

Enhancing Ocean Safety in the Caribbean and Adjacent Regions

Tsunami Ready and CARIBE WAVE Exercises

By Dr. Silvia Chacon-Barrantes (National Tsunami Monitoring System, National University Heredia, Costa Rica), Dr. Elizabeth A. Vanacore (University of Puerto Rico Mayagüez, Dept of Geology, Puerto Rico Seismic Network), Christa von Hillebrandt-Andrade (US NOAA NWS Caribbean Tsunami Warning Program), and Alison Brome (Programme Officer, Coastal Hazards, UNESCO/IOC and Caribbean Tsunami Information Centre)



CARIBE WAVE 2019 Exercise, Corn Island, Nicaragua conducted as part of the Tsunami Ready Nomination Progress. Source: Office of the Mayor, Corn Island, Nicaragua



"Our oceans are crying; our people are dying and we must act quickly ... we must work together to strengthen the resources and capabilities that we have within our coastal communities."

This was the clarion call expressed by Mrs. Sharleen DaBreo-Lettsome, Permanent Secretary and Past Director of the Department of Disaster Management, British Virgin Islands during the Safe Ocean Panel of the Western Tropical Atlantic Regional Workshop 28-29 April 2020. Deliberations reflected this appeal more comprehensively in the Workshop Grand Action identified by Decade Working Group IV for the region - *Develop a regional multi-hazard ocean data and forecast system linked to education, outreach, readiness and communication actions that empowers and recognizes national and local policy and decision making and individual response for the protection of life and livelihoods.*

Over the last 500 years, at least 83 confirmed tsunamis have been observed (7-10 percent of the world's oceanic tsunamis) and over 4,500 people have lost their lives from

tsunamis in the Caribbean and adjacent regions according to NCEI (2021). Since the most recent devastating tsunami of 1946, there has been an explosive population growth and influx of tourists along the Caribbean and Western Atlantic coasts increasing the tsunami vulnerability of the region (von Hillebrandt-Andrade, 2013).

Recent seismic activity in the region such as the 2020 M7.7 earthquake near Jamaica, the 2020 M6.4 earthquake in Puerto Rico, and unrest of the underwater Kick'Em Jenny volcano serve as stark reminders that the region is home to events capable of generating deadly tsunamis. While none of these events have generated significant tsunamis, they can be classified as near misses and underscore the need for efficient preparedness and response capacity at national and community levels.

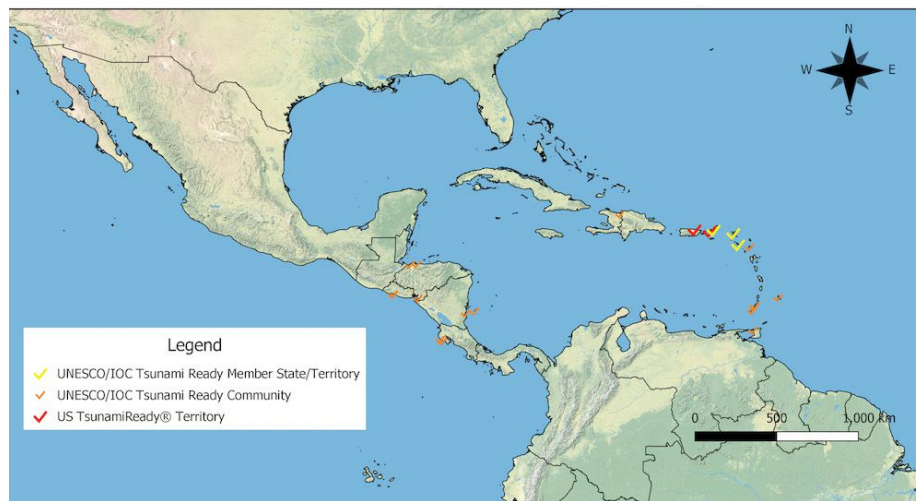


Recent tsunamis worldwide confirm that when a tsunami arrives, and communities are ready to respond, lives are saved, and fewer people die. Given that all coasts are at risk to tsunamis, it is vital that communities be prepared, especially in the case of tsunamis with very rapid onsets. To enhance resilience to tsunamis and other coastal hazards in coastal communities, the UNESCO/IOC-led Intergovernmental Coordinating Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE EWS) in association with regional partners have been implementing the tsunami CARIBE WAVE Exercise and the Community Performance Based Tsunami Recognition Programme (Tsunami Ready) over the past decade.

