The 10 m contour was extracted from the DEM raster and the 1.6 km inland distance buffer was prepared from the island's outline. The general methodology used to map the tsunami inundation extent for the whole island was to primarily trace the coastal inundation data limit. In areas where this particular data layer was exceeded inland by the 10 m elevation or the 1.6 km distance layers, the boundary of the first out of these two layers that reached inland from the coastline was selected and mapped for the tsunami inundation extent. The resulting line has been given the name of “blue line”.

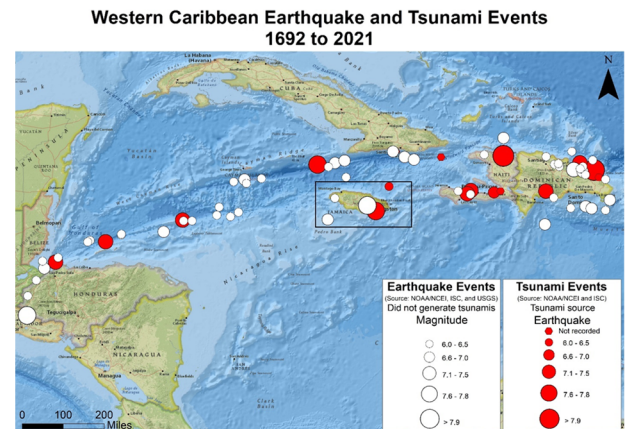


Figure 1: Map of shallow earthquakes (<100 km depth) with a magnitude of >6.0 and confirmed historical tsunami sources (tsunami validities 3 (probable tsunami) and 4 (definite tsunami)) that have impacted the Western Caribbean from 1692 to 2021. Earthquakes that did not generate a tsunami are displayed in white circles, tsunamis generated by earthquakes of unknown magnitude are displayed in red hexagons, and tsunamis generated by earthquakes are displayed in red circles. The black rectangle encloses Jamaica. Data date of access: August 30, 2021

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# NTHMP PARTNER UPDATES

## Historical Tsunami Data and Inundation Extent Mapping Efforts for the Tsunami Ready Recognition in Jamaica

By Desireé Bayouth García and Christa von Hillebrandt-Andrade,  
UNESCO/IOC – NOAA International Tsunami Information Center, Caribbean Office (ITIC-CAR)

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Further work to refine this mapping includes but is not limited to, integrating ground truthing and considering riverine susceptibility data, road networks, community, and infrastructure data provided by the ODPEM. If used at the community level, other datasets and parameters can be considered and integrated as necessary.

While the frequency of high magnitude earthquakes and tsunamis is low for Jamaica, the severity of their impacts cannot be overlooked. Based on the National Tsunami Response Plan and SOPs, 90% of the island's environmental protected areas are located within 3 km of the coast and the majority of Jamaica's population resides within 5 km from the coastline. Therefore, with the *blue line* it was possible to constrain further the potential area of impact and tsunami vulnerability. Conservative nonnumerical products such as the *blue line* have provided insights into the general tsunami inundation extents for Jamaica by integrating local inundation and topographic data. This inundation extent was included in local map products to depict some of the island's critical assets, population density, and emergency shelters located along the coast that are exposed and susceptible to the impacts of tsunamis. The preliminary mapping results can also contribute to future tsunami inundation mapping and modeling efforts for the whole island, as well as for particular communities of interest in Jamaica. In addition, a similar mapping methodology can also be employed in other countries or islands that do not have numerical modeling results and or applicable datasets available.

## California Tsunami Program Supports 2021 San Francisco Fleet Week

By Yvette LaDuke, California Governor's Office of Emergency Services (Cal OES)

The Cal OES Tsunami program staffed an outreach booth during the 2021 San Francisco Fleet Week event held October 8-10, 2021 at Marina Green Park. San Francisco Fleet Week events include an air show headlined by the U.S. Navy Blue Angels, a parade of ships, and many community events that bring together thousands of people from all walks of life to develop and share best practices in humanitarian assistance. This event honors U.S. Armed Forces service members and enhances cooperation and the sharing of knowledge between civilian and military personnel.

The Cal OES Tsunami Program engaged over a thousand attendees during the three days in tsunami preparedness topics. Tsunami hazards education with the public included discussing the difference between local and distant source tsunamis and how tsunami events could potentially impact the California coast, including the Marina Green location that is in the mapped tsunami hazard zone. Participants included students who were very eager to learn more about tsunamis and how to be prepared, and teachers attending the event who were interested in materials and topics for their classrooms to support their science-based education activities.



