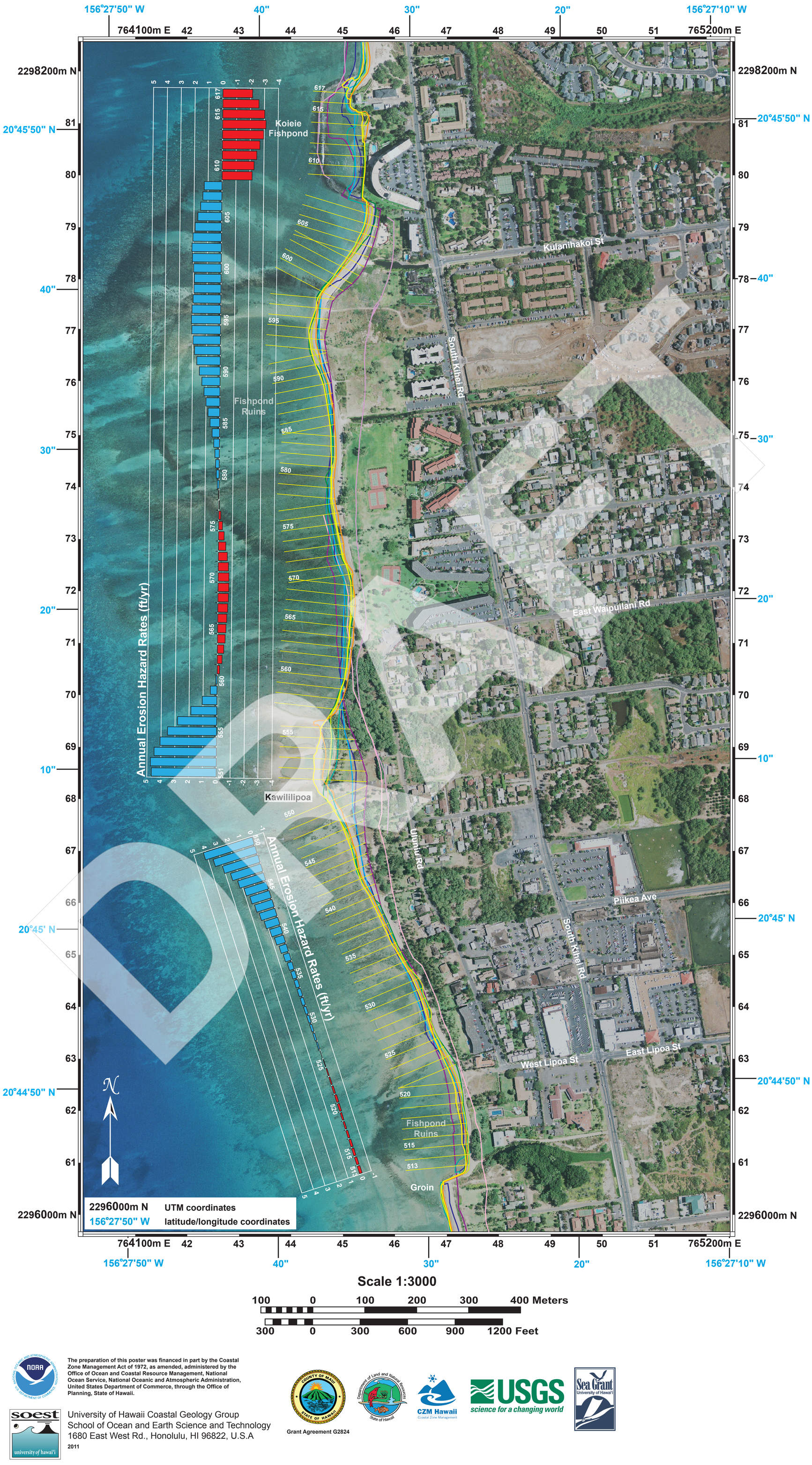
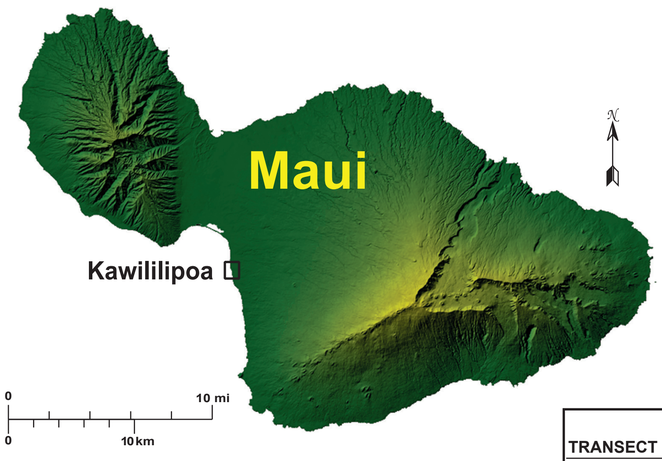
Kawililipoa, Maui, Hawaii

