

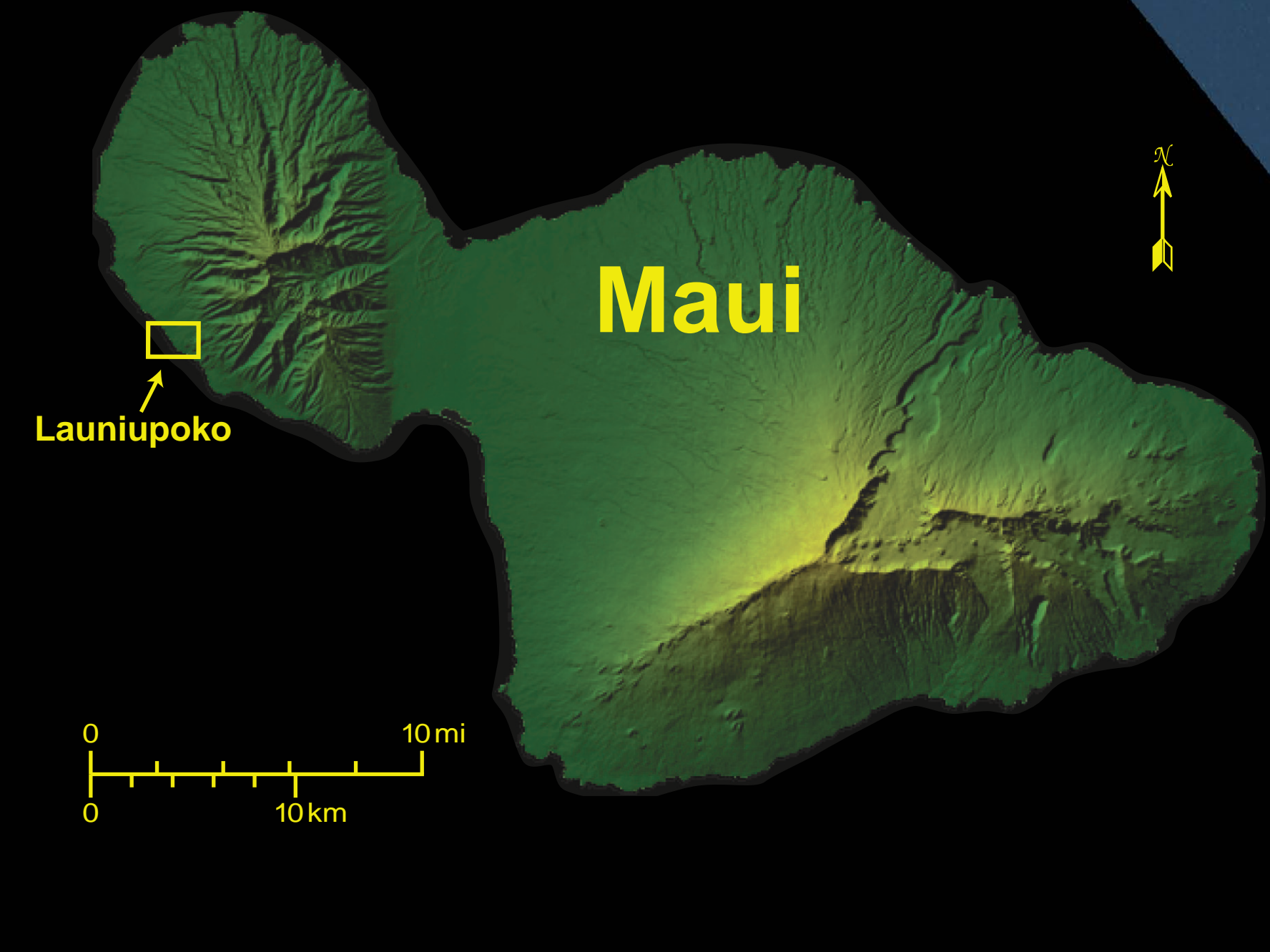
# Launiupoko, Maui, Hawaii

## Annual Erosion Hazard Rates

The Launiupoko study area (transects 485 – 647) extends from Kulanaokalani Beach in the south to Waianukole in the north. The shoreline of the area is composed of both cobble and sandy beaches and hardened shoreline. Coastal armoring appears in 1960 aerial photographs where Honoapiilani Highway is threatened by shoreline change. Launiupoko State Wayside Park is located in the approximate center of the study area and provides a convenient feature to divide the area for description purposes.

As a whole, the Launiupoko area has experienced moderate erosion since 1912 with an average AEHR of -0.3 ft/yr. The southern portion (transects 485 – 575) of the area includes Launiupoko Point and Kulanaokalani Beach. This section of shoreline has experienced moderate erosion over time with an average AEHR of -0.2 ft/yr. The northern portion (transects 579 – 647) has experienced moderate erosion over time with an average AEHR of -0.6 ft/yr. North of Waianukole, the shoreline immediately adjacent to the highway (transects 640 – 647) is a focus of significant shoreline erosion. This section of the coast has an average AEHR of -1.4 ft/yr.

Average beach width, the average horizontal distance from the vegetation line to the low water mark, within the Launiupoko area has varied over time. As a whole, average beach width has decreased 17% between 1949 and 2007. Where revetments have been installed, beach width change and erosion have resulted in the loss of approximately 1300 ft of beach. Average beach width in the southern portion of the area has increased 4% between 1949 and 2007 while average beach width in the northern portion of the area has decreased 40% for the same period.