Photo Credit: Todd Becker, CA Tsunami Program

*(Continues on page 14)*

# NTHMP PARTNER UPDATES

## California Tsunami Program Supports 2021 San Francisco Fleet Week

By Yvette LaDuke, California Governor's Office of Emergency Services (Cal OES)

*(Continued from page 13)*

We spoke to attendees about the Cal OES MyHazards website that allows the public to enter their address to discover multiple hazards (tsunami, earthquake, flood, and fire) based on location. The MyHazards website includes guidance to reduce personal risk. Many participants were also interested and engaged in the outreach material detailing the Tohoku earthquake and tsunami that occurred in March of 2011, and the effects it had on the California coastline.

Cal OES was very proud to participate in this year's San Francisco Fleet Week event. The San Francisco Fleet Week is a great opportunity to reach many people from diverse backgrounds. The Cal OES Tsunami Program looks forward to continuing the tsunami education efforts at this event in 2022 and for many years to come.

## Tsunamis: Know the Signs, Hear the Stories, and Get Prepared!

By Kim Albins, Office of Response and Restoration Disaster Preparedness Program Blog 12/2/2021

Imagine this: you are sitting on a beautiful beach enjoying a lovely day, when out of the blue an alarm blasts from your phone and reads "Tsunami warning." Do you know where you would go and what to do? What if you aren't in the U.S. and there are no alarms, would you know the signs of an approaching tsunami?

Tsunamis are the stuff of nightmares! While they don't occur very often, when they do they can be devastating and deadly. Have you thought about the actions you can take immediately after an alert is received to ensure the safety of yourself and others? Is your coastal town [TsunamiReady®](#) and taking the threat of a tsunami into consideration for coastal development and planning? Nov. 5 was [World Tsunami Awareness Day](#) and we in the Disaster Preparedness Program believe that preparedness begins with knowledge and understanding.

**What exactly is a tsunami?** A tsunami is a series of long period ocean waves that can cause severe flooding and unusually strong currents created by a large and sudden displacement of the ocean, most often caused by an earthquake.

**What are the natural signs of an approaching tsunami?** Depending on where you are located and the source of the tsunami, the following are natural signs that could indicate an approaching tsunami:

1. A long earthquake lasting 20-seconds or more.
2. A very strong earthquake that knocks you off your feet.
3. A rapid, unusual rise or fall in the water level.
4. A loud roar from the ocean



*(Continues on page 15)*

# TSUNAMI PREPAREDNESS

## Tsunamis: Know the Signs, Hear the Stories, and Get Prepared!

By Kim Albins, Office of Response and Restoration Disaster Preparedness Program Blog 12/2/2021

(Continued from page 14)

**How do I know the risk of a tsunami?** A "Tsunami Hazard" sign. Tsunami expert, Dr. Walter Dudley, in a recent lecture on our [You Don't Know What You Don't Know Lecture Series](#), reminded us that a tsunami can happen on any coast! However, they are more likely to occur in the Pacific and in the Caribbean. There are a few ways to know if the area you live, work or are vacationing at is at risk of a tsunami.



1. Notice the signs! NOAA, in partnership with local and state governments as part of the National Tsunami Hazard Mitigation Program, has adopted signs that indicate when you are entering a Tsunami Hazard Zone and also along tsunami evacuation routes.
2. Map it! Depending on your location there are detailed [maps](#) indicating the tsunami hazard [zone](#).
3. Know the risk of [earthquake activity](#) and location of seismic gaps. Earthquakes are not [predictable](#). However, scientists continually seek to better understand the probability of an earthquake occurring. [Seismic gaps](#) are areas that typically experience earthquake/ seismic activity, but have not in a long period of time. Therefore, there is potential that stored stress will at some point slip, producing a large earthquake. Scientists look for areas that have seismic gaps in order to determine potential risk of large earthquakes that could result in tsunamis.

**Is someone watching for potential tsunamis?** Yes! NOAA's Tsunami program has you covered! NOAA operates two [Tsunami Warning Centers](#) that monitor for tsunamis and earthquakes that may cause them around the clock. They also forecast tsunami impacts and issue tsunami messages and warnings. The two warning centers serve the continental United States, Alaska, Canada, the Hawaiian Islands, the U.S. Pacific and Caribbean territories, and the British Virgin Islands. NOAA also works internationally with the United Nations to provide detection and threat advice across the [globe](#).

