Waiehu, Maui, Hawaii

Smoothed Erosion Rates

Produced for the County of Maui by:
Coastal Geology Group
Department of Geology and Geophysics
School of Ocean and Earth Science and Technology
University of Hawaii at Manoa
1680 East - West Road
Honolulu, Hawaii 96822

Published under
Contract No. G0605.

The Waiehu study area extends from Waiehu Beach Park southeast to include Puuone. The shoreline is comprised of sand and cobble beach interspersed with hardened shoreline. Offshore is a fringing reef system buffering the shoreline from the large seasonal north swell. Waiehu Point and Nehe Point are dominant geographic features in this area and conveniently divide the study area into three sections for description purposes.

The area as a whole has experienced light erosion over time with an average AEHR of -0.6 ft/yr. West of Waiehu Point is Waiehu Beach (transects 1 - 57). Waiehu Beach Park is located to the southeast of Waiehu Municipal Golf Course, built in 1928. The narrow white sand beach fronting the park begins at a boulder retaining wall constructed to protect the golf course from erosion. This section of the study area has experienced light to moderate erosion over time with an average AEHR of -0.9 ft/yr.

Kaehu Beach (transects 58 - 104) is located between Waiehu Point and Nehe Point. Kaehu Beach is a curving dark sand beach. This section of coastline is known for its strong rip currents running through several sand channels during large north swell events. This area has experienced light erosion over time with an average AEHR of -0.2 ft/yr.

Paukukalo beach (transects 121 - 197) extends from Nehe Point to the east end of Puuone. This beach fronts a residential neighborhood and light industrial park. This section of shoreline, cobble beach with rock rubble and boulders offshore, has experienced light to moderate erosion with an average AEHR of -0.5 ft/yr.

Overall, average beach width, the average horizontal distance from the vegetation line to the low water mark, in the Waiehu study area has decreased 32% between 1960 and 2002. Waiehu beach has experienced a 38% decrease in average beach width. Kaehu Beach and Paukakulo Beach have each decreased 24% between 1960 and 2002.

HISTORICAL SHORELINES

- 1899
- 1912
- 1929
- Oct 1960
- Mar 1975
- Aug 1987
- Mar 1988
- May 1997
- Feb 2002
- Erosion rate measurement locations (shore normal transects)

Historical beach positions, color coded by year, are determined using ortho-rectified and georeferenced aerial photographs and National Ocean Survey (NOS) topographic survey charts. The low water mark is used as the historical shoreline, or shoreline change reference feature (SCRF).

For situations in which there is coastal armoring or rocky shoreline seaward of any vegetation, the vegetation line is drawn along the seaward side of the rock or armoring. If there is no sandy beach in these areas, both the vegetation line and the SCRF are delineated along the mean high water line.

Movement of the SCRF is used to calculate erosion rates along shore-normal transects spaced every 20 m (65 ft) along the shoreline. The 1967 SCRF is not used in the calculation of the AEHR, however it provides a gauge of seasonal uncertainty.

EROSION RATES

Annual Erosion Hazard Rates (AEHR)

Erosion rates are measured every 20 m along the shoreline. These sites are denoted by yellow shore normal transects. The Annual Erosion Hazard Rate (red), is a spatially smoothed center weighted average of calculated erosion rates. Five contiguous transects are incorporated in the smoothing process. The transects are weighted: 1-3-5-3-1 with the smoothed rate assigned to the center transect. The AEHRs are shown on the shore-parallel histogram graph. Colored bars on the graph correspond to shore-normal transects; approximately every fifth transect and bar are numbered. Where necessary, some transects have been purposely deleted during data processing; as a result, transect numbering is not consecutive everywhere. Where complete beach loss has occurred, erosion rate calculations apply only to the time period when a beach existed.

Despite some scatter, shorelines between 1899 and 2002 show a reasonably consistent trend and are used to calculate AEHRs within the Waiehu study area.

Annual Erosion Hazard Rates (ft/yr)

Waiehu Municipal Golf Course

Waiehu Beach Park

Waiehu

Kaehu Beach

Nehe Point

Paukukalo Beach

Puuone

Kahului Harbor Park

Waiehu

Maui

10 mi
10 km

Scale 1:3000

100 0 100 200 300 400 Meters

300 0 300 600 900 1200 Feet

743000m E UTM coordinates
155°39'50" W latitude/longitude coordinates

760400m E 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 762200m E

156°29'40" W 30" 20" 10" 156°29' 156°28'50" W

2316100m N 60 59 20°55'30" N 58 57 56 20" 55 54 53 10" 52 51 50 20°55' 49 48 47 50" 46 45 44 40" 43 42 41 30" 40 39 38 20" 37 36 35 10" 34 33 32 20°54' N 31 30 2312900m N