

Global Ocean Decade Tsunami Programme is Approved

By Michael Angove (NOAA/NWS Tsunami Program Lead),
 Christa von Hillebrandt-Andrade (Manager, Caribbean Tsunami Warning Program),
 and Laura Kong (Director, International Tsunami Information Center)

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The Thirty-first Session of the Intergovernmental Oceanographic Commission (of UNESCO) Assembly, which took place 14 – 25 June 2021, approved the establishment of the Ocean Decade Tsunami Programme, a Scientific Committee to prepare the Draft 10-Year Research, Development and Implementation Plan and Tsunami Ready Coalition in support of the Programme. The Ocean Decade Tsunami Programme will support the *Safe Ocean* Outcome of the [UN Decade of Ocean Science for Sustainable Development](#) which was launched on January 1, 2021 and will run through 2030.

The establishment of a dedicated Ocean Decade Tsunami Programme represents a once-in-a-generation opportunity to address and fill critical gaps in global tsunami detection, measurement, forecasting, and preparedness. The programme includes the following focus areas related to tsunami warning and mitigation capabilities:



- Expansion of existing observational systems including seismometers, coastal tide gauges, and deep ocean tsunameters (DARTs) to fill identified gaps;
- Deployment of new technologies to address observational gaps that cannot be covered by existing networks. This would include the widespread implementation of scientific instrumentation on deep-ocean telecommunications cables as developed by the [ITU/WMO/UNESCO-IOC Joint Task Force \(JTF\) SMART Subsea Cables](#) effort; and submission of a Programme to the UN Decade of Ocean Science for Sustainable Development;
- Wide expansion of data access and availability and development of capability for real-time and near-real time sea level, seismic and GNSS-derived land motion data at an appropriate sampling rate and relevant tools to forecast tsunamis from all sources;
- Increased access and regular updates to the collection of coastal topographic and bathymetric data, in collaboration with the [Nippon Foundation-GEBCO Seabed 2030](#) project, as well as high performance computational capabilities to enable more timely, accurate and comprehensive tsunami and other coastal hazard forecasts to better advise community response;

TsuInfo Alert

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<http://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards/tsunamis/tsuinfo-alert>

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NATIONAL TSUNAMI HAZARD MITIGATION PROGRAM LIBRARY CATALOG:

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

The views expressed herein are those of the authors and not necessarily those of NOAA, the Washington Department of Natural Resources, or other sponsors of TsuInfo Alert.

TsunamiReady® Recognition Milestones

By Ian Sears, NWS Tsunami Program Coordinator

As of August 2021, there are 173 sites recognized as TsunamiReady®.

During the time period since February 2021:



The following sites renewed their TsunamiReady® recognition:

- ◆ Pender County, NC
- ◆ Calabash, NC
- ◆ Oceanside, CA
- ◆ Port Angeles, WA
- ◆ Hoquiam, WA
- ◆ Guam
- ◆ Oxnard, CA

New TsunamiReady® sites:

- ◆ Hanapepe-Eleele HI
- ◆ South Maui HI
- ◆ Wahiawa HI

Summary

Given the uncertainty surrounding COVID-19, and the non-expiration posture, there are a total of 173 tsunami ready communities. Any community that was due to expire after February 29, 2020 and has not renewed is still considered active at this time.

NWS TsunamiReady® Program: <https://www.weather.gov/TsunamiReady/>

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- All National Tsunami Warning Centres have access to data, tools and communication platforms, protocols and training to timely and effectively warn coastal and maritime communities threatened by tsunamis and other coastal hazards and are integrated into a multi hazard framework;
- 100% of communities at risk of tsunami prepared for and resilient to tsunamis by 2030 through the implementation of the [UNESCO/IOC Tsunami Ready Programme](#) and other initiatives.

The US through the NTHMP and other initiatives is uniquely poised to support and inform the Global Tsunami Programme both domestically and internationally. USAID recently approved \$662,000 for the implementation of Tsunami Ready in the Caribbean and the Pacific thru the [International Tsunami Information Center](#) and [Caribbean Tsunami Warning Program](#). More information on the IOC Tsunami Ready Programme can be found on the website of ITIC at www.tsunamiready.org.