**What do I do when an alarm sounds or I see signs of a possible tsunami?** If you are in a hazard zone and you feel a long, strong earthquake (one that lasts for 20 seconds or more) and/or receive a tsunami warning, it is important to:



1. Remain Calm.
2. If there is an earthquake, drop, cover, and hold on during the earthquake.
3. Quickly walk or run to higher ground (100' above sea level) or inland (1 mile) outside of the Tsunami Hazard Zone.
4. If you are not able to move that distance, move to the fourth floor or higher in a sturdy building.
5. Once you are in a secure place, do not return to the coastal zone until after you get an all clear message from authorities. Tsunami waves can continue for hours. The first wave may not be the largest.

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# TSUNAMI PREPAREDNESS

## Tsunamis: Know the Signs, Hear the Stories, and Get Prepared!

By Kim Albins, Office of Response and Restoration Disaster Preparedness Program Blog 12/2/2021

(Continued from page 15)

**How do I prepare for a tsunami?** Many people live, work, or go to school in a tsunami hazard zone. If you do, it is important to identify where your closest safezone is and plan out the quickest, walkable route there. Once you have a plan, practice it! One way to do this is by conducting a [Tsunami Walk](#). A tsunami walk is a drill in which participants walk their evacuation route and compare the time it takes to the potential arrival time of tsunami waves. If safety zones are not accessible, talk with your local officials. Make sure your community is [TsunamiReady®](#).



**Learn from survivors.** Because tsunamis don't happen frequently, it is important to keep the stories of survivors and the history of tsunami events alive. This reminds us of the very real impact tsunamis can have on ordinary lives. Places like the [Pacific Tsunami Museum](#) in Hilo, Hawaii have taken great effort to record the oral history of tsunami survivors. The United Nations has also worked to record [videos of survivor accounts](#) from across the globe. [The Alaska Department of Homeland Security](#) has recorded stories from the 1964 earthquake and tsunami survivors. Even some of our NOAA colleagues, like Dwayne Meadows, are tsunami survivors. It is worthwhile to take time to [read](#) or [watch](#) accounts like Dwayne's. They are not only touching, they also bring to life what seems unimaginable. No one wants to imagine a life altering disaster, but lives can be saved if we prepare. Take action and get prepared!

### Tsunami References and Resources:

- NOAA's Tsunami Program: <https://tsunami.gov>
- NOAA's Tsunami Ready Program: <https://www.weather.gov/tsunamiready/>
- NOAA's Center for Tsunami Research: <https://nctr.pmel.noaa.gov/index.html>
- NOAA's National Center For Environmental Information, Tsunami Data and Information: <https://www.ngdc.noaa.gov/hazard/tsu.shtml>
- Ocean Today Tsunami Awareness Film: <https://oceantoday.noaa.gov/tsunamiawareness/>
- The National Tsunami Hazard Mitigation Program: [https://nws.weather.gov/nthmp/about\\_program.html](https://nws.weather.gov/nthmp/about_program.html)
- FEMA's Ready Program: <https://www.ready.gov/tsunamis>
- The Tsunami Zone: <https://www.tsunamizone.org/>
- International Tsunami Information Center: <http://itic.ioc-unesco.org/index.php>
- UN Tsunami Day: <https://tsunamiday.undrr.org/>

Link to original blogpost:

<https://blog.response.restoration.noaa.gov/tsunamis-know-signs-hear-stories-and-get-prepared>



# NTHMP PARTNER UPDATES

## Preparing for Tsunamis: How Soon and How Big? Seaside Cert Team Hosts an evening with Geologist Tom Horning

By Anne McBride, Seaside, Oregon, Emergency Preparedness Coordinator

Here in the Pacific Northwest, people who live and visit the Oregon Coast are united in one simple certainty: no matter where they go or what they are doing they are surrounded by the possibility of a Cascadia subduction zone (CSZ) earthquake and tsunami. Communications will be gone. Electricity will be cut off. Sewers and running water will be inoperable. And nearly two-thirds of Seaside's population could be victim to the aftermath of a significant CSZ event. The thought is looming and predicted to be imminent. The CSZ is the tectonic plate boundary between the North American Plate and the Juan de Fuca Plate. When the two deadlocked plates, which are moving toward each other at a rate of about 1.5 inches per year, violently release their built-up energy the result is a megathrust earthquake rupture. Geologists have determined that subduction zone tsunamis occur in the Pacific Northwest every 300-500 years. The area's last subduction zone tsunami occurred 321 years ago, in 1700. "Data shows these megathrust earthquakes occur in clusters. The cluster we're now in shows events for Cascadia averaging 330 years between ruptures, so that leaves a 9-year span before Seaside is at the event marker." said Tom Horning during an October presentation.



