Alaeloa, Maui, Hawaii

Annual Erosion Hazard Rates

2012
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Scale 1:3000

100 0 100 200 300 400 Meters

300 0 300 600 900 1200 Feet

156°40'40" W 30" 20" 10" 156°40' W 156°39'50" W

741300m E 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 743100m E

2324400m N 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 2221900 m N

21°00'10" N 21°00' N 50" 40" 30" 20" 10" 20°59' N

Alaeloa

Maui

0 10 mi

0 10 km

N

Namalu Bay

Kapalua Bay

Napili Bay

Honokeana Beach

Alaeloa Beach

Keonenui Beach

Haukoe Point

Annual Erosion Hazard Rates (ft/yr)

AEHRs (ft/yr)

1436 1435 1430 1425 1424 1423 1421 1420 1415 1410 1405 1404 1403 1401 1400 1397 1396 1395 1390 1385 1382

0 -1 -2

HISTORICAL SHORELINES

- 1912 T-sheet
- Nov 1949
- 1960 T-sheet
- Mar 1975
- Jul 1987
- Mar 1988
- Dec 1992
- May 1997
- Apr 2007

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 (66 ft) along the shoreline. The 1987 SCRF is not used in the calculation of the Annual Erosion Hazard Rate (AEHR). It is used in determining seasonal uncertainty.

ANNUAL EROSION HAZARD RATES (AEHR)

- Accretion Rate
- Erosion Rate

Historical shoreline positions are measured every 66 ft along the shoreline. These sites are denoted by yellow shore-perpendicular transects. Changes in the position of the shorelines through time are used to calculate shoreline change rates (ft/yr) at each transect location.

Annual erosion hazard rates (AEHR) are shown on the shore-parallel graph. Red bars on the graph indicate a trend of beach erosion, while blue bars indicate a trend of accretion. Approximately every fifth transect and bar of the graph is numbered. Where necessary, transects have been purposely deleted to maintain consistent along-shore spacing. As a result transect numbering is not consecutive everywhere.

The Single Transect (ST) method (Genz et al., 2009) is used to calculate erosion hazard rates for the study area. The rates are smoothed alongshore using a 1-3-5-3-1 technique to normalize rate differences on adjacent transects. For more information on erosion rate methods and results see: http://www.soest.hawaii.edu/coasts/erosion/index.php

Genz*, A.S., Frazer, L.N., and Fletcher, C.H. (2009) Toward parsimony in shoreline change prediction (II): Applying basis function methods to real and synthetic data. Journal of Coastal Research, vol. 25, no. 2: 380-392.

The Alaeloa study area extends from Haukoe Point in the south to Namalu Bay in the north. This area is a series of bays and coves with small white sand and cobble and sand pocket beaches interspersed. Offshore is basaltic hard bottom and sand.

As a whole, the area has experienced moderate to high erosion since 1912 with an average AEHR of -0.8 ft/yr. Keonenui Beach (transects 1382 - 1396) is partially backed by a revetment constructed prior to 1960 to protect private property. The beach has experienced moderate erosion over time with an average AEHR of -0.9 ft/yr. To the north, Alaeloa Beach (transect 1397) occupies a small cove and has experienced light erosion with an AEHR of -0.3 ft/yr. Honokeana Bay (transects 1401 - 1403) is comprised of cobble and sand. It has experienced moderate erosion with an average AEHR of -0.7 ft/yr. Napili Bay (transects 1404 - 1421) has experienced moderate erosion over time with an average AEHR of -0.7 ft/yr. Kapalua Bay (transects 1423 - 1435) has experienced moderate erosion since 1912 with an average AEHR of –0.8 ft/yr.

Average beach width, the average horizontal distance from the vegetation line to the low water mark, within the Alaeloa area has decreased 34% between 1949 and 2007. At Keonenui Beach, average beach width has decreased 46% between 1949 and 2007, while average beach width at Alaeloa Beach has decreased 17% for the same time period. Average beach width at both Honokeana and Napili Bays has decreased 47% and 29% respectively between 1949 and 2007. Average beach width at Kapalua Bay has decreased 30% between 1949 and 2007.

2291500m N UTM coordinates

156°27'10" W latitude/longitude coordinates

TRANSECT	AEHR (ft/yr)
1382	-0.761
1383	-0.764
1384	-0.797
1385	-0.853
1386	-0.909
1387	-0.942
1388	-0.949
1389	-0.933
1390	-0.916
1391	-0.932
1392	-0.996
1393	-0.961
1394	-0.890
1395	-0.876
1396	-0.941
1397	-0.339
1400	-0.929
1401	-0.742
1402	-0.741
1403	-0.727
1404	-0.972
1405	-0.955
1406	-0.893
1407	-0.820
1408	-0.767
1409	-0.739
1410	-0.728
1411	-0.715
1412	-0.675
1413	-0.613
1414	-0.549
1415	-0.499
1416	-0.476
1417	-0.472
1418	-0.472
1419	-0.474
1420	-0.479
1421	-0.484
1423	-0.740
1424	-0.807
1425	-0.833
1426	-0.849
1427	-0.878
1428	-0.925
1429	-0.951
1430	-0.909
1431	-0.812
1432	-0.752
1433	-0.744
1434	-0.755
1435	-0.785
1436	-0.473

Maui Shoreline Atlas 2007