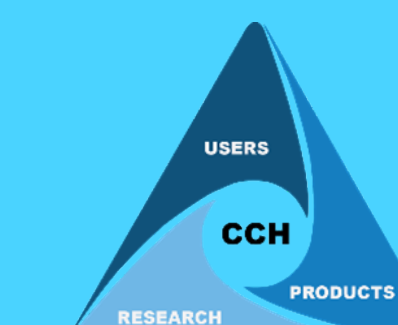


A Vision for a National Coastal Hazards Assessment that Includes Subduction Zone Hazards

Patrick L. Barnard



United States Geological Survey, Pacific Coastal and Marine Science Center, Santa Cruz, CA, USA, pbarnard@usgs.gov



The Problem

With 700 million people living in the coastal zone worldwide, episodic storms, chronic beach erosion, cliff failures, and shallow water tables pose a significant hazard to coastal communities and associated infrastructure, hazards that will be amplified by continued sea level rise and population growth in the coming decades. The Coastal Storm Modeling System (CoSMoS) was developed to provide an assessment of climate-driven coastal hazards, and is currently building toward national coverage. However, to develop comprehensive hazard plans and make effective investments in adaptation, managers and policy makers need to understand the full suite of natural hazards facing coastal communities. Beyond climate-related hazards, geohazards related to coseismic (e.g., tsunamis, liquefaction, landslides) and interseismic hazards (e.g., subsidence) can also increase community risk exposure. Further, information on the range of natural hazards impacting coastal communities is often scattered across a variety of web tools, or buried in reports and journal publications. Therefore, it is imperative that the USGS deliver streamlined, accessible, and actionable tools that communicate the full extent of coastal risk over the next century to support effective local, regional, and national planning.

The Approach

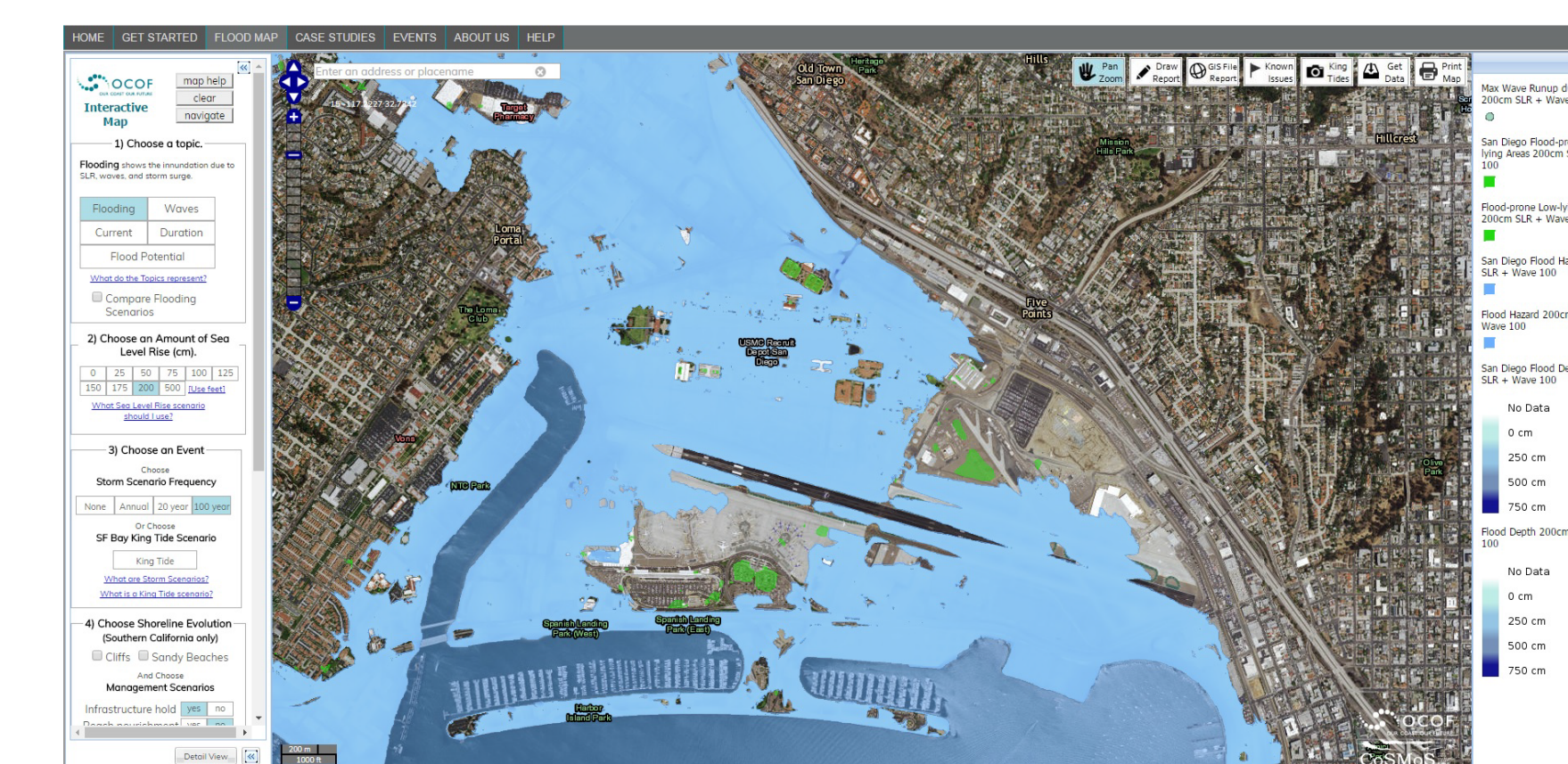
CMHRP is developing regional climate-driven coastal hazard modeling efforts based on the coastal setting, but maintaining a consistent approach for boundary conditions, sea level rise and storm scenarios, and end products. In each case we are integrating observations, global climate models, and a series of state-of-the-art oceanographic models for tides, waves, and storm surge to assess coastal flooding, erosion, and groundwater hazards for the 21st century for coastal communities across the United States. All the projections are served up on the Hazard Exposure Reporting and Analytics (HERA: www.usgs.gov/apps/hera) web tool. Further, we are working with communities to identify user needs and customize products to directly support planning and decision-making on the ground. The goal is to have complete, national coverage in 5 years.

