

2016

Tsunami Warning Information Dissemination Protocol & SOP For St. Kitts & Nevis



National Emergency Management
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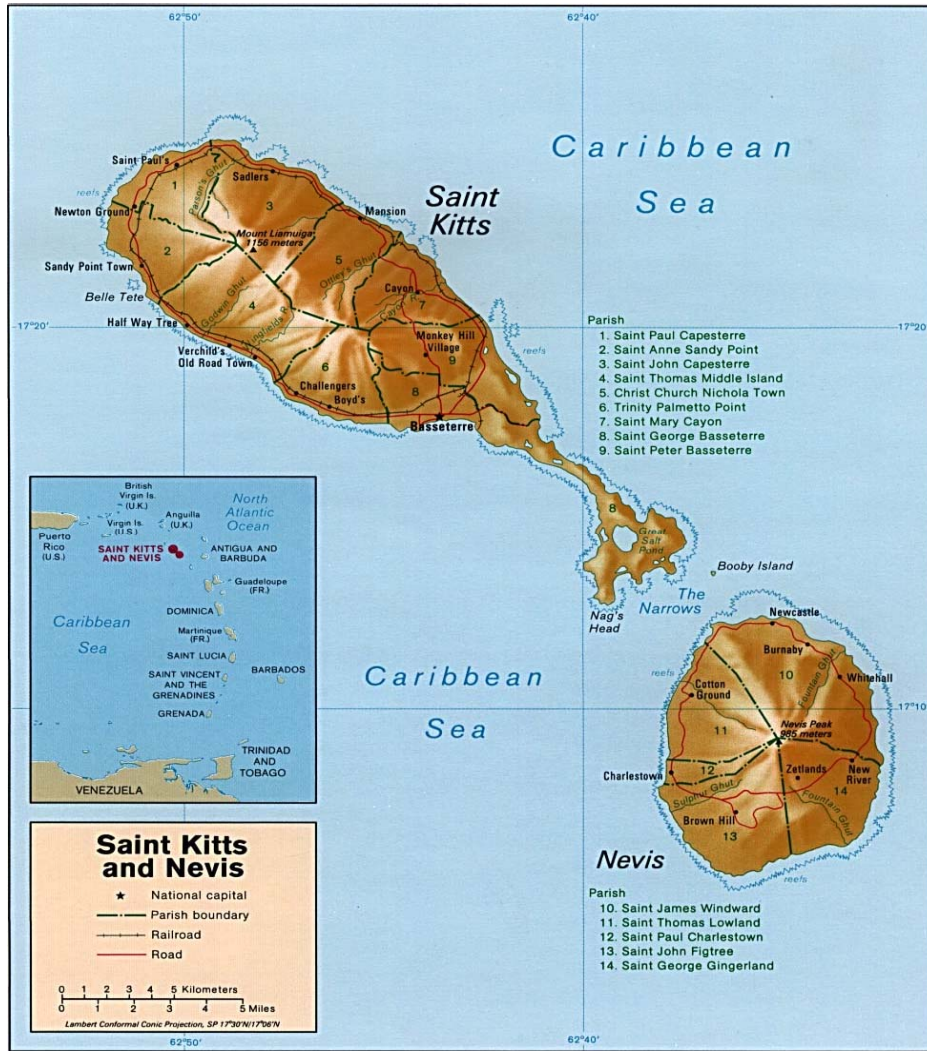


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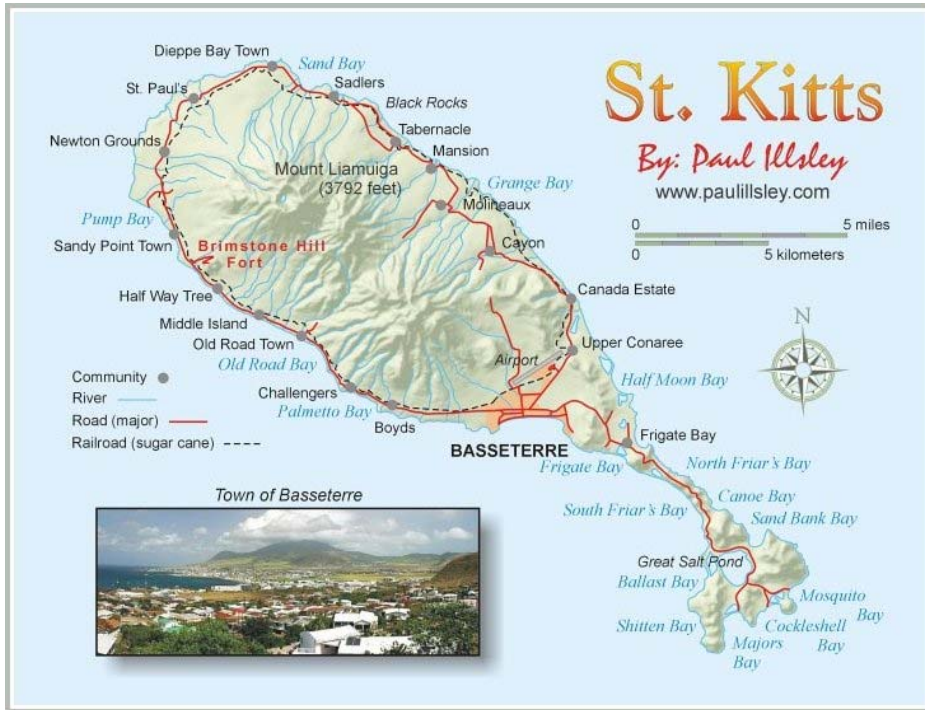
Prefix

The CDEMA Participating States' Model Protocol and Standard Operating Procedures (SOPs) for Tsunami Warnings are adapted herein for use for St. Kitts and Nevis. The adapted SOPs outline the essential responsibilities of the St. Kitts and Nevis Tsunami Warning Focal Point (TWFP) to receive the Tsunami Bulletin, to analyse the Bulletin, and to initiate actions based on the analysis to alert and notify St. Kitts and Nevis' national organizations and the public.

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Map of St. Kitts





Map of Nevis



ACRONYMS

ATFM	Alaska Tsunami Forecast Model
CDEMA	Caribbean Disaster Emergency Management Agency
CDERA	Caribbean Disaster Emergency Response Agency
CDM HIP	Comprehensive Disaster Management Harmonization Implementation Programme
CARIBE-EWS	Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions
CARIBEWAVE	CARIBE-EWS large-scale exercise
CISN	California Integrated Seismic Network
CTIC	Caribbean Tsunami Information Centre
CTWP	Caribbean Tsunami Warning Program
DMD (Nevis)	Disaster Management Department
EOC	Emergency Operations Centre
ETA	Estimated Time of Tsunami Arrival
GUI	Graphical user interface



ICG	Intergovernmental Coordination Group (for regional tsunami warning systems) [IOC-UNESCO]
IOC	Intergovernmental Oceanographic Commission [UNESCO]
ITIC	International Tsunami Information Centre
JMA	Japan Meteorological Agency
KMZ	Keyhole Mark-up Language
NDMO	National Disaster Management Office
NEMA (SKN)	National Emergency Management Agency
NEMO	National Emergency Management Office
NOAA	USA National Oceanic and Atmospheric Administration
NTWC	National Tsunami Warning Centre
NWS	US National Weather Service
OECS	Organisation of East Caribbean States
PTWC	Pacific Tsunami Warning Centre
PTWS	Pacific Tsunami Warning System
RIFT	Real-time Inundation Forecast of Tsunamis
SC	Steering Committee
SIFT	Short-term Inundation Forecasting for Tsunamis [NOAA]
SOP	Standard Operating Procedure



TOWS-WG	Working Group on Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems [IOC-UNESCO]
TWC-TER	Tsunami Warning and Emergency Response
TWFP	Tsunami Warning Focal Points
UNESCO	United Nations Educational, Scientific and Cultural Organization
URL	Uniform Resource Locator
UTC	Universal Time Coordinated
WCMT	W-phase Centroid Moment Tensor
WDT	Warning Decision Time
WG	Working Group
WMO	World Meteorological Organization

1.0 BACKGROUND

At a workshop organized by the International Tsunami Information Centre (ITIC) in collaboration with the IOC ICG/CARIBE-EWS Secretariat, the Caribbean Tsunami Information Centre (CTIC) and the Caribbean Tsunami Warning Programme (CTWP), in November 2013, it was learnt that CDEMA Participating State St. Kitts and Nevis were without a Tsunami specific Protocol and Standard Operating Procedures (SOP). The country indicated this during a presentation on the status/readiness of the state to address a Tsunami related impact at the workshop supported by UNESCO and the United Nations Development Programme (UNDP) Barbados Office and the OECS through the Enhancing Resilience to Reduce Vulnerability in the Caribbean (ERC) Project.



The primary objective of the workshop was to strengthen existing SOPs for Tsunami Warning and Emergency Response; and, to introduce the newly enhanced products for disseminating information on possible Tsunamis.

Subsequent to the workshop a formal request was submitted to the CDEMA CU Roving Technical Support Team (RTST) by the National Disaster Coordinator of Saint Kitts and Nevis Mr. Carl Herbert to develop a Tsunami Protocol and SOPs. CDEMA CU acknowledged the request and the technical support provided is made possible via funding from the Comprehensive Disaster Management Harmonization Implementation Programme (CDM HIP) RTST allocation. The RTST has been established under the CDM HIP to deepen relations with CDEMA Participating States by way of provision of technical support in areas agreed to and not readily available via direct intervention from the Coordinating Unit.

As such, much of the guidance utilised for the production of this document comes from the Tsunami and Other Coastal Hazards Warning System Project, which was implemented by CDEMA's predecessor Caribbean Disaster Emergency Response Agency (CDERA) over the period 2007 – 2010. This activity was co-funded by the United States Agency for International Development (USAID).

This document outlines the initial Tsunami Warning Information Dissemination Protocol and Standard Operating Procedures (SOPs) for CDEMA Participating States which would guide the country's National Tsunami Warning Focal Point (TWFP) to respond to the receipt of Tsunami Bulletins from the CARIBE EWS Tsunami Service Provider, the Pacific Tsunami Warning Centre (PTWC).

Appendix A is a copy of the PTWC Users Guide for Enhanced Products for the CARIBE EWS which details its bulletins to the Caribbean Region and provides examples. A Caribbean Tsunami Warning Programme (CTWP) has been established by the ICG/CARIBE and the Programme was established in 2010 to support the tsunami warning system in the Caribbean and Adjacent Regions.

There are four key elements of an “end-to-end” tsunami warning system:



1. Monitoring and Detection – this involves the collection of seismic and sea-level data from sensors, networks and instruments as well as interpretation and verification of this data by a Warning Centre.
2. Hazard Assessment – this involves tsunami modelling and mapping of vulnerability and risk assessments which would identify vulnerable areas, inundation zones and inform the evacuation process.
3. Dissemination and Communication of Warning Information – this is essentially the component which is covered by the protocol and SOPs presented in this document which seek to set guidelines and rules and procedures for communicating the message received by the National TWFP from the Warning Centre to every person within the vulnerable coastal communities i.e. “to the last mile”.
4. Public Awareness and Education – this section of the system complements the other three elements as it provides the education and awareness activities to ensure that the vulnerable communities are prepared and resilient to the tsunami threat. In the case of the ICG/CARIBE EWS, responsibility for Public Awareness and Education for the CDEMA PS will be primarily that of the Caribbean Tsunami Information Centre (CTIC).

To develop emergency preparedness for infrequent events but those with potentially highly disastrous consequences, one must identify the best response for any potential cause, one which can be tested and practiced, and one which is considered relevant to the emergency response professionals as well as the public. There is no essential difference between the response for an underwater landslide or an earthquake; neither can be predicted by scientific advancements at this time and if either of these events occurs, generation of a disastrous tsunami is possible. One difference that does exist is that when earthquakes occur they are felt for a wide radius around the epicentre of the event; this is not the case for underwater landslides. Although just as hazardous, existing volcanoes are monitored and their eruptions are usually predicted days in advance, providing time for emergency response professionals to prepare the public for a possible tsunami as well.

It must also be pointed out that much of the science regarding tsunami warning has concentrated on the earthquake-generated tsunami. On this basis, an earthquake generated tsunami is therefore the main focus of this document for tsunami response.