United Nations
Educational, Scientific and
Cultural Organization



Intergovernmental
Oceanographic
Commission

“Breaking Down the Silos for More Effective Multi-Hazard Early Warning”

By Christa von Hillebrandt-Andrade (UNESCO/IOC NOAA International Tsunami Information Center Caribbean Tsunami Warning Program and Chair of the UN Ocean Decade Western Tropical Atlantic Safe Ocean Working Group)

On July 8 the Intergovernmental Oceanographic Commission of UNESCO Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE) as regional coordinating body for the UN Decade of Ocean Science for Sustainable Development (Ocean Decade), and the Western Tropical Atlantic Safe Ocean Working Group (WTA SOWG) hosted the first of series of virtual workshops on Co-Design of Decade activities.

In the April 2020 WTA SOWG Ocean Decade planning event, 98.5% of the participants agreed that a multi-hazard approach was required to save life and protect livelihoods now, during and after disasters. With this in mind, the organizers chose the title “Breaking Down Silos for More Effective Multi-Hazard Early Warning” for the Safe Ocean workshop. Through trans-sectoral dialogues, the objective was to facilitate transformative actions across silos enhancing a multi-hazard approach.

A picture of the Silo Art trail in Australia (Figure 1), which captures a group of painted silos, was chosen by the Chair of the WTA SOWG to reflect the multi-hazard approach. She stated, “By reimagining the landscape - a path towards a safe ocean and coastal communities will emerge”.

Breaking down the Silos for More Effective Multi
Hazard Early Warning

Integrated Multi Hazard Early Warning Systems and Services

Raul Salazar
Chief of Office

UN Office for Disaster Risk Reduction (UNDRR)
Regional Office for the Americas and the Caribbean



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By Christa von Hillebrandt-Andrade (UNESCO/IOC NOAA International Tsunami Information Center Caribbean Tsunami Warning Program and Chair of the UN Ocean Decade Western Tropical Atlantic Safe Ocean Working Group)

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In advance of the workshop, a poll was conducted among the members and stakeholders of the WTA SOWG to prioritize the hazards for the event. Tsunamis along with Sargassum influx were voted as the top priorities preceded only by sea level rise/climate change.

The workshop recorded 200 registered participants from a variety of backgrounds: local, national, regional, and global disaster risk reduction specialists; ocean scientists; transdisciplinary researchers; producers of ocean data, products and services; policy makers; UN partners; business and industry; government representatives; NGOs; and other key stakeholders from the regions involved in national and regional ocean study.

The head of the UN Office of Disaster Risk Reduction for the Americas and the Caribbean, Raul Salazar, highlighted the need to improve the understanding of the impacts of ocean related risk and the complex interaction of different natural, political, human and economic systems. He also reminded participants that Multi-Hazard Early Warning Systems (MHEWS) include the four key elements of risk knowledge, monitoring and warning service, dissemination and communication, and response capability.

Michael Angove, Lead of the US NOAA Tsunami Program and UN Global Ocean Decade Tsunami Programme (GODTP), stated that the GODTP proposes (1) to increase direct tsunami observations by integrating more sensors from the deep ocean, land and sky to positively detect and then FORECAST the wave FASTER and (2) for all coastal communities get Tsunami Ready so PEOPLE will KNOW what to DO when SECONDS count.

During the workshop it was noted that the infrastructure and the framework required to reach the goals of the tsunami community can be found within warning systems for other hazards, while tsunami best practices and infrastructure can underpin other hazards for the protection of life and livelihoods.

The next step of the WTA SOWG is the development and submission of a regional proposal on MHEWS for Safe Ocean, which will be adopted and endorsed through the Ocean Decade Governance bodies and mechanisms.



Figure 1. Silo Art Trail in Sea Lake of the Wimmera-Mallee, Australia (painted by Joel Fergie & Travis Vinson) as photographed by Julie Powell (<https://juliepowell2014.wordpress.com/2019/11/20/wimmera-mallee-silo-art-sea-lake/>)

Program Workshop repository with presentations and documents:

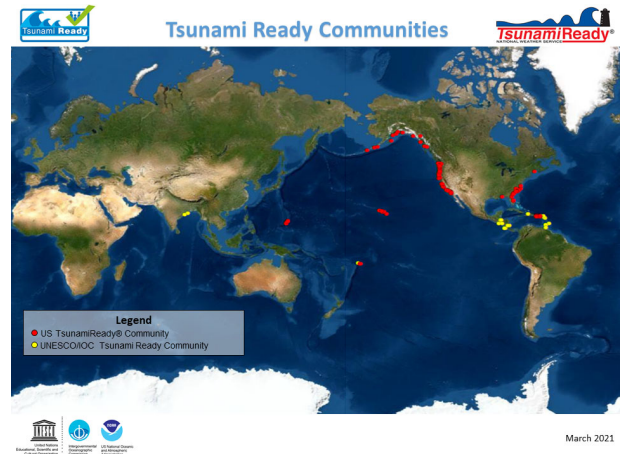
<http://iocaribe.ioc-unesco.org/webinarseries/safeocean>