Annual Erosion Hazard Rates





HISTORICAL SHORELINES

- 1900 T-sheet
- 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

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.

AREA DESCRIPTION

The Kawililipoa study area (transects 513 – 617) is located on the south coast of Maui between a groin in the south and Koieie Fishpond in the north. The shoreline is composed of calcareous sand beach and artificial revetments. The coast is exposed to south swell in summer months and Kona storm waves. A shallow fringing reef protects the shoreline from the full energy of open-ocean waves. In addition to Koieie Fishpond, remains of three other fishponds are found just offshore and may be a factor in the pattern of shoreline change in the area.

The Kawililipoa shoreline is characterized by alternating cells of erosion and accretion along the shore. The south end of the study area (transects 513 – 526) has been approximately stable to slightly erosive with AEHRs under -0.3 ft/yr. An accreted cusp of sand has formed at Kawililipoa (transects 527 – 560) since 1900 or earlier with annual accretion rates as high as 4.8 ft/yr around transect 552. A small area of erosion at transects 561 – 576, with rates up to -0.8 ft/yr, separates Kawililipoa from another accreted cusp at transects 579 – 608 with rates as high as 2.1 ft/yr. The beach inside Koieie Fishpond (transects 609 – 617) has eroded at up to -3.1 ft/yr resulting in loss of the beach at transects 609 – 612 and 616 – 617 and construction of stone revetments to protect shorefront properties.

TRANSECT	AEHR (ft/yr)
513	-0.230
514	-0.210
515	-0.197
516	-0.188
517	-0.160
518	-0.131
519	-0.133
520	-0.171
521	-0.181
522	-0.139
523	-0.101
524	-0.079
525	-0.040
526	0.029
527	0.104
528	0.153
529	0.182
530	0.200
531	0.225
532	0.264
533	0.288
534	0.309
535	0.340
536	0.399
537	0.498
538	0.621
539	0.766
540	0.945
541	1.158
542	1.347
543	1.505
544	1.670
545	1.916
546	2.222
547	2.600
548	3.048
549	3.603
550	4.209
551	4.679
552	4.750
553	4.492
554	4.068
555	3.538
556	2.822
557	1.866
558	1.055
559	0.481
560	0.100
561	-0.168
562	-0.341
563	-0.458
564	-0.548
565	-0.599
566	-0.655
567	-0.711
568	-0.754
569	-0.776
570	-0.779
571	-0.736
572	-0.648
573	-0.532
574	-0.403
575	-0.276
576	-0.151
577	-0.044
578	0.048
579	0.132
580	0.208
581	0.264
582	0.322
583	0.411
584	0.537
585	0.693
586	0.847
587	1.001
588	1.152
589	1.314
590	1.499
591	1.696
592	1.862
593	1.984
594	2.072
595	2.108
596	2.077
597	2.004
598	1.951
599	1.931
600	1.989
601	2.082
602	2.121
603	2.059
604	1.910
605	1.718
606	1.524
607	1.374
608	1.281
609	-2.161
610	-2.295
611	-2.485
612	-2.705
613	-2.964
614	-3.129
615	-3.031
616	-2.607
617	-2.144

Scale 1:3000

100 0 100 200 300 400 Meters

300 0 300 600 900 1200 Feet

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