Consistent Scenarios

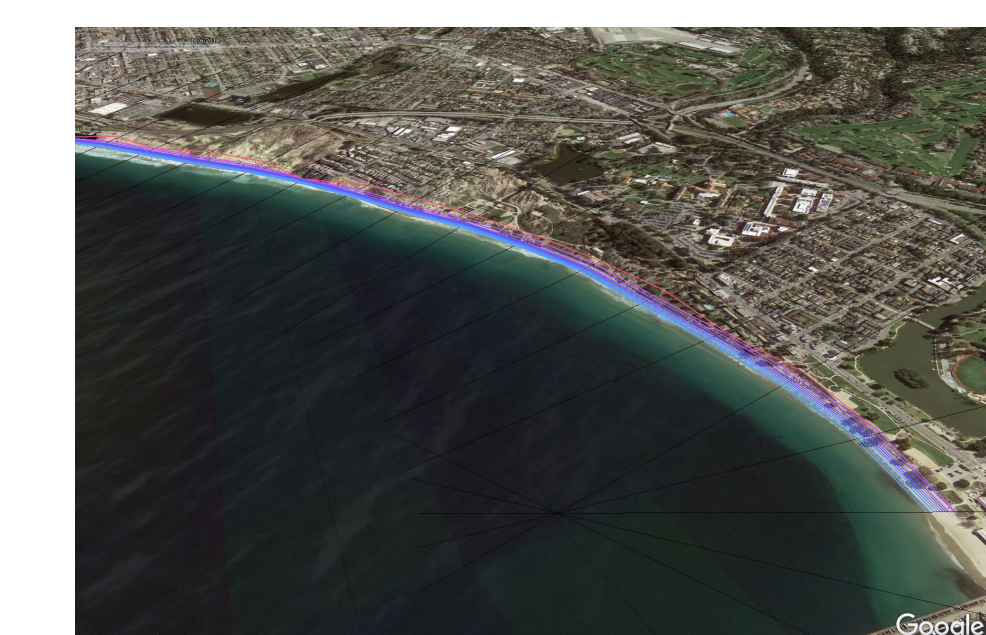
Sea level rise: 0, +0.25, +0.5, +1.0, +1.5, +2.0, and +3.0 m
Storms: daily, annual, 20- and 100-yr

