

Long Island: The Coastal Zone

The Coasts of Long Island

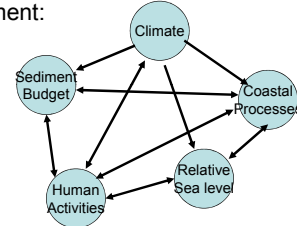


Coastal Zone

- The **shore** is the area that extends from low tide to the highest elevation on land affected by storm waves.
- The **coastal zone** is the area of a shoreline from where the waves first break offshore to the limit of ocean-related influence inland.
- Coastal or shoreline processes** are the dynamic actions of water and wind that result in erosion and deposition.
 - They include waves, tides, longshore drift (currents) and wind. Atmospheric variables that are associated with storms are included.

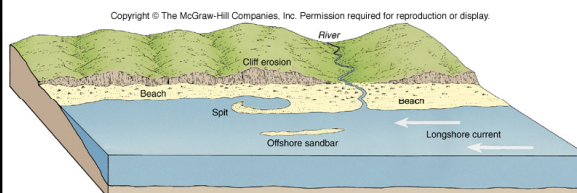
Factors Affecting Coastal Environments

Interrelationships affecting Long Island's coastal environment:



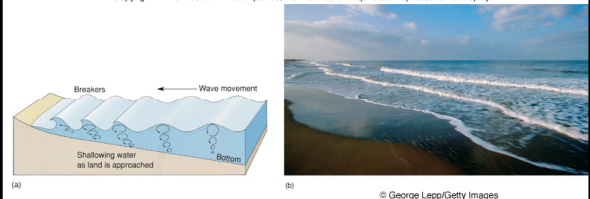
From USGS Circular after Pilkey, et al., 1989

Shoreline Features



Waves Approaching a Sandy Beach

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The Long Island Coastline

NORTH SHORE

1. Rocky shoreline
2. Steep slopes; deep inlets; many embayments.
3. Water quality issues in Long Island Sound, the Peconic bays and many harbors.
4. Endangered by poor circulation and sea level rise.

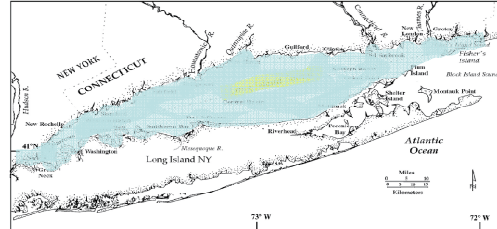
SOUTH SHORE

1. Sandy shoreline.
2. Gentle slopes; marshlands; shallow water; offshore barrier islands.
3. Water quality issues with Great South Bay and Jamaica Bay.
4. Endangered by pounding waves, storm surges and sea level rise.

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Long Island Sound

- http://longislandsoundstudy.net/wp-content/uploads/2010/02/1_LivingTreasures_Intro_LoRes.pdf - 6 page slide show



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Long Island Sound Watershed



- 1 = Connecticut River
2 = Housatonic River
3 = Thames River

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Geography of LIS

- Long Island Sound is an estuary. It is the 2nd largest on the east coast after Chesapeake Bay.
- LIS was created 8000 yrs ago as the glaciers retreated and melt water filled depressions behind the Harbor Hill moraine.
- After "Glacial Lake Connecticut" drained and as sea level rose, the former lake was flooded by sea water from east to west.
- Today, technically, LIS stretches from the Battery (Manhattan) to the Race (islands between NY and RI).
- The East River (actually a strait between LIS and NY Harbor) did not exist as an outlet until the rising sea flowed over the western divide.



Geography of LIS (continued)

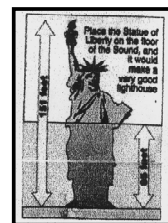
- Three states border it (NY, CT, and RI).
- 20 million people surround it.
- 90% of its fresh water comes from the Thames (3), Connecticut (1), and Housatonic (2) rivers.



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Geography of LIS (continued)

- It has 600 miles of coastline.
- There is no major river to flush out LIS from west to east.
- It is shallow (65-120 ft).
- There is limited exchange of sea water at its the eastern end.
- Its eastern basin is saltier than its western basin.



