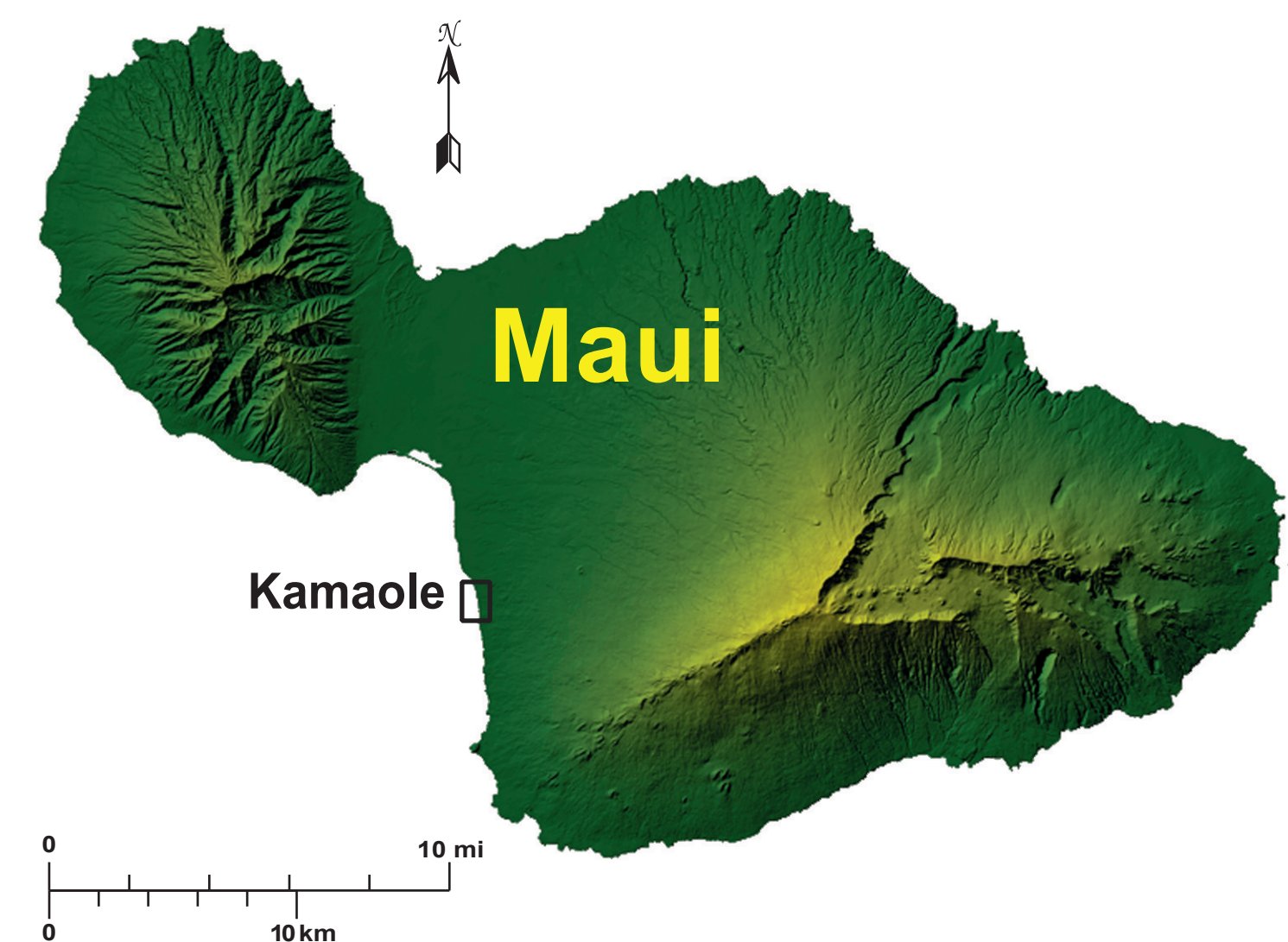
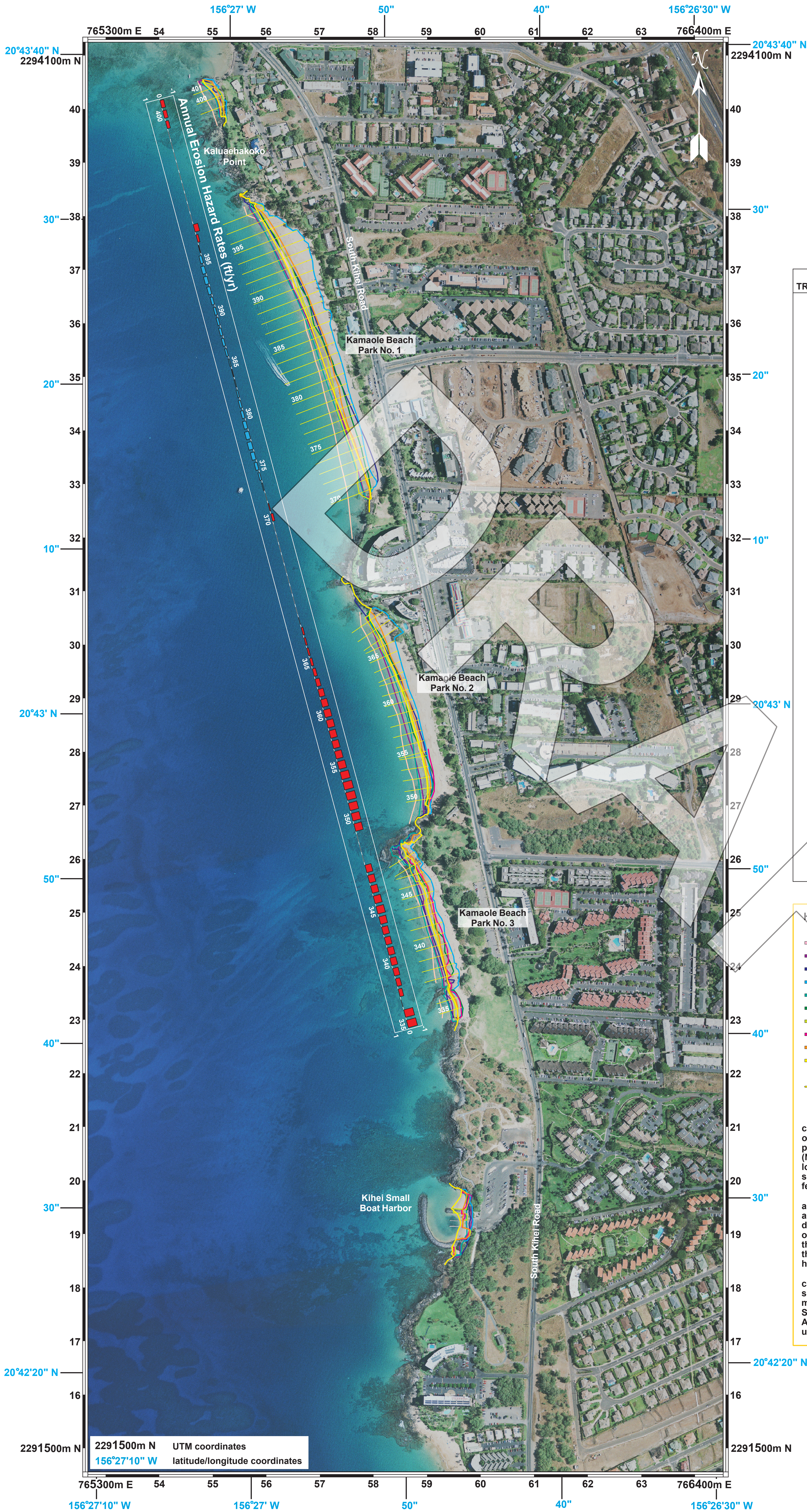