The Tsunami Warning Protocol is an illustrative description of the process flow from tsunami hazard data collection through to warning of the vulnerable locations. SOPs are the implementation procedures (guidelines) to be followed when a Tsunami Bulletin is received. Each SOP is designed to assist the emergency system (and its personnel) in immediately and accurately responding to Tsunami Bulletins.

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The Tsunami Warning SOPs are the implementation procedures (guidelines) to be followed when a Tsunami Bulletin is received by the National TWFP. Each Tsunami Warning SOP is designed to assist the state's TWFP in:

1. Immediately notifying the National Emergency Management Agency (NEMA – St. Kitts) & the Disaster Management Department (Nevis – DMD), the Royal St. Christopher and Nevis Police Force, the St. Kitts and Fire and Rescue Services, and the St. Kitts and Defence Force (who in turn will activate their response processes and procedures); and,
2. Immediately activating public alerting mechanisms when a tsunami threat may be imminent.

2.0 GUIDING PRINCIPLES

2.1 Purpose

The purpose of this document is to outline the process (protocol) and the SOPs for the transfer of bulletins from the Pacific Tsunami Warning Centre to the public.

Standard Operating Procedures (SOPs) provide procedural guidance for actions to be taken and are defined as a description and procedure on agreed upon steps by institutions who will follow the steps to **coordinate who, what, when, where and how** for Tsunami early warning and response.

The SOPs herein described outline initial alert and warning responsibilities and actions to be taken in the event of a potential Tsunami affecting St. Kitts and Nevis. It is anticipated that this document will provide a base from which St. Kitts



and Nevis' National Emergency Operations Centre (NEOC), under the guidance of the Executive Group and managed by the Director of Operations who will further develop their response procedures and prepare and train their emergency response community for the circumstances of a Tsunami.

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2.2 Statement of St. Kitts and Nevis' Vulnerability to a Possible Tsunami

The **Federation of St. Christopher and Nevis** also known as the **Federation of St. Kitts and Nevis**, located in the Leeward Islands, is a Federal two-island country in the West Indies. It is the smallest sovereign state in the Americas, in both area and population.

The capital city and headquarters of government for the federated state is Basseterre on the larger island of St. Christopher. The smaller island of Nevis lies about 2 miles (3 km) southeast of St. Kitts, across a shallow channel called "The Narrows".

The highest peak, at 1,156 metres, is Mount Liamigua on St. Kitts. The circularly shaped Nevis is surrounded by coral reefs and the island is almost entirely a single mountain, Nevis Peak (3,232 ft. [985 m]). A volcanic mountain chain dominates the centre of both islands. The islands are of volcanic origin, with large central peaks covered in tropical rainforest; the steeper slopes leading to these peaks are mostly uninhabited. The majority of the population on both islands lives closer to the sea where the terrain flattens out. There are numerous rivers descending from the mountains of both islands, which provide fresh water to the local population. St. Kitts also has one small lake, a salt pond.

The National TWFP for St. Kitts and Nevis is the Royal St. Christopher and Nevis Police Force Telecommunications Department and the TNC is the NEMA Coordinator.

In view of the fact that the islands are located in an active seismic province, the most likely tsunamis to affect the Eastern Caribbean are those which can be triggered by shallow earthquakes (**<50km depth**) which are greater than **magnitude 6.5**. These earthquakes must also cause significant vertical rupturing of the sea floor. Over 45 large and shallow events have occurred between



Anegada Passage (near the Virgin Islands) and Trinidad since 1500 but only a few generated significant tsunamis.”¹

“A tsunami is a series of ocean waves which are caused by a sudden disturbance of the ocean floor that displaces a large amount of water. This sudden motion could be an earthquake, a powerful volcanic eruption, or an underwater landslide. The impact of a large meteorite could also cause a tsunami. Tsunamis travel across the open ocean at great speeds and build into large deadly waves in the shallow water of a shoreline.”² Tsunamis are generated when an earthquake occurs 100 km or less under the ocean bottom or a huge landslide takes place near a coast and displaces a large body of sea water. Huge landslides can be caused by a volcanic eruption or lava flow into the ocean. Undersea volcanoes can also displace large bodies of sea water.

Arrival of damaging tsunami waves from the time of the seismic event within the Caribbean can occur almost immediately (**within 5 minutes to 60 minutes if the event is locally generated and within 60 minutes to 3 hours if generated regionally**) depending on the distance of the shoreline from the earthquake epicentre.

“Most destructive tsunami can be classified as local or regional...Less frequent, but more hazardous than regional tsunamis, are ocean-wide or distant tsunamis. Usually starting as a local tsunami that causes extensive destruction near the source, these waves continue to travel across an entire ocean basin with sufficient energy to cause additional casualties and destruction on shores.

Local Tsunami: A tsunami from a nearby source for which its destructive effects are confined to coasts within about **100 km (or, alternatively, less than 1 hour tsunami travel time) from its source**. A local tsunami is usually

¹ Reducing Tsunami Risk in the Easter Caribbean, Lloyd Lynch and Stacey Edwards, SRU-UWI, Feb. 27, 2007, pages 2-3.

² Geology.com.



generated by an earthquake, but can also be caused by a landslide or a pyroclastic flow from a volcanic eruption.

Regional Tsunami: A tsunami capable of destruction in a particular geographic region, generally **within 1,000 km or 1-3 hours tsunami travel time from its source**. Regional tsunamis also occasionally have very limited and localized effects outside the region.

Distant/Teletsunami: A tsunami originating from a faraway source, generally **more than 1,000 km or more than 3 hours tsunami travel time from its source.**³

The immediate provision of tsunami warning for coastal regions is essential in reducing and mitigating the catastrophic losses that such waves can bring. Earthquakes are not predictable as of yet; hence, when one occurs its potential is immediately assessed to predict the potential for an ensuing tsunami. Active Volcanoes in the Caribbean are monitored and scientists monitoring their activities provide warning about a potential eruption (and likely ensuing tsunami) from within 3 to 14 days in advance of the eruption.

All islands in the Caribbean Sea are vulnerable to tsunamis that may be generated either in the Caribbean or the Atlantic Ocean.⁴

2.3 Definition of TWFP and TNC

The Tsunami Warning Focal Point (TWFP) is the designated official or point of contact (primary and alternate) **available twenty-four hours a day, seven days a week** to receive tsunami and other coast hazard-related information bulletins and warning guidance. The TWFP has the responsibility of notifying the

³ Intergovernmental Oceanographic Commission, 2008, Tsunami Glossary 2008, Paris, UNESCO, IOC Technical Series, 85. (English).

⁴ Reported by [Aurelio Mercado-Irizarry](#) (Department of Marine Sciences, University of Puerto Rico at Mayagüez) and Philip L.-F. Liu (Department of Civil and Environmental Engineering, Cornell University), at the NSF Caribbean Tsunami Workshop, March 30-31, 2004, San Juan Beach Hotel, San Juan, P.R.



emergency authorities (civil defence or other designated agency responsible for public safety) of the event characteristics (earthquake and/or tsunami), in accordance with the procedures of the Tsunami Response Plan (*in some countries the Tsunami Protocol and SOPs is tied to the Earthquake Response Plan*). The TWFP receives the tsunami advisory information from the PTWC, or other regional warning centres. In the Caribbean and Adjacent Regions this warning focal point also acts as the focal point for other coastal hazards.

The Tsunami National Contact Point (TNC) is the person designated by an ICG Member State government to represent his/her country in the coordination of international tsunami warning and mitigation activities. The person is part of the main stakeholders of the national tsunami warning and mitigation system programme. In the Caribbean and adjacent Regions this contact point also holds responsibility for other coastal hazards. This representative may be the same as the 24/7 TWFP.

The National TWFP for St. Kitts and Nevis is the Royal St. Christopher and Nevis Police Force Telecommunications Department and the TNC is the NEMA Coordinator.

2.4 Brief Description of St. Kitts and Nevis National Disaster Plans

The St. Kitts and Nevis National Disaster Plan which was revised in 2013 outlines the institutional arrangements for the country's disaster management system inclusive of preparations to address a hazard impact. The plan is written in four (4) parts including:

Part 1 – The Basic Plan includes general information about the National Disaster Management Plan including assessment of threats, as well as assigned responsibilities for specific hazards and response functions. This part is for the information of everyone concerned with disasters in St. Kitts and Nevis.

Part 2 – Terms of Reference detailed for each of the National Disaster Sub-Committees. This part outlines planning, preparedness, prevention, training,



mitigation, response and recovery measures which must be undertaken before, during and after disasters.

Part 3 – Hazard Specific Action Plans/Sub Plans detail action guidelines for specific hazards and response functions in shortened operational format which may be pulled out and used as stand-alone operational guidelines. This part is for use by national response agencies.

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Part 4 – Addresses the National Emergency Operations Centre concepts, organization, management and job functions of persons assigned to this facility.

The authorities and duties for each of the sections are defined and the responsibilities are held by the National Disaster Committee who comes under the overall direction of the Prime Minister and includes the following:

National Disaster Committee

The National Disaster Committee is the senior St. Kitts and Nevis Disaster Planning Body.

The members of the Committee are holders of the following offices:

1. The Prime Minister (Chairman)
2. Cabinet Secretary
3. All members of the following Sub-Committees:
 - a. Medical & Public Health Sub Committee
 - b. Transport Sub Committee
 - c. Education, Communication and Warning Sub Committee
 - d. Housing and Shelter Sub Committee
 - e. Damage Assessment and Evaluation Sub Committee
 - f. Environment Sub Committee
 - g. Foreign Assistance Sub Committee
 - h. Welfare and Relief Supplies Sub Committee
 - i. Utilities Sub Committee
 - j. Search, Rescue and Initial Clearance Sub Committee



4. All Permanent Secretaries
5. The Commander – St. Kitts and Nevis Defence Force
6. The Commissioner of Police
7. The Chief Fire Officer
8. The Technical Director - Min. of Housing
9. The Chief Information Officer - Government Information Service (GIS)
10. The President – St. Kitts and Nevis Red Cross Society
11. Chairman – St. Kitts Evangelical Association
12. Chairman - Nevis Evangelical Council
13. Chairman – St. Kitts Christian Council
14. Chairman - Nevis Christian Council
15. President – St. Kitts and Nevis Chamber of Industry and Commerce
16. The General Secretaries of the Major Political Parties
17. General Manager – St. Christopher Air & Sea Ports Authority
18. Chief Meteorologist- St. Kitts and Nevis Met Services
19. The National Disaster Coordinator – NEMA
20. The Director – Nevis Disaster Management Department.

