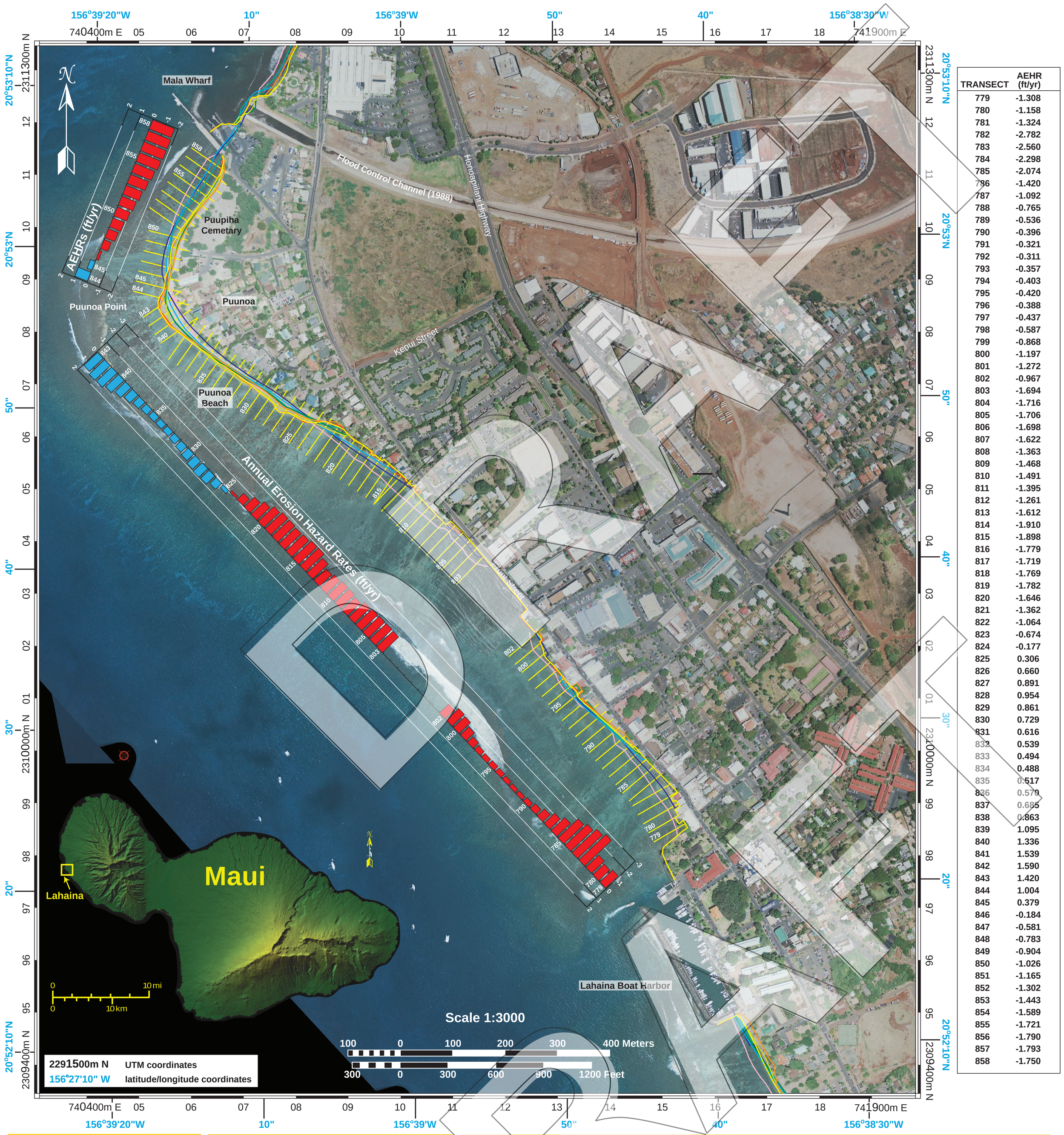
Lahaina, Maui, Hawaii

Annual Erosion Hazard Rates



TRANSECT	AEHR (ft/yr)
779	-1.308
780	-1.158
781	-1.324
782	-2.782
783	-2.560
784	-2.298
785	-2.074
786	-1.420
787	-1.092
788	-0.765
789	-0.536
790	-0.396
791	-0.321
792	-0.311
793	-0.357
794	-0.403
795	-0.420
796	-0.388
797	-0.437
798	-0.587
799	-0.868
800	-1.197
801	-1.272
802	-0.967
803	-1.694
804	-1.716
805	-1.706
806	-1.698
807	-1.622
808	-1.363
809	-1.468
810	-1.491
811	-1.395
812	-1.261
813	-1.612
814	-1.910
815	-1.898
816	-1.779
817	-1.719
818	-1.769
819	-1.782
820	-1.646
821	-1.362
822	-1.064
823	-0.674
824	-0.177
825	0.306
826	0.660
827	0.891
828	0.954
829	0.861
830	0.729
831	0.616
832	0.539
833	0.494
834	0.488
835	0.517
836	0.570
837	0.685
838	0.863
839	1.095
840	1.336
841	1.539
842	1.590
843	1.420
844	1.004
845	0.379
846	-0.184
847	-0.581
848	-0.783
849	-0.904
850	-1.026
851	-1.165
852	-1.302
853	-1.443
854	-1.589
855	-1.721
856	-1.790
857	-1.793
858	-1.750

HISTORICAL SHORELINES

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

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.

The Lahaina study area (transects 779 - 858) is located between Mala Wharf to the north and Lahaina Boat Harbor in the south. The shoreline is comprised of sand pocket beaches broken by hardened shoreline in the south and central portion of the area, and a sand beach at Puunoa in the north. Coastal armoring in the form of seawalls was constructed north of Lahaina Boat Harbor to protect private property and Front Street from shoreline change. Puunoa Beach (transects 803 - 858) is a narrow beach that starts from the seawall fronting businesses on Front Street and ends at Mala Wharf. Puunoa Point provides a reference feature to juxtapose the behavior of Puunoa Beach to the north and to the south.

As a whole, the area has experienced moderate erosion over time with an average AEHR of -1.0 ft/yr. The shoreline north of Lahaina Boat Harbor (transects 779 - 802) has experienced moderate erosion with an average AEHR of -1.1 ft/yr. South of Puunoa Point (transects 803 - 843) the shoreline has experienced moderate erosion with an average AEHR of -1.0 ft/yr. North of Puunoa Point (transects 844 - 858) the shoreline fronting Puupiha cemetery has experienced moderate to high erosion over time with an average AEHR of -0.4 ft/yr.

Average beach width, the average horizontal distance from the vegetation line to the low water mark, within the Lahaina study area has decreased 33% between 1949 and 2007. The section of beach to the north of Puunoa Point has experienced a 6% decrease in average beach width. In contrast, the beach to the south of Puunoa Point has experienced a decrease in average beach width of 36% between 1949 and 2007.

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Maui Shoreline Atlas 2007