

## WAIMEA AREA DESCRIPTION

Waimea Bay is located on the north shore of O‘ahu. The shoreline is composed of carbonate sand, limestone, and basalt. The area is exposed to winter swells from the north and northwest, and persistent easterly tradewind waves characterize the open ocean beyond the mouth of the bay year-round.

Removal of beach sand at Waimea Bay (transects 0 - 26) in the mid 1900's has resulted in a landward shift of the shoreline of over 200 ft. Survey charts and aerial photographs from 1884 - 1928 show the shoreline (low water mark) was previously seaward of Table Rock. Mining operations are visible in 1949 air photos. To calculate rates that better represent modern shoreline behavior, the 1928 and 1949 shorelines (during sand mining) were omitted from calculations for transects 0-26. With sand mining removed, the long-term (1967 - 2015) average shoreline change rate calculated for Waimea Bay indicates accretion of 0.5 ft/yr. However, uncertainties are large due to seasonal exposure to large winter swell (erosive) and year-round tradewind waves (aids beach recovery in the absence of large winter swell). Waimea Bay is famous for big-wave surfing and temporary erosion and run-up from large winter waves is a significant hazard.

Past studies by Hwang (1981) and Sea Engineering (1988) attribute historical sand loss at Waimea to mining but also implicate the 1946 tsunami and 1969 large swell events as possible causes. However, it is not known if tsunamis are typically erosive and the time series of shoreline positions (low water marks) do not reveal major erosion between 1967 and 1971. In addition, recent shorelines, including 2015, are seaward of the 1971 shoreline indicating the 1969 swell did not cause long-term beach loss.

The beach at Three Tables (transects 27 - 31) has experienced moderate rates of erosion at an average -0.6 ft/yr since 1928. Short term erosion and run-up from large winter waves is a significant hazard to shore-front homes and Kamehameha Highway.

For more information see: <http://www.soest.hawaii.edu/asp/coasts/oahu/index.asp>

<sup>1</sup> Hwang, D. (1981) "Beach changes on O‘ahu as revealed by aerial photographs", State of Hawaii, Department of Planning and Economic Development.

<sup>2</sup> Sea Engineering, Inc. (1988) "O‘ahu shoreline study", City and County of Honolulu, Department of Land Utilization.

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