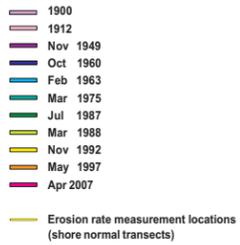


# Kawililipoa, Maui, Hawaii

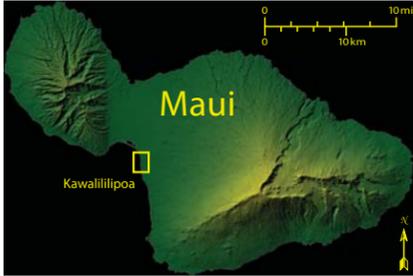
## HISTORICAL SHORELINES



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.



## AREA DESCRIPTION

The Kawililipoa study area (transects 513 – 617) is located on the south coast of Maui between a groin in the south and Koeleie 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 Koeleie 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 rates 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 Koeleie 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.

## SHORELINE CHANGE RATES



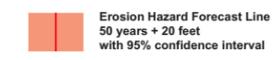
Historical shoreline positions are measured every 66 ft along the shoreline. These sites are denoted by yellow shore-perpendicular transects. Changes in the position of the shorelines through time are used to calculate shoreline change rates (ft/yr) at each transect location.

Annual shoreline change rates 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.

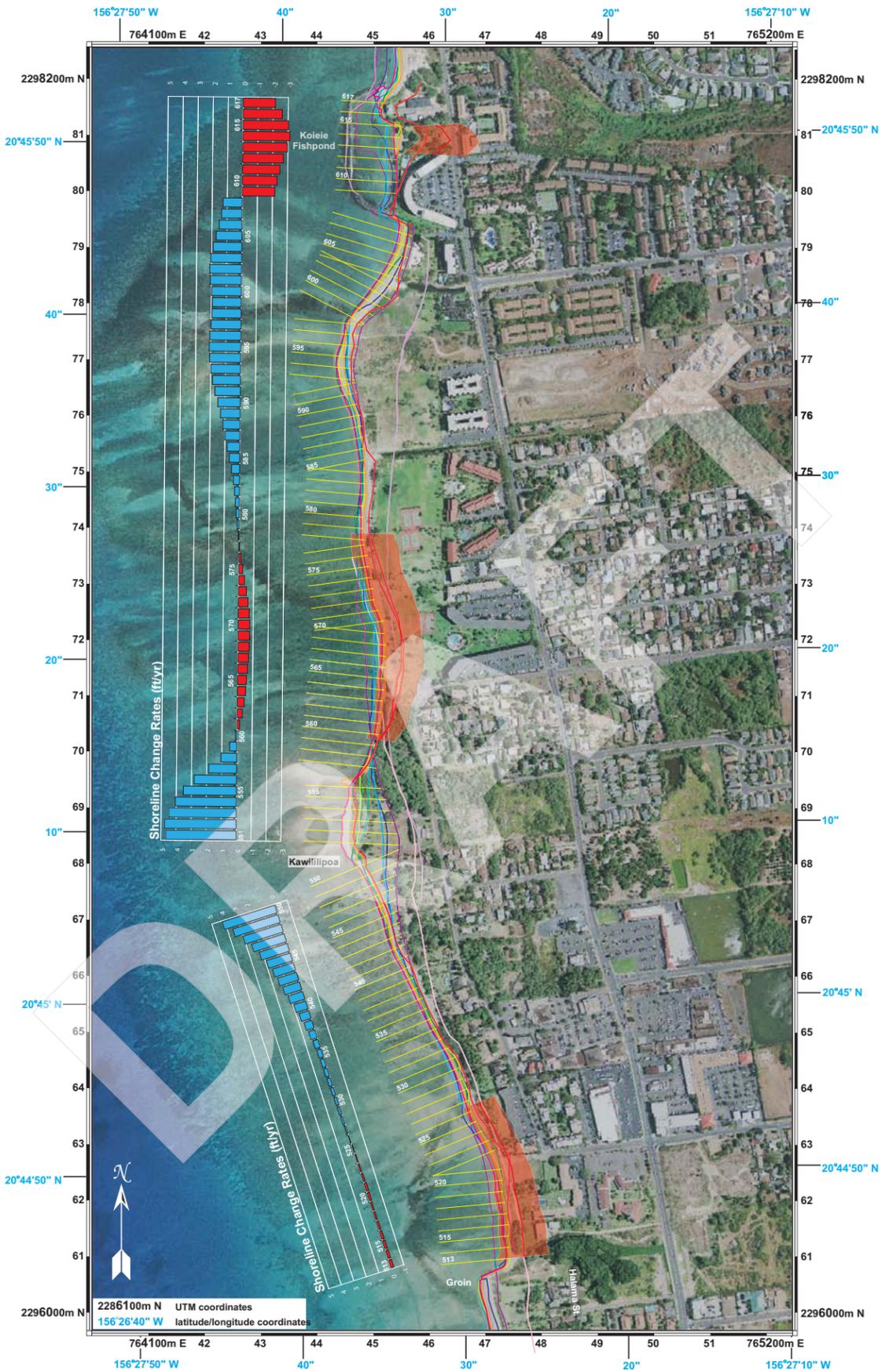
The ST method is used to calculate shoreline change rates for the study area. The rates are smoothed along shore using a 1-3-5-3-1 technique to normalize rate differences on adjacent transects. For more information on erosion rate methods and results see: <http://www.soest.hawaii.edu/asp/coasts/oahu/index.asp>

