Climate Ready Assessment: The Peconic Estuary

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Peconic Estuary Committee Community Advisory Committee

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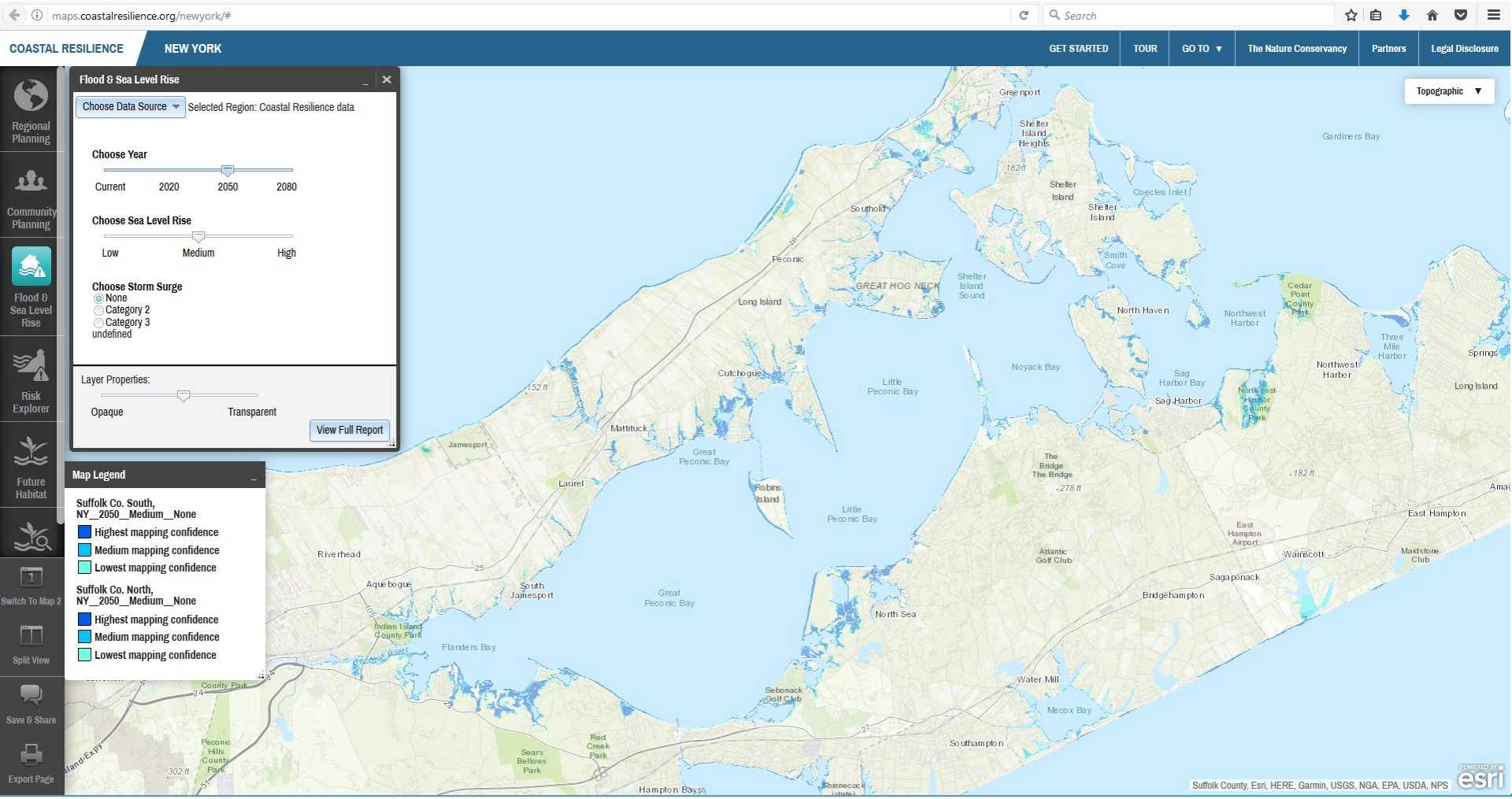
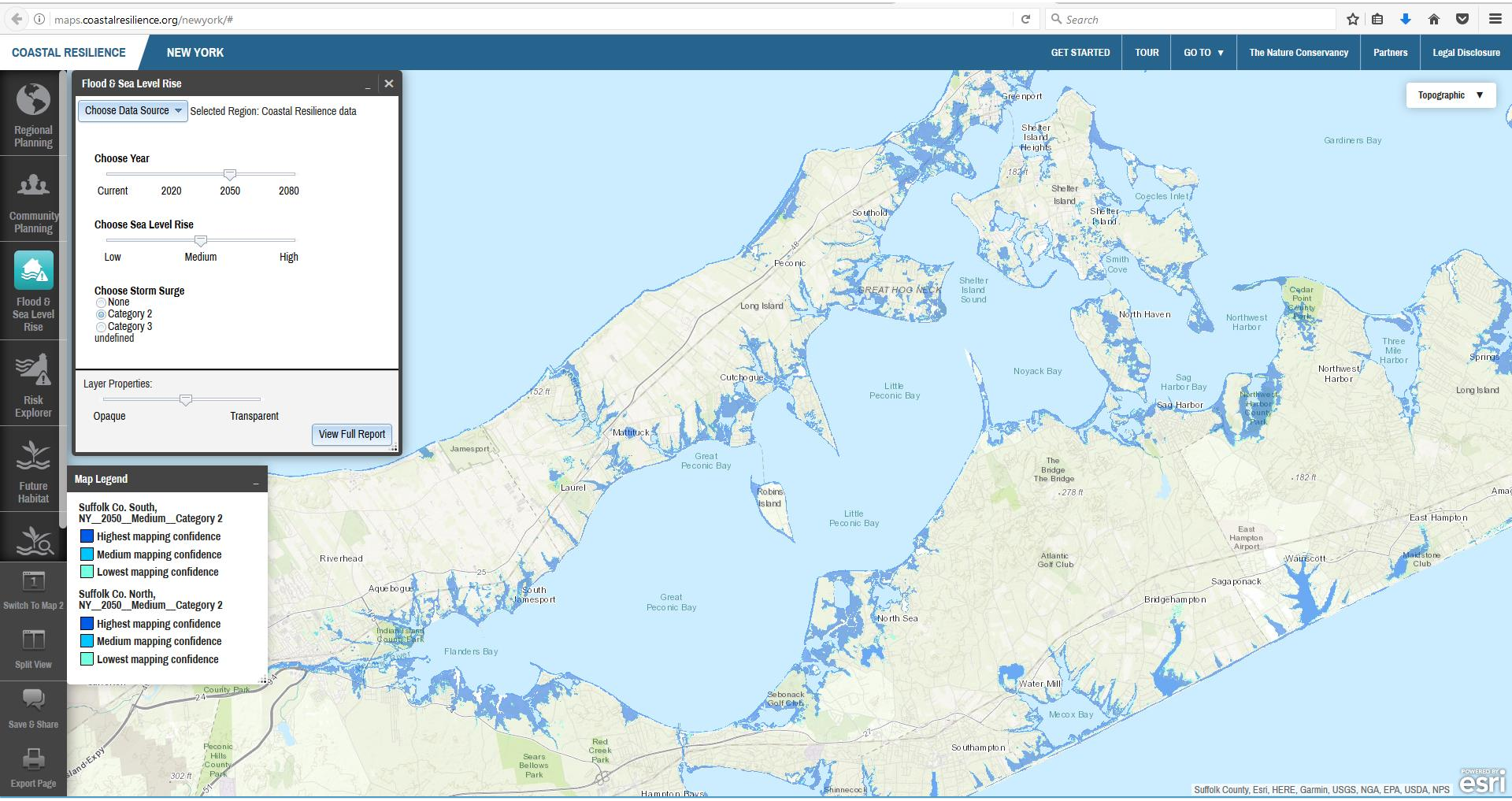
Climate Change in Peconic Estuary