Terms of Reference

1. To meet at least once a year and in the case of an emergency or a disaster.
2. To guide the disaster management activities in St. Kitts and Nevis
3. To ensure coordination and compatibility between disaster management activities in St. Kitts and Nevis.
4. To review and approve the National Disaster Plan.
5. To review and approve disaster management legislation, policies and strategy.
6. To review and approve the NEMA structure, functions and yearly programmes.
7. To review and approve sectoral disaster management plans and programmes.
8. To ensure hazards, vulnerabilities and risks are properly mapped and that a data base exists for effective management action.
9. To ensure warning systems and mechanisms are established in St. Kitts and Nevis.
10. To review and approve hazard specific disaster response plans
11. To review and approve sectoral disaster management plans
12. To review and approve district disaster plans



13. To review and approve public education and awareness strategies and campaigns
14. To review and approve training and simulation exercise national programmes
15. To evaluate the disaster management activities in St. Kitts and Nevis
16. To review and approve mitigation plans and programmes
17. To review and approve hazard and vulnerability mapping
18. To review and approve resources (human, material and financial) for disaster management in St. Kitts and Nevis
19. To provide guidelines and policies for the establishment and operations of a contingency fund
20. To coordinate with CDEMA CU for all activities related to disaster response during emergencies and disasters in the region.
21. To evaluate the response after emergencies and disasters
22. To ensure damage and needs assessments are conducted after disasters
23. To review and approve projects for reconstruction after disasters

Nevis Disaster Plan

The Nevis Disaster Plan done in 2005 contains nine (9) chapters inclusive of the institutional arrangements put in place to manage any hazard impact on the island. The general direction of control of the Nevis Disaster Management Committee resides with the Honourable Premier and its membership is as follows:

1. Honourable Premier – Chairman.
2. Permanent Secretary, Premier's Ministry - Deputy Chairman
3. Director – Nevis Disaster Management Department - Secretary
4. Legal Adviser. Nevis.
5. Permanent Secretary, Agriculture, Lands, Housing, Cooperatives & Fisheries
6. Permanent Secretary, Physical Planning Natural Resources and Environment/Communications Works, Public Utilities and Posts.
7. Permanent Secretary, Finance
8. Permanent Secretary, Education & Library Services
9. Permanent Secretary, Tourism.
10. Permanent Secretary, Health, Gender & Social Affairs



11. Permanent Secretary, Social Services, Youth, Sports, Community Development and Culture.
12. Medical Officer of Health
13. Superintendent of Police (Nevis)
14. Divisional Fire Officer (Nevis), Fire & Rescue Services
15. St. Kitts and Nevis Defence Force
16. Customs
17. Press and Government Information Officer
18. Director of Physical Planning, Natural Resources & Environment
19. NASPA
20. Meteorological Office.
21. Manager, Water Department.
22. Environmental Health. Nevis Solid Waste Management Authority.
23. Manager, Nevis Electricity Company Ltd. (NEVLEC)
24. Representatives, Telecommunication companies: Lime, Caribbean Cable, Digicel, Chippie, Windstream.
25. Representative, Red Cross Society
26. Adventist Disaster Relief Agency
27. Christian Council. Representatives of other faiths
28. Representative, Chamber of Commerce (Nevis Chapter)
29. Representative, Lion's Club
30. Representative, Rotary Club

The main functions of the Nevis Disaster Management Committee are to ensure that the island is in a state of preparedness at all times. Its areas of planning will include:

- a. Collaboration with the Nevis Disaster Management Department. .
- b. Co-ordination of the activities of District Emergency Committees in the island.
- c. Ensure warning systems, warning dissemination, responsibility for and control of local broadcasting.
- d. To ensure the design of disaster plans
- e. To identify emergency shelters.
- f. Identify transport and equipment requirements for emergencies.
- g. Make arrangements for relief aircraft and ships, including customs clearance for relief supplies and personnel.
- h. Ensure storage and control of relief supplies and equipment.
- i. Conduct public relations, informing the general public and international organizations about matters related to disaster management in Nevis.



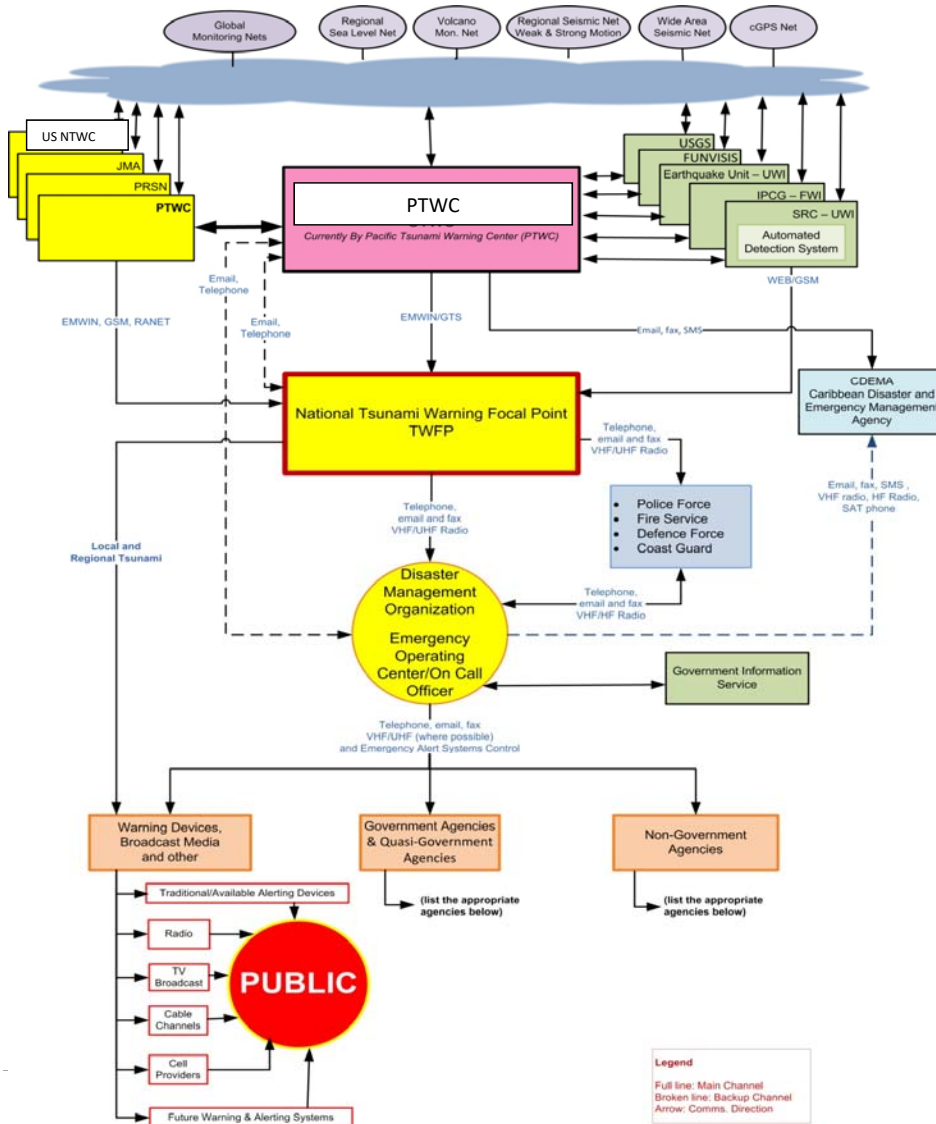
- j. To hold a 'pre-impact meeting' of the Committee before the impact of hurricanes with all members to ensure all sub-committees and the population are informed about and ready for the impact of a storm.
- k. Conduct emergency public information and press briefings.
- l. Vet and approve disaster management reports.
- m. Direction of labour during emergencies.
- n. Regulate the entry control of non-essential visitors.
- o. Advise the National Emergency Management Agency on the requirement for anticipatory orders under the Emergency Powers Act. (Advice Prime Minister sanctioned by the Governor General)
- p. Arrange special reconnaissance in damaged areas and receive reports to make decisions for response and recovery.
- q. Approve post-disaster demolition and repairs.
- r. Conduct the reconstruction of impacted areas.

2.5 St. Kitts and Nevis Adapted Tsunami Warning Protocol

The St. Kitts and Nevis Adapted Tsunami Warning Protocol, Illustration 1 provides a high level view of the tsunami warning alert and notification process beginning with a Tsunami Bulletin emanating from the Pacific Tsunami Warning Centre.



Illustration 1: Model Tsunami Warning Protocol



The preceding St. Kitts and Nevis Tsunami Warning Protocol illustrates the process by which information concerning a tsunami event is gathered, analysed and disseminated, and the vulnerable communities are notified and alerted:

1. Seismic and sea level data are gathered from a variety of monitoring networks and systems and then the information is transmitted to the Pacific Tsunami Warning Centre.
2. The Pacific Tsunami Warning Centre analyses the sea level data calculating the potential landfall impact for all locations within their jurisdiction. Warning Centre staff develop various Tsunami Bulletins (Information Statements, and Tsunami Threat and End of Threat Messages) and disseminate the information to TWFP
3. Upon receipt of the messages, the TWFP immediately analyses the message to identify landfall areas within the country, initiates public alert mechanisms (for local and regional tsunamis), notifies the Coordinator of the National Emergency Management Agency and specific civil defence authorities and continues to monitor developments accordingly.

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The urgency of the potential emergency and the number of immediate notifications to be made by the TWFP underscores the requirement for a centralised and automated notification system for emergency responders. The automated notification system should also incorporate report features which indicate who acknowledged receipt of the message, date and time stamped. Further, the same critical issues represent significant justification for public alerting systems that can also be automated and activated immediately by the TWFP.

2.6 Types of Tsunami Products Issued by PTWC

In 2016 the CARIBE EWS Tsunami Service Model was adopted. In this model Regional Tsunami Service Providers issue information, threat and end of threat messages to the TWFP and NTWC. It is the responsibility of St. Kitts and Nevis to issue the corresponding tsunami warnings, advisories, watches, and information, cancellation and all clear messages.

The PTWC provides tsunami information and threat bulletins to the Caribbean and Adjacent Regions (based on the data available). Within the first minutes of an earthquake, the PTWC



issues initial rest products. A Tsunami Information Statement is issued if there is no tsunami threat of potential threat from far away that it is still under evaluation. A Threat Message will be immediately issued for earthquakes that pose a potential tsunami threat to CARIBE EWS coasts near the epicentre in accordance with the Table 1 criteria. Once the PTWC has a more accurate estimate of the earthquake location, depth and magnitude as well as the earthquakes mechanism the seafloor deformation that is the tsunami source it will proceed to run the tsunami forecast model. This process will take 15-20 minutes. If the forecast indicates no amplitudes above 0.3 m and data from the nearest sea-level gauges are consistent with that then a final Threat Message is issued. For events with forecast amplitudes above 0.3 m a Threat Message is issued to the TWFP and NTWC with maps, table of forecast statistics and a coastal forecast amplitudes kmz file. In the ensuing hours sea level gauges will be monitored and model forecasts may be adjusted. Supplemental messages will also include key observations. The process of refining the earthquake parameters and collection and comparison of sea level observations with models will continue and supplemental messages will be issued. When it is likely that there is NO longer a significant tsunami threat then a final Threat Message is issued.



Earthquake				Product	
Region	Location	Depth	Magnitude (Mw)	Type	Tsunami Threat
Caribbean	under the sea or very near the coast	any	< 6.0	none	none
			6.0 – 7.0	Information Statement	None - earthquake is too small
	well inland		≥ 6.0	Information Statement	None – earthquake is too far inland
Atlantic	under the sea or very near the coast	any	< 6.5	none	none
			6.5 – 7.0	Information Statement	None - earthquake is too small
	well inland		≥ 6.0	Information Statement	None – earthquake is too far inland
Caribbean or Atlantic	under the sea or very near the coast	≥ 100 km	≥ 7.1	Information Statement	None - earthquake is too deep
		< 100 km	7.1 - 7.5	Threat Message	Potential threat to coasts within 300 km
			7.6 – 7.8	Threat Message	Potential threat to coasts within 1000 km
			≥ 7.9	Threat Message	Potential threat to coasts with ETA ≤ 3 hours
Atlantic	under the sea or very near the coast	< 100 km	≥ 7.9	Information Statement	Potential threat but no coasts with ETA ≤ 3 hours. Evaluation continues.

2.7 Types Of Tsunami Bulletins Issued by SKN

It is the responsibility of Saint Kitts and Nevis to issue the corresponding tsunami warnings, advisories, watches, and information, cancellation and all clear messages. The alert levels to be used by SKN are:



TSUNAMI WARNING

The highest level of tsunami alert. Warnings are issued due to the imminent threat of a tsunami from a large undersea earthquake or following confirmation that a potentially destructive tsunami is underway. They may initially be based only on seismic information as a means of providing the earliest possible alert. Warnings advise that appropriate actions be taken in response to the tsunami threat. Such actions could include the evacuation of low-lying coastal areas and the movement of boats and ships out of harbours to deep water. Warnings are updated at least hourly or as conditions warrant continuing, expand, restrict, or end the warning.

TSUNAMI ADVISORY

The second highest level of tsunami alert. Advisories are issued to coastal populations if dangerous waves and currents are expected, but no or very limited coastal flooding. As conditions warrant, the Advisory will either be continued, upgraded to a warning or ended.

TSUNAMI WATCH

The third highest level of tsunami alert. Watches are issued based on seismic information without confirmation that a destructive tsunami is underway. It is issued as a means of providing an advance alert to areas that could be impacted by destructive tsunami waves. Watches are updated at least hourly to continue them, expand their coverage, upgrade them to a Warning, or Advisory or end the alert.

