2020 California Tsunami Inundation Map and Community Evacuation Plan Updates

FREQUENTLY ASKED QUESTIONS:

What are the three different parts of tsunami modeling and mapping process?

- SOURCE – The tsunami source is defined by the region, magnitude, and earthquake rupture area. We are only including large, realistic sources (earthquakes and landslides).
- PROPAGATION – The tsunami model allows the tsunami to travel across the ocean using low-resolution bathymetry.
- INUNDATION – The tsunami is modeled using high-resolution (10m) bathymetry and topography to show all areas of flooding on land. These products are reviewed in the field and final inundation maps are created.

Why is the State updating the existing tsunami inundation maps?

- The California Tsunami Program is constantly evaluating tsunami events and potential dangerous sources to ensure that coastal communities are safe from tsunami hazards.
- The 2009 tsunami maps are 10-years old. New tsunami hazard information and mapping tools developed over the past 10 years indicate that some areas of coastline may have a higher tsunami hazard than is represented in the existing inundation and evacuation maps.
- In addition, guidelines set by the National Tsunami Hazard Mitigation Program indicate that tsunami inundation maps should be re-evaluated and possibly updated every 5 to 10 years.

Are the existing 2009 tsunami inundation maps and related evacuation maps inaccurate or inadequate?

- The existing maps accurately capture the tsunami hazard from most major tsunamis from local and distant source threats.
- There are multiple reasons for the update: 1) to develop more precise tsunami hazard maps incorporating new information; 2) to follow national guidance on updating maps every 5 to 10 years; and 3) to provide more conservative, more consistent tsunami inundation maps statewide.
- Significant changes to the 2009 tsunami maps are not expected in most places.
- If significant changes are recommended, the State will work with community emergency planners to determine appropriate evacuation lines and to ensure they understand the reason for the change.

What new tsunami hazard information is available, and why is it appropriate for updating the 2009 maps?

- Over the past 10 years, tsunami science has significantly improved, with a better understanding of tsunami sources and enhancements to computer modeling.

    - New information about tsunami sources around the Pacific Ocean and local earthquake and landslide sources off the coast of California has been discovered. These sources are being included to update the tsunami hazard maps in many areas.
    - Improvements have also been made in the tsunami computer models used to simulate tsunami inundation. These improvements include verification against existing tsunami flood data and the availability of bathymetric and topographic information that is more accurate and has a higher map resolution. This helps the tsunami model better capture subtle changes to the land surface, topography, and, therefore, the landward limit of expected tsunami inundation.
- Tsunami events such as 2010 Chile, 2011 Japan, and 2018 Indonesia have taught scientists and planners a number of lessons about how to better plan for and respond to tsunamis.
    - In the 2011 Japan tsunami, evacuation maps underestimated the tsunami threat in some locations in Japan because they were based on inundation from historical events over the past 100 to 500 years. However, there was geologic evidence of larger tsunami events that occurred on a 1000-year basis; the 2011 Japan tsunami was one of those 1000-year events.
    - California does not have historical tsunami records going back more than 200 years, though there is geologic evidence of tsunamis over the past 3,500 years along the north coast where the Cascadia Subduction Zone is located.
    - Evacuation planning should not rely on the historical or geologic record alone; it should be more conservative. The State is using the new scientific information to make tsunami planning more conservative and capture potential, lesser-known events.
- A new type of tsunami hazard map, the probabilistic tsunami hazard analysis (PTHA) map, represents all potential tsunami events with a 1000-year average return period, which translates to a 5 percent chance of flood exceedance over a 50-year period.
    - Probabilistic maps incorporate a statistical representation of the unknown, called "uncertainties," into the hazard level. The upper statistical limit of uncertainty is incorporated into the probabilistic map, making the results more conservative and safeguarding communities against unknown tsunami hazards. This information helps provide a conservative buffer against potential tsunami events that have not happened in historic time or in the geologic record.
- Overall, the new State tsunami inundation maps best characterize the state of tsunami science in California, and conservatively represent safe evacuation from all realistic tsunami events.

<u>When are the tsunami inundation and evacuation maps expected to be completed statewide?</u>

- The State is in the process of working with the following counties to complete this work: San Francisco, Humboldt, Del Norte, Alameda, and Los Angeles counties.
- This work started in 2018, but due to funding constraints, the State will only be able complete these maps for about five counties per year.
- The State expects to complete all maps by the end of 2021.