



TsuInfo Alert

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National Tsunami Hazard Mitigation Program Update

By Rocky Lopes, NTHMP Administrator

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The National Tsunami Hazard Mitigation Program has been busy, having concluded “summer meetings” of the Mitigation & Education Subcommittee (MES) and the Mapping & Modeling Subcommittee (MMS) on August 1 – 3, 2017, in Salt Lake City, Utah. Additionally, the NTHMP Strategic Planning Work Group met August 4. These meetings were hosted by the National Weather Service Western Region, home office of the NTHMP Chair, Dr. Grant Cooper.

While the subcommittees will be publishing results and outcomes of their meetings separately, the following is news of note:

- **SAVE THE DATE!** The NTHMP Annual Meeting will be held in Seattle, Washington, from Monday January 29 through Friday morning, February 2, 2018. It will be hosted by the NOAA Pacific Marine Environmental Lab. More information will follow soon.
- The MES wishes Co-Chair Gala Gulascik of FEMA Region X well as she leaves FEMA and moves to the University of Washington to pursue a PhD. Gala has served as an MES Co-Chair quite admirably for almost two years. We will miss her.
- Tamra Biasco of FEMA Region X has agreed to step back in to serve as a Co-Chair of the MES, and was elected by the MES to serve in this role. The NTHMP Coordinating Committee will confirm this election at its next meeting.
- The Warning Coordination Subcommittee (WCS), MES, and MMS reviewed and voted to update their *Terms of Reference* which are like subcommittee By-Laws. (All newly updated documents are on the respective subcommittees’ pages on the NTHMP website—<http://nws.weather.gov/nthmp/>) The updates to these documents provide for:
 - ♦ Appropriate reference to the *Tsunami Warning, Education, and Research Act of 2017*, Public Law 115-25 (instead of TWEA).



Attendees of the NTHMP 2017 Summer Meeting in Salt Lake City, Utah.



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NATIONAL TSUNAMI HAZARD MITIGATION PROGRAM LIBRARY CATALOG:

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

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National Tsunami Hazard Mitigation Program Update

By Rocky Lopes, NTHMP Administrator

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- ◆ Development of an *Annual Work Plan* by all three subcommittees with milestones and deliverables that will be aligned with the NTHMP Strategic Plan and aid in subcommittee accountability. The MMS took this a little further by including development of a “Five-year vision plan” that outlines goals and milestones over the life of the five-year Strategic Plan.
- Deep discussions were held about activities suggested in TWERA, the NTHMP External Review report, and the past list of “allowable grant activities.” These discussions are leading to an update of recommendations to the National Weather Service for what activities should be permitted for NTHMP partners to request grant funding to accomplish, and feed into the FY18 *National Weather Service Grant Guidance for Financial Support for Tsunami Programs*. These discussions will continue through September by an appointed Work Group, and final recommendations will be considered by the NTHMP Coordinating Committee at its September 19 meeting.
- The MES and MMS developed inputs to a strategic planning worksheet that outlined their strategic goals for the next five years. These ideas and measurable concepts were consolidated and considered as the foundation for the next NTHMP Strategic Plan.
- The NTHMP Strategic Planning Work Group met and made major headway on development of the *2018-2023 NTHMP Strategic Plan*. (See separate article on Page 3).

NTHMP NEWS

NTHMP Strategic Planning Update

By Rocky Lopes, NTHMP Administrator

In my quest to keep this process open and transparent, the following are insights and results from the NTHMP Strategic Planning Work Group meeting of August 4, 2017:

- Dr. Grant Cooper, NTHMP Chair and Director of the NWS Western Region, has had years of experience in strategic planning while he served in the U.S. Navy. He led a discussion that achieved congenial consensus that—
 - ♦ The next NTHMP Strategic Plan should outline high-level themes, goals, and strategies that serve the entire NTHMP, and not be specific to subcommittees. There will not be separate subcommittee elements any more.
 - ♦ FEMA's 2014-2018 Strategic Plan (<https://www.fema.gov/media-library/assets/documents/96981>) provides an excellent model for how to develop and format the next NTHMP Strategic Plan, especially with photos that illustrate each point and shows action. (Hint: more “photo calls” to partners is forthcoming!)
- Revisions to the NTHMP Vision and Mission were made, this time with consensus.
- During facilitated brainstorming, the Work Group reviewed the consolidated worksheets developed by the MES and MMS, and derived four major Strategic Priorities under which goals and strategies will be developed: Hazard & Risk Assessment; Education & Preparedness; Mitigation & Recovery; Alerting, Warning, and Response. (Names of Strategic Priorities may be changed to be more active and engaging.)
- Front matter will be developed – Forward (by Dr. Cooper), Executive Summary, and an Introduction that sets the tone, provides policy context, and covers cross-cutting issues.
- Concluding section to be included that will cover implementation and execution.
- Each member of the Strategic Planning Work Group agreed to collaborate on writing content for several sections, and are now writing their drafts that Rocky will assemble and continue to facilitate the review and production process.
- The Work Group will meet by phone about every three weeks until the final draft of the *2018-2023 NTHMP Strategic Plan* is completed and delivered to the NTHMP Coordinating Committee in advance of its November meeting, scheduled for the 21st (though it may change considering this is the week of Thanksgiving.)
- The final *2018-2023 NTHMP Strategic Plan* will be approved during the NTHMP Annual Meeting.



If you have thoughts, ideas, or questions about the NTHMP Strategic Plan or this process, feel free to contact any of the Work Group members: Corina Forson (MMS); Juan Horrillo (MMS); Rick Wilson (MMS); Tamra Biasco (MES); Kevin Miller (MES); Christa von Hillebrandt (MES); Althea Rizzo (WCS); Mike Angove (WCS); Kevin Richards (Island Caucus), or Rocky Lopes (Administrator.)

NTHMP Mitigation & Education Subcommittee Update

By Christa von Hillebrandt (NOAA Caribbean Tsunami Warning Program) and Gala Gulascik (FEMA Region X)

The NTHMP Mitigation & Education Subcommittee (MES) met in Salt Lake City on August 1-3, 2017. Topics covered during the meeting included TsunamiReady® Tier Two, Hazus, National Centers for Environmental Information (NCEI), tsunami preparedness campaigns in the states and territories, tsunami exercises, World Tsunami Day, NTHMP talking points, strategic planning, evacuation best practices, grant-allowable activities, smartphone applications and tools, national tsunami education projects, and the Island Caucus.

The discussions on Tsunami Ready® Tier Two were facilitated by Troy Nicolini and Rocky Lopes. Tier Two Guidelines will help high-risk communities more completely prepare for and mitigate extreme tsunami risks and will help communities reach a higher level of disaster resilience. It was noted that Tier Two was a process during which the community together with emergency managers, warning coordination meteorologists, and other stakeholders could identify mitigation opportunities, including resources to address evacuation barriers.



In 2017, FEMA released the Hazus Tsunami Model. The release represents the first time that analysis will be available for most US territories. It also includes a new National Structure Inventory, five case studies, and two types of damage analysis (Earthquake and Tsunami or Tsunami only). MES agreed that it is a great tool, and significant training and support will be required for implementation by most states. Kelly Stroker provided an update on the many tsunami tools and resources that are available through NCEI.

Each of the states and territories participating in the meeting provided highlights on their tsunami preparedness campaigns. In terms of tsunami exercises, Christa von Hillebrandt reviewed the experience of NTHMP and NOAA supported CARIBE WAVE and LANTEX exercises. This was followed by a discussion on how NTHMP can further support tsunami exercises that are included in the TsunamiReady guidelines. It was noted that many states and FEMA have their exercise structures. Tsunamizone.org was recognized as a tool for tracking and promoting participation in tsunami exercises. Dr. Laura Kong gave an update on World Tsunami Awareness Day which is celebrated every year on November 5. One of the focuses this year is on tsunami evacuation exercises for schools and it was agreed that videos of such exercises in the US should be prepared and shared with the international community.

Kevin Miller gave an overview on tsunami signage that is being used and it was suggested that an inventory with artwork and other details on signs be created to facilitate the production of signage. MES will also be following up on signs for vertical evacuation. Nate Wood of USGS facilitated a discussion on how to better link the results of pedestrian evacuation modeling with emergency managers and the community. It was agreed that a workshop would be required to develop guidelines for evacuation modeling, mapping product development, dissemination and outreach. Many states are interested in implementing the “Blue Line” through which the pavements are painted indicating the tsunami evacuation zone limit. This concept was originally developed in New Zealand but has been successfully implemented in Oregon which shared their experience. FEMA and Oregon shared the Safe Haven Newport project as a successful partnership among federal, state, local, community and private stakeholders.