TSUNAMI INFORMATION STATEMENT

A text product issued to inform that an earthquake has occurred and to advise regarding its potential to generate a tsunami. In most cases, a Tsunami Information Bulletin indicates there is no threat of a destructive tsunami, and are used to prevent unnecessary evacuations as the earthquake may have been felt in coastal areas. A Tsunami Information Bulletin may, in appropriate situations, caution about the possibility of a destructive local tsunami. A supplemental Tsunami Information



Bulletin may be issued if important additional information is received such as a sea level reading showing a tsunami signal. A Tsunami Information Bulletin may also be upgraded to a watch, advisory or warning if appropriate.”⁵

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2.8 St. Kitts and Nevis Tsunami Warning Focal Point SOP

The St. Kitts and Nevis TWFP SOPs were developed based on the Tsunami Bulletins received from the PTWC, and an analysis of what the urgency of each of the bulletins may be advising and the time required to evacuate vulnerable locations. The PTWC Bulletins will be used to activate a full Alert (includes immediate evacuation in vulnerable areas), monitor the situation, or take no action.

In disseminating bulletins to the First Response Agencies, the TWFP (NEMA/NDMD) will contact the emergency contact person or his/her alternate, who will in turn contact the various units of their agencies.

Commented [LD1]: This section was inserted based on our meeting this morning. What do you think?

There are five SOPs:

1. **SOP A:** For **any potential Caribbean generated tsunami** whether it is considered local or regional.
2. **SOP B:** For **any potential Atlantic generated tsunami** (distant tsunami) and in the event of early notification of a potential volcanic eruption which may result in sea water displacement.
3. **SOP C:** For any bulletin advising about an earthquake with no potential for tsunami occurring either in the Caribbean or in the Atlantic.
4. **SOP D:** For Cancellation bulletins from the Tsunami warning Centre advising there is no longer a threat from a tsunami.
5. **SOP E:** For test bulletins.

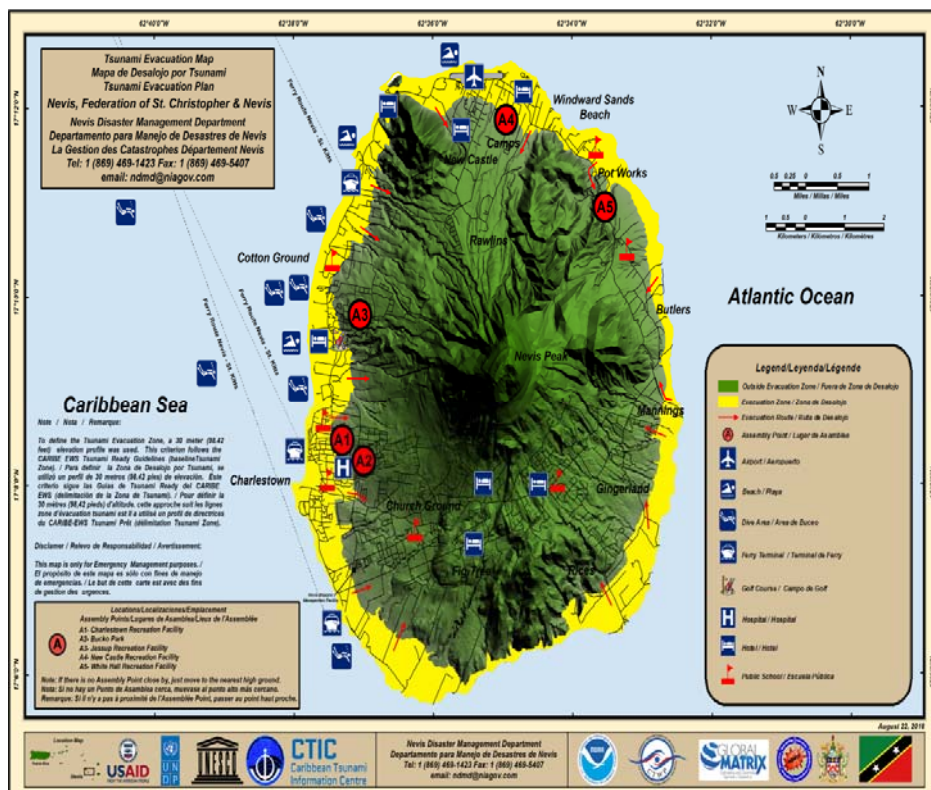
A draft Tsunami Warning Responsibility Agreement is provided at Appendix B for your information and use as necessary.

⁵ http://www.prh.noaa.gov/ptwc/about_messages.php?region=3



Illustration 2 which follows illustrates the requirements of the St. Kitts and Nevis TWFP to address seven (7) different bulletins that may presently be received from the PTWC. In each situation where the TWFP determines that a tsunami threatens the coastline (reflected in SOPs A and B), the immediate public alert message issued will be for everyone to move away from the coastline to higher ground. The 2016 Tsunami Evacuation maps for St. Kitts, and Nevis; Basseterre, and Charlestown will be used to guide the evacuation.





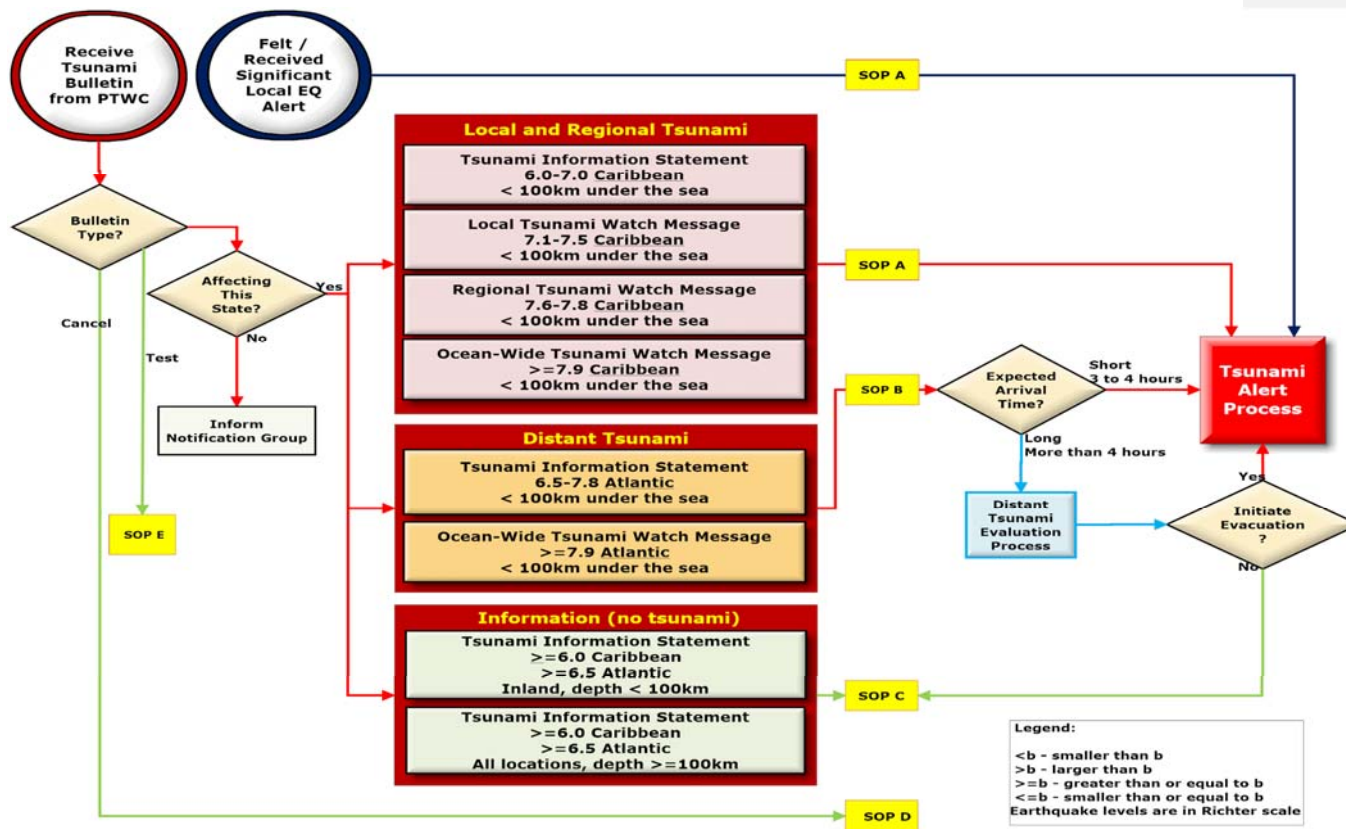


Canada

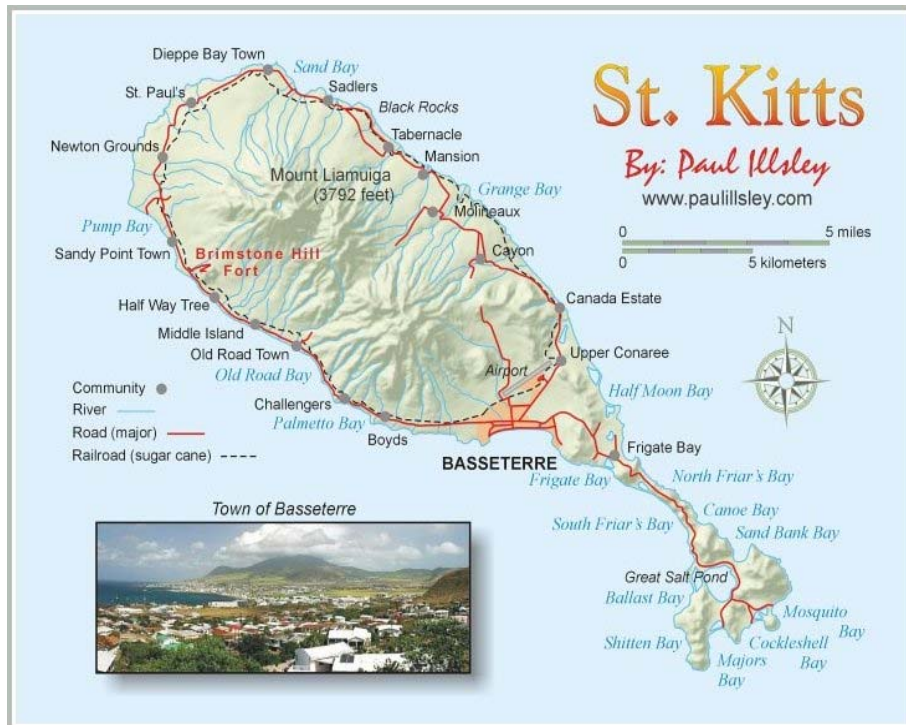




ILLUSTRATION 2. ST. KITTS AND NEVIS TWFP/TWCP STANDARD OPERATING PROCEDURES



STANDARD OPERATING PROCEDURES FOR ST. KITTS



3.0 SOP A (CARIBBEAN EARTHQUAKE)

3.1 Purpose

To provide procedural guidance and action steps to be followed in responding to PTWC issued Tsunami Threat Bulletin or a Tsunami Information Statement due to a local/regional seismic event to determine whether the Tsunami Threat Bulletin identifies whether or not Saint Kitts and Nevis is threatened or experienced a significant “felt earthquake.”

3.2 General

When a significant “felt earthquake” is experienced, and before any bulletins are received, it is recommended that the TWFP be authorized to activate all components of SOP A, Section 2.3 Immediate Actions Checklist. Appendix C provides a chart which outlines the characteristics of a felt earthquake indicating comparison levels for Richter Scale magnitude. **All of the following may be used to judge a felt earthquake with a magnitude of 7.0 or higher:**

- i. Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of factory stacks, columns, monuments, walls. Heavy furniture overturned.
- ii. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
- iii. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rail bent.
- iv. Few, if any (masonry) structures remain standing. Bridges destroyed.
- v. Damage total. Lines of sight and level are distorted. Objects thrown into the air.

The PTWC will issue TSUNAMI THREAT/INFORMATION STATEMENT BULLETINS under the following conditions:

An earthquake occurs with a preliminary 7.1 to 7.8 or greater magnitude in the Caribbean where the depth of the earthquake is equal to or less than 100km.



- An earthquake occurs with a preliminary 6.0 to 7.0 magnitude in the Caribbean where the depth of the earthquake is equal to or less than 100km.

The PTWC threat bulletins include forecasted wave heights and observations from sea level stations.

