New tool provides wave flooding predictions for West Maui

August 19 2022

Kahana Sunset wave action at seawall. Credit: Carol Tu'ua.

A new interactive mapping tool provides predictions of coastal flooding in West Maui under various scenarios of sea-level rise and a range of wave events for community members, property owners, businesses, as well as state and county officials. The West Maui Wave-Driven Flooding With Sea Level Rise tool was created by researchers at the Pacific Islands Ocean Observing System (PacIOOS) based at the University of Hawai‘i at Mānoa.

The combination of high sea levels and large swells can result in significant coastal erosion, damage to infrastructure and properties, and land-based sedimentation that impairs coastal water quality. Hawai‘i has experienced an increase in wave plus tide-driven flooding in recent years, and these events are expected to grow in numbers and duration due to sea-level rise and changing wave energies.

"Along with other planning tools, we hope these scenarios that are tailored for West Maui will be useful to inform land use planning," said Tara Owens, co-investigator on the grant that funded this work and extension specialist with UH Sea Grant College Program.

Factors impacting West Maui

The water level—and the associated risk of coastal flooding—in West Maui is impacted by several factors that are included in the flooding product: daily tidal cycles, long-term sea-level rise, moderate to large wave events, and the slowly-oscillating ocean sea level height around Maui (caused in part by El Niño). PacIOOS, based at UH Mānoa's School of Ocean and Earth Science and Technology, created the new West Maui Wave-Driven Flooding With Sea Level Rise tool by adopting a next-generation modeling approach to combine these factors and augment the annual high wave flooding model represented in the State of Hawai‘i Sea Level Rise Viewer.

Keonenui Bay. Credit: Don McLeish

In addition to chronic coastal erosion leading to severe damage of properties, wave overtopping and flooding also pose a major safety concern to infrastructure, in particular to Honoapi‘ilani Highway, the major access corridor to West Maui.

"Coastal managers and planners in Hawai'i rely on science-based information that can support decision making," said County of Maui Coastal Planner Jim Buika. "This scenario-based tool is powerful because it is locally specific and easy to use. It can guide us to promote sustainable land use and environmental protection."

Provided by University of Hawaii at Manoa