

Hawea and Honolua, Maui, Hawaii

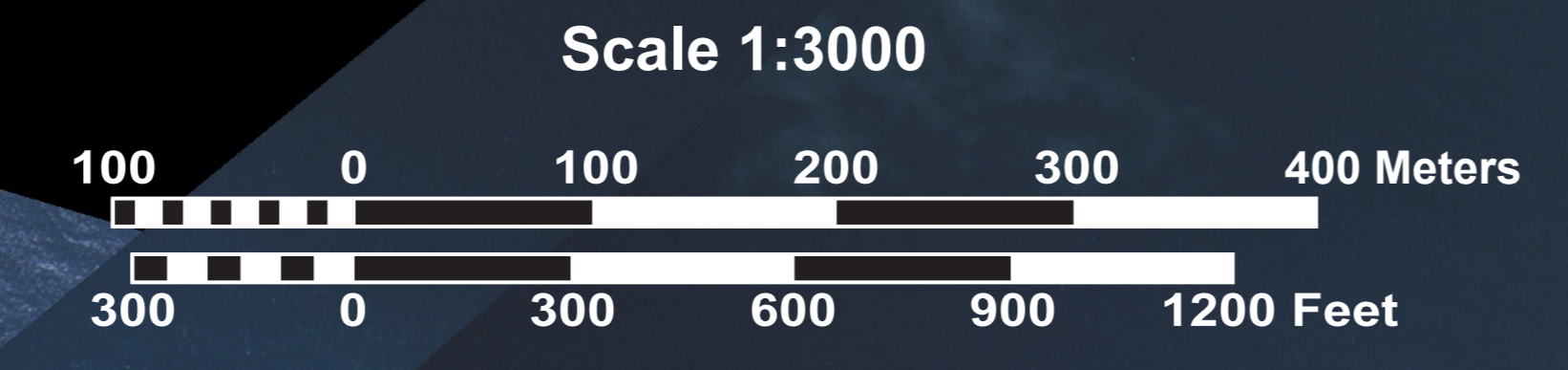
Annual Erosion Hazard Rates

| TRANSECT | AEHR (ft/yr) | TRANSECT | AEHR (ft/yr) |
|----------|--------------|----------|--------------|
| 1438 | -0.688 | 1471 | 0.333 |
| 1439 | -0.588 | 1472 | 0.342 |
| 1440 | -0.408 | 1473 | 0.352 |
| 1441 | 0.237 | 1474 | 0.349 |
| 1442 | 0.166 | 1475 | 0.330 |
| 1443 | 0.081 | 1476 | 0.307 |
| 1444 | -0.007 | 1477 | 0.286 |
| 1445 | -0.059 | 1478 | 0.297 |
| 1446 | -0.094 | 1479 | 0.236 |
| 1447 | -0.132 | 1480 | 0.171 |
| 1448 | -0.149 | 1481 | 0.073 |
| 1449 | -0.112 | 1482 | -0.009 |
| 1450 | -0.021 | 1483 | -0.033 |
| 1451 | 0.083 | 1484 | -0.005 |
| 1452 | 0.155 | 1485 | -0.115 |
| 1453 | 0.183 | 1486 | -0.483 |
| 1454 | 0.189 | 1487 | -1.044 |
| 1455 | 0.184 | 1488 | -1.182 |
| 1456 | 0.148 | 1489 | -1.166 |
| 1457 | 0.076 | 1490 | -1.107 |
| 1458 | 0.010 | 1491 | -1.101 |
| 1459 | -0.024 | 1492 | -1.148 |
| 1460 | -0.038 | 1493 | -1.259 |
| 1461 | -0.036 | 1494 | -1.392 |
| 1462 | -0.663 | 1495 | -1.458 |
| 1463 | -0.395 | 1496 | -1.445 |
| 1464 | -0.176 | 1497 | -0.896 |
| 1465 | -0.006 | 1498 | -0.843 |
| 1466 | 0.105 | 1499 | -0.768 |
| 1467 | 0.193 | 1500 | -0.706 |
| 1468 | 0.258 | 1501 | -0.713 |
| 1469 | 0.298 | 1502 | -0.768 |
| 1470 | 0.323 | | |

The Hawea and Honolua Study area extends from Hawea Point in the west to Honolua Bay in the east. The coastline is comprised of several bays with sand or cobble pocket beaches. Offshore is characterized by rock substrate and sand. The orientation of this coast towards the northwest exposes it to winter swell events. Geographic divisions of bays and pocket beaches offer a convenient layout for describing this area.