3.3 Tsunami Warning: SOP A IMMEDIATE ACTIONS CHECKLIST

	SOP A IMMEDIATE ACTIONS CHECKLIST
[] 1.	<p>TWFP Duty Officer must review the message from the PTWC and learn if the tsunami is forecast to arrive at Saint Kitts and Nevis</p> <p>[] a. Does not threaten Saint Kitts and Nevis</p> <p>After assessment of the Bulletin, the TWFP determines the event does not threaten St. Kitts and Nevis coastlines. The TWFP should continue to monitor information about the event and contact civil authorities to advise that a Tsunami Bulletin was received; that assessment shows that it will not impact St. Kitts and Nevis; and, that no further action is required. (Use Attachment A, page 34, for directory of Civil Authorities' Contact Information)</p> <p>[] i. Contact the Coordinator, (National Emergency Management Agency).</p> <p>[] ii. Contact the Royal St. Christopher and Police Force.</p>



	<p><input type="checkbox"/> iii. Contact the St. Kitts and Nevis Fire and Rescue Services.</p> <p><input type="checkbox"/> iv. Contact the St. Kitts and Nevis Defence Force.</p> <p><input type="checkbox"/> b. Tsunami threatens St. Kitts and Nevis; Initiate Evacuation.</p> <p><input type="checkbox"/> i. Evacuate all coastal areas of St. Kitts and Nevis , and its outlying islands and cays</p> <p style="text-align: center;">Or</p> <p><input type="checkbox"/> ii. Evacuate all vulnerable coastal areas. (Use Attachment B, page 35, for Listing of Vulnerable Coastal Areas.)</p> <p>And</p> <p><input type="checkbox"/> iii. Notify Civil Authorities. (Use Attachment A, page 34, for directory of Civil Authorities' Contact Information)</p>
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4.0 SOP B (ATLANTIC OCEAN GENERATED TSUNAMI)

4.1 Purpose



To provide procedural guidance and action steps to be followed in responding to a PTWC issued Tsunami Threat Bulletin due to a distant (ocean wide) seismic event to determine whether the Tsunami Threat Bulletin identifies St. Kitts and Nevis as threatened.

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4.2 General

The PTWC will issue a Tsunami Threat or Tsunami Information Statement under the following conditions in the Caribbean:

- An earthquake occurs with a preliminary 6.5 to 7.8 in the Atlantic Ocean
- An earthquake occurs with a preliminary 7.9 or greater magnitude in the Atlantic Ocean

Arrival time of tsunami generated by either of the preceding events is over 3 hours. While this does not mean there is significant time with which to evaluate danger or to begin warning the public; it does provide more opportunity for the Tsunami Warning Centre and the St. Kitts and Nevis National TWFP to evaluate the situation and make better forecasts for wave arrival time and arrival locations.



4.3 Tsunami Warning: SOP B IMMEDIATE ACTIONS CHECKLIST



	SOP B IMMEDIATE ACTIONS CHECKLIST
<input type="checkbox"/> 1.	<p>TWFP Duty Officer must review the message from the PTWC and learn if the tsunami is forecast to arrive at St. Kitts and Nevis.</p> <p><input type="checkbox"/> a. If the event does not threaten St. Kitts and Nevis.</p> <p>After assessment of the Bulletin (the TWFP determines the event does not threaten St. Kitts and Nevis the TWFP should continue to monitor information about the event and contact civil authorities to advise that a Tsunami Bulletin was received; that assessment shows that it will not impact St. Kitts and Nevis; and, that no further action is required. (Use Attachment A, page 34, for Directory of Civil Authority's Contact Information)</p> <p><input type="checkbox"/> i. Contact the Coordinator, at the National Emergency Management Agency</p> <p><input type="checkbox"/> ii. Contact the Royal St. Christopher and Nevis Police Force</p> <p><input type="checkbox"/> iii. Contact the St. Kitts and Nevis Fire and Rescue Services</p> <p><input type="checkbox"/> iv. Contact the St. Kitts and Nevis Defence Force</p> <p><input type="checkbox"/> b. Tsunami threatens St. Kitts and Nevis</p>



Current:

St. Kitts and Nevis TWFP Duty Officer will initiate dialogue with the PTWC Duty Officer to verify assessment of tsunami wave arrival time, potential for size of wave, etc. It is presumed that this should take no longer than 15 to 20 minutes. Following this discussion, St. Kitts and Nevis National TWFP Duty Officer should proceed with remainder of the SOP.

Or

Future:

St. Kitts and Nevis TWFP Duty Officer will participate in a CTWC Conference Call (this will only be possible once the CTWC is built and operational)

Conference Call in Number: _____

Participant Code: _____

Following the Conference Call, St. Kitts and Nevis National TWFP Duty Officer should proceed with remainder of the SOP.

[] c. Immediately contact Civil Authorities, advise expected Tsunami Arrival Time. (Use Attachment A, page 34, for Directory of Civil Authority's Contact Information)

5.0 SOP C (NO POTENTIAL FOR TSUNAMI)

5.1 Purpose

To provide procedural guidance and action steps to be followed in responding to a PTWC issued Tsunami Information Statement due to a local or regional seismic event.



5.2 General

The PTWC will issue a Tsunami Information Statement under the following conditions:

- An earthquake occurs more than 100km from the surface for all locations and is less than or equal to 6.0 magnitude in the Caribbean or 6.5 magnitude in the Atlantic.

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5.3 Immediate Actions Checklist

<div>[] 1.</div>	<div>SOP C IMMEDIATE ACTIONS CHECKLIST</div> <div>TWFP Duty Officer must review the message from the PTWC and contact civil authorities to advise that a Tsunami Bulletin was received; that review/assessment shows that it will not impact Participating State; and, that no further action is required. (Use Attachment A, page 34, for directory of Civil Authorities' Contact Information)</div> <div><div>[] i. Contact the Coordinator, National Emergency Management Agency</div><div>[] ii. Contact the Royal St. Christopher and Nevis Police Force</div><div>[] iii. Contact the St. Kitts and Nevis Fire and Rescue Services</div><div>[] iv. Contact the St. Kitts and Nevis Defence Force</div></div>
<div>[] 2.</div>	<div>No further action required. End of Procedure.</div>

6.0 SOP D (END OF THREAT MESSAGE)

6.1 Purpose



To provide procedural guidance and action steps to be followed in responding to PTWC issued Tsunami Information Statement due to a local or regional seismic event.

6.2 General

The PTWC will issue a Tsunami Information Statement advising that all danger of a Tsunami has passed.

- End of Threat Message

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6.3 Immediate Actions Checklist

[] 1.	<p>SOP D IMMEDIATE ACTIONS CHECKLIST</p> <p>TWFP Duty Officer must contact the Director, NDMD (Nevis Disaster Management Department) and report receipt of cancellation message from the PTWC but take no further action. (Use Attachment A for Directory of Civil Authorities' Contact Information)</p> <p>[] i. Contact the Coordinator, NEMA, Director DMD</p>
[] 2.	<p>No further action required. End of Procedure.</p>



7.0 SOP E (TEST MESSAGE)

7.1 Purpose

To provide procedural guidance and action steps to be followed in responding to a PTWC issued Tsunami Test Bulletin

7.2 General

The PTWC will issue a Tsunami Test Bulletin approximately 4 times a year

- Test Bulletin

7.3 Immediate Actions Checklist

SOP E IMMEDIATE ACTIONS CHECKLIST ⁶	
[] 1.	<p>TWFP Duty Officer must contact the Civil Authorities and report receipt of Test Bulletin from the PTWC. (Use Attachment A for Directory of Civil Authorities' Contact Information)</p> <p>[] i. Contact the Coordinator, NEMA, Director DMD</p> <p>[] ii. Contact the Royal St. Christopher and Nevis Police Force</p> <p>[] iii. Contact the St. Kitts and Nevis Fire and Rescue Services</p> <p>[] iv. Contact the St. Kitts and Nevis Defence Force</p>
[] 2.	<p>TWFP Duty Officer must report to the Coordinator, National Emergency Management Agency that the test message information has been successfully delivered or in the event a contact person/s or telephone contact numbers are not answered, the TWFP Duty Officer must submit a written report to the Coordinator, National Emergency Management Agency so that the situation can be immediately remedied.</p>

⁶ It is recommended that Antigua and Barbuda TWFP and Director, NODS develop a series of tests of their tsunami systems to coincide with receipt of each PTWC Test message. Such exercises can be used to update contact information lists and identify weaknesses in operations which can then be remedied.



[] 3.	No further action required. End of Procedure
--------	--

8.0 SOP F(DRILL/PREPARE PROCEDURE)

8.1 Purpose

To provide opportunity for all first responder organizations to drill and practice their SOPs for a tsunami. Tsunamis are rare events but the hazard is real throughout the Caribbean. Unless dedicated drills are held routinely and thinking applied to the procedures of the drill, improvements integrated, first responders will not be ready, and they will not know how to respond to protect the public during the tsunami (assist with evacuations, shelter requirements, etc.) and the follow up recovery efforts when a devastating tsunami occurs.

There are several components to adequate preparation:

1. Drills that address technical and operational responsibilities:
 - a. Assure technical infrastructure is available at all times
 - b. Verifies accuracy of contact information
 - c. Keeps track of and constantly seek to improve response time
 - d. Practices that test response during various days of the week and times of days
 - e. Provides incentives to all participant organizations to further prepare their organization for response activities once the alert is received.
2. Routine training sessions to address ideas and thoughts for improvements for infrastructure and operations.



3. Annual tests to assure readiness and understanding of an individual's responsibility in such an event

8.2 General

This SOP is intended as an initial drill/prepare procedure. It is expected that each organization that participates in the process will develop further SOPs that prepare their own organizations for response to tsunami alerts. To begin, this drill procedure will address the practice requirements of key organizations to receive the alert message and to check the readiness of tools involved in the tsunami alert and notification process:

- i. Tsunami Warning Focal Point
- ii. National Emergency Management Agency/Disaster Management Department
- iii. Police
- iv. Fire and Rescue services
- v. Defence Force
- vi. Coast Guard
- vii. Broadcast Media/Cell Providers
- viii. Public Alerting Tools

8.3 National Tsunami Drill Schedule

Given that the responsibility for Disaster Management lies with NEMA and with DMD in Nevis, it is recommended that drills be initiated. Further, there should also be drills at random times on random days to assist each organization with preparations for the "what if" scenario, it is recommended that the National Emergency Management Agency activate drills according to the following schedule:

2016:

- | | |
|-----------|--|
| February: | First Sunday of the Month, at 11:00 a.m. |
| April: | First Wednesday of the Month, at 3:00 a.m. |
| June: | First Friday of the Month, at 7:00 p.m. |
| August: | First Monday of the Month, at 11:00 a.m. |
| October: | First Thursday of the Month, at 3:00 a.m. |
| December: | First Saturday of the Month, at 7:00 p.m. |



2017

January: First Tuesday of the Month, at 12:00 noon
 March: First Friday of the Month, at 4:00 a.m.
 May: First Sunday of the Month, at 8:00 p.m.
 July: First Wednesday of the Month, at 12:00 noon
 September: First Saturday of the Month, at 4:00 a.m.
 November: First Monday of the Month, at 8:00 p.m.

2018

February: First Thursday of the Month, at 1:00 p.m.
 April: First Saturday of the Month, at 5:00 a.m.
 June: First Monday of the Month, at 9:00 p.m.
 August: First Friday of the Month, at 1:00 p.m.
 October: First Sunday of the Month, at 5:00 a.m.
 December: First Tuesday of the Month, at 9:00 p.m.

