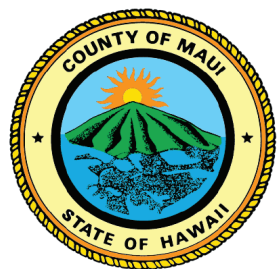


Honokowai, Maui, Hawaii

Annual Erosion Hazard Rates

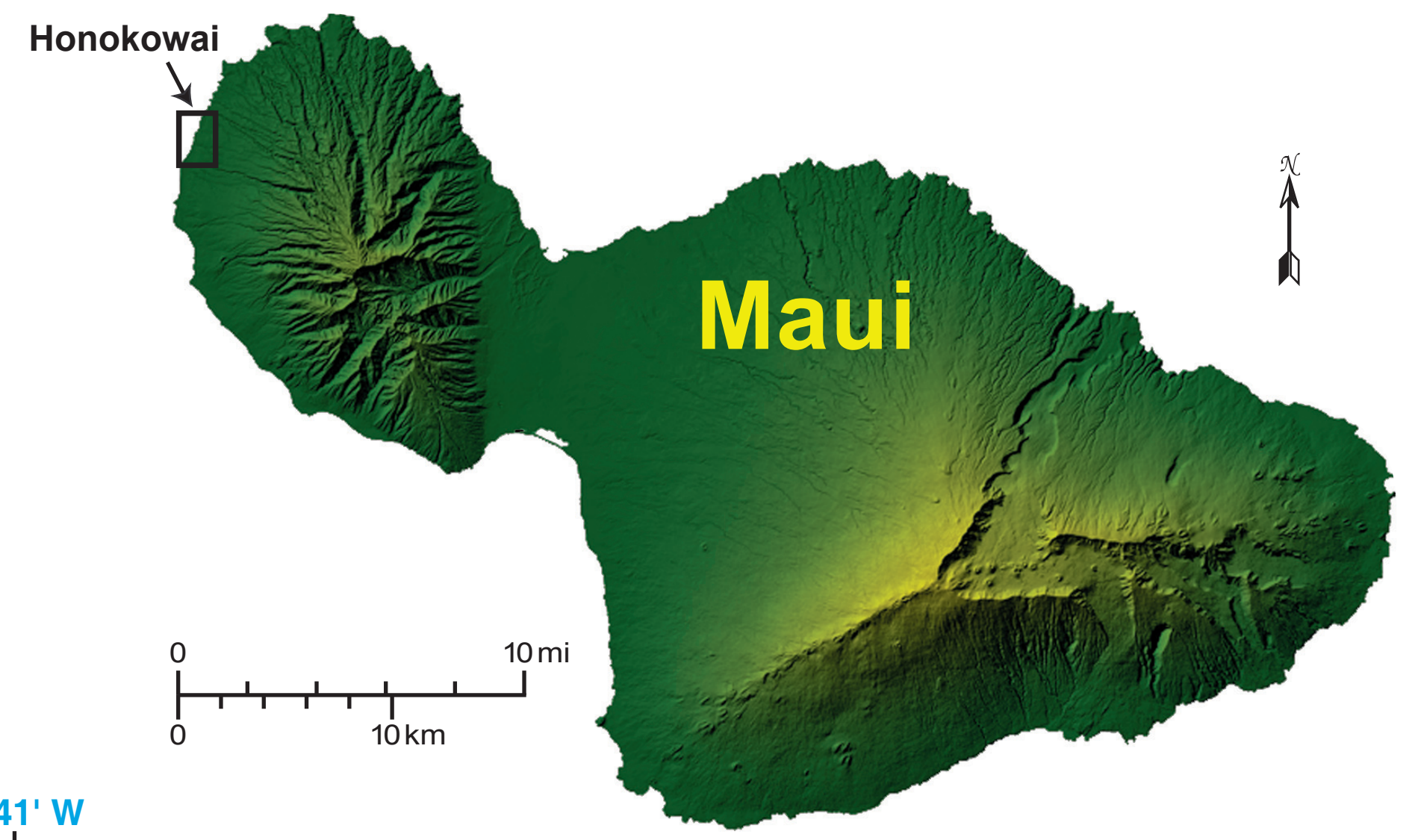


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2012

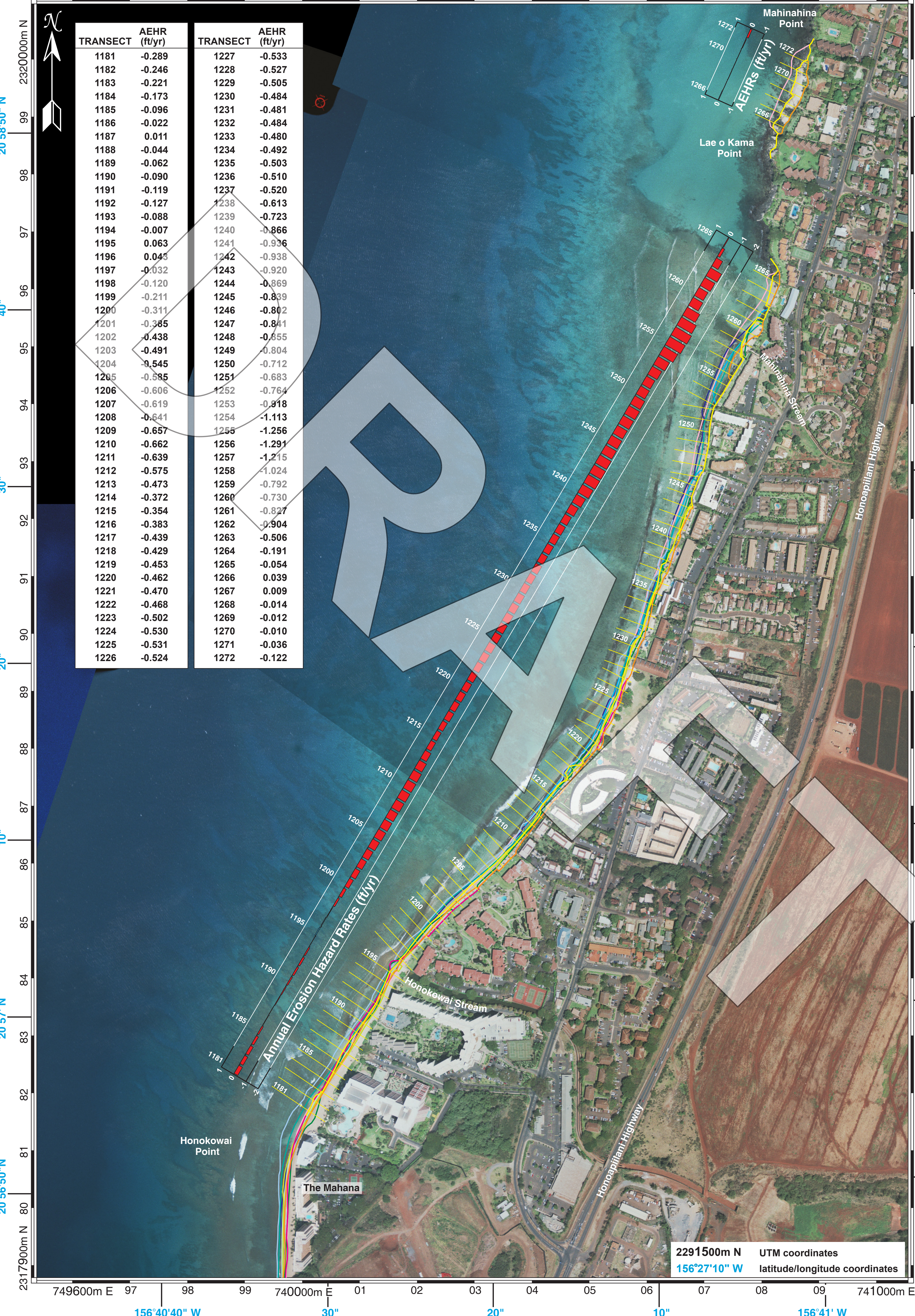


Grant Agreement G2824

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739600m E 97 98 99 740000m E 01 02 03 04 05 06 07 08 09 741000m E
156°41'40" W 30" 20" 10" 156°41' W



TRANSECT	AEHR (ft/yr)	TRANSECT	AEHR (ft/yr)
1181	-0.289	1227	-0.533
1182	-0.246	1228	-0.527
1183	-0.221	1229	-0.505
1184	-0.173	1230	-0.484
1185	-0.096	1231	-0.481
1186	-0.022	1232	-0.484
1187	0.011	1233	-0.480
1188	-0.044	1234	-0.492
1189	-0.062	1235	-0.503
1190	-0.090	1236	-0.510
1191	-0.119	1237	-0.520
1192	-0.127	1238	-0.613
1193	-0.088	1239	-0.723