Seaside, OR Community Emergency Response Team (CERT)

[Seaside's Community Emergency Response Team \(CERT\)](#) recently hosted an event with speaker Tom Horning, a local geologist and geotechnical consultant. A Seaside native, Tom experienced the 1964 tsunami that hit Seaside after a 9.2



Tom Horning's presentation *Preparing for Tsunamis: How Soon and How Big?*

subduction zone earthquake occurred when Alaska's continental shelf and North American plate were suddenly displaced. The result was a massive distant tsunami whose waves rebounded down the North American coastline and damaged property along Oregon's coastal beaches. Tom was 10 years old at the time, but still remembers the night and often brings it up in his tsunami education programs. Tom frequently gives geology presentations on Seaside topography that can leave the audience feeling a little uneasy. After the October presentation *Preparing for Tsunamis: How Soon and How Big?*<sup>1</sup>, "You could see and feel the audience's collective shifting in their chairs when particularly uncomfortable, sobering facts were presented," wrote Jonathan Williams, a reporter for *The Astorian*.<sup>2</sup>

(Continues on page 18)

# NTHMP PARTNER UPDATES

## Preparing for Tsunamis: How Soon and How Big? Seaside Cert Team Hosts an evening with Geologist Tom Horning

By Anne McBride, Seaside, Oregon, Emergency Preparedness Coordinator

(Continued from page 17)

A new publication from the Oregon Department of Geology and Mineral Industries<sup>3</sup> (DOGAMI) illustrates the following sobering facts in the event of a significant CSZ. The entire downtown core and residential zone will be swept away by the oncoming tsunami wave. Evacuees will have 20 to 25 minutes to reach high ground. It is estimated there will be 4,000 to 11,000 fatalities and anywhere from 4,000 of the 7,000 visiting public will be caught without food and supplies. More than 90% percent of buildings will be destroyed as a result of the wave's punishment. Those stats will make anyone uneasy.

The CERT team's objective for this presentation by Tom Horning was to encourage new members from the community to join the 7-member volunteer team. The surprise came when 145 people came to the event wanting to know more about preparedness and what they could do to be part of a solution. The next week 17 new members came to the monthly CERT team meeting. Seaside's CERT team is focused on training and teaching others to be prepared for any disaster. Just like all coastal communities, new residents are moving to these rural areas from cities around the western states. Seaside is seeing a growing population of new property owners who are considered a "vulnerable population" because of their lack of knowledge about the risks inherent to living on the coast. CERT members want to initiate the "be ready" conversation with these new residents, business owners, employees, and even the old salts as new information is being streamlined and available in new colorful, easy-to-understand maps and apps.

Seaside has a proactive emergency plan. The city has placed 118 emergency supply caches in high-ground in each of the 5 evacuation sites throughout Seaside. The 55-gallon barrels are filled with survival supplies that will serve 20 people for 3 days. In the event of an earthquake and major tsunami inundation, the barrels are to be rolled out to the street for public access. In 2019, the Seaside High School Associated Student Body donated the matching funds to allow the City to fulfill the generous grant from DOGAMI to adhere 87 thermoplastic markers along evacuation routes which direct evacuees to high ground. A planning guide to begin a cache program for your city is available here: <https://www.oregongeology.org/tsuclearinghouse/resources/pdfs/TsunamiDisasterCachePlanningGuide.pdf>

"If you can't stand during the earthquake and it lasts more than 30 seconds, that should be your cue to evacuate," stated Horning. "We are often asked 'what if I can't hear the siren? How will I know when to run?'" said Anne McBride, Seaside's Emergency Preparedness Coordinator. Explaining the difference between a distant and local tsunami is usually at the front of any discussion. Next, it's the mystery of what to include in a grab and go bag. "Just start filling a simple grocery bag. Improve on the contents and packaging over time, but start now," says Anne. "Even the local library has example grab and go bags that community members can check out to get ideas for what they could include in their own grab and go bags." During the open discussion which followed Tom's talk, about 30% of the audience raised their hand when asked if they had a bag of survival supplies ready to grab when evacuating after an earthquake. The CERT team is hoping to continue its education series by hosting a Be Ready Seaside "grab and go bag" night to increase the number of prepared residents.