8.3.1 Immediate Actions Checklist

SOP F IMMEDIATE ACTIONS CHECKLIST

Coordinator of the NEMA (Director of the DMD-Nevis) must make contact with TWFP Duty Officer using the same mechanism/s that is/are used for a real tsunami alert (EMWIN/GTS, and in some cases fax machines) and announce a ***National Drill of the Tsunami Warning***



[] 1.	<p>System. Initiation of the <i>National Drill Message</i> by the NEMA begins the clock ticking for the drill records. Attachment H provides a timeline reporting document for use by the NEMA.</p> <p>[] Contact the TWFP 465-2241, 911</p>
[] 2.	<p>TWFP Duty Officer must review the National Drill message from the NEMA, note the exact time of receipt and the mechanism of delivery used (if multiple messages received, note all of them) and immediately must contact the Civil Authorities and report receipt of a <i>National Drill Message</i> from the NEMA. (Use Attachment A for Directory of Civil Authorities' Contact Information)</p> <p>[] i. Contact the Coordinator, NEMA (Director, DMD-Nevis)</p> <p>[] ii. Contact the Royal St. Christopher and Nevis Police Force</p> <p>[] iii. Contact the St. Kitts and Nevis Fire and Rescue Services</p> <p>[] iv. Contact the St. Kitts and Nevis Defence Force</p>
[] 3.	<p>TWFP Duty Officer must contact persons responsible for activating PUBLIC ALERTING DEVICES; advise <i>National Tsunami Drill</i>. (Use Attachment C for Listing of Alerting Devices and Directory of Device Activation Contact Information).</p>
[] 4.	<p>TWFP Duty Officer must CONTACT RADIO, TV, AND CABLE BROADCAST STATIONS. (Use Attachment D for Directory of Broadcast Media Partner Contact Information). Advise – <i>National Tsunami Drill</i> (Use Attachment I for Broadcast Message—Tsunami Evacuation Alert).</p>





[] 5.	TWFP Duty Officer must CONTACT CELL PROVIDERS. (Use Attachment E for Directory of Cell Service Provider Company Partner Contact Information.) Advise -- <u>National Tsunami Drill</u> (Use Attachment I for Broadcast Message— <u>National Tsunami Drill</u>)
[] 6.	TWFP Duty Officer must CONTACT COAST GUARD DISPATCH at 465-8384, Radio Frequency: Marine; 16. Advise -- <u>National Tsunami Drill</u> (Use Attachment J for Mariners Broadcast Message— <u>National Tsunami Drill</u>)
[] 7.	TWFP Duty Officer must report to the Coordinator NEMA that the National Drill Message has been delivered and provide the NEMA the contact name, time of message delivery, mechanism/s by which the message was delivered. Use Attachments A, C, D, and E for making the report about who was reached and when. In the event contact person telephone/radio contact number/s is not answered, the TWFP Duty Officer must submit a written report about the attempt to the Coordinator NEMA so that the situation can be immediately addressed.
[] 8.	Director NEMA must prepare a Drill Summary Report and follow up with each agency, advising about the results of the drill, explaining how it compared with previous drills in terms of overall time taken to get the alert message out. Once the Drill Summary Report is finalized, the Director NEMA may make a report to the Prime Minister's Office along with any recommendations for improvements in responses that are required.
[] 9.	



	End of National Drill Procedure. All drill activity log files to be sent to the drill manager (Coordinator NEMA), CDEMA and CTWC for analysis. Drill summary report to be issued within 10 business days from the execution of drill.
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STANDARD OPERATING PROCEDURES FOR NEVIS



SOP A (CARIBBEAN EARTHQUAKE)

8.4 Purpose

To provide procedural guidance and action steps to be followed in responding to PTWC issued Tsunami Threat Bulletin or a Tsunami Information Statement due to a local/regional seismic event to determine whether the Tsunami Threat Bulletin identifies whether or not Saint Kitts and Nevis is threatened or experienced a significant “felt earthquake.”

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8.5 General

When a significant “felt earthquake” is experienced, and before any bulletins are received, it is recommended that the TWFP be authorized to activate all components of SOP A, Section 2.3 Immediate Actions Checklist. Appendix C provides a chart which outlines the characteristics of a felt earthquake indicating comparison levels for Richter Scale magnitude. All of the following may be used to judge a felt earthquake with a magnitude of 7.0 or higher:

- i. Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of factory stacks, columns, monuments, walls. Heavy furniture overturned.
- ii. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
- iii. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rail bent.
- iv. Few, if any (masonry) structures remain standing. Bridges destroyed.
- v. Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Refer to Table 1. A. for the criteria used by the PTWC to issue TSUNAMI THREAT/INFORMATION STATEMENT BULLETINS under the following conditions:



1. A. CARIBE-EWS CRITERIA TABLE - QUANTITATIVE PTWC FORECAST PRODUCT:

Warning / Watch Alerts (1.0 m threshold)

CARIBE-EWS Criteria Table for NTWC tsunami alerts and emergency response actions based upon PTWC threat messages that include a quantitative tsunami forecast typically issued 30 minutes to one hour after a large Caribbean or Atlantic earthquake with a tsunamigenic potential. Key criteria for each situation are indicated in bold red letters. This is the same criteria (≥ 1 m) that PTWC will use until February 29, 2016 to designate Watch alert levels.

PTWC Product Type	Earthquake Parameters	Maximum Tsunami Wave Amplitude Indicated for Your Country or Area	Threatened Coast	Time left to Initial Wave Arrival	NTWC Alert Level for Threatened Coast	Emergency Response Action
Tsunami Threat Message	Magnitude of 7.1 or greater, undersea or very near the sea, and < 100 km depth	≥ 1 m	Sections of coast with forecast amplitudes ≥ 1 m	< 3 hrs	WARNING	Evacuate threatened coast
				3 to 6 hrs	WATCH	Standby, Prepare to evacuate
				> 6 hrs	INFORMATION	Monitor for subsequent forecasts
		< 1 m	None		INFORMATION	Monitor for subsequent forecasts



NOTES:

- Threatened coast information can be gotten from the public text message, coastal forecast amplitude maps or the KMZ file. If only the Public Text message is used, then the entire country should be placed in a Warning.
- The 3-hour time criteria is based on the amount of time required for a country to safely complete a coastal evacuation. The 3-hr threshold used by PTWC is considered a conservative, but reasonable time criteria. Historically, the value is from a requirement from Hawaii State Emergency Management Agency as the time required to safely evacuate all coasts of the State of Hawaii. Each country should consider their situation, especially smaller islands in the Caribbean that may not require 3 hrs to safely evacuate.



8.6 Tsunami Warning: **SOP A IMMEDIATE ACTIONS CHECKLIST**

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<input type="checkbox"/> 1.	<p>SOP A IMMEDIATE ACTIONS CHECKLIST TWFP Duty Officer must review the message from the PTWC and learn if the tsunami is forecast to arrive at Nevis.</p> <p><input type="checkbox"/> a. Does not threaten Nevis.</p> <p>After assessment of the Bulletin, the TWFP determines the event does not threaten Nevis coastlines. The TWFP should continue to monitor information about the event and contact civil authorities to advise that a Tsunami Bulletin was received; that assessment shows that it will not impact Nevis; and, that no further action is required. (Use Attachment A, for directory of Civil Authorities' Contact Information)</p> <p><input type="checkbox"/> i. Contact the Director, Disaster Management Department.</p> <p><input type="checkbox"/> ii. Contact the Royal St. Christopher and Nevis Police Force (Nevis).</p> <p><input type="checkbox"/> iii. Contact the St. Kitts and Nevis Fire and Rescue Services (Nevis).</p> <p><input type="checkbox"/> iv. Contact the St. Kitts and Nevis Defence Force.</p> <p><input type="checkbox"/> b. Tsunami threatens Nevis. Initiate Evacuation.</p> <p style="padding-left: 40px;"><input type="checkbox"/> i. Evacuate all coastal areas of Nevis</p> <p style="padding-left: 40px;">Or</p> <p style="padding-left: 40px;"><input type="checkbox"/> ii. Evacuate all vulnerable coastal areas. (Use Attachment B, page 35, for Listing of Vulnerable Coastal Areas.)</p> <p>And</p> <p style="padding-left: 40px;"><input type="checkbox"/> iii. Notify Civil Authorities. (Use Attachment A for directory of Civil Authorities' Contact Information)</p>
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9.0 SOP B (ATLANTIC OCEAN GENERATED TSUNAMI)

9.1 Purpose

To provide procedural guidance and action steps to be followed in responding to a PTWC issued Tsunami Threat Message or Information Statement due to a distant (ocean wide) seismic event to determine whether the Bulletin identifies St. Kitts and Nevis as threatened.

9.2 General

The criteria the PTWC will use to issue a Tsunami Threat Bulletin or Tsunami Information Statement are included in **Table 1. B.**

Arrival time of tsunami generated by either of the preceding events is over 3 hours. While this does not mean there is significant time with which to evaluate danger or to begin warning the public; it does provide more opportunity for the Tsunami Warning Centre and the St. Kitts and Nevis National TWFP to evaluate the situation and make better forecasts for wave arrival time and arrival locations

1. B. CARIBE-EWS CRITERIA TABLE - QUANTITATIVE PTWC FORECAST PRODUCT:

Warning / Advisory Watch Alerts (0.3 / 1.0 m thresholds)

CARIBE-EWS Criteria Table for NTWC tsunami alerts and emergency response actions based upon PTWC threat messages that include a quantitative tsunami forecast typically issued 30 minutes to an hour after a large Pacific earthquake with a tsunamigenic potential. Key criteria for each situation are indicated in bold red letters. This adds another NTWC alert level; the Advisory corresponds to a lower level of Warning, and calls for evacuating the beaches and harbours only.

Laboratory studies complementing empirical structural damage and casualty data collected from recent tsunamis show that tsunami inundation or flow depths of less than one meter, and as small as tens of



centimetres, can be dangerous and destructive (e.g., Arikawa et al., 2006; Suppasri et al., 2013)^{7,8}. The data suggest that a lower level of warning for a marine threat may be desirable. The response to this lower level of warning would be for people to avoid beaches and low-lying coastal areas, and for vessels in harbours and waterways to take precaution against unusually strong water currents. This lower level of warning is used in the United States, and is termed an Advisory. In an Advisory status, a full-scale land evacuation is not necessary.

PTWC Product Type	Earthquake Parameters	Maximum Tsunami Wave Amplitude Indicated for Your Country or Area	Threatened Coast	Time left to Initial Wave Arrival	NTWC Alert Level for Threatened Coast	Emergency Response Action
Tsunami Threat Message	Magnitude 7.1 or greater, undersea or very near the sea, and < 100 km depth	≥ 1 m	Sections of coast with forecast amplitudes ≥ 1 m	< 3 hrs	WARNING	Evacuate threatened coast
				3 to 6 hrs	WATCH	Standby, Prepare to evacuate
				> 6 hrs	INFORMATION	Monitor for subsequent forecasts
	< 100 km depth	0.3 to 1 m	Sections of coast with forecast amplitudes 0.3 to 1 m	< 3 hrs	ADVISORY	Evacuate beaches and harbours
				3-6 hrs	WATCH	Standby, Prepare to evacuate

⁷ Arikawa, T., Imamura, F., Matsutomi, H., Nakano, F., Otsubo, D., Shimosako, K., and Takahashi, S. Large Scale Experiment on the Impact Force due to Surge Front Tsunami. *Annual Journal of Coastal Engineering*, JSCE, 2006, 53: 796-800, (in Japanese)

⁸ Suppasri, A., Mas, E., Charvet, I., Gunasekera R., Imai, K., Fukutani, Y., Abe, Y., Imamura, F. Building damage characteristics based on surveyed data and fragility curves of the 2011 Great East Japan tsunami. *Nat. Hazards Earth Syst. Sci.* 2013, 66 (2): 319–341



				> 6 hrs	INFORMATION	Monitor for subsequent forecasts
		< 0.3 m	None		INFORMATION	Monitor for subsequent forecasts

NOTES:

- Threatened coast information from public text message, coastal forecast amplitude maps or the KMZ file. If only the Public Text message is used, then the entire country should be placed in a Warning.
- The 3-hour time criteria is based on the amount of time required for a country to safely complete a coastal evacuation. The 3-hr threshold used by PTWC is considered a conservative, but reasonable time criteria. Historically, the value is from a requirement from Hawaii State Emergency Management Agency as the time required to safely evacuate all coasts of the State of Hawaii. Each country should consider their situation, especially smaller islands in the Caribbean that may not require 3 hrs to safely evacuate.

