Coastal Resilience, Long Island, USA

Coastal Resilience Project:
The purpose of the Coastal Resilience project is to provide communities with easy access to information to assist in coastal planning, zoning, acquisition, and other management decisions regarding resources at risk from sea level rise and coastal hazards. One of the principal products of the project is a spatially explicit tool that provides forecasts of inundation on the south shore of Long Island under different sea level rise scenarios. The aim of this web mapping tool is to provide communities with easy access to information for their planning, zoning, acquisition and permitting decisions.

Category: Ecological

General Description:
The potential viability calculation is an index of marsh size, marsh elevation, and potential migration impediments.

Source:
1. 1974 wetland inventory dataset with 1995 update for Shinnecock Bay area: NY DEC
3. 2006 Suffolk Co. LiDAR dataset: Suffolk County
4. 2009 Potential Migration Impediments dataset: TNC (see *Potential Migration Impediments* methodology for details)

Caveats and limitations:

This index provides a general estimation of a marsh's potential viability based on best available data. To more accurately estimate a marsh's ability to migrate - and therefore more accurately reflect its potential viability - more detailed data than is currently available would need to be employed; data such as local marsh accretion rates and fine-scale local land cover data which was not available for our study area.

This index assumes that larger, higher, and less impeded marshes have a greater chance at migrating upslope in the face of sea level rise. This is a general estimation and should not be used to identify which marshes are a "lost cause" and which ones will remain throughout the coming years. To most accurately capture the viability of marshes, a marsh-specific, "on the ground" analysis would need to be employed. This type of analysis was beyond the scope of this project, although the Conservancy intends to do such work in future phases of this project.

This dataset is dated (1974 with minimal updates in 1995), but remains the primary spatial dataset upon which regulatory decisions are made within Suffolk County. Due to the historical nature of this dataset, this dataset likely contains inaccuracies as the spatial distribution of marshes in Suffolk County has undoubtedly changed over the past 30 years. The Coastal Resilience web application will serve updated tidal marsh data as it becomes available.

Process:

1. Marsh size
   - Calculated marsh area based on NYDEC marsh datasets
   - Classified **marsh size** into 5 classes using a Jenks Natural Breaks classification technique
2. Marsh elevation
   - Calculated marsh average elevation based on LiDAR elevation data
   - Classified **marsh elevation** into 5 classes using a Quantile classification technique
3. Potential migration impediments
   - *Slope impediments* – extracted slopes >= 10 degrees and within 50 ft. of existing marshes from slope map (slope map generated from LiDAR dataset). Converted impeding slopes from raster to vector line datasets.
   - *Road impediments* – extracted roads within 50 ft. of existing marshes
   - *Hardened shoreline impediments* – extracted hardened shorelines within 50 ft. of marshes
   - Summed total length of impediments within 50 ft of marshes, returning total linear distance of potential marsh impediments
   - Calculated **potential migration impediments** indicator by dividing summed adjacent impediments distance by total marsh perimeter (i.e. total impediments/marsh perimeter), returning percentage of marsh perimeter potentially impeded.
   - Classified **potential migration impediments** percentage into 5 classes using Natural Breaks (Jenks) classification technique.
4. Added classified **marsh size**, **marsh elevation**, and **potential migration impediments** layers
5. Scaled summed layer's data range from to 1 to 10 for **Potential Viability** calculation.
6. The 1 to 10 classification is shown in 4 classes within the Coastal Resilience web mapping tool, ranging from "Lower" to "Higher"; These raw values are as follows: 3-7, 7-9, 9-10.5, and 10.5-13.

The Nature Conservancy
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