As the CERT team continues to gain members, 10 new active members have joined as a result of the presentation. By targeting their message to the community, the CERT team volunteers are teaching and learning to share emergency preparedness activities that are grounded in the principals: 'Know your risks, make a plan and make a kit'.

<sup>1</sup>Tom Horning Presentation: *Preparing for Tsunamis, How Soon and How Big?* <https://www.youtube.com/watch?v=soB09K5z9rY>

<sup>2</sup>Williams, Jonathan. *Writer's Notebook: You Are the Help until Help Arrives.* *The Astorian*, 16 Oct. 2021, p. A4.

<sup>3</sup>DOGAMI Open-File Report 0-20-10 Earthquake and Tsunami Impact Analysis for Coastal Clatsop County, Oregon [https://www.oregongeology.org/pubs/ofr/O-20-10/O-20-10\\_report-and-appendix.pdf](https://www.oregongeology.org/pubs/ofr/O-20-10/O-20-10_report-and-appendix.pdf)

# NTHMP PARTNER UPDATES

## NWS Melbourne and National Tsunami Warning Center Host the First Tsunami Seminar for East Central Florida

By Jesse Smith and Scott Spratt, National Weather Service Melbourne, Florida

When the public thinks of weather-related hazards in Florida, ranking at the top of the list are hurricanes and lightning storms, but where do tsunamis fall? On December 2, 2021, NWS Melbourne and the National Tsunami Warning Center (NTWC) hosted a virtual Tsunami Seminar open to community leaders and the general public to help raise awareness of the low-probability, high-impact tsunami threat, which exists along the east-central Florida coast.

Leading the seminar was Jessie Smith, NWS Melbourne Tsunami Program Leader, and Warning Coordination Meteorologist, Scott Spratt, with guest speaker, Dave Snider of the NTWC in Palmer, Alaska. Advertised to local government officials and community leaders, as well as SKYWARN Storm Spotters, and promoted to the general public, the seminar garnered much attention and many questions from eager participants.



A main feature of the seminar was the local TsunamiReady partnerships with the City of Indian Harbour Beach and Indian River County, represented by the Police Department and Emergency Management staff, respectively. The TsunamiReady program holds deep roots in the Melbourne forecast area, as Indian Harbour Beach became the very first TsunamiReady community on the entire U.S. East or Gulf Coast in 2005! This was followed by Indian River County, which gained recognition as Florida's first TsunamiReady county in 2012.

Tsunamis are not a hazard that are often considered by those in Florida. The most likely origins of a tsunami that would impact the Florida east coast would be from a strong, shallow earthquake occurring within portions of the Caribbean Sea, resulting in a lead time of around 3-hours, or from a seismic event along or near the coast of the far northeastern Atlantic, which would give up to a 9-hour lead-time. Data suggests a general occurrence interval of about once per 100 years; nearly the same return period as a Category 5 hurricane landfall within east central Florida. Relating the risk of tsunamis to a hazard that is familiar to Floridians has proven very helpful and was further illustrated by NTWC's Dave Snider, when he compared tsunami hazard zone impacts and dangers to that of hurricane storm surge.

Another focus of the seminar was to highlight the tsunami detection and warning system, including how safety officials and the general public would receive notification of a tsunami threat. The need to have multiple ways to receive tsunami information was stressed and examples were provided, just like what should be practiced for more common weather threats.

This virtual seminar was the first of its kind for east-central Florida, bringing together community leaders and the public, along with NWS local and national experts to increase awareness of a low-likelihood, but potentially high-impact event. A special thank you goes out to the NTWC staff for sharing knowledge with Floridians and to our TsunamiReady partners in Indian Harbour Beach and Indian River County for their tsunami readiness and public education campaigns.