# Kamaole, Maui, Hawaii

## Annual Erosion Hazard Rates



TRANSECT	AEHR (ft/yr)	TRANSECT	AEHR (ft/yr)
335	-0.664	382	0.100
336	-0.654	383	0.055
337	-0.272	384	0.042
338	-0.319	385	0.074
339	-0.385	386	0.130
340	-0.432	387	0.167
341	-0.439	388	0.161
342	-0.420	389	0.146
343	-0.441	390	0.151
344	-0.499	391	0.179
345	-0.542	392	0.219
346	-0.514	393	0.253
347	-0.472	394	0.248
348	-0.445	395	0.183
349	-0.442	396	0.034
350	-0.538	397	-0.153
351	-0.570	398	-0.334
352	-0.612	399	-0.219
353	-0.646	400	-0.256
354	-0.642	401	-0.273
355	-0.604		
356	-0.538		
357	-0.493		
358	-0.466		
359	-0.470		
360	-0.486		
361	-0.477		
362	-0.436		
363	-0.375		
364	-0.300		
365	-0.225		
366	-0.167		
367	-0.117		
368	-0.110		
369	-0.121		
370	-0.166		
371	-0.062		
372	0.001		
373	0.059		
374	0.120		
375	0.199		
376	0.270		
377	0.305		
378	0.292		
379	0.240		
380	0.186		
381	0.147		

**AREA DESCRIPTION**

The Kamaole study area (transects 335 - 401) is located on the south shore of Maui between Kihel Small Boat Harbor and Kaluaehakoko Point. Basalt headlands separate the calcareous sand beaches at Kamaole Beach Parks 1, 2, and 3, and a narrow pocket beach north of Kaluaehakoko Point. The shoreline in this area is exposed to south swell in summer and Kona storm waves.

The beach at Kamaole Beach Park 1 (transects 370 - 398) has been relatively stable since 1912 with an average AEHR of 0.1 ft/yr. The beaches at Kamaole Beach Parks 2 (transects 350 - 369) and 3 (transects 335 - 349) have experienced moderate erosion with average AEHRs of -0.4 ft/yr and -0.5 ft/yr, respectively. In addition to this long-term trend of erosion, periodic erosion from large waves is a significant hazard along this portion of coast, indicated by the February 1963 historical shoreline position.

**HISTORICAL SHORELINES**

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

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