

CASE STUDY: Mapping sea-level rise in Honolulu

Rising sea levels along Hawai'i's coastlines will exacerbate many other episodic coastal hazards such as storm surge, tsunami, and hurricane inundation. The threat of rising ocean levels calls for strong leadership and proactive measures from federal, state, and local governments. Mapping the potential impact of sea-level rise provides a basis for developing adaptation guidelines and choosing among a range of coastal land-use policy tools (Culver et al., 2008; Codiga & Wager, 2012). Maps allow communities to assess what needs protection and what form protection should take. Based on stakeholder workshops, agency surveys, and analysis by researchers at the University of Hawai'i, Codiga and Wager conclude that Hawai'i is likely to experience a sea-level rise of around 1 foot by 2050 and around 3 feet by the end of this century (Figure 3.18). Local and regional decision-makers, land-use planners, and managers should consider this forecast as a guideline for development planning (e.g., *SLR Policy Toolkit* <http://seagrant.soest.hawaii.edu/publications>)

Using these estimates combined with digital elevation models, the University of Hawai'i Coastal Geology Group has developed maps to help visualize the impact of elevated sea level on the island of O'ahu (see Figures below). This work suggests that segments of shoreline and numerous low-lying inland areas will fall below the high-tide line later in the century as sea levels rise.

Low-lying areas that are not submerged will be increasingly vulnerable to inundation by high waves, storms, tsunami, coastal flooding, and extreme tides. Along the shoreline, the impacts are already being observed, and include beach erosion and waves reaching over seawalls and other structures with increased frequency and magnitude. In areas of Honolulu and Waikiki within five to eight blocks of the ocean, there is the potential for basements to flood, ground floors to be splashed by storm wave runup, seawater to come out of the storm drains, and increased flooding following heavy rains.



Figure 3.18. Waikiki District: Areas shaded in blue on the left lie at or below 0.3 m above the current high-tide line; areas shaded in blue on the right lie at or below 0.9 m above the current high-tide line. Thin white line is the current shoreline. Maps courtesy of University of Hawai'i Coastal Geology Group.