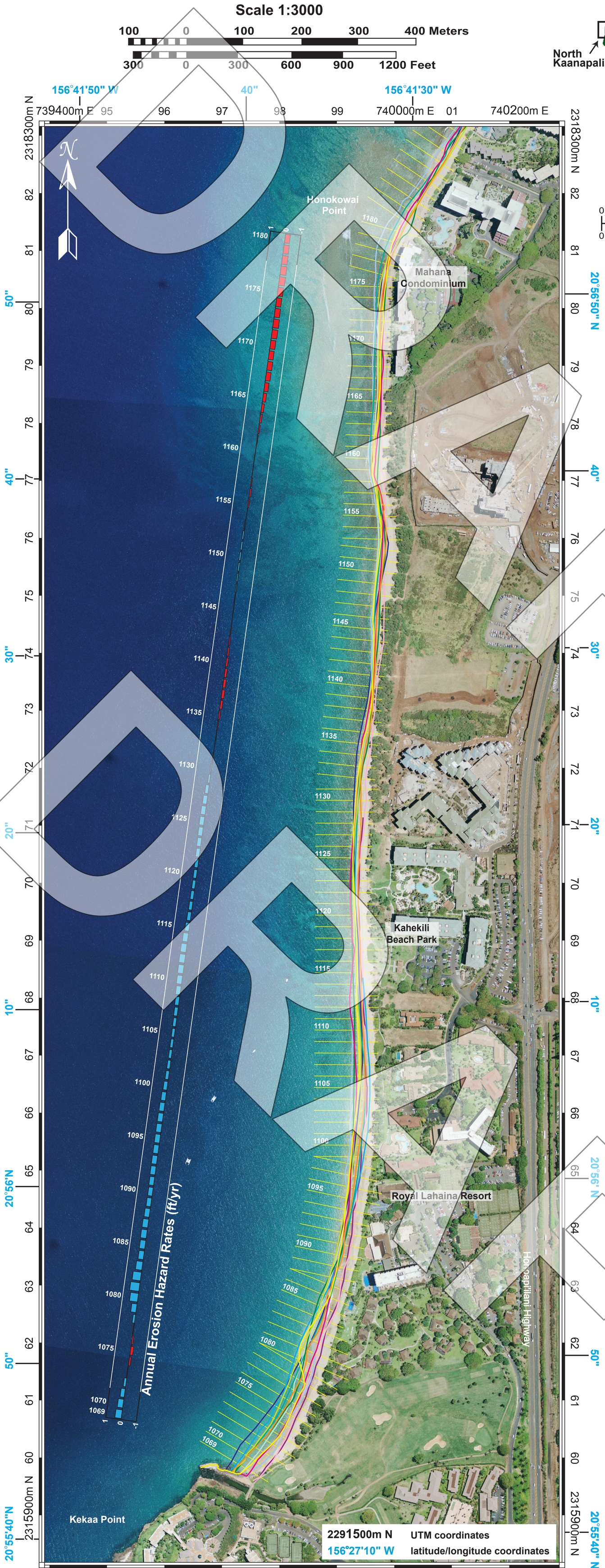
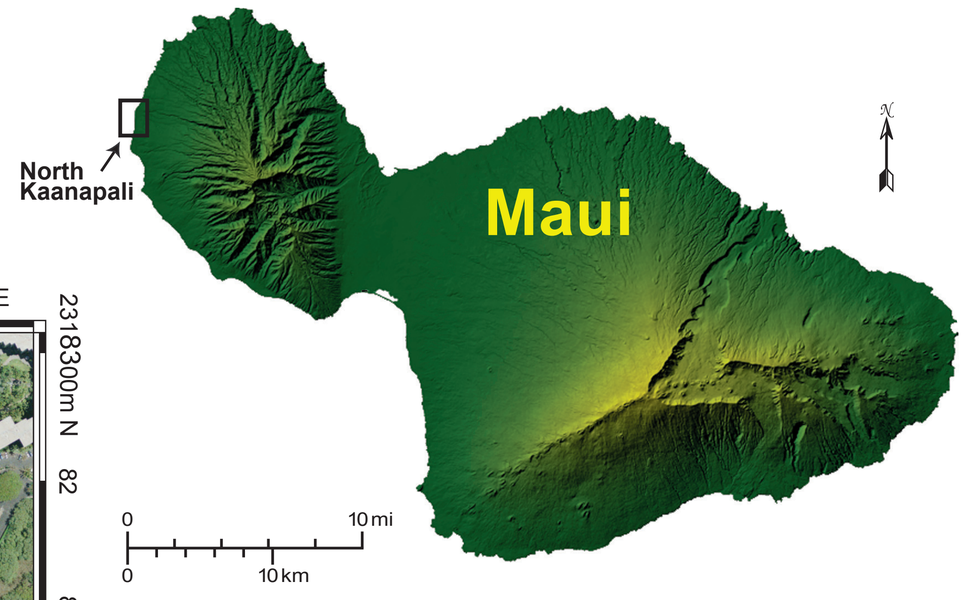
North Kaanapali, Maui, Hawaii

