

Wahikuli, Maui, Hawaii

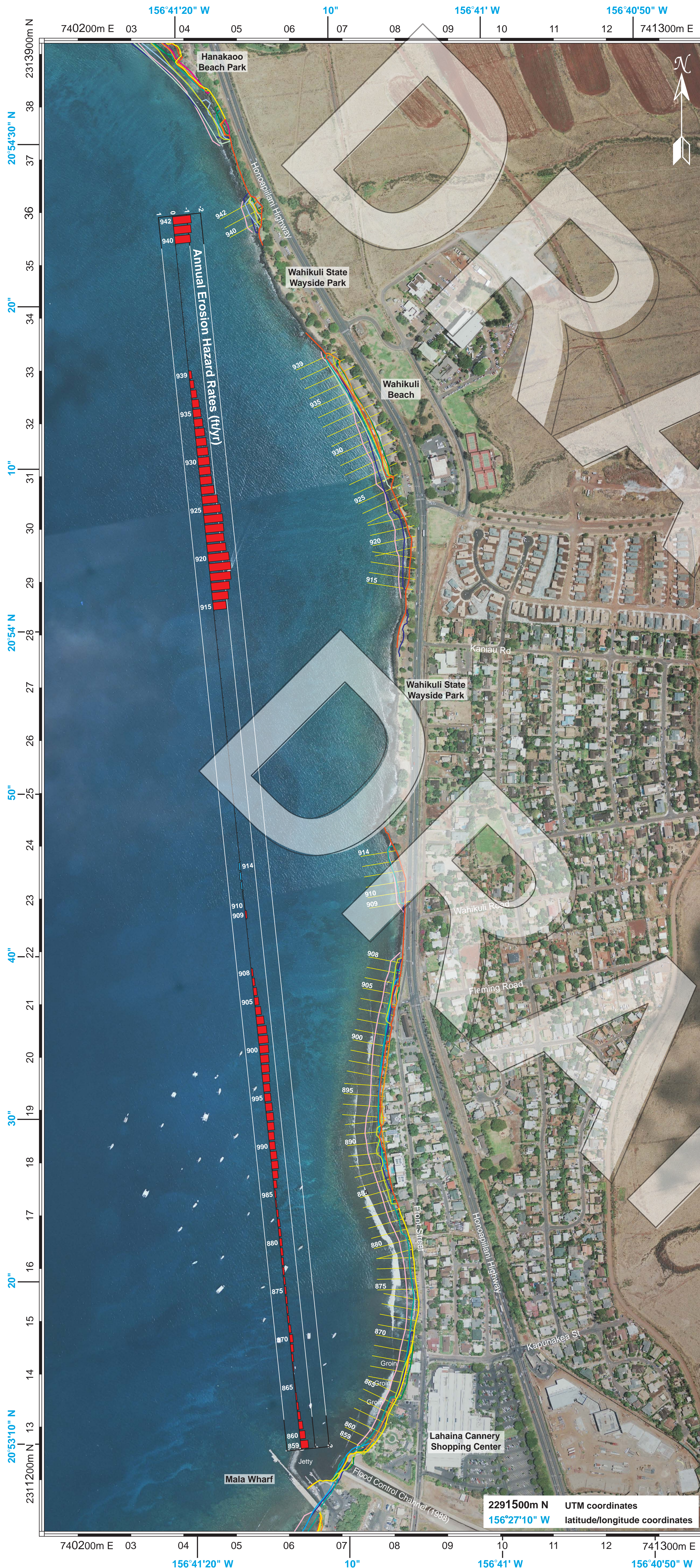
Annual Erosion Hazard Rates



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TRANSECT	AEHR (ft/yr)
859	-0.541
860	-0.399
861	-0.291
862	-0.197
863	-0.132
864	-0.085
865	-0.049
866	-0.040
867	-0.062
868	-0.129
869	-0.209
870	-0.240
871	-0.172
872	-0.116
873	-0.106
874	-0.126
875	-0.130
876	-0.124
877	-0.125
878	-0.148
879	-0.174
880	-0.184
881	-0.178
882	-0.175
883	-0.137
884	-0.079
885	-0.116
886	-0.237
887	-0.387
888	-0.476
889	-0.448
890	-0.409
891	-0.417
892	-0.481
893	-0.505
894	-0.484
895	-0.456
896	-0.468
897	-0.506
898	-0.550
899	-0.593
900	-0.650
901	-0.696
902	-0.656
903	-0.540
904	-0.402
905	-0.308
906	-0.253
907	-0.176
908	-0.125
909	-0.112
910	-0.019
911	0.052
912	0.100
913	0.114
914	0.108
915	-0.930
916	-1.146
917	-1.313
918	-1.466
919	-1.535
920	-1.484
921	-1.335
922	-1.268
923	-1.315
924	-1.329
925	-1.253
926	-1.107
927	-0.922
928	-0.832
929	-0.814
930	-0.814
931	-0.785
932	-0.736
933	-0.676
934	-0.615
935	-0.558
936	-0.499
937	-0.404
938	-0.290
939	-0.198
940	-1.104
941	-1.213
942	-1.284

- ### HISTORICAL SHORELINES
- 1912 T-sheet
 - Nov 1949
 - Oct 1960
 - Mar 1961
 - May 1963
 - Mar 1975
 - Jul 1987
 - Mar 1988
 - Nov 1992
 - 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 Wahikuli study area (transects 859 – 942) is located between Hanakaoo Beach Park to the north and Mala Wharf in the south. The northern portion of the area (transects 909 - 942) is dominated by hardened shoreline with sand beaches interspersed. The southern area (transects 859 - 908) is characterized by narrow cobble beaches and hard shoreline. Wahikuli beach (transects 926 - 939) is the only significant sandy pocket beach in the study area. Much of this area has been altered by vertical armoring, small groins and jetties or revetment construction.

As a whole, the area has experienced moderate erosion over time with an average AEHR of -0.5 ft/yr. The northern portion (transect 909 - 942) of the area includes a small section of cobble shoreline, Wahikuli State Wayside Park and Wahikuli beach. This section of shoreline has experienced moderate erosion with an average AEHR of -0.8 ft/yr. The shoreline at Wahikuli State Wayside Park appears to have been significantly altered. The 1912 shoreline in much of Wahikuli State Park suggests major alterations took place sometime between 1912 and 1949, presumably to expand the park seaward. The southern portion of the area (transects 859 - 908) has experienced light to moderate erosion over time with an average AEHR of -0.3 ft/yr.

Average beach width, the average horizontal distance from the vegetation line to the low water mark, within the Wahikuli area has decreased 61% between 1949 and 2007. Average beach width in the northern portion of the area has decreased 57% between 1949 and 2007 while average beach width in the southern portion of the area has decreased 72% for the same period.