(Continues on page 5)

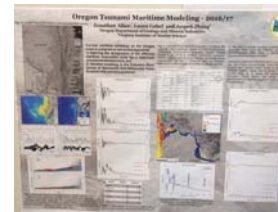
NTHMP NEWS

NTHMP Mapping & Modeling Subcommittee Update

By Marie Eble (NOAA/Pacific Marine Environmental Lab) and Dmitry Nicolsky (University of AK)

The Mapping and Modeling Subcommittee (MMS) convened on August 1-3, 2017 and held discussions on the following topics:

- The NTHMP External Review Report and its implications for the next NTHMP Strategic Plan.
- Establishing a team to draft modeling guidelines and best practices for numerical models used in estimation of tsunami currents. Review of the "Tsunami Modeling and Mapping: Guidelines and Best Practices" is also pending.
- Outcomes of the MMS Landslide workshop held in Galveston, Texas, on January 9 - 11, 2017.
- Prioritization of Digital Elevation Models (DEMs) to be developed in federal fiscal year 2018 for use in inundation modeling.
- Powell Center Proposal and related outcomes - to produce a collection of vetted and standardized earthquake and landslide tsunami sources for use in production of hazard assessment products necessary for effective tsunami hazard mitigation and risk reduction.



Additionally, the MMS test-pioneered a meeting poster session as a way for each subcommittee member to highlight accomplishments and present ideas for future efforts in an interactive and engaging way while at the same time saving subcommittee discussion time. The poster session proved successful and was met with interest by members of the Mitigation and Education Subcommittee.

Mapping and Modeling Subcommittee meeting minutes will be available from the NTHMP website (<http://nws.weather.gov/nthmp/>) for those interested in additional or more specific meeting information.

NTHMP Mitigation & Education Subcommittee Update

By Christa von Hillebrandt (NOAA Caribbean Tsunami Warning Program) and Gala Gulascik (FEMA Region X)

(Continued from page 4)

Given that many states indicated the usefulness of the National Tsunami Media Guide, Christa Rabenold will continue liaising with NOAA staff and state partners as how best to update this resource. Participants were reminded that Tsunami.gov should be the website promoted for tsunami alerts as well as the entry point to other tsunami resources, including NTHMP.

A joint MES/MMS session was also held to discuss the strategic plan, pedestrian evacuation mapping, social science research, mitigation and recovery activities and tsunami maritime issues.

Kara Gately from the National Tsunami Warning Center gave an update on Tview, a tool that will provide emergency managers and other key stakeholders with real time travel time contours, inundation forecasts, tsunami wave front, as well as other information. BETA testers are going to be requested in hopes that the tool can go online in 2018.



In closing the MES thanked Co-Chair Gala Gulascik who is leaving FEMA Region X to pursue a PhD and welcomed back Tamra Biasco of FEMA Region X as a Co-Chair of the MES.

RESEARCH & NTHMP NEWS

Challenges in Defining Tsunami Wave Heights

By Paula Dunbar, George Mungov, Aaron Sweeney, Kelly Stroker, and Nicolas Arcos

ABSTRACT: The National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) and co-located World Data Service for Geophysics maintain the global tsunami archive consisting of the historical tsunami database, imagery, and raw and processed water level data. The historical tsunami database incorporates, where available, maximum wave heights for each coastal tide gauge and deep-ocean buoy that recorded a tsunami signal. These data are important because they are used for tsunami hazard assessment, model calibration, validation, and forecast and warning. There have been ongoing discussions in the tsunami community about the correct way to measure and report these wave heights. It is important to understand how these measurements might vary depending on how the data were processed and the definition of maximum wave height. On September 16, 2015, an 8.3 Mw earthquake located 48 km west of Illapel, Chile generated a tsunami that was observed all over the Pacific region. We processed the time-series water level data for 57 coastal tide gauges that recorded this tsunami and compared the maximum wave heights determined from different definitions. We also compared the maximum wave heights from the NCEI-processed data with the heights reported by the NOAA Tsunami Warning Centers. We found that in the near field different methods of determining the maximum tsunami wave heights could result in large differences due to possible instrumental clipping. We also found that the maximum peak is usually larger than the maximum amplitude ($1/2$ peak-to-trough), but the differences for the majority of the stations were <20 cm. For this event, the maximum tsunami wave heights determined by either definition (maximum peak or amplitude) would have validated the forecasts issued by the NOAA Tsunami Warning Centers. Since there is currently only one field in the NCEI historical tsunami database to store the maximum tsunami wave height for each tide gauge and deep-ocean buoy, NCEI will consider adding an additional field for the maximum peak measurement.

