

Tsunami Maritime Actions

Maritime Actions for a Distant Source Tsunami Hazard

FOR SMALL CRAFT such as recreational sailing and motor vessels, and commercial fishing vessels. All vessels under 300 gross tons.

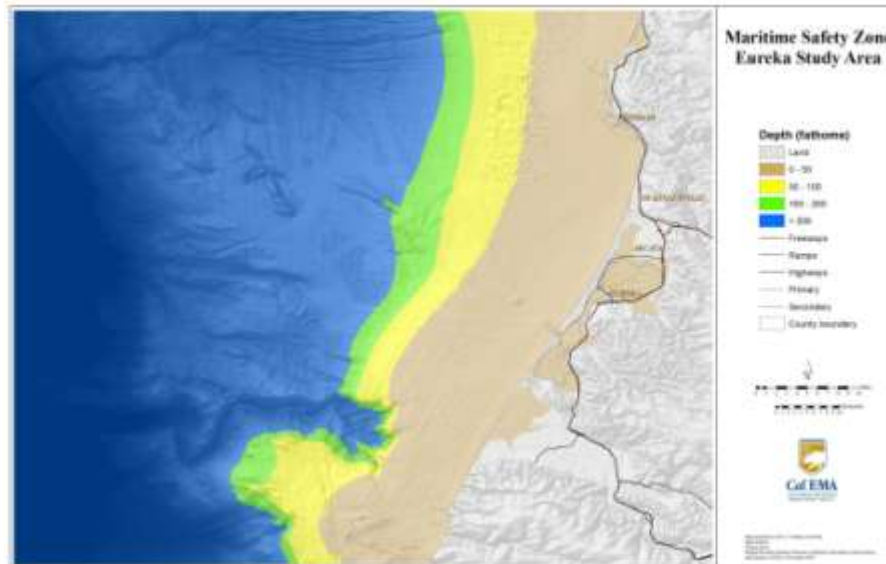
DROP, COVER, HOLD ON - You should first protect yourself from an earthquake. When the shaking stops, move quickly to higher ground away from the coast. Signs a tsunami may be imminent - if you feel a strong earthquake lasting 20 seconds or more near the coast, rapid change in water elevation, a loud roar from the ocean, go to high ground immediately.

Maritime Actions for a Distant Source Tsunami Hazard

These Maritime Actions for a Distant Source Tsunami Hazard have been created for the Humboldt County Emergency Operations Plan and is considered a living document subject to change. This is for a DISTANT SOURCE tsunami only.

KEY POINTS TO KNOW

- The safest locations for a vessel in a tsunami event are in deep water or out of the water and out of the Tsunami Hazard Zone.
- CalOES's "RULE OF THUMB" is 600+ feet (100 fathoms or more) in depth. This is 9-12 miles off shore of Humboldt Bay.
- NOAA currently states Mariners in deep water 600 feet or greater should stay at sea. Those in shallow water or harbors should move to deep water if there is enough time and weather conditions are suitable.



Possible Mariner Actions Prior to Tsunami Surge Arrival:

- Vessels at sea when a tsunami event is announced should remain in deep water.

- **Given the time frame available, vessels within Humboldt Bay, with the ability to travel to deep water prior to the initial tsunami surge arrival time should do so as soon as possible. At Humboldt Bay, bar conditions may dictate the ability of vessels to get to sea.**
- **Trailerable vessels in the water or vessels on trailers within the Tsunami Hazard Zone should be moved to locations outside the zone.**

DO YOU HAVE ENOUGH TIME TO ACCOMPLISH YOUR GOAL?

Exceptional care should be taken when making the decision to move a vessel from the Tsunami Hazard Zone. Congestion on the roads and in the harbor area may greatly delay all mitigation actions. **Mariners should not attempt to remove a vessel from the Tsunami Hazard Zone unless they are certain the movement activity can be completed in the time available.**

Remember there may be road closures, restricted access and traffic congestion. **At tsunami estimated TIME of arrival MINUS ONE (1) HOUR, also known as T minus 1 or T-1, access to coastal areas including the marinas will be prohibited.**

TRAILERABLE: If your vessel is trailerable and you wish to remove it from the water, consider the following:

- Make sure your family is safe first
- Check the tide and weather conditions
- Find someone to assist you to, hook up your trailer, drive to the marina to drop you off, drive to the boat ramp, load the boat, go to high ground.
- **PLEASE remember**, there may be road congestion and congestion at the boat ramps. *If you do not have time to accomplish your goals, you should not make the attempt.*

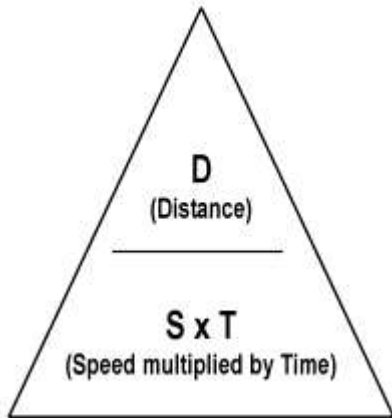
NON-TRAILERABLE: If you are unable to remove your vessel from the water, consider the following:

- Make sure your family is safe first
- Grab extra lines and fenders for your vessel and remove any important items from your vessel
- **PLEASE remember**, there may be road congestion. *If you do not have time to accomplish your goals, you should not make the attempt.*

VESSELS considering leaving the harbor and head to sea, please consider the following:

- Make sure your family is safe first
- Check tide, bar and ocean conditions
- Check the weather forecast for the next couple of days
- Ensure you have enough fuel, food and water to last a couple of days
- Have someone drive you to the marina so your vehicle is not in the inundation zone.
- **PLEASE REMEMBER:** There may be road congestion. There may also be vessel congestion in the harbor as SHIPS, BARGES and other vessels attempt to depart at the same time. All vessels should monitor VHF Channel 16 and use extreme caution. **NEVER** impede another vessel. *If you do not have time to accomplish your goal, you should not make the attempt.*

Distance Speed Time formula. To use this triangle put your finger over the letter you are going to solve. **Distance = Speed multiplied by Time.**



- If you want to know **S**, then put your finger over the **S** and it gives you **D / T** (Distance divided by Time).
- If you want to find **D** then cover the **D** and you have **S x T** (Speed multiplied by Time).
- If you want to find **T** then cover the **T** and you have **D / S** (Distance divided by Speed)

For marine purposes **D**istance is in nautical miles and tenths of a nautical mile. **S**peed is in knots (nautical miles per hour) and tenths of a knot. **T**ime is in hours and minutes. To convert minutes to hours, divide by 60. To convert hours to minutes, multiply by 60.

Example:

I need to travel 19.0 nautical miles at 6 knots. How long will it take?

Distance divided by Speed = Time

19.0 nautical miles / 6 knots = 3.17 hours (3 hours 10 minutes)

It is approximately 15 nautical miles from Woodley Island Marina breakwater to 50 fathom line.
It is approximately 19 nautical miles from Woodley Island Marina breakwater to 100 fathom line.

Things to consider while at sea:

- Monitor VHF-FM Channel 16 and the marine WX channels for periodic updates of tsunami and general weather conditions.
- Keep in contact with other boaters for safety and moral support.
- **BEFORE RE-ENTERING HUMBOLDT BAY**, make sure the harbor is open for traffic.
- Be aware of the tides, currents and surges. Keep a look out for debris.

Possible Mariner Actions Following the Tsunami "All-Clear" Message:

"ALL CLEAR" – DOES NOT MEAN THE HARBOR IS OPEN.

The "All-Clear" message is for land entry only. Mariners at sea should stay at sea until after the United States Coast Guard Captain of the Port has issued a message stating that Humboldt Bay is open for traffic. Check with your docking facility to ascertain its ability to receive vessels. Adverse tsunami surge impacts may preclude safe use of the harbor. Vessels may be forced to anchor offshore or to travel great distances to seek safe harbor. An extended stay at sea is a possibility if the Harbor is impacted by debris or shoaling. Make sure your vessel is prepared to stay at sea. Where possible, mariners should congregate for mutual support while at sea, anchor or during transit elsewhere.

LESSONS LEARNED FROM PAST EVENTS

During the March 11, 2011 event, Crescent City boats headed to sea. Once the tsunami hit and they realized they were unable to return to Crescent City harbor, decisions needed to be made as to where to go because of a huge storm approaching the coast. Some vessels had enough fuel to make it to Brookings Harbor and to Humboldt Bay. Some smaller vessels did not have enough fuel and made the choice to re-enter Crescent City harbor to anchor. Some Crescent City Captains had never been to Humboldt Bay and some were running single handed as they did not have enough time to round up crewmen. As with the Captains who chose to go to Brookings, all of the Captains heading to Humboldt Bay kept in close contact with each other for safety and for moral support. Even though the tsunami initially impacted the west coast on the morning of March 11, 2011, the largest surges in Crescent City did not arrive until later in the evening.

BACKGROUND

Very large underwater earthquakes are the most likely cause of tsunami waves which can cause significant damage at very distant shores. Earthquake-caused tsunami waves occur when the sea floor abruptly deforms and vertically displaces the overlying water column. The displaced water travels outward in a series of waves which grow in intensity as they encounter shallower water along coastlines. Tsunami wave impacts are greatest in and around ocean beaches, low-lying coastal areas, and bounded water bodies such as harbors and estuaries. Potential tsunami wave impact areas should always be avoided during tsunami events.

Any tsunami event can threaten harbors, facilities and vessels. A distant source tsunami event does allow at least some time for local agencies and citizens to take steps to help mitigate the expected impacts of tsunami surges. However, the time available for response is minimal – All needed mitigation actions probably cannot be accomplished. Therefore, the actions to be taken must be prioritized and based on life-safety preservation. Only those actions with a surety of success should be attempted.

The distant tsunami source location does greatly impact the ability of Humboldt County response entities and the public to mitigate expected impacts. A tsunami originating in Chile (14-15 hours away) or Japan (9-10 hours away) will allow much more local mitigation activity than will a tsunami originating in the Aleutians (4-5 hours away). Response entities and the public should allow enough time to complete the mitigation activity and to depart the Tsunami Hazard Zone prior to the projected first tsunami surge arrival time. Emergent mitigation activities will be extensive and involve large numbers of people resulting in congestion and delayed actions – It may not be possible to complete normally simple mitigation actions in the time frame available.

Where do I get more information on Tsunamis and local conditions?

Redwood Coast Tsunami Working Group

<http://humboldt.edu/rctwg/>

Tsunami evacuation maps may be found on the Redwood Coast Tsunami Working Group website. Locate your home, work, schools, etc. and download the maps of your areas. Talk with your family about emergency procedures. Know your surroundings and how to react.

Tsunami Warning Center

www.tsunami.gov

National Weather Service Office in Eureka

www.weather.gov/eureka

1-707-443-6484

Humboldt Harbor Safety Committee

<http://humboldtharborsafety.org/>

Local television and radio stations.