9.3 Tsunami Warning: SOP B IMMEDIATE ACTIONS CHECKLIST



SOP B IMMEDIATE ACTIONS CHECKLIST

- [] 1. TWFP Duty Officer must review the message from the PTWC and learn if the tsunami is forecast to arrive at Nevis.
- [] a. If the event does not threaten Nevis.
After assessment of the Bulletin (the TWFP determines the event does not threaten Participating State's coastlines) the TWFP should continue to monitor information about the event and contact civil authorities to advise that a Tsunami Bulletin was received; that assessment shows that it will not impact CDEMA PS; and, that no further action is required. (Use Attachment A for Directory of Civil Authority's Contact Information)
- [] i. Contact the Director, (at the Disaster Management Department)
- [] ii. Contact the Royal St. Christopher and Nevis Police Force (Nevis)
- [] iii. Contact the St. Kitts and Nevis Fire and Rescue Services (Nevis)
- [] iv. Contact the St. Kitts and Nevis Defence Force
- [] b. Tsunami threatens Nevis
- Current:
- Nevis TWFP Duty Officer will initiate dialogue with the PTWC Duty Officer to verify assessment of tsunami wave arrival time, potential for size of wave, etc. It is presumed that this should take no longer than 15 to 20 minutes. Following this discussion, Nevis TWFP Duty Officer should proceed with remainder of the SOP.
- Or
- Future:
- Nevis TWFP Duty Officer will participate in a PTWC Conference Call (procedure are still being established)
- Conference Call in Number: _____
- Participant Code: _____
- Following the Conference Call, Nevis TWFP Duty Officer should proceed with remainder of the SOP.
- [] c. Immediately contact Civil Authorities, advise expected Tsunami Arrival Time. (Use Attachment A for Directory of Civil Authority's Contact Information)



10.0 SOP C (NO POTENTIAL FOR TSUNAMI)

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10.1 Purpose

To provide procedural guidance and action steps to be followed in responding to a PTWC issued Tsunami Information Statement due to a local or regional seismic event.

10.2 General

The criteria to be used by PTWC to issue a Tsunami Information Statement can be found in **Table 1. C.**

1. C. CARIBE-EWS CRITERIA TABLE - NO PTWC PRODUCT ISSUED

CARIBBEAN AND ATLANTIC EARTHQUAKES

PTWC Product Type	Earthquake Parameters	Potential Tsunami Type	Are Possible Hazardous Tsunami Waves Indicated for Your Country or Area	Threatened Coast	Time left to Initial Wave Arrival (ETA)	NTWC Alert Level for Threatened Coast	Emergency Response Action
none	CARIBBEAN	None	No	None	Not applicable	None	No action required



	Magnitude less than 6.0						
none	ATLANTIC Magnitude less than 6.5	None	No	None	Not applicable	None	No action required

10.3 Immediate Actions Checklist

[] 1.	SOP C IMMEDIATE ACTIONS CHECKLIST TWFP Duty Officer must review the message from the PTWC and contact civil authorities to advise that a Tsunami Bulletin was received; that review/assessment shows that it will not impact Participating State; and, that no further action is required. (Use Attachment A, for directory of Civil Authorities' Contact Information) [] i. Contact the Director, Disaster Management Department [] ii. Contact the Royal St. Christopher and Nevis Police Force (Nevis) [] iii. Contact the St. Kitts and Nevis Fire and Rescue Services (Nevis) [] iv. Contact the St. Kitts and Nevis Defence Force
	[] 2. No further action required. End of Procedure.



11.0 SOP D (CANCELLATION)

11.1 Purpose

To provide procedural guidance and action steps to be followed in responding to PTWC issued Tsunami Information Statement due to a local or regional seismic event.

11.2 General

The PTWC will issue an End of Threat Message when it is likely that there is no longer a significant tsunami threat.

- Cancellation Message

11.3 Immediate Actions Checklist

[] 1.	<p>SOP D IMMEDIATE ACTIONS CHECKLIST</p> <p>TWFP Duty Officer must contact the Director, NDMD (Nevis Disaster Management Department) and report receipt of End of Threat message from the PTWC but take no further action. (Use Attachment A for Directory of Civil Authorities' Contact Information)</p> <p>[] i. Contact the Director, Disaster Management Department</p>
[] 2.	<p>No further action required. End of Procedure.</p>



12.0 SOP E (TEST MESSAGE)

12.1 Purpose

To provide procedural guidance and action steps to be followed in responding to a PTWC issued Tsunami Test Bulletin

12.2 General

The PTWC issue every first Thursday of the Month at 15:30 UTC (11:30 AM Nevis time) a Tsunami Test Bulletin. In addition to the scheduled tests it issues two no notice test bulletins a year

- Test Bulletin

12.3 Immediate Actions Checklist

SOP E IMMEDIATE ACTIONS CHECKLIST	
[] 1.	<p>TWFP Duty Officer must contact the Civil Authorities and report receipt of Test Bulletin from the PTWC. (Use Attachment A for Directory of Civil Authorities' Contact Information)</p> <p>[] i. Contact the Director, DMD</p> <p>[] ii. Contact the Royal St. Christopher and Nevis Police Force (Nevis)</p> <p>[] iii. Contact the St. Kitts and Nevis Fire and Rescue Services (Nevis)</p> <p>[] iv. Contact the St. Kitts and Nevis Defence Force</p>
[] 2.	<p>TWFP Duty Officer must report to the Director Disaster Management Department that the test message information has been successfully delivered or in the event a contact person/s or telephone contact numbers are not answered, the TWFP Duty Officer must submit a written report to the Director</p>



	National Disaster Management Agency so that the situation can be immediately remedied.
[] 3.	No further action required. End of Procedure

13.0 SOP F(DRILL/PREPARE PROCEDURE)

13.1 Purpose

To provide opportunity for all first responder organizations to drill and practice their SOPs for a tsunami. Tsunamis are rare events but the hazard is real throughout the Caribbean. Unless dedicated drills are held routinely and thinking applied to the procedures of the drill, improvements integrated, first responders will not be ready, and they will not know how to respond to protect the public during the tsunami (assist with evacuations, shelter requirements, etc.) and the follow up recovery efforts when a devastating tsunami occurs.

There are several components to adequate preparation:

1. Drills that address technical and operational responsibilities:
 - a. Assure technical infrastructure is available at all times
 - b. Verifies accuracy of contact information
 - c. Keeps track of and constantly seek to improve response time
 - d. Practices that test response during various days of the week and times of days
 - e. Provides incentives to all participant organizations to further prepare their organization for response activities once the alert is received.



2. Routine training sessions to address ideas and thoughts for improvements for infrastructure and operations.
3. Annual tests to assure readiness and understanding of an individual's responsibility in such an event

13.2 General

This SOP is intended as an initial drill/prepare procedure. It is expected that each organization that participates in the process will develop further SOPs that prepare their own organizations for response to tsunami alerts. To begin, this drill procedure will address the practice requirements of key organizations to receive the alert message and to check the readiness of tools involved in the tsunami alert and notification process:

- i. Tsunami Warning Focal Point
- ii. Disaster Management Department
- iii. Police
- iv. Fire and Rescue Services
- v. Defence Force
- vi. Coast Guard
- vii. Broadcast Media/Cell Providers
- viii. Public Alerting Tools

13.3 National Tsunami Drill Schedule

Given that the responsibility for Disaster Management lies on the island of Nevis lies with the DMD, it is recommended that drills be initiated. Further, there should also be drills at random times on random days to assist each organization with preparations for the "what if" scenario, it is recommended that the Disaster Management Department activate drills according to the following schedule:

2017

February:	First Sunday of the Month, at 11:00 a.m.
April:	First Wednesday of the Month, at 3:00 a.m.
June:	First Friday of the Month, at 7:00 p.m.
August:	First Monday of the Month, at 11:00 a.m.
October:	First Thursday of the Month, at 3:00 a.m.
December:	First Saturday of the Month, at 7:00 p.m.



2017

January: First Tuesday of the Month, at 12:00 noon
 March: First Friday of the Month, at 4:00 a.m.
 May: First Sunday of the Month, at 8:00 p.m.
 July: First Wednesday of the Month, at 12:00 noon
 September: First Saturday of the Month, at 4:00 a.m.
 November: First Monday of the Month, at 8:00 p.m.

2018

February: First Thursday of the Month, at 1:00 p.m.
 April: First Saturday of the Month, at 5:00 a.m.
 June: First Monday of the Month, at 9:00 p.m.
 August: First Friday of the Month, at 1:00 p.m.
 October: First Sunday of the Month, at 5:00 a.m.
 December: First Tuesday of the Month, at 9:00 p.m.

13.3.1 Immediate Actions Checklist

	SOP F IMMEDIATE ACTIONS CHECKLIST
[] 1.	<p>Director of the DMD must make contact with TWFP Duty Officer using the same mechanism/s that is/are used for a real tsunami alert(EMWIN/GTS, and in some cases fax machines) and announce an Island Wide Drill of the Tsunami Warning System. Initiation of the Drill Message by the DMD begins the clock ticking for the drill records. Attachment H provides a timeline reporting document for use by the DMO.</p> <p>[] Contact the TWFP 469-5391, 469-5392</p>



[] 2.	<p>TWFP Duty Officer must review the Drill message from the DMD, note the exact time of receipt and the mechanism of delivery used (if multiple messages received, note all of them) and immediately must contact the Civil Authorities and report receipt of an <u>Island-Wide Drill Message</u> from the DMD. (Use Attachment A for Directory of Civil Authorities' Contact Information)</p> <p>[] i. Contact the Director, DMD</p> <p>[] ii. Contact the Royal St. Christopher and Nevis Police Force (Nevis)</p> <p>[] iii. Contact the St. Kitts and Nevis Fire and Rescue Services (Nevis)</p> <p>[] iv. Contact the St. Kitts and Nevis Defence Force</p>
[] 3.	<p>TWFP Duty Officer must contact persons responsible for activating PUBLIC ALERTING DEVICES; advise <u>Island Wide Tsunami Drill</u>. (Use Attachment C for Listing of Alerting Devices and Directory of Device Activation Contact Information).</p>
[] 4.	<p>TWFP Duty Officer must CONTACT RADIO, TV, AND CABLE BROADCAST STATIONS. (Use Attachment D for Directory of Broadcast Media Partner Contact Information). Advise – <u>Island Wide Tsunami Drill</u> (Use Attachment I for Broadcast Message—Tsunami Evacuation Alert).</p>



[] 5.	TWFP Duty Officer must CONTACT CELL PROVIDERS. (Use Attachment E for Directory of Cell Service Provider Company Partner Contact Information.) Advise – <u>Island-Wide Tsunami Drill</u> (Use Attachment I for Broadcast Message— <u>Island-Wide Tsunami Drill</u>)
[] 6.	TWFP Duty Officer must CONTACT COAST GUARD DISPATCH at 465-8384, Marine channel 17. Advise – <u>Island-Wide Tsunami Drill</u> (Use Attachment J for Mariners Broadcast Message— <u>Island-Wide Tsunami Drill</u>)
[] 7.	TWFP Duty Officer must report to the Director DMD that the Island-Wide Drill Message has been delivered and provide the DMD the contact name, time of message delivery, mechanism/s by which the message was delivered. Use Attachments A, C, D, and E for making the report about who was reached and when. In the event contact person telephone/radio contact number/s is not answered, the TWFP Duty Officer must submit a written report about the attempt to the Director DMD so that the situation can be immediately addressed.
[] 8.	Director DMD must prepare a Drill Summary Report and follow up with each agency, advising about the results of the drill, explaining how it compared with previous drills in terms of overall time taken to get the alert message out. Once the Drill Summary Report is finalized, the Director DMD may make a report to the Premier's Office along with any recommendations for improvements in responses that are required.



