

Ala Moana, Oahu, Hawaii

AREA DESCRIPTION

Ala Moana Beach Park and Magic Island (transects 0 – 86) is located on the southern shoreline of Oahu. The beach park, including "Outer Beach" (transects 0 – 17), and Ala Moana Beach (transects 18 – 86), were created by dredging and filling of the shallow near-shore reef. The coast in this area is exposed to refracted easterly tradewind waves and seasonal swell during summer months. The shoreline at Outer Beach is protected from waves by man-made break walls. The inner reef and shoreline at Ala Moana Beach are protected from large, long period swell by the fringing reef.

Engineering events at the Ala Moana shoreline (adapted from Wiigel, 2008):

- 1920's Ala Moana is a wetland used as a garbage dump.
- 1925 Kewalo Basin built, entrance channel dredged in reef.
- 1928 Shore-parallel channel dredged linking Kewalo Basin and Ala Wai Canal.
- 1934 Ala Moana Beach Park constructed with coral dredge material and sand.
- 1935 Ala Wai Boat Harbor (original) constructed by dredging in the reef.
- 1945 Kewalo Basin enlarged.
- 1945 Ala Wai entrance channel dredged through reef to deep water.
- 1955 New shore-parallel swimming channel dredged, old channel filled with coral dredge material, new beach constructed with 54,000 yd³ of sand.
- 1964 Magic Island and Outer Beach constructed on reef flat from coral dredge material.
- 1976 Ala Moana Beach: 30,000 yd³ of sand placed on eroded beach.

Historical shorelines are available from aerial photographs 1927 – 2005 for most of the Ala Moana shoreline. Due to extensive shoreline reconstruction, only historical shorelines from the modern configuration of each beach are used to calculate change rates. Overall, the Ala Moana shoreline (transects 0 – 86) is accreting to stable, with an average rate 0.03 ± 0.18 ft/yr. Outer Beach (transects 0 – 17) is eroding to stable, with an average rate -0.07 ± 0.19 . Ala Moana Beach (transects 18 – 86) is accreting to stable, with an average rate 0.05 ± 0.18 ft/yr.

For more information see: <http://www.soest.hawaii.edu/ssp/coasts/oahu/index.asp>

Wiigel, R.L. (2008). "A History of Waikiki: the history of its transformation from a natural to an urban shoreline." Shore and Beach, 76(2), 3-30.

SHORELINE CHANGE RATES

- 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 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 EX 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/ssp/coasts/oahu/index.asp>

HISTORICAL SHORELINES

- 1927
- Feb 1949
- Sept 1952
- Dec 1957
- Jan 1958
- Feb 1958
- Nov 1970
- Dec 1974
- Mar 1975
- Dec 1982
- Jan 1992
- Feb 1999
- Dec 2005

Erosion rate measurement locations (shore-normal transects)

Historical beach positions, color coded by year, are determined using orthorectified and georeferenced aerial photographs and National Ocean Survey (NOS) bathymetric survey charts. The low water mark is used as the historical shoreline, or shoreline change reference feature (SCRF).

Movement of the SCRF along shore-normal transects (spaced every 66 ft) is used to calculate erosion rates.



119000E UTM coordinates
157°34'47" W Longitude/Longitude coordinates



Scale 1:3000



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