TRANSECT	ST(ft/yr)	SETBACK(ft)	TRANSECT	ST(ft/yr)	SETBACK(ft)
513	-0.2	36.5	563	-0.5	47.9
514	-0.2	35.5	564	-0.5	52.4
515	-0.2	34.8	565	-0.6	54.9
516	-0.2	34.4	566	-0.7	57.7
517	-0.2	33.0	567	-0.7	60.6
518	-0.1	31.6	568	-0.8	62.7
519	-0.1	31.6	569	-0.8	63.8
520	-0.1	33.6	570	-0.8	63.9
521	-0.2	34.0	571	-0.7	61.8
522	-0.1	31.9	572	-0.6	57.4
523	-0.1	30.0	573	-0.5	51.6
524	-0.1	28.9	574	-0.4	45.1
525	0.0	27.9	575	-0.3	38.8
526	0.0	NO EROSION	576	-0.2	32.5
527	0.1	NO EROSION	577	0.0	27.2
528	0.2	NO EROSION	578	0.0	NO EROSION
529	0.2	NO EROSION	579	0.1	NO EROSION
530	0.2	NO EROSION	580	0.2	NO EROSION
531	0.2	NO EROSION	581	0.3	NO EROSION
532	0.3	NO EROSION	582	0.3	NO EROSION
533	0.3	NO EROSION	583	0.4	NO EROSION
534	0.3	NO EROSION	584	0.5	NO EROSION
535	0.3	NO EROSION	585	0.7	NO EROSION
536	0.4	NO EROSION	586	0.8	NO EROSION
537	0.5	NO EROSION	587	1.0	NO EROSION
538	0.6	NO EROSION	588	1.2	NO EROSION
539	0.9	NO EROSION	589	1.3	NO EROSION
540	0.8	NO EROSION	590	1.5	NO EROSION
541	1.2	NO EROSION	591	1.7	NO EROSION
542	1.3	NO EROSION	592	1.9	NO EROSION
543	1.5	NO EROSION	593	2.0	NO EROSION
544	1.7	NO EROSION	594	2.1	NO EROSION
545	1.9	NO EROSION	595	2.1	NO EROSION
546	2.2	NO EROSION	596	2.1	NO EROSION
547	2.6	NO EROSION	597	2.0	NO EROSION
548	3.0	NO EROSION	598	2.0	NO EROSION
549	3.6	NO EROSION	599	1.9	NO EROSION
550	4.2	NO EROSION	600	2.0	NO EROSION
551	4.7	NO EROSION	601	2.1	NO EROSION
552	4.8	NO EROSION	602	2.1	NO EROSION
553	4.5	NO EROSION	603	1.9	NO EROSION
554	4.1	NO EROSION	604	1.9	NO EROSION
555	3.5	NO EROSION	605	1.7	NO EROSION
556	2.8	NO EROSION	606	1.5	NO EROSION
557	1.9	NO EROSION	607	1.4	NO EROSION
558	1.1	NO EROSION	608	1.3	NO EROSION
559	0.5	NO EROSION	609	-2.3	133.0
560	0.1	NO EROSION	610	-2.2	139.7
561	-0.2	33.4	611	-2.5	149.3
562	-0.3	42.1	612	-2.7	160.3
			613	-3.0	173.2
			614	-3.1	181.5
			615	-3.0	176.5
			616	-2.6	155.3
			617	-2.1	132.2

## EROSION HAZARD FORECAST LINE



The Erosion Hazard Line is a 50 year forecast of the vegetation line position based on the historical rate of erosion at each transect plus a 20 foot buffer. The thick red band shows the uncertainty of the hazard forecast line at the 95% confidence interval. Erosion hazard forecast lines are shown along the shoreline where historical shorelines indicate erosion. Erosion hazard lines are not shown where the beach has been lost and is now hardened (e.g., seawalls).



The preparation of this poster was financed in part by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration, United States Department of Commerce, through the Office of Planning, State of Hawaii.



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Grant Agreement G2824

Scale 1:3000