[] 9.	End of National Drill Procedure. All drill activity log files to be sent to the drill manager (Coordinator, NEMA), CDEMA and CTWC for analysis. Drill summary report to be issued within 10 business days from the execution of drill.
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14.0 SOP ATTACHMENTS

ATTACHMENT A – DIRECTORY OF CIVIL AUTHORITIES' CONTACT LIST (ST. KITTS)

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AGENCY NAME	Emergency Contact Name	24x7 Telephone Number	24x7 Cell Phone Number	SAT Phone Number	Via Radio Channel/s (HF & VHF)	Name of Recipient and Time Message Received
National Disaster Management Agency	CARL HERBERT (NDC) CLARICIA LANGLEY-STEVENS (DNDC)		662-9099 668-0812		HF 7.45350	CARL HERBERT (NDC) CLARICIA LANGLEY-STEVENS (DNDC)
Royal St. Christopher and Police Force	Telecommunication Department	465-2241 or 911		662-7311 662-7315 662-1977 665-2527		ACP Ops Div. Off. A Div. Off. B Div. Off. C
St. Kitts and Nevis Fire and Rescue Services	(Telecommunication Department) Guard/Alert Room	911, 465-2515, 465-7167, 465-4339				Duty Orderly
St. Kitts and Nevis Defence Force & Coast Guard	Guard Room	466-9279, 466-9280				Orderly Officer
Permanent Secretary, National Security	Osmond Petty		662-8890			Osmond Petty
Permanent Secretary,	Osbert DeSuza		665-6517			Osbert DeSuza



Office Of Prime Minister						
SKN Red Cross Society	Natile Fough		765-7492 660-9750			Natile Fough
Amateur Radio Society	Basil Woods		662-2494			Basil Woods



ATTACHMENT A (i) – DIRECTORY OF CIVIL AUTHORITIES CONTACT LIST (NEVIS)

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AGENCY NAME	Emergency Contact Name	24x7 Telephone Number	24x7 Cell Phone Number	SAT Phone Number	Via Radio Channel/s (HF & VHF)	Name of Recipient and Time Message Received.
National Disaster Management Agency	NEMA	1-869-466-5100	1-869-662-9099		150.5000 MHz 150.5250 MHz	Mr. Carl Herbert
Nevis Disaster Management Department	NDMD	1-869-469-1423 1-869-469-7903	1-869-668-6401 1-869-764-7567		151.6250 MHz	Mr. Brian Dyer Mr. Jacob Ngumbah
Police Force	(Police Force DISPATCH)	1-869-469-5391 1-869-469-5392	1-869-665-2527 1-869-661-6267			Mr. Trevor Mills Mr. Conrad Bertie
Fire & Rescue Services	(Fire Service DISPATCH)	1-869-469-3444 1-869-469-8926	1-869-662-3808 1-869-665-1775			Mr. David Stapleton Mr. Abdias Samuel
Defence Force & Coast Guard	Dispatch	1-869-465-8384 1-869-466-9280	1-869-667-9768		156.8000 MHz	Mr. Anthony Comrie
Premier's Ministry	Premier Min.		1-869-665-6169			Mr. Wakely Daniel
Ministry of Education	MOE	1-869-469-4651	1-869-667-3332			Mrs. Palsy Wilkin
Ministry of Health	MOH	1-869-469-4669	1-869-662-5942		151.4250 MHz	Mrs. Nicole Slack Liburd
Ministry Of Tourism	MOT	1-869-469-0051	1-869-662-1550			Mr. Carl Williams
Chamber of Industry and Commerce	CIC	1-869-469-5528	1-869-662-8000			Ms. Debra Lalouche Mr. Ernie France
Ministry of Finance	MOF		1-869-664-2959			Mr. Colin Dore
Ministry of Agriculture	MOA		1-869-662-6043 1-869-663-8941			Mr. Eric Evelyn



Ministry of Works	PWCUP	1-869-662-3126	1-869-662-5180			Mr. Ernie Stapleton
Nevis Branch Red Cross	RC	1-869- 469-5961	1-869-662-8934			Mrs. Roxane Brookes
Nevis Water Department	NWD		1-869-667-8106		158.7250 MHz	Mr. Roger Hapley
Nevis Solid Waste Management Authority	NSWMA		1-869-669-7500			Mr. Andrew Hendrickson
Nevis Air and Sea Ports Authority	NASPA		1-869-663-0579		157.5000 MHz	Mr. Oral Brandy

ATTACHMENT B. LISTING OF TSUNAMI VULNERABLE COASTAL AREAS (ST. KITTS)

SEE INUNDATION MAP



ATTACHMENT B(i). LISTING OF TSUNAMI VULNERABLE COASTAL AREAS (NEVIS)

SEE INUNDATION MAP

ATTACHMENT C. LISTING OF ALERTING DEVICES AND DEVICE ACTIVATION CONTACT INFORMATION (ST. KITTS)

N/A AT THE MOMENT

Alert Device	Device Activation Emergency Contact Name	24x7 Telephone Number	24x7 Cell Phone Number	Name of Recipient and Time Message Received

ATTACHMENT C (i). LISTING OF ALERTING DEVICES AND DEVICE ACTIVATION CONTACT INFORMATION (NEVIS)

N/A AT THE MOMENT



Alert Device	Device Activation Emergency Contact Name	24x7 Telephone Number	24x7 Cell Phone Number	Name of Recipient and Time Message Received

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ATTACHMENT D. DIRECTORY OF TSUNAMI ALERT MEDIA PARTNERS (ST. KITTS)

BROADCAST STATIONS (Radio, Television, Cable)	Emergency Contact Name	24x7 Telephone Number	24x7 Cell Phone Number	Via Radio Channel/s (HF & VHF)	Name of Recipient and Time Message Received
ZIZ RADIO & TELEVISION		465-2555 465-2621 465-2623			
WIN FM		466-9180 466-0989			
FREEDOM FM	JUNI LIBURD	466-5887 465-6474 465-0546			JUNI LIBURD
KYSS FM	Mr. A.U. Brown	466-5977 466-5978	662-3350		Mr. A.U. Brown



DOMINION RADIO	REVEREND DR. CALVIN O. HAZEL	465-1597 466-7915			REVEREND DR. CALVIN O. HAZEL
THE CABLE		465-2588 465-2233 466-9999			
RADIO ST.KITTS-NEVIS	HUGH PEMBERTON	465-7528			HUGH PEMBERTON
GOODWILL RADIO	DENNIS HUGGINS-NELSON		663-5973		DENNIS HUGGINS-NELSON
SUGAR CITY	SLIEH BONCAMPER	466-0903 466-1113			SLIEH BONCAMPER

ATTACHMENT D (i). DIRECTORY OF TSUNAMI ALERT MEDIA PARTNERS (NEVIS)

BROADCAST STATIONS (Radio, Television, Cable)	Emergency Contact Name	24x7 Telephone Number	24x7 Cell Phone Number	Via Radio Channel/s (HF & VHF)	Name of Recipient and Time Message Received
Department of Government	NNC		869-762-4839		Mr. Huey Sargeant



Information Service					
VON Radio	VON	896-469-1616	869-662-8168		Mr. Everred Herbert
Choice Radio	Raynaldon Bartlette	469-5300	763-3126		Raynaldon Bartlette

ATTACHMENT E. DIRECTORY OF TSUNAMI ALERT CELL SERVICE PROVIDER (ST. KITTS)

Cell Service Company	Emergency Contact Name	24x7 Telephone Number	24x7 Phone Number	Cell	Via Radio Channel/s (HF & VHF)	Name of Recipient and Time Message Received
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FLOW	Lincoln Browne		1-869-662-5707		Lincoln Browne	Page 82
	Rhodell Whittaker		1-869-662-8169		Rhodell Whittaker	
	Raul Lakhram		1-869-662-4323		Raul Lakhram	
Digicel	Sean Latty		1-869-765-5059		Sean Latty	
	Justin John		1-869-762-8300		Justin John	
	Burchell Crooke		1-869-762-3015		Burchell Crooke	

ATTACHMENT E (i) . DIRECTORY OF TSUNAMI ALERT CELL SERVICE PROVIDER (NEVIS)



Cell Service Company	Emergency Contact Name	24x7 Telephone Number	24x7 Cell Phone Number	Via Radio Channel/s (HF & VHF)	Name of Recipient and Time Message Received
FLOW	Lincoln Browne		1-869-662-5707		Lincoln Browne
	Rhodell Whittaker				Rhodell Whittaker
	Raul Lakhram		1-869-662-8169		Raul Lakhram
			1-869-662-4323		
Digicel	Sean Latty		1-869-765-5059		Sean Latty
	Justin John		1-869-762-8300		Justin John
	Burchell Crooke		1-869-762-3015		Burchell Crooke

ATTACHMENT F. BROADCAST MESSAGE FOR MEDIA PARTNERS



URGENT TSUNAMI WARNING

BROADCAST SCRIPT

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A TSUNAMI WARNING HAS BEEN ISSUED.

THIS IS AN URGENT TSUNAMI WARNING FOR

[] 1. ALL COASTAL AREAS OF ST. KITTS AND NEVIS

OR

[] 2. ALL VULNERABLE COASTAL AREAS OF ST. KITTS AND NEVIS

A TSUNAMI HAS BEEN GENERATED. IMMEDIATELY EVACUATE ALL BEACHES AND ALL LOW LYING COASTAL AREAS. MOVE INLAND TO HIGHER GROUND



ATTACHMENT G. BROADCAST MESSAGE FOR MARINERS

URGENT TSUNAMI WARNING

MARINERS WARNING SCRIPT

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A TSUNAMI WARNING HAS BEEN ISSUED. THIS IS AN
URGENT TSUNAMI WARNING FOR ST. KITTS AND NEVIS

A TSUNAMI HAS BEEN GENERATED. DO NOT APPROACH HARBORS UNTIL THE TSUNAMI
ALL CLEAR HAS BEEN ANNOUNCED. IF YOU ARE NEAR THE HARBORS MOVE AWAY FROM
LAND TO A LOCATION FURTHER OUT. STAY TUNED FOR FURTHER INFORMATION.



ATTACHMENT H. NATIONAL TSUNAMI DRILL RECORD

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Date of Drill: _____

Day & Time Drill Initiated: _____

Name of Recorder: _____

Title of Recorder: _____

Complete the following which document the various steps in the process, the contact infrastructure used, the success, the time of message delivery and message receipt.

[] Initiate Drill

1. Document the various means of delivering the message:

List Mechanism of Message Delivery (list all that are available)	Provide Message Delivery Time	Provide Message Acknowledgement Time, if any, noting how acknowledgement was received. If no acknowledgement received, mark as none.	Provide Comments, as necessary



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☐ Received Completed Attachment A.

☐ Received Completed Attachment C.

☐ Received Completed Attachment D.

☐ Received Completed Attachment E.

☐ End Drill

☐ Record Day & Time Drill Ended: _____

☐ Record Comments, if any:



ATTACHMENT I. NATIONAL TSUNAMI DRILL BROADCAST MESSAGE FOR MEDIA PARTNERS

NATIONAL TSUNAMI DRILL

BROADCAST SCRIPT

A NATIONAL DRILL OF THE TSUNAMI WARNING SYSTEM IS BEING CONDUCTED BY THE DISASTER MANAGEMENT ORGANIZATION & OTHER KEY EMERGENCY RESPONSE AGENCIES. IF THIS HAD BEEN A REAL TSUNAMI ALERT, YOU WOULD BE ADVISED WHAT COASTAL AREAS MUST BE EVACUATED IMMEDIATELY. THERE IS NO TSUNAMI; THIS IS ONLY A TSUNAMI DRILL.

ATTACHMENT J. NATIONAL TSUNAMI DRILL BROADCAST MESSAGE FOR MARINERS

NATIONAL TSUNAMI DRILL



BROADCAST SCRIPT

A NATIONAL DRILL OF THE TSUNAMI WARNING SYSTEM IS BEING CONDUCTED BY THE DISASTER MANAGEMENT ORGANIZATION & OTHER KEY EMERGENCY RESPONSE AGENCIES. IF THIS HAD BEEN A REAL TSUNAMI ALERT, YOU WOULD BE ADVISED NOT TO MOVE YOUR VESSELS TOWARDS THE COAST LINE AND TO HEAD FOR OPEN WATERS UNTIL AN ALL CLEAR IS SOUNDED. THERE IS NO TSUNAMI; THIS IS ONLY A TSUNAMI DRILL.

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15.0 NEXT STEPS

- 15.1 To establish country-wide tsunami risk and understanding of the special operational concepts, organization tasks, and coordinated emergency actions of public agencies, utility districts, and other organizations and institutions which would be involved in a tsunami warning response and rapid deployment of mutual aid; and,
- 15.2 To provide for mobilization and direction of national and various district emergency organizations in support of tsunami evacuation and security operations.

What is required is a full integration of these herein described tsunami protocols and SOPs into the St. Kitts and Nevis disaster/communications/education plans.

16.0 CONCLUSIONS

The potential for a tsunami event is real. The risk is credible that a tsunami could occur that would affect the coastline areas of St. Kitts and Nevis. The degree of damage experienced by tsunami waves will depend on:



- a. The local sea bottom and coastal topography as well as the incoming direction of the tsunami
- b. How well the emergency response agencies have planned for and are prepared to respond to the event immediately
- c. How well the alert systems advising the public to evacuate function and how quickly they can be made to sound
- d. How well the public is educated and responds to the evacuation alerts