- Sea Level Rise
  - Property Loss
  - Salt Water Intrusion
- Mean Temperature Rise
  - Growing seasons
  - Species changes
    - Blooms, Invasives, Loss of natives
- Rain and Snowfall
  - Storm Intensity
    - Runoff, Erosion, Water Quality
  - Changing Amounts/Patterns

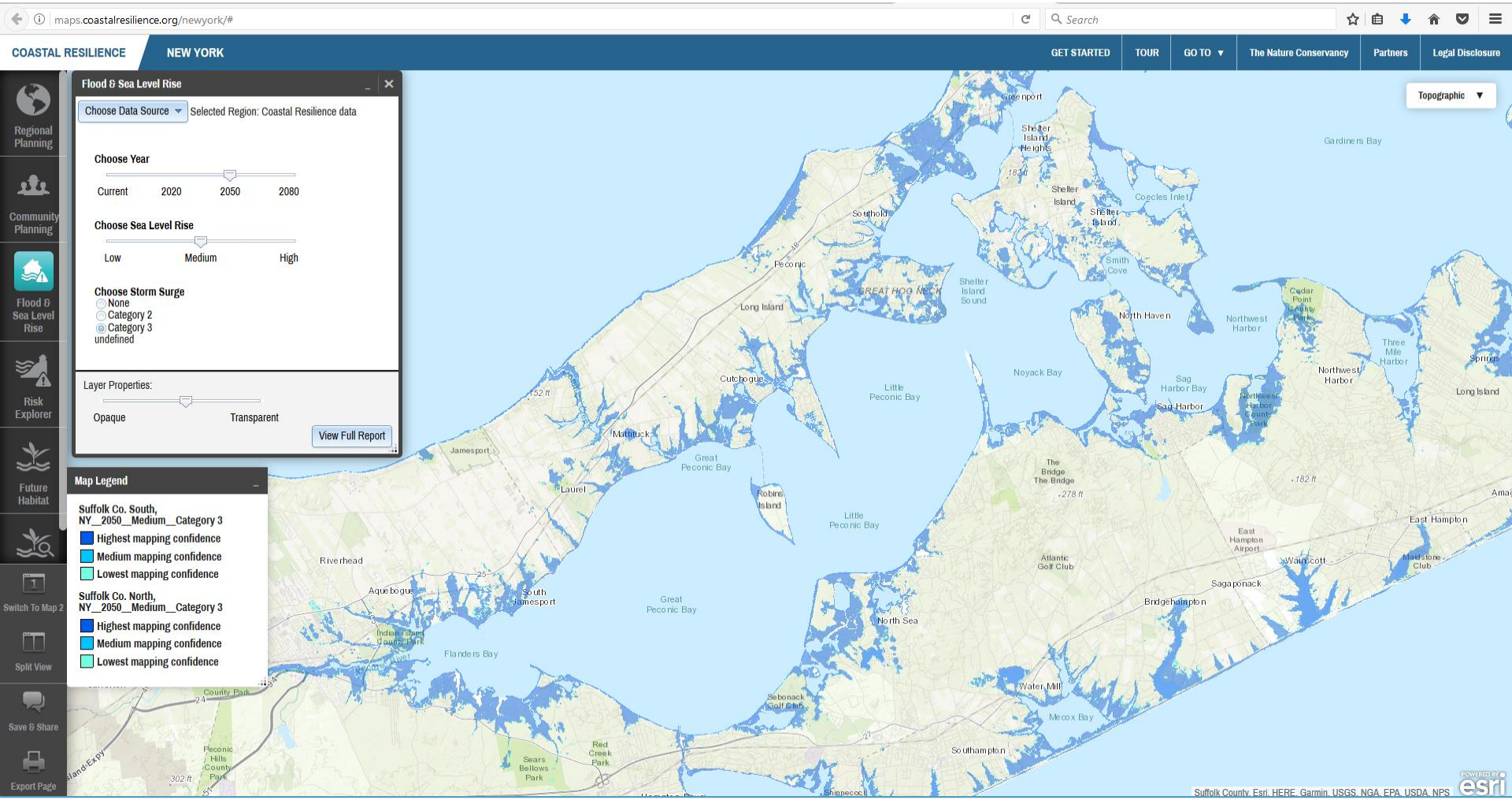
Medium Sea Level Rise



Medium Sea Level Rise: Category 2 Storm



Medium Sea Level Rise: Category 3 Storm



Climate Ready Assessment Services

Comprehensive Conservation and Management Plan (CCMP)

