

Comprehensive Emergency Management Plan



Section 6-Tsunami Annex

June 2016

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Annex 6 – 4 Tsunami Annex

I. PURPOSE

The purpose of this Tsunami Annex is to establish specific procedures to be followed in the event of a tsunami incident in Horry County. This plan has been created to help minimize loss of life and property in Horry County and along the Grand Strand area. This hazard-specific plan is subordinate to the Horry County Comprehensive Emergency Management Plan and is to be used in conjunction with the EOP.

The National Tsunami Warning Center (NTWC) located at the Palmer Observatory in Palmer, Alaska monitors for earthquakes and subsequent tsunami events in both the Pacific and Atlantic Oceans. If a tsunami is generated, the NTWC issues tsunami watches and warnings, as well as tsunami information bulletins for both the U.S. West and East Coast areas.

II. SITUATION AND ASSUMPTIONS

- A. Horry County is at a very slight risk for tsunamis. A tsunami is a series of ocean waves started by a sudden displacement of ocean water, usually by an earthquake. A tsunami's waves rapidly travel in all directions away from the disturbance and can spread across entire ocean basins. They can also be caused by volcanic eruptions, landslides, undersea slumps, or even meteorites.
- B. The best information available indicates two possible scenarios for Horry County concerning its tsunami risk. The first threat is from a 9.0 magnitude earthquake along the Puerto Rico Trench. The tsunami could have a wave height of 1.4 meters (4-5 feet) and reach the Horry County coast in about 4-5 hours. Less is known about the second scenario, which would be a tsunami generated by a submarine landslide of the east coast of the US. This scenario depending on the location of the occurrence could shorten the arrival time of the tsunami. In addition the wave heights could be much greater.
- C. A tsunami could create fast moving run-up and dangerous currents in the surf zone, inlets, river entrances and other vulnerable locations across the coast.
- D. Horry County is located along South Carolinas Grand Strand Resort area with over 13 million visitors each year. Life safety is the highest priority for residents and visitors residing in the risk area.
- E. Horry County's greatest risk during a tsunami is the immediate coast-line. During all season but particularly during the summer months, many visitors populate the beach. At any time during those months there may be over 100,000 people on the beach at any given time. During the off-season, or winter months, that number decreases to approximately several thousand people on the beach at any given time.
- F. To avoid the dangerous tsunami waves. People both residents and visitors who may be located in the risk area along the coast-line will need to evacuate inland at minimum 300 feet and/or 15 feet vertically prior to the arrival of tsunami waves.
- G. The prompt and effective evacuation of high-risk areas requires the cooperation and coordination of the Horry County and local jurisdiction Public Safety Departments. Horry County Emergency Management Department will assist in coordinating this effort.

III. CONCEPT OF OPERATIONS

A. General

1. Response and coordination of action will be in accordance with the Horry County Emergency Management Plan.
2. Coordinate evacuation notifications through Horry County Emergency Management, E-911 Communications Center, the NWS Wilmington Office and the Horry County Public Information Office for the entire coastal area including local jurisdictions.
3. Coordinate beach evacuation notifications through the Horry County Police and Horry County Fire/Rescue departments.
4. Coordinate State and Federal agencies

B. Operational Issues

1. Once a tsunami wave has been detected that may affect the Horry County coast, the Horry County Emergency Management Director, or his designee and/or National Weather Service will activate the Emergency Alert System advising the need to evacuate the beach area.
2. The Horry County E-911 Department will be notified to contact the law enforcement and fire/rescue units closest to the beach front to respond to the beach and announce the evacuation of the beach.
3. The Emergency Management Department will activate the County's automated notification system, if a tsunami threatens our coast line.
4. In the event of an actual event of observation of severe water draw-back by first responders, an evacuation order may be given by the officer in charge. The E-911 Department will be notified immediately. They will contact the Horry County Emergency Management Director and the NWS and activate the Emergency Messaging Service.
5. Once an evacuation becomes necessary, the Horry County Public Information Office will broadcast warning and evacuation instructions through the local media outlets.

IV. PLANS DEVELOPMENT AND MAINTENANCE

This plan addresses specific procedures to follow in the event of a tsunami impacting the coast-line of Horry County. The Horry County Emergency Management Director will review and update this plan on an annual basis.

A. Warnings, Advisories & Watches

1. Tsunami Warning – A tsunami warning is issued when a tsunami with the potential to generate widespread inundation is imminent, expected, or occurring. Warnings alert the public that dangerous coastal flooding accompanied by powerful currents is possible and may continue for several hours after initial arrival. Warnings alert emergency management officials to take action for the entire tsunami hazard zone. Appropriate actions to be taken by local officials may include the evacuation of low-lying coastal areas, and the repositioning of ships to deep waters when there is time to safely do so. Warnings may be

updated, adjusted geographically, downgraded, or canceled. To provide the earliest possible alert, initial warnings are normally based only on seismic information.