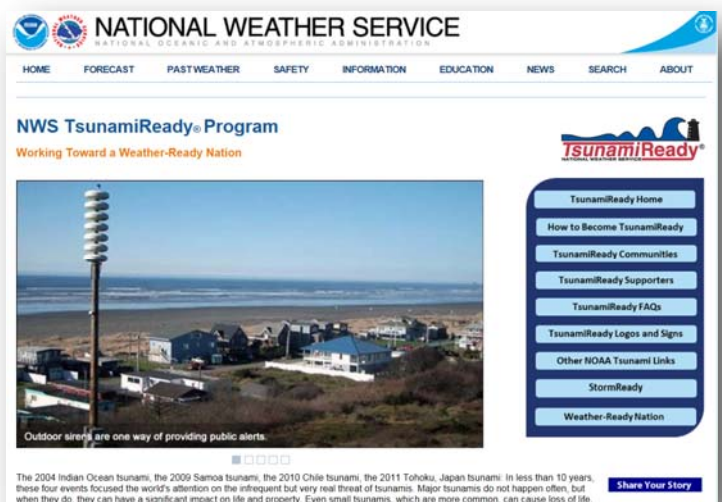


CITATION: Dunbar, Paula; Mungov, George; Sweeney, Aaron; Stroker, Kelly; Arcos, Nicolas, 2017, Challenges in Defining Tsunami Wave Heights: Pure and Applied Geophysics, v. 174, no. 8, p. 3043-3063, DOI: 10.1007/s00024-017-1614-y.

New Web Address for NWS TsunamiReady® Program

The web address for the NWS TsunamiReady Program has changed as the result of a National Weather Service-wide transition to a new content management system. The new address is <https://www.weather.gov/tsunamiready/>.

Partners and other supporters of the TsunamiReady program are urged to update bookmarks and, more importantly, links on their agency websites. There are some redirects from the old site currently in place, but when the old server goes offline, those redirects will be lost. The TsunamiReady program website can also be accessed through the Information dropdown menu on the National Weather Service's homepage: <https://www.weather.gov/>.



IN THE NEWS

Tsunami CSI

By Ashleen Knutsen, University of Southern California

Six-hundred-foot waves crashed down on the coasts of Taan Fiord, Alaska after a massive landslide sent over 100-million tons of rocks into the water on October 17, 2015. A group of investigators, including Patrick Lynett from the USC Tsunami Research Center, conclude that the event was caused by rapid glacier retreat, an indirect effect of climate change that is increasing natural hazards near glaciated mountain coastlines in locations like Norway and Greenland.



A skid driving into Taan Fiord, Alaska. Photo/Bjorn Olson

This was the highest marine tsunami worldwide since 1958. Luckily, Icy Bay, the home to Taan Fiord, is uninhabited and no one was in the area at the time of the event. Moreover, when the rocks came hurtling down, creating waves as high as the Space Needle, no one even noticed until a seismometer picked up the signal hours after the event. However, in at-risk locations with higher populations, an event like this could be catastrophic.

“Local climate changes in that area [of Alaska] caused the supply of snow and ice feeding that glacier to be reduced so that it retreated back quickly,” said Patrick Lynett, associate professor in USC Viterbi’s Sonny Astani Department of Civil and Environmental Engineering. “There are a handful of locations throughout the world that have this situation. There are many places in Alaska, particularly southeast Alaska, many in South America and in Northern Europe.”

See full article: <https://viterbischool.usc.edu/news/2017/08/tsunami-csi-alaska-landslide-taan-fiord/>

BVI Remains Tsunami Ready – Achieves Recognition For Four More Years

By Viona Alexander-Smith, Department of Disaster Management, Government of the Virgin Islands

The British Virgin Islands remains a Tsunami Ready Territory with the renewal of its Tsunami Ready recognition for another four years.



Mr. Steven Hall from UK delegation/IOC Vice Chair receiving the Tsunami Ready certification for the British Virgin Islands from IOC Secretary, Dr. Vladimir Ryabinin and ICG CARIBE EWS Chair, Christa von Hillebrandt-Andrade.

The renewal was awarded under the UNESCO Intergovernmental Coordination Group for Tsunamis and Other Coastal Hazards in the Caribbean and Adjacent Regions (IOC CARIBE EWS) pilot project.