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

TRANSECT	AEHR (ft/yr)	TRANSECT	AEHR (ft/yr)
485	-0.628	583	-0.505
486	-0.572	584	-0.466
487	-0.502	585	-0.450
488	-0.416	586	-0.475
489	-0.327	587	-0.495
490	-0.254	588	-0.554
491	-0.205	589	-1.000
492	-0.178	590	-1.055
493	-0.163	591	-1.526
494	-0.164	592	-1.558
495	-0.195	593	-1.433
496	-0.251	594	-0.502
497	-0.307	595	-0.405
498	-0.350	596	-0.341
499	-0.370	597	-0.366
500	-0.371	598	-0.342
501	-0.360	599	-0.220
502	-0.352	600	-0.166
503	-0.359	601	-0.098
504	-0.389	602	-0.011
505	-0.428	603	-0.013
506	-0.459	604	-0.983
507	-0.474	605	-1.022
508	-0.445	606	-1.003
509	-0.374	607	-0.368
510	-0.280	608	-0.144
511	-0.171	609	0.043
512	-0.182	610	-0.085
513	-0.203	611	-0.102
514	-0.249	612	-0.146
515	-0.305	613	-0.230
516	-0.339	614	-0.286
517	-0.342	615	-0.222
518	-0.304	616	-0.139
519	-0.214	617	-0.098
520	-0.126	618	-0.121
521	-0.136	619	-0.734
522	-0.218	620	-0.694
523	-0.294	621	-0.609
524	-0.305	622	-0.459
525	-0.302	623	-0.296
526	-0.319	624	-0.212
527	-0.380	625	-0.343
528	-0.403	626	-0.496
529	-0.370	627	-0.611
530	-0.302	628	-0.344
531	-0.262	629	-0.287
532	-0.247	630	-0.211
533	-0.263	631	-0.171
534	-0.279	632	-0.181
535	-0.297	633	-0.218
536	-0.271	634	-0.256
537	-0.188	635	-0.275
538	-0.137	636	-0.242
539	-0.168	637	-0.217
540	-0.251	638	-0.287
541	-0.314	639	-0.440
542	-0.336	640	-0.645
543	-0.314	641	-1.069
544	-0.301	642	-1.789
545	-0.305	643	-2.185
546	-0.306	644	-2.022
547	-0.310	645	-1.497
548	-0.311	646	-1.147
549	-0.305	647	-0.992
550	-0.283		
551	-0.217		
552	-0.120		
553	-0.022		
554	0.061		
555	0.104		
556	0.127		
557	Hard		
558	-0.265		
559	-0.291		
560	-0.327		
561	Hard		
562	Hard		
563	Hard		
564	Hard		
565	Hard		
566	Hard		
567	0.577		
568	0.745		
569	0.890		
570	0.968		
571	0.957		
572	0.916		
573	0.876		
574	0.839		
575	0.801		
576	0.508		
577	0.359		
578	0.014		
579	-0.387		
580	-0.600		
581	-0.585		
582	-0.549		

**ANNUAL EROSION HAZARD RATES (AEHR)**

Accretion Rate (Blue bar)  
Erosion Rate (Red bar)

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.

**HISTORICAL SHORELINES**

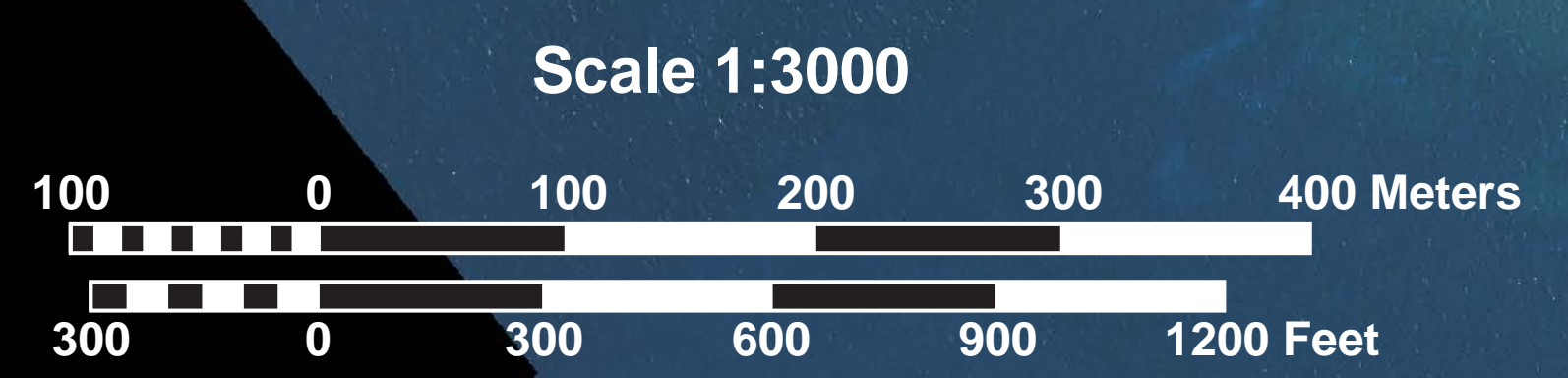
- 1912 T-sheet
- Nov 1949
- Oct 1960
- Mar 1975
- Jul 1987
- Mar 1988
- May 1997
- June 2007

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.



University of Hawaii Coastal Geology Group  
School of Ocean and Earth Science and Technology  
1680 East West Rd., Honolulu, HI 96822, U.S.A  
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