The California Tsunami Program: A Partnership between Science and Emergency Management Rick Wilson¹, Nick Graehl¹, Jacqueline Bott¹ The California Tsunami Program (CTP) is a collaborative partnership between science and emergency manage-The California Tsunami Program - the products Kiosks Kiosks are placed in ment provided by the California Geological Survey (CGS) and led by the California Governor's Office of Emergenkey locations to help cy Services (Cal OES). people identify the **Evacuation Routes Tsunami Evacuation Routes Tsunami Hazard Area** The foundation of our work are the Tsunami Hazard Area (THA) Maps that are used by coastal jurisdictions for so that they can emergency response planning. These maps are the basis for tsunami hazard mitigation planning and are necesmiliarize vourself with evacuation routes, landmarks, and flood areas. Plan se evacuate out of the sary to implement a comprehensive tsunami program. County and city emergency managers use the State THA Hazard Area during a Once the Tsunami Hazard Areas are Maps to develop effective tsunami response and evacuation plans for their jurisdictions. mapped, a long list of products can tsunami emergency. Pacific Ocean They can also include be derived using those data. One of THA Maps are also used by the CTP to develop Tsunami Sign Plans and tsunami evacuation route maps for couneducational material the first things that people want to ties and cities. Tsunami Sign Plans help assist local agencies communicate information to the public regarding the about historical prepare are Evacuation Routes. tsunami hazard area, evacuation routes, and pre-determined evacuation sites. tsunami. These routes can be displayed on maps and the maps can be placed The CTP works with coastal partners to develop tsunami evacuation routes for specific locations within their ju-Kiosk for the Tsunami in brochures, in kiosks, or used for planning tsunami walks. Walk in Crescent City DROP! COVER! HOLD ON! Official Tsunami Warning How to use Evacuation maps. To support local partners during response operations, the CTP developed Tsunami Playbooks, which are designed ARCATA Evacuation sunami Hazard Map How to Map Use Survive Catomar of Conservation For more information, visit tsunami.gov ers with the opportunity to evacuate only the areas of potential inundation rather than evacuating the entire worst-case scenario THA Map areas. Tailoring the size of the evacuation area to the size of the tsunami will in-Brochures The CTP is able to help prepare coastal communities for future tsunami events because of the close coordination Brochures can include Move from nd partnership between the science programs at CGS and emergency management at Cal OES. Our partnership pared by: 🕃 💟 🤅 nformation about the Hazard Area

risdiction. Once the evacuation routes are determined, they are communicated to the public using maps, brochures, and informational tsunami kiosks designed by a graphic artist to be visually appealing and easy to understand. Local decision-makers can use the evacuation route maps to develop evacuation plans and hold evacuation exercises (Tsunami Walks).

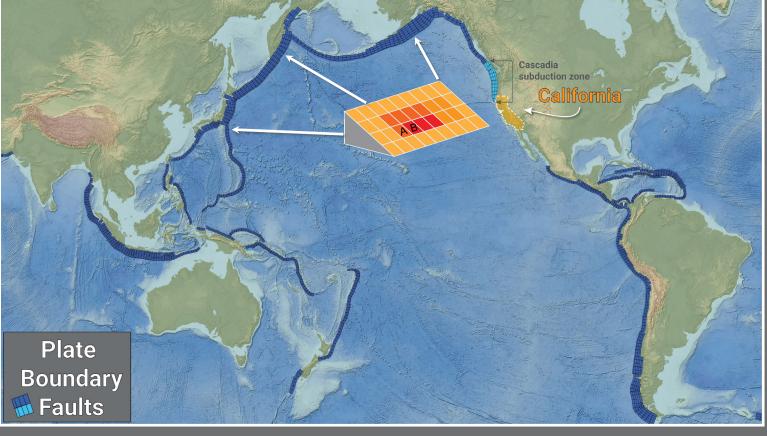
to be used by emergency managers as secondary evacuation areas for small-to-moderate sized distant source tsunamis (see Graehl et al. this session). A phased-approach to tsunami evacuation provides local decision-makcrease the likelihood for safe and orderly evacuation.

s essential to mitigate the tsunami hazard and to meet California's mission to protect lives and property.

Tsunami Hazard Area Maps - the foundation

A. Probabilistic Tsunami Hazard Assessment

Use Tsunami Sources to Model **Tsunami Waves across the Pacific** Basin and then Locally along the coast of California.



Tsunami Inundation Results for Tsunami Events of particular Annual Rates of Recurrence (ARP).



