

## **Abstract**

The city of Hilo, Hawaii is more vulnerable to tsunamis than any other location in the United States. Due to the unique bathymetry, topography, and location relative to the Cascadia Subduction Zone, in the future, Hilo could be struck by a large tsunami similar to the historic 1946 and 1960 events. The Cascadia Subduction Zone can produce a 9.5 M earthquake with the potential of generating a tsunami with maximum wave heights of over 29 feet. Before devastating economic loss occurs, it is imperative that such potential flood inundation and consequent dollar exposure are understood. This study compares the Joint Research Centre's (JRC) Scenarios for Hazard-induced Emergencies Management (SCHEMA) flood model implemented using ArcGIS with the Federal Emergency Management Agency's (FEMA) Hazards-United States (HAZUS) flood model to simulate the potential impact of a large-scale tsunami on the city of Hilo. The SCHEMA and HAZUS models, the National Oceanic and Atmospheric Administration (NOAA), and the State of Hawaii provided the spatial data required to build the financial and structural inventory database for these analyses. Field measurements recorded during the 1946 and 1960 tsunamis and corresponding historical inundation maps provided input into the models. The results of this research suggest that although the SCHEMA model has the benefit of being more customizable, the HAZUS inundation scenario can be implemented with fewer input data and produce results comparable to historical damages. Future work will involve refining the inundation scenarios to include more detailed input data such as historical terrain (digital elevation models), field-verified updates to the structural inventory database, and an increased number of predicted events based on wave height.