



2020-2021 California Tsunami Hazard Area Map 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 part of tsunami modeling which shows movement of the tsunami from the source across the deep ocean towards the nearshore area of coastline.
- INUNDATION – As the tsunami approaches the coast, a more precise model is used to simulate the tsunami moving within the shallow-water/nearshore region and onto land to show all areas of flooding. These products are reviewed in the office using GIS and in the field before the tsunami hazard area maps are created.

Why is the State updating the existing tsunami hazard area maps?

- The California Tsunami Program is constantly evaluating tsunami events and potential sources to ensure that coastal communities have plans in-place to reduce impacts from the tsunami hazard.
- 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 represented in the existing maps.
- Guidelines established by the National Tsunami Hazard Mitigation Program recommend that tsunami hazard maps 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 for 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 hazard maps statewide.
- Significant changes to the 2009 tsunami maps are not expected in most places.
- If significant changes occur to the defined tsunami hazard area, the State will assist local emergency managers and decision-makers who want to update their local tsunami response/evacuation plans.

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 is available about tsunami sources around the Pacific Ocean and local earthquake and landslide sources off the California coast. These sources are included in the tsunami hazard map updates 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 with higher map resolution, which improves accuracy. This enhances the ability of the tsunami model to capture subtle land surface changes and refine the extent of water flow onto land.
- Tsunami events such as 2010 Chile, 2011 Japan, and 2018 Indonesia taught scientists and planners a number of lessons about how to better plan for and respond to tsunamis.
 - In the 2011 Japan tsunami, hazard 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 a number 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 new scientific information to make tsunami planning more conservative and capture potential, lesser-known events.
- The new tsunami hazard maps incorporate most potential tsunami events with a 1000-year average return period; this return period translates to a 5 percent chance of flood exceedance over the next 50 years.
 - The tsunami hazard maps incorporate a statistical representation of the unknown, called “uncertainties.” The upper statistical limit of uncertainty is added to the modeled inundation area, 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.
- The tsunami hazard maps include an additional buffer that typically extends to the nearest streets and landmarks or a specific elevation, which will more directly help communities with their evacuation planning needs.
- Overall, the new State tsunami hazard area maps best characterize current tsunami science in California.

When are the tsunami hazard area maps expected to be completed statewide?

- The State plans to complete all maps by the end of 2021.
- The existing maps and Playbooks are still valid and should be used during a tsunami event.