

Shoreline Characterization and Change Analyses

Boston Harbor Region

Regional Coastal Erosion Commission Workshop

Boston - May 22, 2014



Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
Coastal Erosion Commission

SHORELINE CHARACTERIZATION

Description

Coastal landforms, habitats, developed lands, and hardened coastal structures (collectively referred to as "classes") were identified at the immediate, exposed shoreline for coastal Massachusetts. Protected harbors and estuaries were generally excluded. Classes were identified for every ~50 meters of assessed shoreline and summarized by percentage of total assessed shoreline for each community.

Methods

A transect approach was used to identify classes along the shoreline. This approach allows us to examine features along any given ~50 m segment of shoreline. It provides more information at a finer scale than one where areal coverage of features are summarized within a specified shoreline buffer. Analysis can be expanded to include additional information on the order in which features occur moving landward, their landward extents, and the rates at which they co-occur along the shoreline.

Data sources include the 2011 USGS-CZM Shoreline Change Project's contemporary shoreline (MHHW) and transect data, CZM and DCR's Coastal Structures Inventory data, MassDEP's Wetlands map data, and MassGIS's 2005 Land Use data.

Shoreline Change Project transects generally occur every ~50 meters along exposed shoreline (Fig. 1). Assessed shoreline segments begin and end with shoreline midpoints between transects (Fig. 2).

Attributes for hardened coastal structures, wetlands and landforms, and other land use/land cover features were spatially joined to transects, then to their respective shoreline segments (Fig.3). More than 50 classes from multiple source datasets were identified in this process. Classes were aggregated into 11 bins to make analysis and reporting more meaningful. Data were further processed to generate class/bin summaries, as shown in the community bar charts below. *Natural Upland is comprised of Forest and Brushland/Successional land cover classes only.

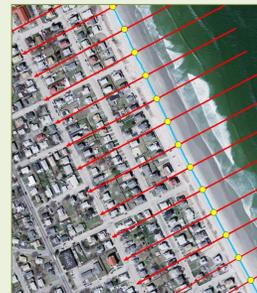


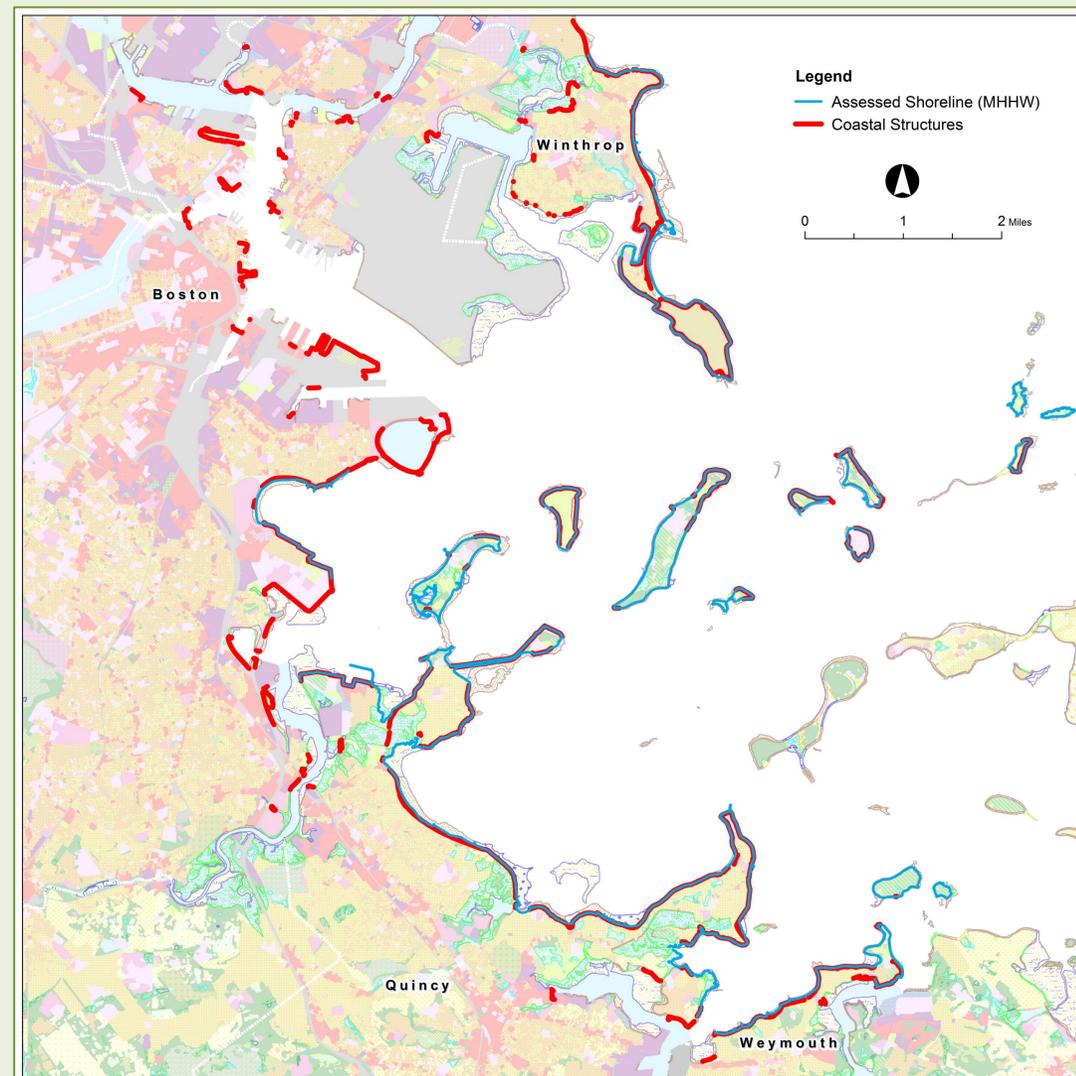
Fig. 1. Transects less than or equal to 200 m from intersection points (yellow) with contemporary shoreline.