Tsunami Ready Recognition Renewal and Historical Tsunami Data in St. Kitts and Nevis

By Desireé Bayouth García (2021 Pathways Student) and Christa von Hillebrandt-Andrade (Manager UNESCO/IOC - NOAA International Tsunami Information Center Caribbean Tsunami Warning Program)

The UNESCO-Intergovernmental Oceanographic Commission (IOC) Tsunami Ready Recognition Programme is an international and voluntary performance-based program that promotes and assists tsunami risk and hazard preparedness in the Caribbean and Adjacent Regions. To date, communities in 11 countries in the Caribbean have been recognized (Figure 1).

The Federation of St. Kitts and Nevis, was recognized as Tsunami Ready in 2016 and is currently in the process of renewing its recognition status.



Eastern Caribbean Earthquake and Tsunami Events 1530 to 2021

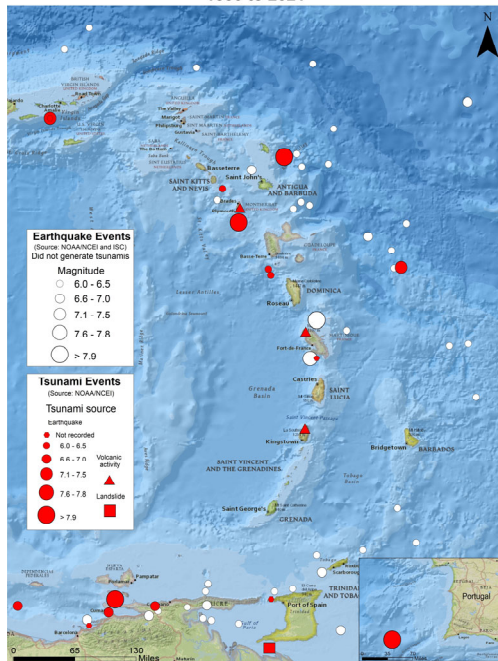


Figure 2: Map of shallow earthquakes (< 100 km depth) with a magnitude of > 6.0 and confirmed historical tsunami sources (tsunami validities 3 (probable tsunami) and 4 (definite tsunamis)) that have impacted the Eastern Caribbean from 1530 to 2021. Inset map shows the 1755 Lisbon earthquake, which generated a tsunami that affected islands in the Eastern Caribbean. Date of access: July 14, 2021

The recognition and renewal process requires the countries to prepare and update their Tsunami Warning Information Dissemination Protocol and Standard Operating Procedures (SOPs). The Protocol and SOPs are a set of procedures, responsibilities, and guidelines prepared for designated National Tsunami Warning Focal Points and other national and local authorities, to follow when there is a strong earthquake and/or potential tsunami threat. The SOPs also provide important information on the regions' vulnerability to a potential tsunami, international tsunami products and messages, national alert levels, and more.

Figure 1: Tsunami Ready Communities in the US Tsunami Ready and the UNESCO/IOC UNESCO-IOC Tsunami Ready Recognition Programme as of March 2021. Source: [IOC Tsunami Ready](https://www.earthquake.usgs.gov/earthquake-preparedness/advise/prepare/prepare-tsunami-ready/)

Updates to the St. Kitts and Nevis' SOPs included a review of earthquakes and tsunamis that have affected the country and the Eastern Caribbean from 1530 to 2021. The historical perspective provides stakeholders with important information on past events and impacts. Several sources were used to evaluate past events: NOAA's National Center for Environmental Information (NCEI), the International Seismological Center – Global Earthquake Model (ISC-GEM) Global Instrumental Earthquake Catalogue, and the United States Geological Survey (USGS) Earthquake Catalogue. The NCEI database was the source of information on the historical tsunami events, including tsunami source and event validities, and reviewed earthquake information from 1500 to 2021. The

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(Manager UNESCO/IOC - NOAA International Tsunami Information Center Caribbean Tsunami Warning Program)

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ISC – GEM Global Instrumental Earthquake Catalogue was used to review earthquake information from 1907 to 2017, and the USGS Earthquake Catalogue was used to review earthquake information from 1900 to 2021. 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 and included on the map (Figure 2). Based on these data sources and parameters, at least 50 earthquakes and 24 tsunamis, originating from earthquake, volcanic, and landslide sources, have been recorded in the Eastern Caribbean. By including this information the officials have a clearer idea on the frequency of earthquakes and tsunamis and it is also an opportunity to raise awareness of the vulnerability to tsunamis at a local and regional scale.