As a whole the area (transects 1438 – 1502) has remained relatively stable to slightly erosive since 1912 with an average AEHR of -0.2 ft/yr. Oneloa Beach (transects 1441 - 1461) and D. T. Fleming Beach (transects 1462 - 1486) at Honokahua Bay have both remained relatively stable over time with average AEHRs of 0 and 0.1 ft/yr respectively. Seasonally, these two beaches' profiles change considerably. Mokuleia Beach (transects 1487 - 1496) has experienced moderate to high erosion over time with an average AEHR of -1.2 ft/yr. The beach at Honolua Bay (transects 1497 - 1502) is a cobble and sand beach. It 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 Hawea and Honolua area has increased 18% between 1949 and 2007. At Oneloa Beach, average beach width has increased 3% between 1949 and 2007, while average beach width at D. T. Fleming Beach has increased 31% for the same time period. 1949 coverage does not extend to Mokuleia and Honolua Bays. Average beach width at these beaches has decreased 35% and 27% respectively between 1975 and 2007.



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

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

ANNUAL EROSION HAZARD RATES (AEHR)

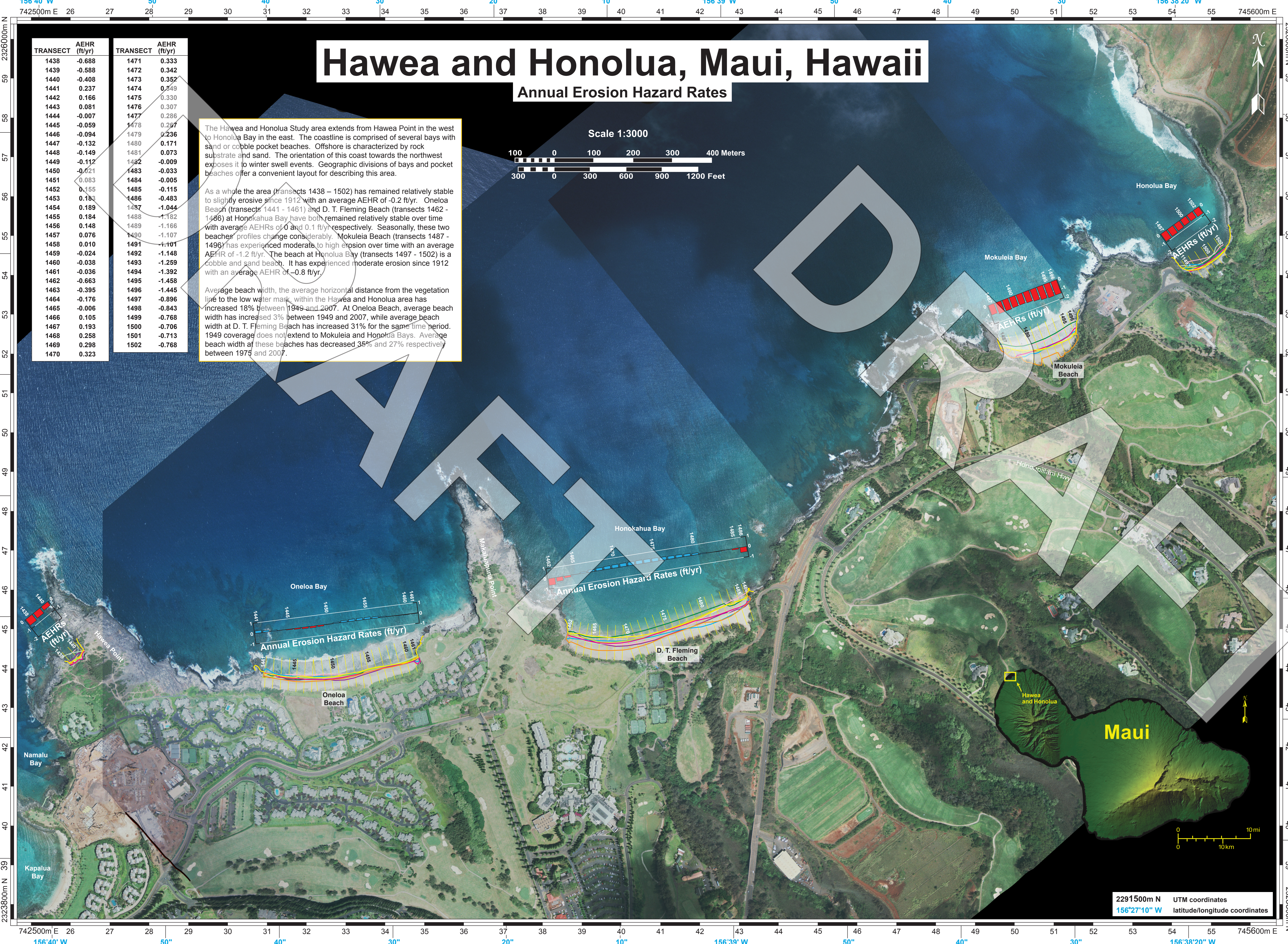
- Accretion Rate
- Erosion Rate

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.



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2291500m N UTM coordinates
 156°27'10" W latitude/longitude coordinates