Current Products

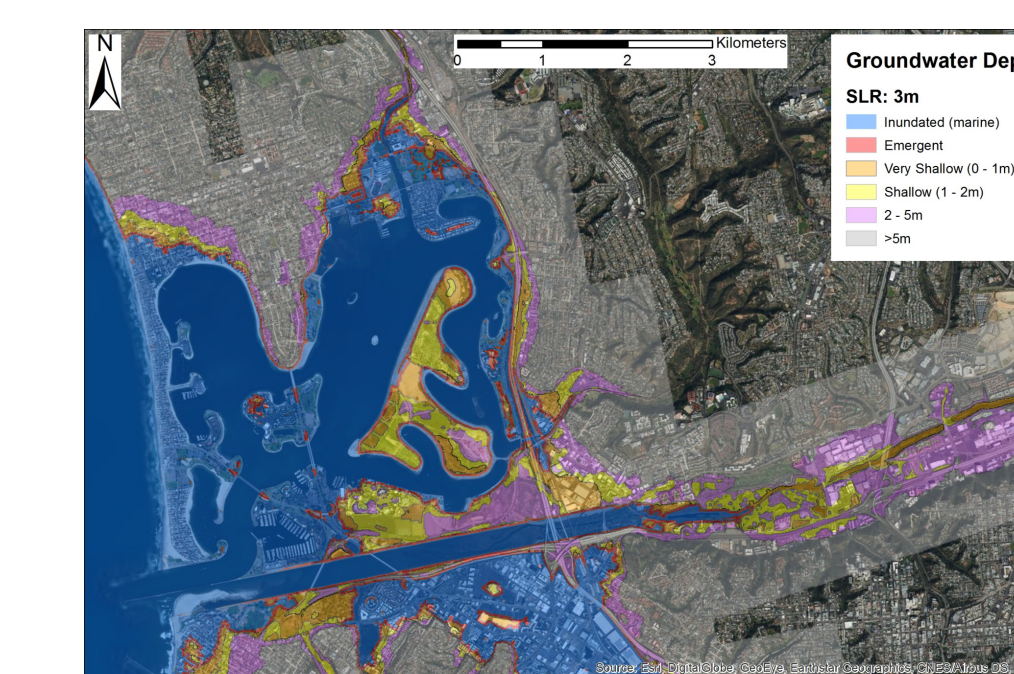
- Flood extent, depth, duration and uncertainty for 28 unique SLR and storm scenarios



