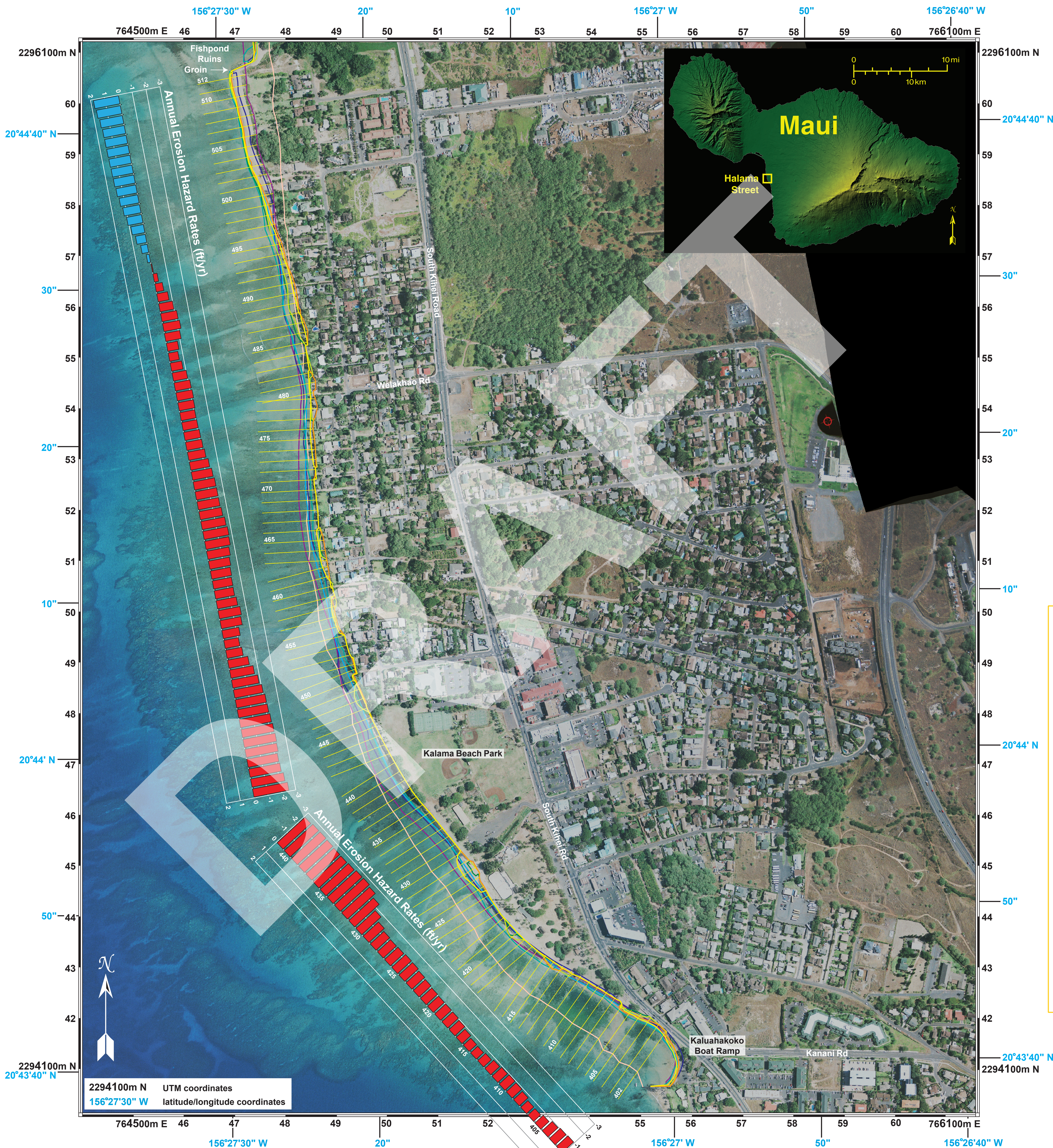


Halama Street, Maui, Hawaii

Annual Erosion Hazard Rates



TRANSECT	AEHR (ft/yr)	TRANSECT	AEHR (ft/yr)	TRANSECT	AEHR (ft/yr)
402	-1.081	454	-1.698	484	-1.016
403	-1.045	455	-1.458	485	-0.823
404	-0.952	456	-1.155	486	-0.688
405	-0.784	457	-1.052	487	-0.799
406	-0.673	458	-1.217	488	-1.097
407	-0.688	459	-1.501	489	-1.224
408	-0.833	460	-1.577	490	-1.157
409	-0.919	461	-1.447	491	-0.990
410	-0.942	462	-1.360	492	-0.777
411	-0.910	463	-1.374	493	-0.537
412	-0.846	464	-1.426	494	-0.299
413	-0.749	465	-1.502	495	-0.060
414	-0.679	466	-1.610	496	0.208
415	-0.707	467	-1.743	497	0.471
416	-0.830	468	-1.781	498	0.705
417	-0.947	469	-1.715	499	0.901
418	-1.017	470	-1.611	500	1.071
419	-1.037	471	-1.553	501	1.211
420	-1.040	472	-1.551	502	1.333
421	-1.076	473	-1.537	503	1.425
422	-1.139	474	-1.470	504	1.475
423	-1.210	475	-1.357	505	1.496
424	-1.285	476	-1.232	506	1.520
425	-1.308	477	-1.161	507	1.536
426	-1.262	478	-1.129	508	1.547
427	-1.241	479	-1.085	509	1.562
428	-1.285	480	-1.073	510	1.622
429	-1.452	481	-1.125	511	1.727
430	-1.826	482	-1.165	512	1.803
431	-2.324	483	-1.140		
432	-2.636				
433	-2.749				
434	-2.734				
435	-2.669				
436	-2.637				
437	-2.649				
438	-2.687				
439	-2.713				
440	-2.700				
441	-2.628				
442	-2.520				
443	-2.369				
444	-2.241				
445	-2.206				
446	-2.293				
447	-2.319				
448	-2.278				
449	-2.222				
450	-2.164				
451	-2.140				
452	-2.042				
453	-1.885				

AREA DESCRIPTION

The Halama Street study area (transects 402 - 512) is located on the south shore of Maui between the ruins of a Hawaiian fishpond and a groin in the north and Kaluahakoko Boat Ramp in the south. The shoreline is exposed to southerly swell in summer and Kona storm waves. A shallow fringing reef protects the shoreline from the full energy of open-ocean waves.

The central and southern portions of the Halama Street study area (transects 402 - 495) are characterized by chronic erosion and beach loss. Little or no beach has existed between transects 402 - 450 since the 1970's, transects 451 - 484 since the 1980's, and transects 485 - 495 since the 1990's. Waves break against revetments in this area at high tide. Only intermittent pockets of sand are found in small openings and at the base of revetments in this area in the 2007 air photos. For areas where the beach has been lost to erosion, shoreline change rates are calculated up to and including the first shoreline with no beach and show the rate at which the beach disappeared. The beach in the north of the study area (transects 496 - 512) has accreted against the south side of a groin at an average rate of 1.27 ft/yr. Expanding beach loss toward the north and accretion against the south side of the groin suggests that predominant sediment transport is to the north and that there is a threat of continued expansion of the extent of erosion and beach loss toward the north.

HISTORICAL SHORELINES

- 1912 T-sheet
- Nov 1949
- Oct 1960
- Feb 1963
- Mar 1975
- Jul 1987
- Mar 1988
- 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>

Genz¹, 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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