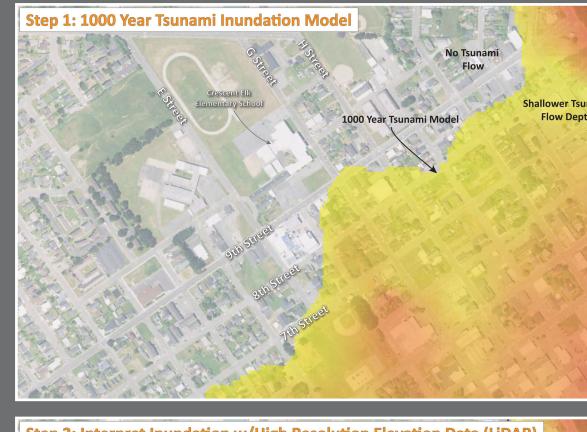
The map above shows the inundation model results for sunami with three rates of recurrence. Note how the sunami with a longer recurrence interval is larger (extends further inland) than the tsunami with a shorter recurrence interval.

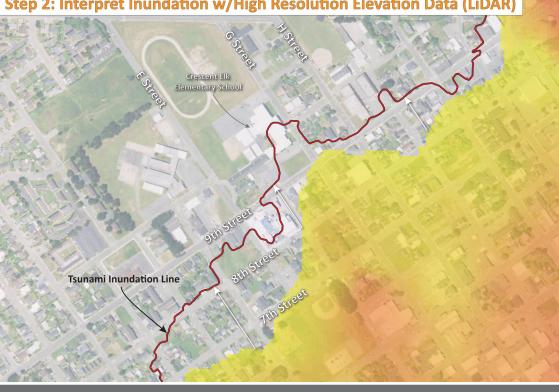
Here is a breakdown of these three annual return periods:

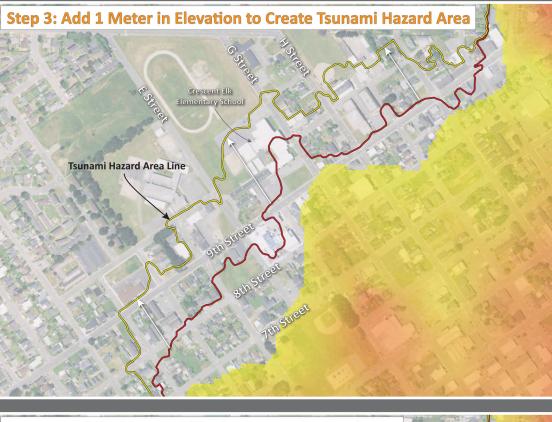
500 yr tsunami = 10% probability of occurence in 50 yrs 1,000 yr tsunami = 5% probability of occurence in 50 yrs 2,500 yr tsunami = 2% probability of occurence in 50 yrs

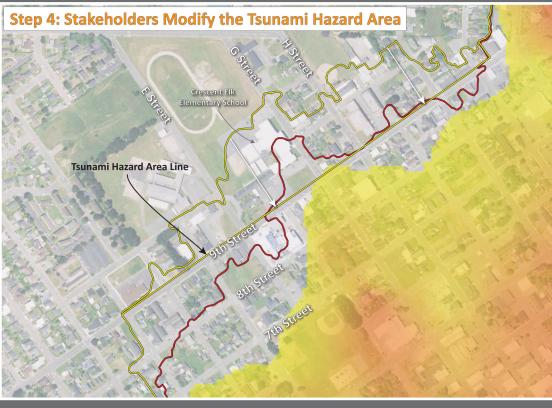
B. Tsunami Hazard Area Mapping

Map the Tsunami Hazard Area.











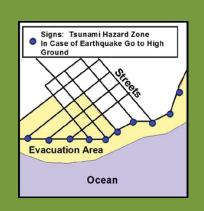


Cal OES

Evacuation Signs & Plans

Tsunami Hazard signs can be placed in key locations to help the public learn when they are entering the Hazard Area, which way to go to evacuate, and when they are leaving the Hazard





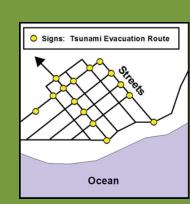
to Outside of

the Hazard Area

Signs: Tsunami Hazard Zone In Case of Earthquake Go to High Ground
May be placed in areas of foot traffic at beaches, parking lots and areas where people gather along the coast.



There is a potential sign location anywhere the evacuation line intersects a road leading into/out of zone.



Signs to be placed on designated roads leading away from coast/shoreline. Spacing/size may be determined by posted speed and sight-distance requirements.

acuation Area

Signs may be placed at predetermined, safe assembly areas, as a destination for public evacuating the coast.







Playbook Phase	Evacuation Elevation (mean sea level)
Phase 1 Evacuation	up to 1m
Phase 2 Evacuation	up to 1.5 m
Phase 3 Evacuation	up to 2.5 m
Phase 4 Evacuation	up to 3.5 m
Maximum Evacuation Phase	entire THA