1194	-0.007	1240	-0.866
1195	0.063	1241	-0.936
1196	0.045	1242	-0.938
1197	-0.032	1243	-0.920
1198	-0.120	1244	-0.869
1199	-0.211	1245	-0.839
1200	-0.311	1246	-0.802
1201	-0.385	1247	-0.841
1202	-0.438	1248	-0.855
1203	-0.491	1249	-0.804
1204	-0.545	1250	-0.712
1205	-0.585	1251	-0.683
1206	-0.606	1252	-0.764
1207	-0.619	1253	-0.918
1208	-0.641	1254	-1.113
1209	-0.657	1255	-1.256
1210	-0.662	1256	-1.291
1211	-0.639	1257	-1.215
1212	-0.575	1258	-1.024
1213	-0.473	1259	-0.792
1214	-0.372	1260	-0.730
1215	-0.354	1261	-0.827
1216	-0.383	1262	-0.904
1217	-0.439	1263	-0.506
1218	-0.429	1264	-0.191
1219	-0.453	1265	-0.054
1220	-0.462	1266	0.039
1221	-0.470	1267	0.009
1222	-0.468	1268	-0.014
1223	-0.502	1269	-0.012
1224	-0.530	1270	-0.010
1225	-0.531	1271	-0.036
1226	-0.524	1272	-0.122