2. **Tsunami Advisory** – A tsunami advisory is issued when a tsunami with the potential to generate strong currents or waves dangerous to those in or very near the water is imminent, expected, or occurring. The threat may continue for several hours after initial arrival, but significant inundation is not expected for areas under an advisory. Appropriate actions to be taken by local officials may include closing beaches, evacuating harbors and marinas, and the repositioning of ships to deep waters when there is time to safely do so. Advisories are normally updated to continue the advisory, expand/contract affected areas, upgrade to a warning, or cancel the advisory.
3. **Tsunami Watch** – A tsunami watch is issued to alert emergency management officials and the public of an event which may later impact the watch area. The watch area may be upgraded to a warning or advisory - or canceled - based on updated information and analysis. Therefore, emergency management officials and the public should prepare to take action. Watches are normally issued based on seismic information without confirmation that a destructive tsunami is underway.
4. **Tsunami Information Statement** – A tsunami information statement is issued to inform emergency management officials and the public that an earthquake has occurred, or that a tsunami warning, watch or advisory has been issued for another section of the ocean. In most cases, information statements are issued to indicate there is no threat of a destructive tsunami and to prevent unnecessary evacuations as the earthquake may have been felt in coastal areas. An information statement may, in appropriate situations, caution about the possibility of destructive local tsunamis. Information statements may be re-issued with additional information, though normally these messages are not updated. However, a watch, advisory or warning may be issued for the area, if necessary, after analysis and/or updated information becomes available

B. Potential Tsunami Events

The Horry County coastline is subject to a couple of different types of Tsunami incidents. The first potential scenario deals with an earthquake occurring on the Puerto Rican Trench causing tsunami occurrences up and down the Atlantic Coast. This type of tsunami is the subject of the Tsunami Travel chart shown below. This type of occurrence might give Horry County roughly a 4.5 hour notification time that a Tsunami will be occurring and some time to issue appropriate warnings along the coast.

The other possible scenario is a sub-marine landslide that could occur off the continental slope and could be a much worse scenario for Horry County. The USGS simulated a sub-marine landslide in 2012 with the Currituck Slump. The sub-marine landslide was simulated as occurring off the coast of the Outer Banks in North Carolina and it resulted in a much shorter notification time for the coast of North and South Carolina and most definitely for Horry County. It also increased the risk for larger wave height along our coast. From the best predictions of the National Weather Service-Wilmington a sub-marine landslide off the coast of South Carolina could produce a tsunami on our coast within an hour and if there were to be a sub-marine landslide off the coast of Florida we could be seeing the tsunami within two hours.

C. Tsunami Travel Time Chart

Puerto Rico Trench 9.0M Earthquake generated Tsunami travel time and landfall height based on recent model output from NOAA Tsunami Warning Center

Location	Region	Travel Time (hr-min)	Peak SSH(cm)	Initial Motion	Period (hr-min)
Flagler_FL	Atlantic	4 hours 15 min	116	elevation	1 hour 1 min
Fernandiana_FL	Atlantic	5 hours 13 min	23	elevation	xxx
St Simons_GA	Atlantic	5 hours 15 min	43	elevation	1 hour 18 min
Altamaha_GA	Atlantic	5 hours 17 min	52	elevation	1 hour 1 min
So Santee_SC	Atlantic	4 hours 22 min	86	elevation	1 hour 15 min
Springmaid_SC	Atlantic	4 hours 42 min	138	elevation	38 min
Charleston_SC	Atlantic	4 hours 45 min	51	elevation	1 hour 28 min
Wrightsville Bch_NC	Atlantic	4 hours 18 min	133	elevation	42 min
Surf City_NC	Atlantic	4 hours 17 min	116	elevation	1 hour 5 min
Beaufort_NC	Atlantic	3 hours 48 min	125	elevation	47 min
D41420	Atlantic	22 min	128	elevation	xxx
D42407	Caribbean	22 min	-48	depression	xxx
Bermuda	Atlantic	1 hour 52 min	458	elevation	15 min
Limetree_StCroix	Caribbean	0 min	227	depression	15 min
Punta_Guayanilla	Caribbean	0 min	226	elevation	19 min

V. ANNEX MAINTENANCE

Horry County Emergency Management has the responsibility of coordinating, developing and maintaining the Tsunami Annex and is the designated Lead Agency. The Tsunami Annex will be updated in conjunction with the CEMP as stated in Section VII, Plan Development and Maintenance.

ATTACHEMENTS

A. Horry County Tsunami Risk Map