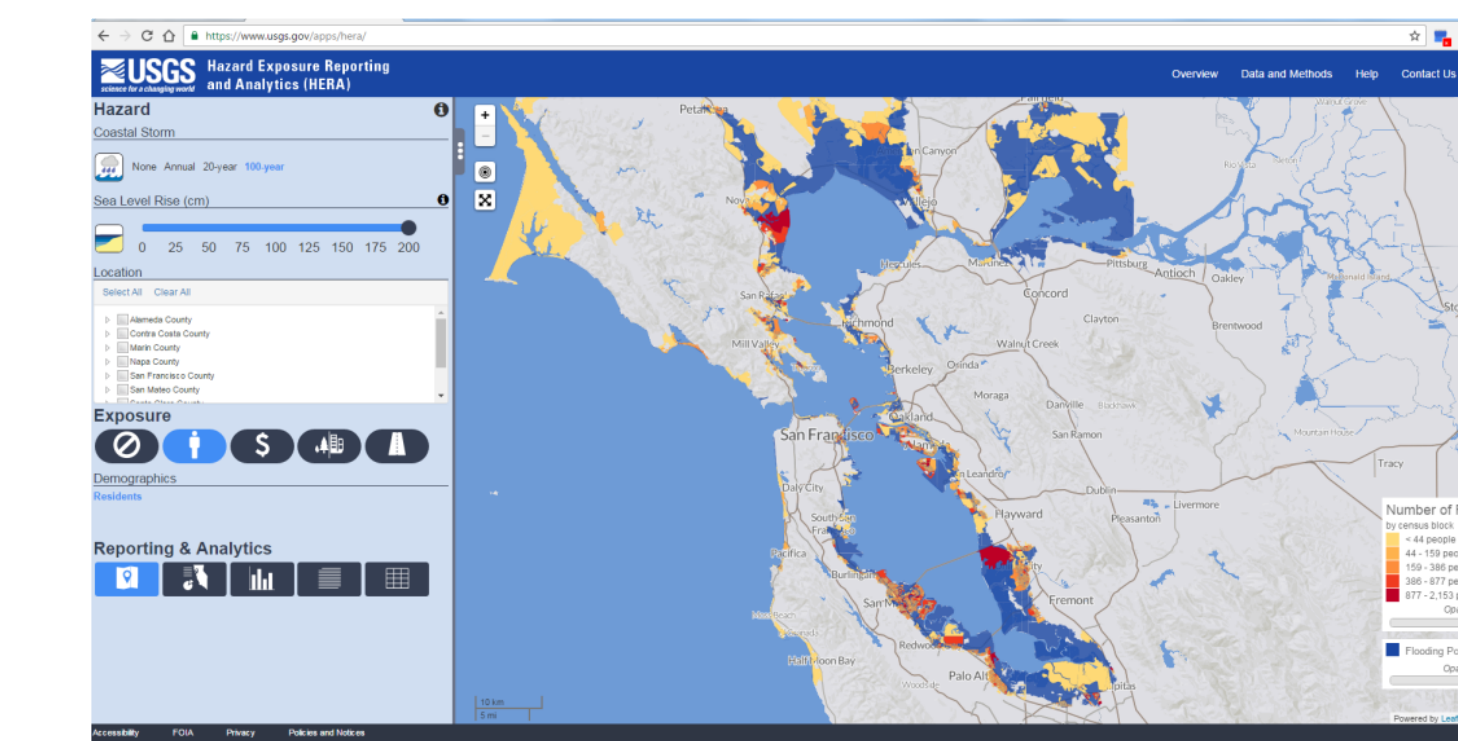
- Future erosion hazard zones for the 7 SLR scenarios



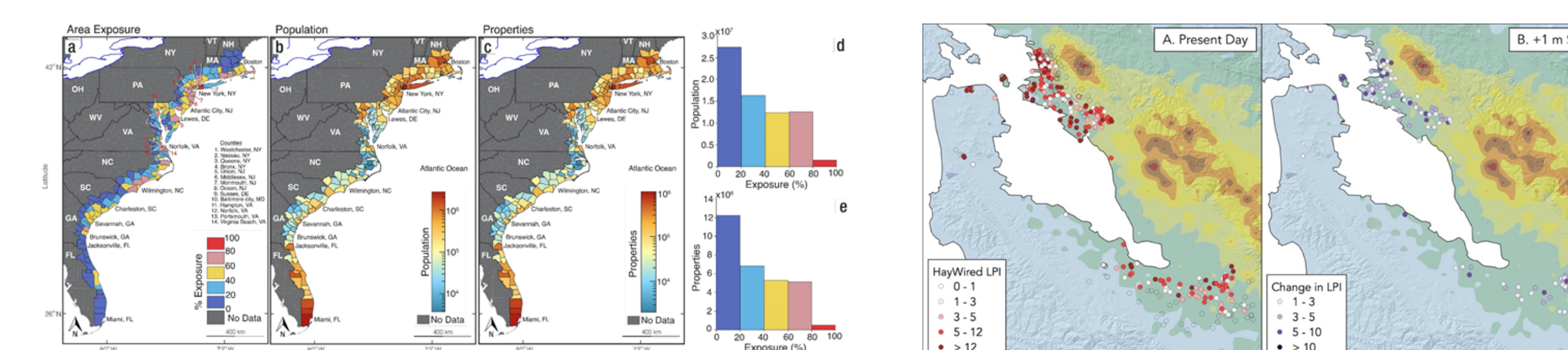
- Depth to water table for the 7 SLR scenarios