The ICG/CARIBE EWS Task Teams for CARIBE WAVE and Tsunami Ready (TR) have been providing tremendous support to Member States through annual exercises and the readiness program. The first CARIBE WAVE exercise was held in 2011 and has been held annually since 2013. The TR Task Team; together with the US National Weather Service of the National Ocean and Atmospheric Administration (NOAA), in coordination with the national disaster management stakeholders in the Caribbean adapted the US-based TsunamiReady® program through a phased approach towards the current modality of the Tsunami Ready which was endorsed by the IOC General Assembly in 2015. These two initiatives are characterized by significant community participation, and support the last mile approach of the CARIBE EWS. In the throes of the COVID-19 pandemic that has ushered in the IOC-driven UN Ocean Decade, organizers have had to employ adaptation measures to ensure continued success of these initiatives. Highlighted as a key challenge within the Ocean Decade is the need to increase community resilience to ocean hazards, or rather; create *A Safe Ocean*.

Unfortunately, one of the biggest challenges facing the disaster risk reduction community is the need to bridge the gap between science and policy. It is no secret that scientists and policymakers have different approaches and priorities, and this can negatively impact decision-making. The CARIBE WAVE Exercise and Tsunami Ready ground the science to enable action at all levels to achieve enhanced ocean safety. These regional initiatives, as with the Ocean Decade, employ cooperative approaches to strengthening dialogue, capacity building, partnership development and leveraging resources to support the needs of decision-makers, disaster management officials, and vulnerable populations.

A plan is only as good as its implementation; it is therefore critical to practice, test, and improve tsunami plans. To aid in this endeavor, CARIBE WAVE goes beyond validating communications systems but also provides coastal locales with the opportunity to practice their plans and conduct local community outreach.



Map of Tsunami Ready Communities, 2021. Source: US NWA NOAA, Caribbean Tsunami Warning Program

Executive Secretary of the Coordination Center for the Prevention of Natural Disaster in Central American (CEPRE-DENAC); Claudia Herrera Melgar opined: "The regional CARIBE WAVE Exercise allows CEPREDENAC Member States to enhance their tsunami preparedness through the testing of plans and procedures. This approach to building resilience is reflected within the Central American Policy for Comprehensive Risk Management which focuses on strengthening the work carried out by the civil protection systems within Central America and the Dominican Republic."

The 2021 exercise on March 11 was planned in part as remembrance of the 2011 Tohoku earthquake and tsunami. Member States are encouraged to take a multi-hazard approach to coordinating CARIBE WAVE Exercises wherever possible, and this has been evident in some countries and territories hosting week/month long activities twinning tsunamis preparedness with other hazards such as earthquakes and volcanoes.

Tsunami Ready is a voluntary performance-based program guided by a current set of 10 indicators spanning preparedness, mitigation and response. Communities must meet all guidelines to be recognized. With its roots in the US NWS NOAA Storm Ready Program, the Tsunami Ready preparedness (outreach activities and annual community exercises) and response (community emergency operations plans and communication mechanisms) indicators in particular lend to adaption for other hazards by design.

Following their receipt of Tsunami Ready recognition (territory-wide) in 2014, Jasen Penn, Acting Director Department of Disaster Management, British Virgin Islands credited the program's qualification process and annual maintenance requirements for providing tremendous support to their preparedness and response efforts during the 2017 Atlantic Hurricane Season. As part of World Tsunami Awareness Day (WTAD) 2020 celebrations, Mr. Penn recalled that during the threats posed by Hurricanes Irma and Maria when the majority of communications systems were destroyed/offline, various pieces of tools employed for the Tsunami Ready nomination e.g., bull horns and police sirens on vehicles were

MITIGATION (MIT)
MIT-1. Have designated & mapped tsunami hazard zones
MIT-2. Have a public display of tsunami information
PREPAREDNESS (PREP)
PREP-1. Have a tsunami evacuation map developed in collaboration with communities and local authorities
PREP-2. Develop and distribute outreach and public education materials
PREP-3. Hold at least three outreach or educational activities annually
PREP-4. Conduct an annual tsunami community exercise
RESPONSE (RESP)
RESP-1. Address tsunami hazards in the community's emergency operations / response plan
RESP-2. Have the capacity to manage emergency response operations during a tsunami
RESP-3. Have redundant and reliable means to receive official tsunami warnings 24x7
RESP-4. Have redundant and reliable means to disseminate official tsunami warnings and information to the public 24x7

| [CARIBE EWS Tsunami Ready Guidelines At A Glance](#)

used to warn persons of the impending hurricane and advise of evacuation.