The renewal was officially awarded to the Territory at the UNESCO IOC Assembly held in Paris this week. Mr. Steven Hall from United Kingdom delegation and IOC Vice Chair accepted the certificate on the BVI’s behalf.

As part of the renewal process a site verification visit was conducted on June 8 by Manager of the National Weather Service Caribbean Tsunami Warning Programme and Chair of the UNESCO IOC CARIBE EWS, Mrs. Christa von Hillebrandt-Andrade, followed by a meeting of the CARIBE EWS Tsunami Ready Board on June 15 to review the BVI’s application.

See full article: <http://www.bvi.gov.vg/media-centre/bvi-remains-tsunami-ready-achieves-recognition-four-more-years>

RESEARCH & NTHMP EVENTS

CURRENT TSUNAMI RESEARCH

Bai, Yefei; Lay, Thorn; Cheung, K. F.; Ye, Lingling, 2017, Two regions of seafloor deformation generated the tsunami for the 13 November 2016, Kaikoura, New Zealand earthquake: *Geophysical Research Letters*, v. 44, no. 13, p. 6597-6606, DOI: 10.1002/2017GL073717.



Bécel, Anne; Shillington, D. J.; Delescluse, Matthias; Nedimovic, M. R.; Abers, G. A.; Saffer, D. M.; Webb, S. C.; Keranen, K. M.; Roche, Pierre-Henri; Li, Jiyao; Kuehn, Harold, 2017, Tsunamigenic structures in a creeping section of the Alaska subduction zone: *Nature Geoscience*, v. 10, p. 609-614, DOI: 10.1038/NNGEO2990.

Goda, K.; De Risi, R., 2017, Performance-based tsunami engineering for community resilience: 12th International Conference on Structural Safety & Reliability, Vienna, Austria, August 6-10, 2017.



King, D. N.; Goff, J. R.; Chague-Goff, C.; McFadgen, B.; Jacobsen, G. E.; Gadd, P.; Horrocks, M., 2017, Reciting the layers: Evidence for past tsunamis at Mataora-Wairau Lagoon, Aotearoa-New Zealand: *Marine Geology*, v. 389, p. 1-16, <http://dx.doi.org/10.1016/j.margeo.2017.05.001>.

Macias, Jorge; Castro, M. J.; Ortega, Sergio; Escalante, Cipriano; Gonzalez-Vida, J. M., 2017, Performance Benchmarking of Tsunami-HySEA Model for NTHMP's Inundation Mapping Activities: *Pure and Applied Geophysics*, v. 174, p. 3147-3183, DOI 10.1007/s00024-017-1583-1. <https://link.springer.com/content/pdf/10.1007%2Fs00024-017-1583-1.pdf>

Mori, N.; Goda, K.; Cox, D., 2018, Recent process in probabilistic tsunami hazard analysis (PTHA) for mega thrust subduction earthquakes. IN *The 2011 Japan Earthquake and Tsunami: Reconstruction and Restoration: Insights and Assessment after 5 Years*. Springer, pp. 469-485, DOI: 10.1007/978-3-319-58691-5_27.

Rubin, C. M.; Horton, B. P.; Sieh, Kerry; Pilarczyk, J. E.; Daly, Patrick; Ismail, Nazli; Parnell, A. C., 2017, Highly variable recurrence of tsunamis in the 7,400 years before the 2004 Indian Ocean tsunami: *Nature Communications*, v. 8, 12 p., doi: 10.1038/ncomms16019. <http://www.nature.com/articles/ncomms16019.pdf>



UPCOMING NTHMP & RELATED EVENTS

- ◆ October 22-25, 2017—GSA Annual Meeting (Seattle, Washington)

<http://community.geosociety.org/gsa2017/home>



- ◆ December 11-15, 2017—AGU Fall Meeting (New Orleans, Louisiana)

<https://fallmeeting.agu.org/2017/>



- ◆ January 29-February 2, 2018—NTHMP Annual Meeting (Seattle, Washington)

<http://nws.weather.gov/nthmp/>



- ◆ April 24-26, 2018—SSA Joint Conference of the Latin American and Caribbean Seismological Commission and the Seismological Society of America (San Juan, Puerto Rico) <http://seismology2018.org/>



- ◆ May 7-9, 2018—8th International Symposium on Submarine Mass Movements and Their Consequences (Victoria, British Columbia) <http://igcp640.oceannetworks.ca/>