Similar work is ongoing in Jamaica as they seek to have their first community, Old Harbour Bay, recognized as Tsunami Ready. Since it is an initial recognition, national, regional and local SOPs are being prepared, as well as the creation of a local evacuation map, installation of signage and other education and outreach efforts.

These Tsunami Ready efforts in St. Kitts and Nevis and Jamaica contribute to one of the ongoing goals of the Tsunami Programme of the United Nations Ocean Decade project: 100% of the vulnerable communities Tsunami Ready by 2030. As the current decade unfolds, the Caribbean Tsunami Warning Program in coordination with the Caribbean Tsunami Information Center will continue to support Tsunami Ready efforts throughout the Caribbean and Adjacent Regions.

Family Radio Service Used to Enhance Tsunami-prone Community Communication

By Víctor J. Rivera, PhD, Professor-University of Puerto Rico at Mayaguez

Introduction—An important aspect of tsunami-prone communities' response to a tsunamigenic event is a coherent response by communities. However, this response can be thwarted by several factors, including a lack of effective coordination of efforts due to deficient or nonexistent communication among key community members.

This article describes an ongoing pilot field study designed to investigate the effect of owning, training and using Family Radio Service (FRS) radios among community members to enhance community coherence and communication capabilities. It is expected that existing differences between communities will be reduced due to continued emergency communication training, particularly in the communities' perception of possessing improved communication capabilities.

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Methodology—Fifteen residents from two tsunami-prone coastal communities along the Mayaguez Bay, Urb. San José (18.182 N, 67.170 W) and Comunidad Santa Rosa de Lima (18.262 N, 67.182 W) participated in this study. These communities differ in several ways, the most relevant for this study being their participation in tsunami exercises (higher for Urb. San José residents).

The leader of each of these two communities was asked to participate in the study and to identify residents of their communities that would be willing to participate. Once identified, the residents were asked to fill out a pre-study questionnaire that assessed several dimensions, among them: knowledge of FRS and Radio NOAA, intercommunity communication, and radio protocol communication skills.



Santa Rosa de Lima Family Radio Service project participants.

Family Radio Service (FRS) radios were then distributed to the residents, and extensive guidance on their use was provided (four hours of in-person or online training). Two General Mobile Radio Service (GMRS) and three Amateur Radio Service (ARS) licensees provided intermediate and long range communication in and out of the communities.

Residents were asked to participate in a biweekly 15-minute (Monday and Thursday, Urb. San José) or weekly (Saturday, Com. Santa Rosa de Lima) Traffic Net. A Traffic Net Script was distributed and used to practice formal communication radio procedures. A Net Control Station (NCS)/Net Control Operator (NCO) calendar was created and community FRS operators rotated NCS/NCO duties. The nets began in mid-February of 2021 and as of this writing are still ongoing. GMRS and ARS licensees checked into the nets and served as relay stations in and out of the communities to pass along traffic as needed.

Pre-test Preliminary Results—The pre-test data show that there is a considerable disparity between communities in their knowledge of FRS and Radio NOAA, in their intercommunity communication and in their use of emergency communication radio protocols. Residents of Urb. San Jose obtained higher averages in these three dimensions. Post-test results will provide valuable information to determine if training and practice improved the residents' skills in radio communication for emergency response.

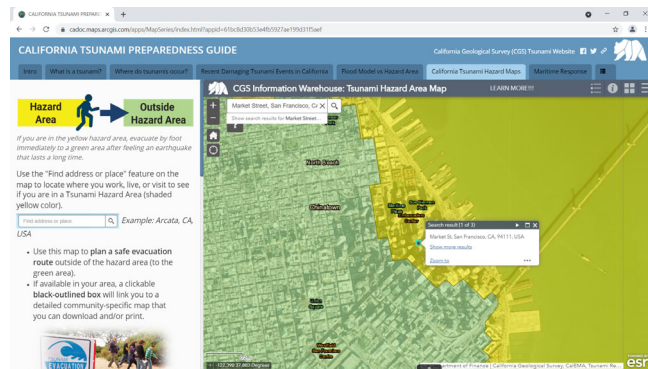
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Updated Tsunami Hazard Area Maps for California

By Rick Wilson, Senior Engineering Geologist, California Geological Survey

On July 8, 2021, the California Geological Survey (CGS) along with its partners at the California Governor's Office of Emergency Services, released new Tsunami Hazard Area maps for evacuation and response planning. These new maps cover a number of counties: San Francisco, Contra Costa, Santa Clara, San Luis Obispo, Santa Barbara, and Orange. Along with other maps recently released, CGS has now updated Tsunami Hazard Area maps for two-thirds of the counties in the state. Maps for the remaining counties will be completed in early 2022.