"This allowed for targeting of very at-risk communities particularly those in isolated locations close to the coast, or persons in structures that were severely compromised by the passing of the first hurricane," he added.

Over the lifetime of the CARIBE WAVE Exercise, participation has grown since 2011 where a few hundred authorities participated from 34 member states to a peak of almost 800,000 participants across all 48 Member States and Territories in 2019. Due to the COVID pandemic in 2020, the exercise was scaled down to a simple communications test. Despite this, 46 out of 48 Member States and territories still participated in the exercise demonstrating the commitment of the region to ensuring a safe ocean.

As the COVID pandemic continues, the 2021 CARIBE WAVE Exercise was conducted following local COVID protocols. Virtual participation via webinars, revision of personal emergency plans and supplies, and monitoring local announcements were highly encouraged. Irrespective of the scenario selected, each member state/territory and Tsunami Ready community were able to use the exercise to practice their tsunami response. Activities ranged from simple communications tests to tabletop exercises to full-scale tsunami walks. CARIBE WAVE continues to generate excitement with close to 400,000 participants registered for the 2021 Exercise.

Fourteen communities in eleven countries within the Caribbean and adjacent regions have been recognized as Tsunami Ready at national or local levels. CARIBE WAVE has become a staple on the Tsunami Ready calendar to support the initial qualification of at-risk communities for Tsunami Ready recognition, as well as annual maintenance of this status over the renewal period. As with CARIBE WAVE, the Tsunami Ready recognition process had to adapt quickly to the restrictions of the COVID-19 virus. In April 2020, with five pilot communities on the cusp of recognition, and four others in progress.

Virtual meetings of the National Tsunami Ready Board, complemented by videos/photos and written reports by in-country capacity, successfully replaced in-person site visits to the various communities by the IOC Teams to ensure that eligibility for recognition could be verified. These approaches together with virtual training activities and enhanced utilization of local consultant expertise are current features of the Tsunami Ready nomination process for 5 pilot states.

In addition to CARIBE WAVE, frequent tsunami exercises are coordinated in the other 3 IOC-led regional tsunami early warning systems in the Indian Ocean; North Eastern Atlantic, Mediterranean and Connected Seas; and the Pacific. The IOC's efforts from 2017 to transition Tsunami Ready from

a regional program pioneered in the CARIBE EWS to the other regions has resulted in the program becoming one of the pillar initiatives of the Global UN Ocean Decade dedicated towards achieving the societal outcome of *A Safe Ocean* aimed at making 100 percent of highly vulnerable communities Tsunami Ready by 2030.

Ms. Elizabeth Riley, Acting Executive Director of the Caribbean Disaster Emergency Management Agency (CDEMA) stated, "The Tsunami Ready Programme has proven to be a key paver on the pathway towards regional disaster resilience. It is aligned not only to the UN Ocean Decade societal outcome aimed at achieving A Safe Ocean, but also Priority Area 4 of the regional CDEMA-led Comprehensive Disaster Management Strategy focused on strengthened and sustained community resilience. Tsunami Ready is an especially valuable initiative for CDEMA Participating States, as many are Small Island Developing States with acute vulnerability to tsunamis given their dependence on tourism and dominant linear coastal settlement pattern."

To have a safe ocean, we must strive to empower all communities vulnerable to tsunamis to become Tsunami Ready. To achieve this requires testing initiatives such as CARIBE WAVE, cooperation and advancement of local scientific experts, emergency managers, government authorities, community leaders, and most importantly the impacted communities themselves. Together we can take a large step forward to making the ocean safe for all and all safe from the oceans.

References:

National Centers for Environmental Information/World Data Service (NCEI/WDS). 2021.
 NGDC/WDS Global Historical Tsunami Database. Boulder, National Center Environmental Information, (doi:10.7289/V5PN93H7).
 von Hillebrandt-Andrade, C. (2013). Minimizing Caribbean Tsunami Risk. *Science*, 341(6149),966–968.doi:10.1126/science.1238943