Annual Erosion Hazard Rates

TRANSECT	AEHR (ft/yr)
1069	0.414
1070	0.356
1071	0.265
1072	0.154
1073	0.023
1074	-0.100
1075	-0.173
1076	-0.080
1077	0.024
1078	0.148
1079	0.337
1080	0.518
1081	0.605
1082	0.537
1083	0.415
1084	0.345
1085	0.355
1086	0.379
1087	0.371
1088	0.337
1089	0.300
1090	0.290
1091	0.307
1092	0.331
1093	0.336
1094	0.334
1095	0.340
1096	0.339
1097	0.335
1098	0.323
1099	0.294
1100	0.250
1101	0.213
1102	0.197
1103	0.187
1104	0.182
1105	0.189
1106	0.202
1107	0.228
1108	0.262
1109	0.302
1110	0.337
1111	0.358
1112	0.374
1113	0.370
1114	0.334
1115	0.280
1116	0.239
1117	0.217
1118	0.209
1119	0.203
1120	0.209
1121	0.226
1122	0.244
1123	0.265
1124	0.282
1125	0.294
1126	0.293
1127	0.269
1128	0.208
1129	0.117
1130	0.059
1131	0.021
1132	-0.007
1133	-0.029
1134	-0.045
1135	-0.081
1136	-0.136
1137	-0.170
1138	-0.164
1139	-0.136
1140	-0.108
1141	-0.086
1142	-0.065
1143	-0.040
1144	-0.012
1145	0.011
1146	0.035
1147	0.058
1148	0.077
1149	0.090
1150	0.098
1151	0.101
1152	0.088
1153	0.047
1154	-0.011
1155	-0.062
1156	-0.083
1157	-0.050
1158	0.003
1159	0.018
1160	-0.010
1161	-0.041
1162	-0.072
1163	-0.111
1164	-0.159
1165	-0.209
1166	-0.264
1167	-0.306
1168	-0.321
1169	-0.318
1170	-0.332
1171	-0.364
1172	-0.373
1173	-0.345
1174	-0.332
1175	-0.354
1176	-0.382
1177	-0.381
1178	-0.365
1179	-0.343
1180	-0.319





HISTORICAL SHORELINES

- 1912 T-sheet
- 1932 T-sheet
- Nov 1949
- Mar 1961
- May 1963
- Apr 1969
- Mar 1975
- Jul 1987
- Mar 1988
- Nov 1992
- 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.

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 North Kaanapali study area extends continuously from Kekaa Point (Black Rock) north to the revetment fronting the Mahana Condominium at Honokowai Point. The coastline is comprised of a long white sand beach backed by hotel and condominium developments in the north and south. Offshore, a fringing reef system dominates the northern portion of the area near Honokowai Point, while the central and southern portions have steep nearshore slopes that extend to deeper offshore sand and rock patches.

Overall, the area has remained relatively stable since 1912 with an average AEHR of 0.1 ft/yr. The northern portion of the area (transects 1132 - 1180) has remained relatively stable over the long term with an average AEHR of -0.1 ft/yr. The southern portion (transects 1069 – 1131) of the area is exposed to the majority of seasonal swell events and kona storm activity. As a result, the position of the shoreline is highly variable through time and exhibits a long-term trend of light accretion 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 North Kaanapali area has decreased 18% between 1949 and 2007. Average beach width in the northern portion of the area has decreased 12% between 1949 and 2007 while average beach width in the southern portion of the area has decreased 20% for the same period.

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Maui Shoreline Atlas 2007