"These new maps are based on a number of extreme local- and distant-source tsunami scenarios, and also include a source representing a baseline 1,000-year recurrence," says Nick Graehl, a CGS engineering geologist who worked on maps for Santa Barbara and Orange counties.



Tsunami Preparedness Guide:

<https://cadoc.maps.arcgis.com/apps/MapSeries/index.html?appid=61bc8d30b53e4fb5927ae199d31f5aef>

High-resolution elevation data were used in the tsunami source modeling and field verification process for developing the final maps. The Tsunami Hazard Area maps also include a small buffer beyond the modeled tsunami flood area to bring the hazard area to identifiable geographic features, such as roads. This helps in emergency response as it is easier for people to evacuate beyond geographically known features.

"The 2021 maps are more accurate and conservative than the previous set of maps developed in 2009," states Jacqueline Bott, CGS engineering geologist who completed the maps in Contra Costa and Santa Clara counties. "It was important for us to update these maps to show that there is a slightly higher tsunami hazard in many parts of the state."

CGS has developed a Tsunami Preparedness Guide for the public to learn about the map-making process, search to see if they live, work, or visit areas prone to tsunami hazards, and help devise a plan for tsunami evacuation. Visit tsunami.ca.gov for more information.

The Redwood Coast Tsunami Work Group Turns 25

By Lori Dengler/For the Times-Standard August 1, 2021

This week, the Redwood Coast Tsunami Work Group (RCTWG) celebrates a silver anniversary. The RCTWG was founded in July 1996 to help prepare agencies with coastal jurisdictions and the public to deal with a tsunami generated by a great earthquake on the Cascadia subduction zone (CSZ).

The first meeting was held at the Redwood National Park Office in Arcata and attended by nine people. I missed the first meeting, but three of the attendees, Vicki Ozaki (Redwood National Park), Linda Nellist (then Humboldt OES coordinator), and Jim Falls (California Geological Survey), are still active members.

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The Redwood Coast Tsunami Work Group Turns 25

By Lori Dengler/For the Times-Standard August 1, 2021

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We were the “Interagency Tsunami Education Task Group” at that first meeting and Vicki Ozaki was the instigator. Vicki, a hydrologist with the National Park, was concerned about how the Park could plan outreach and emergency response to our new awareness of the near-source tsunami threat.

The 1992 Cape Mendocino earthquake was a sea change in tsunami awareness, not only locally, but nationwide (Not My Fault 4/12/2017). The M7.2 was a mini version of what we think a Cascadia earthquake will be like – very strong ground shaking, sea floor and coast deformation and a tsunami that arrives at nearby locations only minutes to tens of minutes later.

The earthquake spurred State and federal agencies to study impacts of a larger Cascadia earthquake. The report, published in 1995, outlined the double whammy of an earthquake and tsunami together. We had experienced many strong local earthquakes and protocols were in place for tsunamis coming from far away when there was time to issue warnings. But an earthquake quickly followed by tsunami surges was new ground in 1995.

We were lucky that the 1992 earthquake struck a rural part of California with no big federal or university research centers. The Cascadia earthquake/tsunami problem had been dropped squarely in our laps and it was up to us to deal with it; we couldn't rely on the USGS or a State Agency to solve the problem. We had local expertise with geologists at HSU and personnel from local federal/state/county agencies and organizations. But we also had something much more important – personal investment. We all lived here, and a great Cascadia earthquake/tsunami would profoundly affect each and every one of us.

From the first meeting in 1996, we made sure the table was large. We soon had representatives from the Eureka NWS, Red Cross, Cal Trans, State Parks, Tribes and Rancherias. We were ad hoc in the truest definition of the term – formed for the specific task of building resilience to the Cascadia earthquake and tsunami threat within the three North Coast counties most affected.

The RCTWG never had a formal charter or official structure. Everyone has an equal voice. Most of the effort is volunteer and we have no budget or salaries. Grants and contracts are funneled through RCTWG member organizations – the RCTWG serves a coordinating function to make sure that all efforts in the region are consistent.

For the first eight years, the RCTWG functioned with little outside interest. We were tied into nascent national efforts at the same time. The National Tsunami Hazard Mitigation Program (NTHMP) also began in 1996, and I served on the NTHMP steering committee in those early days as well. We benefitted from knowing what others in the Cascadia region were doing. After the Indian Ocean tsunami in 2004, we gained international attention for grass roots efforts.