- Hazards zones translated into socioeconomic impacts per the Hazard Exposure Reporting and Analytics (HERA) tool



- Pilot work on interseismic subsidence (left) and the influence of rising water tables on liquefaction risk (right)

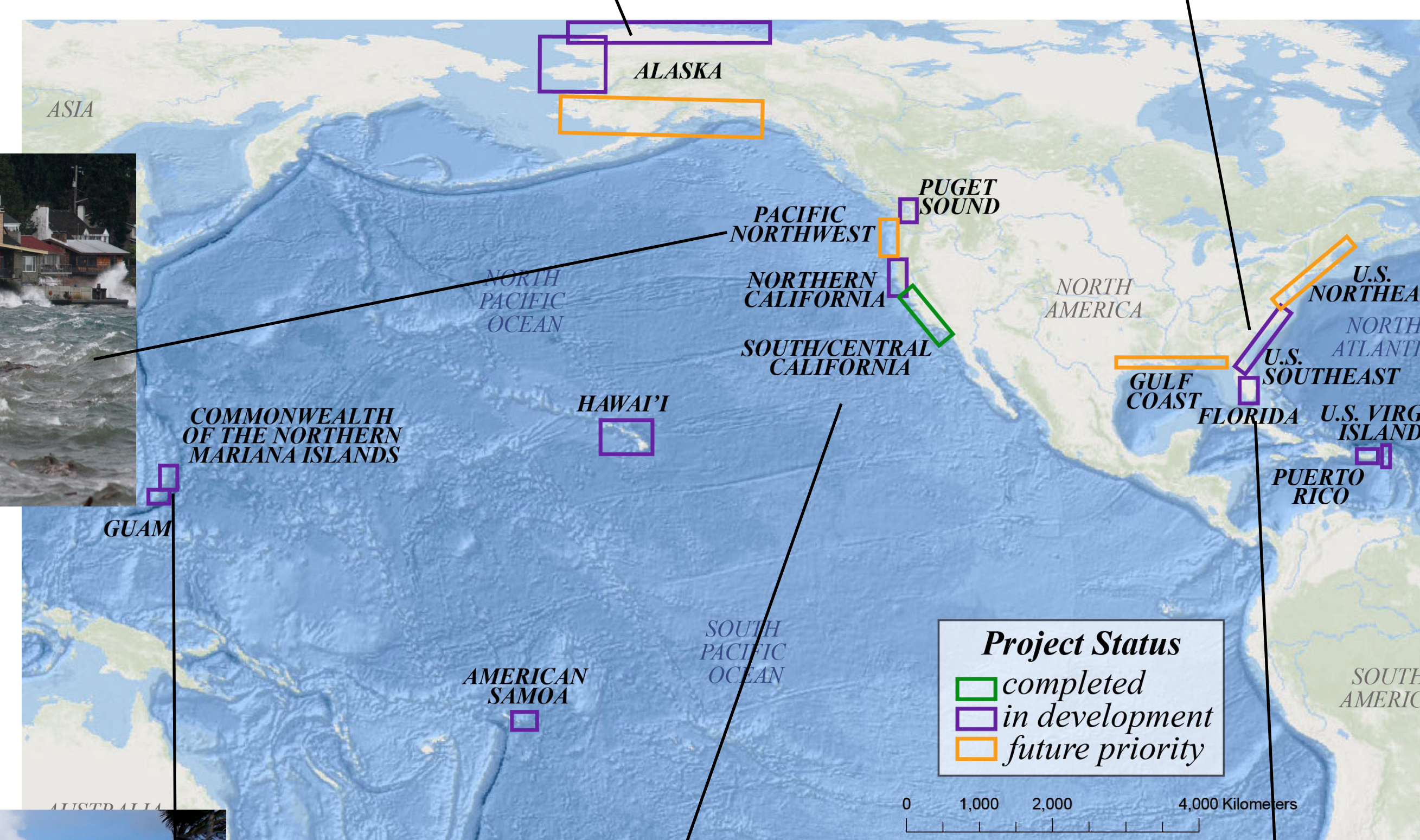
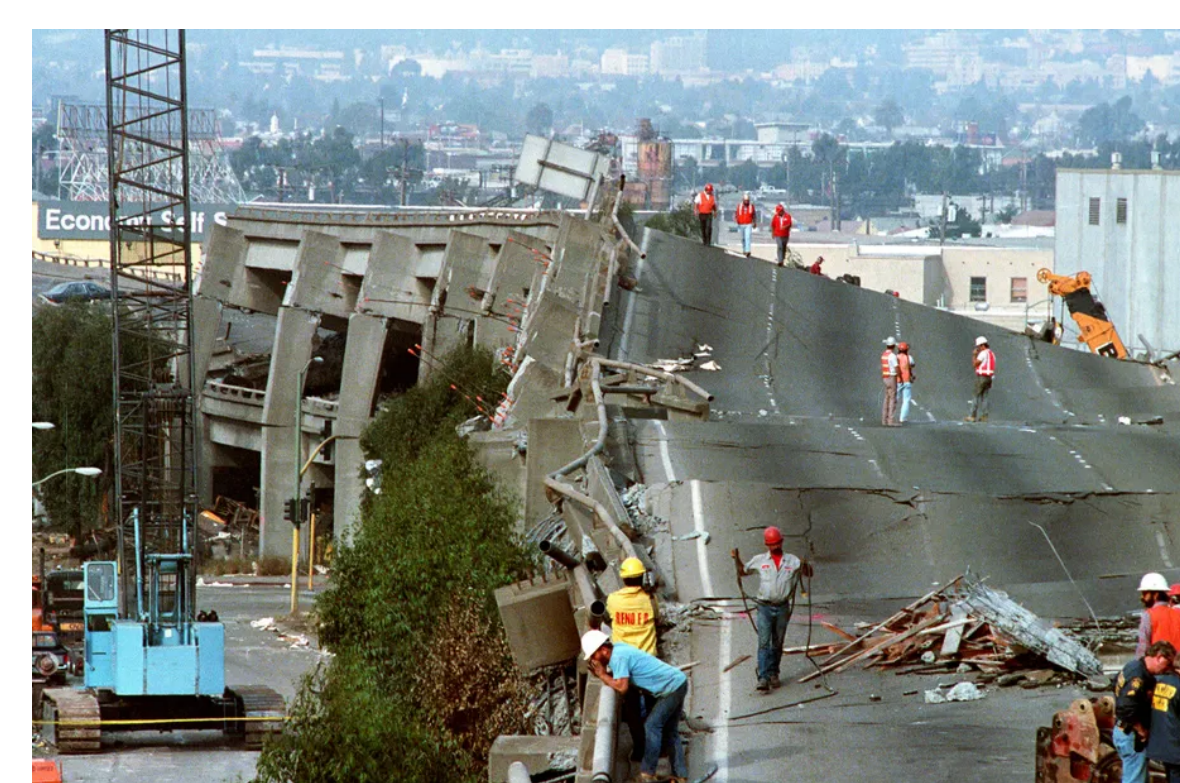


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Additional Information

- USGS CMHRP: www.usgs.gov/natural-hazards/coastal-marine-hazards-and-resources
- Coastal Storm Modeling System (CoSMoS): www.usgs.gov/cosmos/
- Hazard Exposure Reporting and Analytics (HERA) tool: www.usgs.gov/apps/hera
- Coastal National Elevation Dataset (CoNED): https://topotools.cr.usgs.gov/topobathy_viewer/
- USGS Coastal Change Hazards Portal: <https://marine.usgs.gov/coastalchangehazardsportal/>



The Solution

The Natural Hazards Mission Area has been developing applied research products for decades across a range of coastal settings, including low-lying dune-backed coasts, active tectonic margins (including subduction zones), permafrost coasts, and coral reef-lined islands and atolls. However, the products have been stovepiped, with minimal integration and coordination across programs. The ideal solution to support coastal communities would be to develop an integrated product with national scope that assesses all risks to natural hazards in a single location. This requires coordination among the Coastal Change Hazards and Marine Geohazards groups within the Coastal and Marine Hazards and Resources Program (CMHRP), as well as with the Earthquake Hazards and Landslide Hazards Programs. The products could be served up in a well established web tool.