- ### HISTORICAL SHORELINES
- 1912 T-sheet
 - Nov 1949
 - 1960 T-sheet
 - Mar 1961
 - May 1963
 - Mar 1975
 - Jul 1987
 - Mar 1988
 - Nov 1992
 - 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.

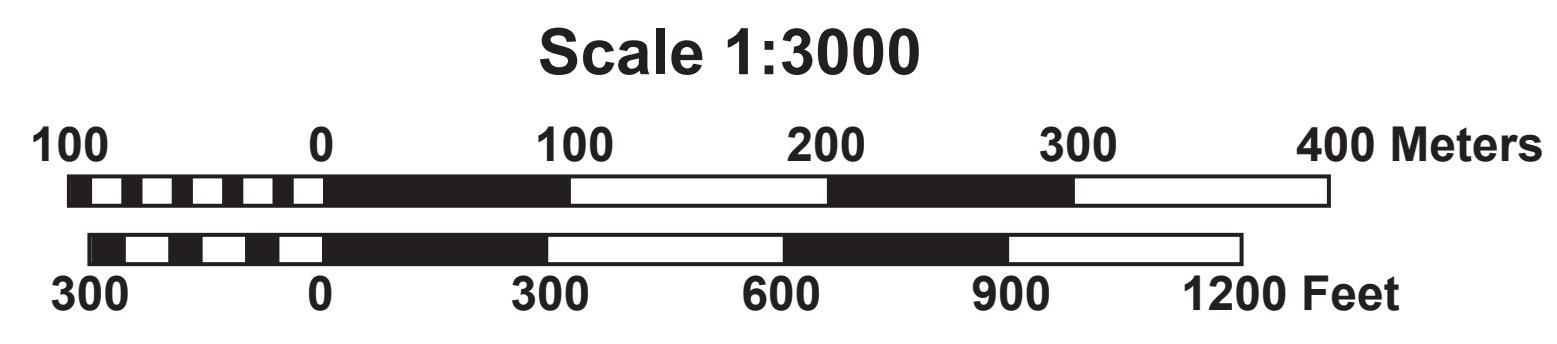
The Single Transect (ST) method (Genz et al., 2009) is used to calculate erosion hazard rates for the study area. The rates are smoothed alongshore using a 1-3-5-3-1 technique to normalize rate differences on adjacent transects. For more information on erosion rate methods and results see: <http://www.soest.hawaii.edu/coasts/erosion/index.php>

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.

The Honokowai study area extends from the revetment fronting Mahana Condominium at Honokowai Point north to the start of hardened shoreline at Lae o Kama Point. The shoreline is comprised of narrow white sand beach, most of which is backed by hardened shoreline and sea walls built to protect several hotels and condominiums from shoreline change. Offshore is dominated by beach rock shelves and fringing reef.

As a whole, the area (transects 1181 – 1272) has experienced moderate erosion since 1912 with an average AEHR of -0.5 ft/yr. Honokowai Beach Park (transects 1221 – 1228), central to this area, has experienced moderate erosion over time with an average reflecting the area trend (-0.5 ft/yr). 2007 imagery reveals sandy beach in the north of the study area (transects 1266 – 1272) not present in older imagery. It is indicated on the 1912 T-sheet. It is included in this study with a long term average AEHR of 0 ft/yr.

Average beach width, the average horizontal distance from the vegetation line to the low water mark, within the Honokowai area has decreased 27% between 1949 and 2007. At Honokowai Beach Park, average beach width has decreased 4% for the same time period. Evidence from 1949 aerial photographs and the 1912 T-sheet indicates a wide white sand beach extending the length of this study area. Of the approximately 5300 feet of continuous beach that existed in 1949, approximately 300 feet has been lost. This includes the approximately 650 ft of sandy beach at the north end of the area (transects 1266 – 1272) not present in 1949 imagery.



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