RCTWG celebrating the Manila Tier2 certification in 2019

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By Lori Dengler/For the Times-Standard August 1, 2021

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I am amazed that the RCTWG has survived and grown stronger. We have tallied up an impressive number of products – seven editions of the Living on Shaky Ground publication, coordinating at least seven community evacuation drills, developing and staffing 26 county fair displays, 25 community tsunami brochures, preparedness triad magnets in 13 languages, and have been part of at least 75 community meetings and countless workshops. RCTWG members have participated in eight post-earthquake/tsunami field investigations and have presented papers at national and international meetings. Eight North Coast communities/entities have now achieved national TsunamiReady recognition.

Two significant tsunamis and a damaging North Coast earthquake occurred in the last 25 years and RCTWG helped in communication both during and after those events. And the partnerships developed through the RCTWG have helped in non-geologic events as well including flooding, winter storms, sneaker waves and wildland fires. Perhaps the most telling example of the group's value is that at least a dozen RCTWG members, long retired from the position that first linked them to the group, continue to actively participate. I like to remind people that once an RCTWG member, always an RCTWG member.

Twenty-five years deserved a party and that was our plan. Ryan Aylward, at the Eureka NWS, came



RCTWG Virtual Earthquake–Tsunami Fair: <https://rctwg.humboldt.edu/virtual-fair>

up with a motto – “Party like it’s 1996.” We reserved a space, ordered a cake, and people were coming from far away. For the last two weeks I have been collecting photographs and documents and compiling a PowerPoint presentation.

Sadly, it isn’t 1996. As the delta variant emerged and COVID cases climbed, a niggling doubt arose. Many of our members have young children at home and even though we are all vaccinated, there is now worrisome data that vaccinated people can transmit the virus. The RCTWG developed a phrase about a decade ago that has become my mantra, “when in doubt, drill it out.” If you aren’t sure, treat the threat as real. It was time to follow our own advice and postpone the celebration.

It was such a hard call –the momentum was surging towards our party and the potential threat was small. Small but still real and if anyone from the party had exposed a child or other vulnerable family member, that was not acceptable. But 25 years in the RCTWG has helped me learn that lesson. It may be months or even years before we can really party like it’s 1996 again, but I am sure the RCTWG will still be going strong and worthy of a celebration.

Link to original article:

<https://www.times-standard.com/2021/08/01/lori-dengler-redwood-coast-tsunami-work-group-turns-25/>

NTHMP PARTNER UPDATES

Mapping Tsunami Hazards in California: When Experience Meets Expertise

Posted by CALCONSERVATIONPUBLICAFFAIRS on JULY 15, 2021

Nick Graehl, engineering geologist in California Geological Survey's Tsunami Program, often reflects on his first post-tsunami reconnaissance trip as a reminder of the importance of preparing Californians for a tsunami.

"It's something not everyone gets to experience but then once you have, you never forget."

From Studying to Experiencing Tsunami Effects

A post-tsunami reconnaissance trip, or post-tsunami survey, is a scientific evaluation of an area recently impacted by tsunami.

For Graehl, this happened in 2010, in Chile. A magnitude 8.8 earthquake triggered a devastating tsunami. He was not well prepared for the event.

First, he had to leave his wife alone with their 10-month old baby, "that was hard enough right there."

Then there was the firsthand experience, witnessing tsunami destruction created just weeks prior, and meeting the people who survived it. A stark contrast to reviewing centuries old tsunami sand deposits, which Graehl had been studying prior to the Chile earthquake.

Graehl recounts, "Studying the science behind prehistoric earthquakes and tsunamis is one thing, but observing the tsunami aftermath weeks after an event is something that I will never forget."

"I'm a paleotsunami scientist by training but what happened to the local residents was...I can't even put it into words." -Nick Graehl, California Geological Survey Tsunami Program Engineering Geologist

Witnessing the Damage Firsthand

The earthquake struck on the final weekend of summer, just off the coast. Beaches were packed with visitors from all over the area, many still awake watching fireworks or partying at 3:30 a.m. when the fault rupture began, about three kilometers offshore. About 370,000 homes were destroyed, 525 people died, 25 people went missing. Losses were estimated at up to \$30 billion.

"What was left standing in the inundation zone was either badly damaged or completely erased as buildings were ripped clean off their foundation from the tsunami.

"In one particularly hard-hit town, I remember seeing the remains of toddler toys strewn about. Some were the same toys as my son back home, and that's when it really connected on a personal level for me."