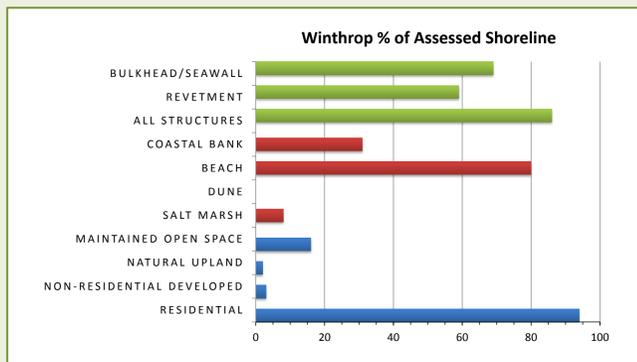
Fig. 2. Shoreline segments of ~50 m split using intersection midpoints (green).



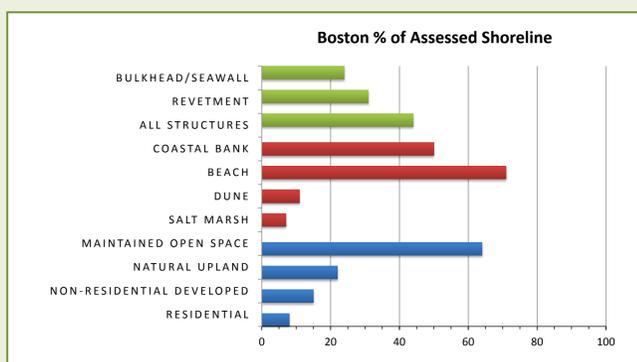
Fig. 3. Land use, wetland, and coastal structure (black line) features with assessed shoreline (blue line) and transects.



Winthrop



Boston



SHORELINE CHANGE

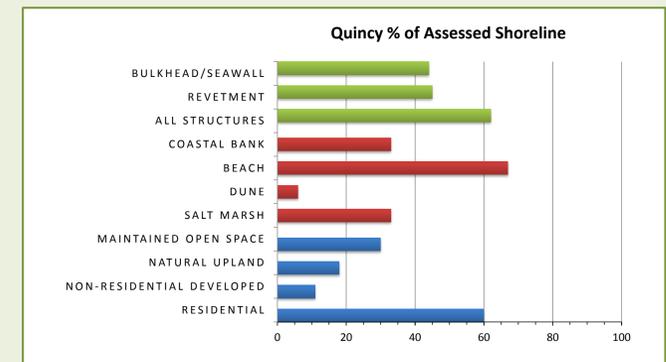


Short-term erosion and accretion trends (1970-2009) per community in the Boston Harbor region. This plot denotes dominant *direction*, not magnitude, of shoreline movement based on the number of shoreline change transects in each town.



Long-term erosion and accretion trends (1844-2009) per community in the Boston Harbor region. This plot denotes dominant *direction*, not magnitude, of shoreline movement based on the number of shoreline change transects in each town.

Quincy



Weymouth

