WHAT DO YOU MEAN BY MEAN HIGH TIDE? THE PUBLIC TRUST DOCTRINE IN RHODE ISLAND

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INTRODUCTION:

The Rhode Island State Constitution guarantees shoreline privileges that include but are not limited to fishing from the shore, collecting seaweed, leaving the shore to swim in the ocean and passing along the shore (Article I, Section 17). Traditionally the "seaweed line" has been interpreted as the boundary between private property and public trust lands. On wave dominated shorelines, the position of the "seaweed line", or the last high tide swash line (LHTS), is dependent on the wave climate as much or more than tidal phase.

Cha-EZ profile showing LHTS line at spring tide

(ordinary tides)

Cha-EZ profile showing LHTS line at neap tide

(ordinary tides)

Cha-EZ profile showing storm swash

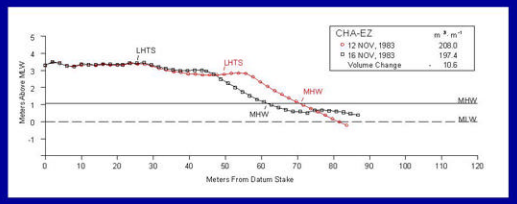
(extraordinary tides)

METHODS:

Long term beach profile data collected Cha-EZ by the University of Rhode Island Department of Geosciences was examined to determine the relationship between the mean high tide line (MHW) and the last high tide swash line (LHTS). Profilers use a modified version of the Emory Method (Rosenberg, 1985) which allows rapid data collection, with little in the way of high tech equipment. The profiles are measured weekly and data is used to examine shoreline dynamics, to quantify beach volume changes and to study long term trends (Blais, 1986; Harwood, 1993). Data records include time the profile was taken, wave height, wind speed and direction, and, sometimes but not always, details such as the location of the last high tide swash line and the current swash line where the profilers hit the water.

Modified Emory Method

The distance of the LHTS and MHW line from the profile datum was calculated for the 19 year Tidal Epoch between 1983 and 2001. A total of 716 profiles recorded both the LHTS and the MHW. Tide elevations from the Newport, RI tide station were downloaded from the NOAA CO-OPS website (www.co-ops.nos.noaa.gov).



Cha-EZ pre- and post-storm beach profiles show the landward migration of the mean high water line (MHW) after the storm. The position of the last high tide swash line (LHTS) is dependant on wave height and the beach profile.

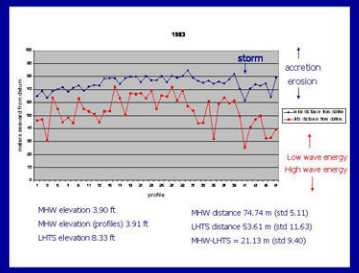
ACKNOWLEDGMENTS

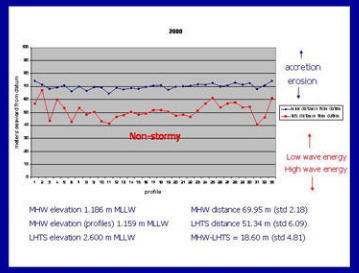
We would like to thank Dr. Jon Boothroyd of the University of Rhode Island, Department of Geosciences for giving us access to his long term beach profile data.

RESULTS

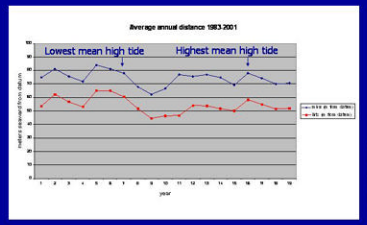
Seven hundred sixteen (716) profiles were examined for this analysis. The results show considerable variability in the distance from datum (0 meters) and the MHW line in the different profiles. This distance was dependent on the amount of erosion or accretion along the shoreline. Average annual distances from datum to the MHW line ranged from a low of 62.35 meters in 1991, the year when the RI coast was hit by Hurricane Bob and the Perfect Storm, to a high of 84.02 meters in 1987, a relatively calm year.

The distance from datum (0 meters) to the LHTS line was more variable than MHW within any given year but consistent with the MHW line measures when examining annual trends. Average annual distances from datum to the LHTS line ranged from a low of 44.48 meters in 1991 to a high of 64.81 meters in 1987. The average distance between the MHW and LHTS lines was consistently 19-20 meters. The same uniformity is seen when comparing the average annual distance between the MHW and LHTS lines over the 1983-2001 Tidal Epoch.





In non-stormy years there is less variability in the position of the MHW line and the LHTS line. The LHTS line is still meters landward of the MHW line.



The average annual distance between the MHW line and the LHTS line is consistent over time. The MHW line intersected the shoreline at approximately the same location for the years with the lowest annual mean high tide level and the highest mean high tide level within the Tidal Epoch.

CONCLUSIONS:

The distance of the LHTS and MHW lines seaward from the profile datum is influenced by the shape of the shoreline and the amount of wave energy. Variability in the position of the MHW line and the LHTS line is due to erosion and accretion. Variability in the position of the LHTS line is also dependent on wave energy. On wave dominated shorelines MHW will always be seaward of the LHTS line. The distance between MHW and the LHTS line averaged 19-20 meters (19.91 meters std. 3.06 meters) at the Cha-EZ profile over the 1983-2001 Tidal Epoch. Thus, MHW is not the appropriate measure for determining the public trust boundary along the Rhode Island South Shore.

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