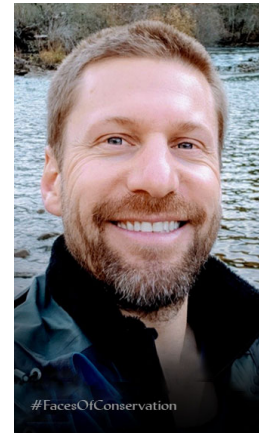
When it comes to applying lessons learned, he takes the job seriously.

"I'll carry that experience with me the rest of my life. It does influence how I conduct myself at work."

Learning from Chile for California

Graehl reflects on the Chile trip regularly, as a reminder of why communicating hazards is so important. For Californians, that means knowing what your risk is, by knowing where the risks are.

There are two worst-case tsunami sources in California: North of Cape Mendocino and South of Cape Mendocino.



”
My tsunami work helps
make California more
resilient and prepared for
potential hazards.

Nick Graehl
Engineering Geologist



#FacesOfConservation

(Continues on page 12)

NTHMP PARTNER UPDATES

Mapping Tsunami Hazards in California: When Experience Meets Expertise

Posted by CALCONSERVATIONPUBLICAFFAIRS on JULY 15, 2021

(Continued from page 11)

Graehl explains, “North of Cape Mendocino, the highest hazard comes from a local tsunami source- the Cascadia subduction zone; South of Cape Mendocino, the worst-case is a distant source tsunami generated from the Alaskan Aleutian Islands. “

Knowing how to react to each one in a real event will help save your life.

Then, Japan’s Tsunami Hits California

The year after his Chile trip, Graehl practiced his own advice when a magnitude 9.1 earthquake occurred in Japan and triggered a tsunami. Though he was home in California, now with his toddler and new two-month old baby, they lived near a tsunami hazard zone.

“I remember being very concerned at the time because my wife would need to commute to work through a tsunami hazard zone. That was a big deal for me.”

He looked up routes they travel from home to work, cross referencing hazard maps and evacuation zones. “It was an opportunity for us to discuss our own family emergency plans,” he said.

Channeling His Passion at California Geological Survey

Ten years later, Graehl contributes his expertise and first-hand experiences to CGS’ tsunami program. The team recently developed a 10-year commemorative reflection of Japan’s 2011 quake and tsunami and a California Tsunami Preparedness Guide to help explain their new Tsunami Hazard Area Maps.

Graehl also helped coordinate the release of updated tsunami hazard maps for 13 of the state’s 20 coastal counties: Alameda, Contra Costa, Del Norte, Humboldt, Los Angeles, Mendocino, Monterey, Orange, San Francisco, San Luis Obispo, San Mateo, Santa Barbara, and Santa Clara.

As lead tsunami mapper for Los Angeles, Monterey, Orange and Santa Barbara counties, he worked closely with county and city emergency officials to finalize these maps and assist communities with updating their own disaster communication materials.

Next, he’s focusing his sights on other parts of California as he continues updating tsunami hazard maps for Santa Cruz and San Diego counties.

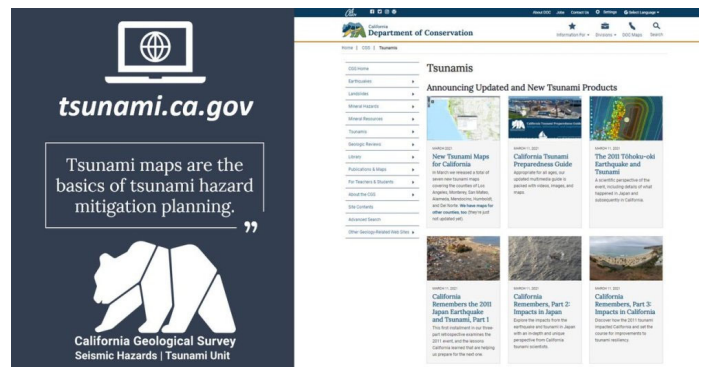
“Seeing the devastation first-hand and its impact on families...that just brings it home. It is so important for people to plan, prepare, and be aware.”

Plan, Prepare, Be Aware

Graehl admits preparing for natural hazards can be daunting – especially in California where tsunami hazards fall into the shadow of well-known earthquake hazards. But he encourages Californians to start small...then work up to more involved tsunami preparedness activities.

For a first step, visit the CGS State tsunami website at tsunami.ca.gov.

