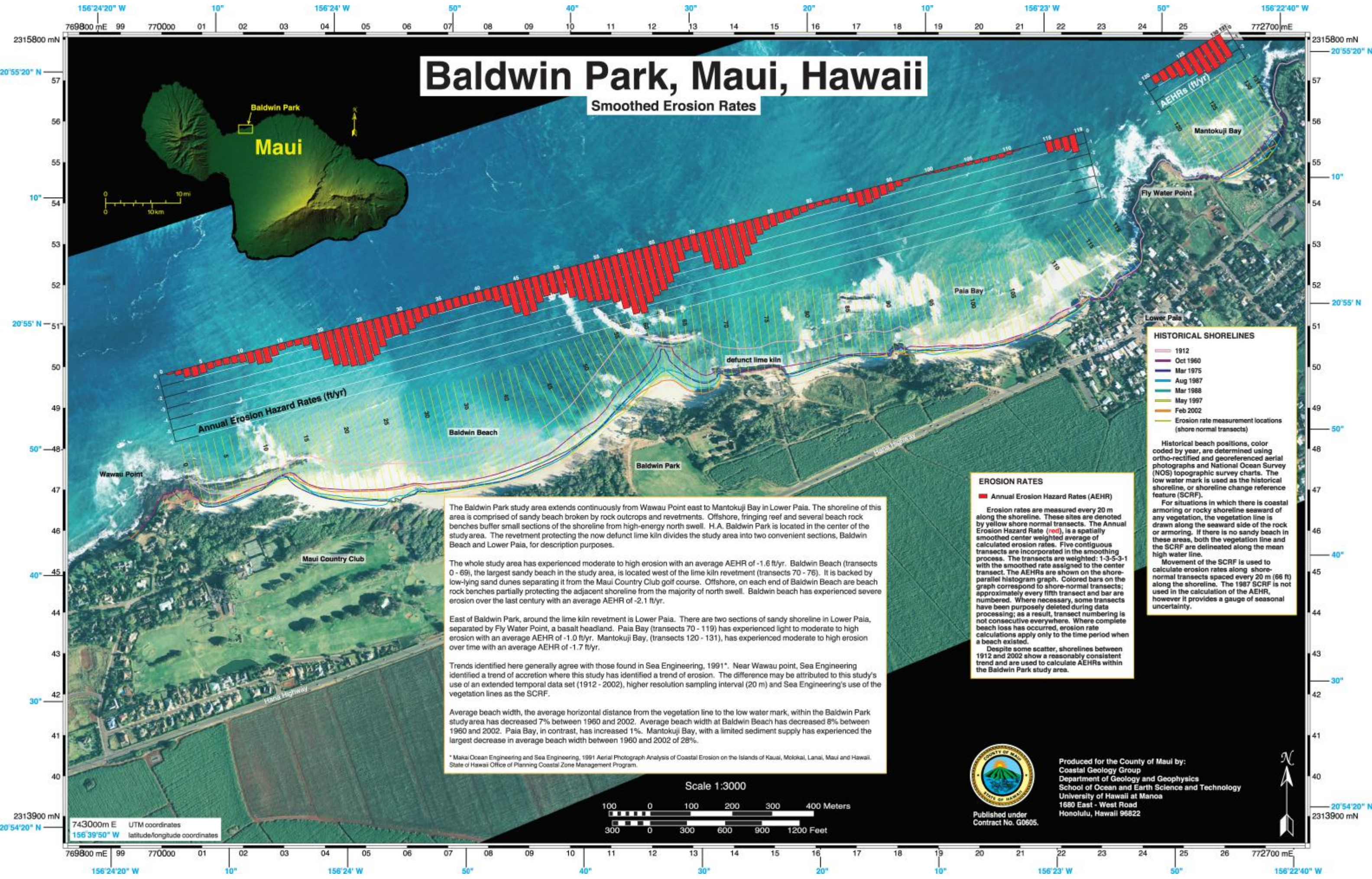


Baldwin Park, Maui, Hawaii

Smoothed Erosion Rates



Annual Erosion Hazard Rates (ft/yr)

HISTORICAL SHORELINES

- 1912
- 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 (66 ft) along the shoreline. The 1987 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 1912 and 2002 show a reasonably consistent trend and are used to calculate AEHRs within the Baldwin Park study area.

The Baldwin Park study area extends continuously from Wawau Point east to Mantokuji Bay in Lower Paia. The shoreline of this area is comprised of sandy beach broken by rock outcrops and revetments. Offshore, fringing reef and several beach rock benches buffer small sections of the shoreline from high-energy north swell. H.A. Baldwin Park is located in the center of the study area. The revetment protecting the now defunct lime kiln divides the study area into two convenient sections, Baldwin Beach and Lower Paia, for description purposes.

The whole study area has experienced moderate to high erosion with an average AEHR of -1.6 ft/yr. Baldwin Beach (transects 0 - 69), the largest sandy beach in the study area, is located west of the lime kiln revetment (transects 70 - 76). It is backed by low-lying sand dunes separating it from the Maui Country Club golf course. Offshore, on each end of Baldwin Beach are beach rock benches partially protecting the adjacent shoreline from the majority of north swell. Baldwin beach has experienced severe erosion over the last century with an average AEHR of -2.1 ft/yr.

East of Baldwin Park, around the lime kiln revetment is Lower Paia. There are two sections of sandy shoreline in Lower Paia, separated by Fly Water Point, a basalt headland. Paia Bay (transects 70 - 119) has experienced light to moderate to high erosion with an average AEHR of -1.0 ft/yr. Mantokuji Bay, (transects 120 - 131), has experienced moderate to high erosion over time with an average AEHR of -1.7 ft/yr.

Trends identified here generally agree with those found in Sea Engineering, 1991*. Near Wawau point, Sea Engineering identified a trend of accretion where this study has identified a trend of erosion. The difference may be attributed to this study's use of an extended temporal data set (1912 - 2002), higher resolution sampling interval (20 m) and Sea Engineering's use of the vegetation lines as the SCRF.

Average beach width, the average horizontal distance from the vegetation line to the low water mark, within the Baldwin Park study area has decreased 7% between 1960 and 2002. Average beach width at Baldwin Beach has decreased 8% between 1960 and 2002. Paia Bay, in contrast, has increased 1%. Mantokuji Bay, with a limited sediment supply has experienced the largest decrease in average beach width between 1960 and 2002 of 28%.

* Makai Ocean Engineering and Sea Engineering, 1991 Aerial Photograph Analysis of Coastal Erosion on the Islands of Kauai, Molokai, Lanai, Maui and Hawaii. State of Hawaii Office of Planning Coastal Zone Management Program.

Scale 1:3000



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.

743000m E UTM coordinates
 156°39'50" W latitude/longitude coordinates