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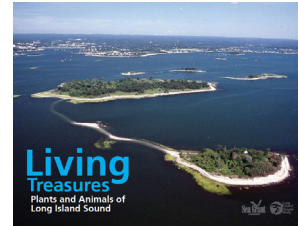
Problems

- Shallow water with limited tidal and freshwater flushing.
- Surrounded by one of the most densely populated urban-industrialized areas of the country.
- Tidal wetlands have been lost to development (filled in).
- Has hypoxia (low dissolved oxygen level from sewage and agricultural activities containing nitrogen).
- Habitat degradation from pollution.
- Contaminated with toxic chemicals (in bottom sediment) and pathogens (bacteria and viruses) in water.
- There is floatable debris.

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Living Treasures of LIS

- Access Living Treasures by clicking on the image.



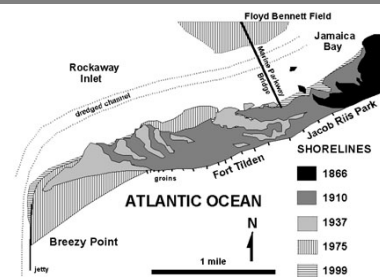
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Barrier Island Development

- A **barrier island** is a long, narrow body of sand laid parallel to the shoreline by longshore currents and separated from the mainland by a bay or lagoon.
- It is wider, longer and higher than a sand bar or sand spit and generally has a low profile.
- There are usually sand dunes running the length of the island.
- It is unstable geologically and fragile ecologically. It changes easily under the force of coastal processes and human disturbance.

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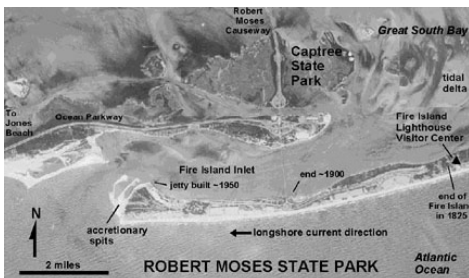
Rockaway Peninsula



Source: USGS

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Robert Moses State Park

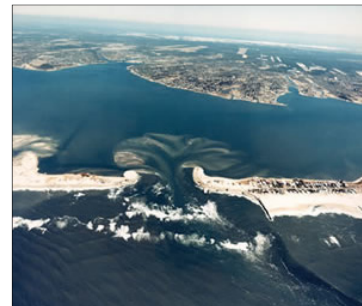


Source: USGS

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Breach at West Hampton Dunes

West Hampton Dunes
in December 1992
Source: NOAA



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Beach Erosion



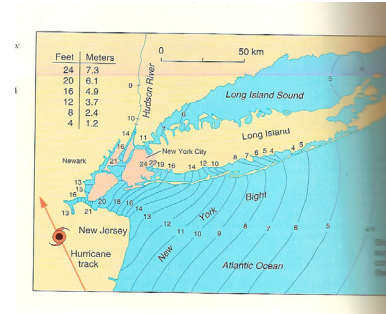
Aftermath of winter 1991 coastal storms at West Hampton Dunes.

Source: N. Coch, Queens College-CUNY

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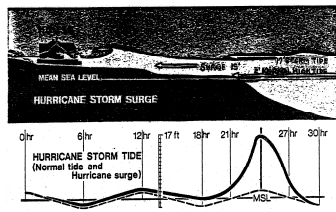
SLOSH Map of NY Bight

(Sea, Land Overland Surges from Hurricanes)



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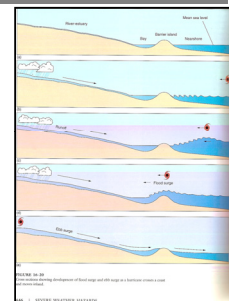
Storm Surge



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Double-whammy Storm Surge

- As a hurricane crosses the coast there is a storm surge as sea water floods the island and then a secondary or ebb surge as water rushes back to the ocean.
- At the same time runoff from heavy rains raises the water level in the lagoon and washes over the island from behind in the storm's wake.



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Resources

- http://longislandsoundstudy.net/wp-content/uploads/2010/02/1_LivingTreasures_Intro_LoRes.pdf - 6 page slide show
- www.nyswaterfronts.com
- http://www.nyswaterfronts.com/maps_regions.asp
- <http://longislandsoundstudy.net/> - Long Island Sound Study
- <http://www.dec.ny.gov/energy/45202.html> - Sea Level Rise Task Force
- <http://www.nyswaterfronts.com/index.asp> - view short videos from the hot links on this web page.
- <http://3dparks.wr.usgs.gov/nyc/shoreline/shoreline.htm> - USGS publication - Our transient Coastal Environment

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