Link to original post: <https://calconservation.blog/2021/07/15/mapping-tsunami-hazards-california-experience-meets-expertise/>



California’s state tsunami website: tsunami.ca.gov

NTHMP PARTNER UPDATES

Washington State Completes Statewide Tsunami Siren Network

By Elyssa Tappero, Washington State Emergency Management Division

In July, the Washington State tsunami program completed its 15+ year effort to install tsunami sirens on Washington's most at-risk inner and outer coastlines thanks to the program securing a combination of state (\$2,746,000) and federal (\$400,000) funding in 2020. In the last 2 years, the program installed 50 sirens, 46 of those in the last year alone. Without this critical funding from the Washington State Legislature and the NOAA National Weather Service via the National Tsunami Hazard Mitigation Program, plus the hard work and dedication of partners across Western Washington, completing the siren network would have taken another 20 years.

There are now 122 sirens on the Washington coast, all of which are run and maintained by the state.

This life-saving project brought together state agencies and tribal, county, and city emergency management, as well as other important community stakeholders, to ensure Washington's coastal communities can be alerted in the event of a tsunami warning. The 50 new sirens were installed in locations across 8 different inner and outer coastal counties, including 12 sirens which were installed on tribal land. Utilizing this funding before it expired in July 2021 required a truly monumental effort from the program to coordinate and manage site selection, community approvals, permitting, purchasing and installation, contracting, and outreach and education for each individual siren.



The tsunami sirens are intended to act as an outdoor tsunami alerting method for people and communities on or near the beach who may not otherwise have access to other official alerting methods via radio, TV, or their smartphones.

Tsunami sirens
are coming to your area!

These sirens are an outdoor tsunami alerting method for people and communities on or near the beach. The pole-mounted voice/tone siren is also topped with a blue light for the deaf and hard of hearing.

Upon issuance of a tsunami warning, the siren will play a wailing sound followed by a voice message in English and Spanish. If you hear the wail sound, immediately evacuate inland or to the closest high ground. Do not return to the inundation zone until local officials tell you it is safe to do so.

Learn more about the tsunami sirens and how to prepare yourself and your loved ones for a tsunami at www.mil.wa.gov/tsunami

This is especially helpful for distant tsunami events from places like Alaska, Japan, or Southeast Asia. The sirens have an audible range of approximately 1 mile, though this varies depending on environmental factors like topography, wind direction, and physical barriers. The pole-mounted voice/tone sirens are also topped with a blue light for the hard of hearing. The sirens are not intended to be heard indoors.

With siren installations complete, Washington's tsunami program is focused now on conducting a thorough outreach campaign to communities with sirens ahead of the Great Washington ShakeOut in October. ShakeOut is the one day of the year when the siren network is tested with the actual tsunami warning wail tone; education is necessary ahead of time to ensure the public responds appropriately to this test and to prevent spontaneous self-evacuations or calls to 9-1-1. Local jurisdictions were provided a packet of outreach materials to use when educating their stakeholders about the new sirens, and in September the program will launch a paid ad campaign via print, radio, and social media.

Now that the siren network is completed, the program can now dedicate more time and energy to other vital projects such as improving tsunami evacuation route signage and working with local officials on vertical tsunami evacuation structure initiatives.

To learn more about the Washington state tsunami siren network, visit www.mil.wa.gov/tsunami.

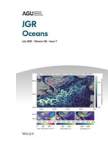
TSUNAMI RESEARCH & EVENTS

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UPCOMING NTHMP & RELATED EVENTS

- ◆ September 20-26, 2021—AEG Annual Meeting (San Antonio, TX) <https://www.aegannualmeeting.org/>
- ◆ September 23, 2021 (2pm EDT)—NTHMP MMS Fall Meeting (Virtual) <https://nws.weather.gov/nthmp/index.html>
- ◆ September 23, 2021 (4pm EDT)—NTHMP CC Fall Meeting (Virtual) <https://nws.weather.gov/nthmp/index.html>
- ◆ October 10-13, 2021— Geological Society of America (Portland, OR) <https://community.geosociety.org/gsa2021/home>
- ◆ November 18, 2021 (2pm EST)—NTHMP MMS Fall Meeting (Virtual) <https://nws.weather.gov/nthmp/index.html>
- ◆ November 18, 2021 (4pm EST)—NTHMP CC Fall Meeting (Virtual) <https://nws.weather.gov/nthmp/index.html>
- ◆ December 13-17, 2021—AGU Fall Meeting (New Orleans, LA) <https://www.agu.org/fall-meeting>
- ◆ February 1-4, 2022—NTHMP Winter Meeting (Portland, OR) <https://nws.weather.gov/nthmp/index.html>