# GEOLOGIC HAZARD EVENT UPDATE

## Information for US East Coast, Puerto Rico, and US Virgin Islands Emergency Managers on Recent Cumbre Vieja Volcanic Activity

By the National Tsunami Hazard Mitigation Program

### What is the Cumbre Vieja volcano (CVV) and what is occurring there now?

- Cumbre Vieja (Spanish: Old Summit) is an active volcano on the Island of La Palma in the Canary Islands, Spain.
- Since Sept 19th 2021, the CVV has been erupting, causing lava flows, moderate seismic activity, and explosions. This eruption is expected to last for some weeks and is being closely monitored.

### What is the likelihood of Cumbre Vieja failure causing a tsunami on the US East Coast, Puerto Rico, and US Virgin Islands?

- Volcanism can be a source of tsunamis, particularly if flanks of the volcano collapse into the ocean.
- The potential for a full failure and total collapse of Cumbre Vieja volcano (CVV) and subsequent creation of a large, damaging tsunami along the US East Coast, Puerto Rico, and the US Virgin Islands is remote now and in the future.

### What if a tsunami were to occur? How would it impact the US East Coast, Puerto Rico, and US Virgin Islands?

- In the unlikely event a large failure of the CVV flank were to occur, a worst-case scenario could create a tsunami resulting in flooding impacts similar in scale to that of a storm surge from a landfalling hurricane.
- In addition to flooding, tsunamis are accompanied by more dangerous and dynamic currents than storm surge. These powerful currents pose a hazard to coastal infrastructure and may last for hours or days after tsunami alerts have ended.
- The [NOAA/NWS Tsunami Warning Centers](#) continue to monitor the Atlantic Basin for any event which can create a tsunami and are prepared to issue tsunami products if a tsunami is detected.

### What can Emergency Managers do to prepare for a tsunami?

- If a tsunami is detected, Emergency Managers would be notified by NOAA's Tsunami Warning Centers. They would likely have several hours of advanced notice.
- Although the probability of a Cumbre Vieja volcano-related tsunami impacting the US East Coast, Puerto Rico, and US Virgin Islands is extremely low, now is a good time to review the history and facts about [tsunamis](#) from other sources and their potential to affect the Atlantic basin.
- Consider emphasizing efforts to achieve and maintain [TsunamiReady](#) recognition for at-risk communities.
- Determine if your jurisdiction is vulnerable to tsunamis and consider adding tsunamis to your operational and hazard mitigation plans, if you have not already done so.

### Sources for additional information on tsunamis

- [U.S. Tsunami Warning System](#)
- [TsunamiReady](#)
- [NOAA Coastal Hazards Mapper \(US East Coast Tsunami Inundation\)](#)
- [Tsunami Safety](#)
- [International Tsunami Information Center Caribbean Office](#)
- [National Tsunami Hazard Mitigation Program](#)
- [NOAA Tsunamis](#)
- [Draft Inundation Maps and Reports for Parts of the U. S. East Coast](#)
- [Tsunami Evacuation Maps for Puerto Rico](#)
- [Additional scientific information](#)

Link: [https://nws.weather.gov/nthmp/documents/Talking\\_Points\\_on\\_Cumbre%20Vieja\\_Volcanic\\_Activity-110221.pdf](https://nws.weather.gov/nthmp/documents/Talking_Points_on_Cumbre%20Vieja_Volcanic_Activity-110221.pdf)

# TSUNAMI RESEARCH & EVENTS

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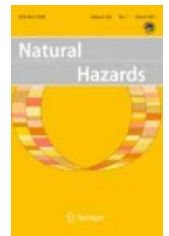


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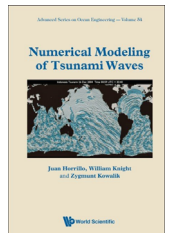


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Lin, Zhiheng; Toh, Kiroaki; Minami, Takuto, 2021, Direct Comparison of the Tsunami-Generated Magnetic Field With Sea Level Change for the 2009 Samoa and 2010 Chile Tsunamis: *Journal of Geophysical Research Solid Earth*, v. 126, no. 11, article e2021JB022760, <https://doi.org/10.1029/2021JB022760>.

## UPCOMING NTHMP & RELATED EVENTS

- ◆ February 1-4, 2022—NTHMP Winter Meeting (Portland, OR) <https://nws.weather.gov/nthmp/index.html>
- ◆ March 10, 2022—CARIBE WAVE 21 Tsunami Exercise <https://www.weather.gov/ctwp/caribewave22>
- ◆ April 19-23, 2022—SSA Annual Meeting (Virtual) <https://www.seismosoc.org/annual-meeting/>