- Blueprint to restore and protect the waters of the Peconic Bays

Brown Tide, nutrients, habitat and living resources, pathogens, toxic pollutants, and ***critical lands protection***

Critical Lands Protection Strategy (CLPS)

- Chapter 7 of CCMP
- Evaluate land available for development
- Identify priorities for protection
- Does not include agricultural land

Table 7. CRITICAL LANDS PROTECTION STRATEGY (CLPS)

Environmental Criteria used to identify critical lands:

1. **Shoreline** – located within 1000 feet of the shoreline of a bay, tidal creek or the Peconic River
2. **NWI** – contains freshwater or tidal wetlands as identified by the U.S Fish and Wildlife Service 1994 National Wetlands Inventory (NWI)
3. **CNRA** – within a Critical Natural Resource Area, areas of particular ecological significance designated by the Peconic Estuary Program (further described in the Habitat and Living Resources Chapter of the CCMP)
4. **N-Stressed** – within a nitrogen-stressed subwatershed as designated by the Peconic Estuary Program (further described in the Nutrients Chapter of the CCMP)

Priority Categories:

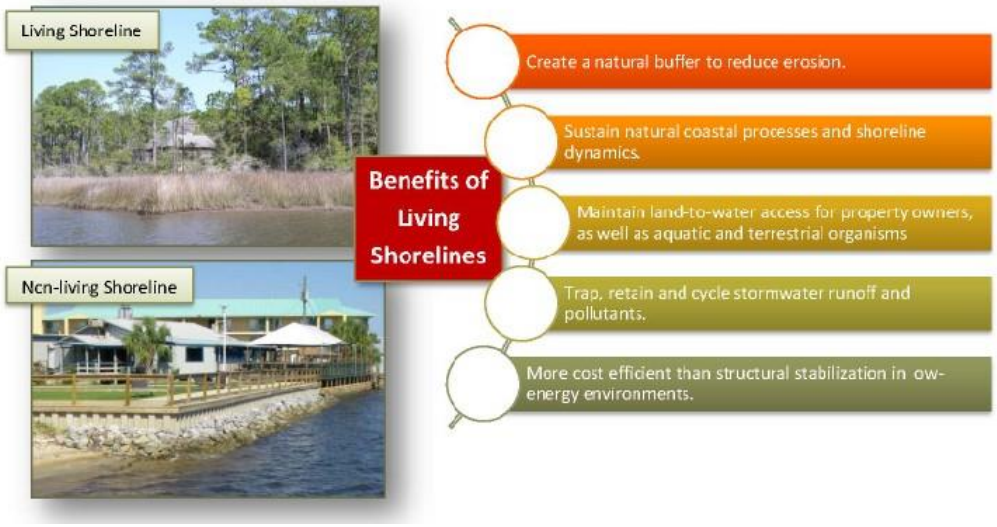
1.	**Aggregates -**	Multiple parcels of any size, that meet at least one (1) environmental criteria and that form an aggregate of ≥ 10 acres
2.	**10 Up -**	Parcels of ≥ 10 acres that meet at least one (1) environmental criteria
3.	**3 Hits 1000' -**	Parcels of any size that meet at least three (3) environmental criteria including 1000 feet from the shoreline
4.	**Adjacent to protected -**	Parcels of any size that meet at least one (1) environmental criteria and that are adjacent to protected lands of ≥ 2 acres

Overview and Approach

- **Issue:** CCMP and CLPS have not taken climate change into account
- **Approach:**
  - Assess risk and vulnerability of the natural resources within the PEP due to climate change
  - Develop recommendations to augment environmental criteria in the CCMP and update the CLPS
  - Develop climate ready action plan to address prioritized climate change risks and vulnerabilities.
- ***Public Process***
- **Team:** Anchor QEA, TNC, Fine Arts and Sciences

Objectives

- Identify opportunities to develop green coastal protection solutions to protect against imminent ***and*** long-term climate change effects
- Emphasize nature-based solutions



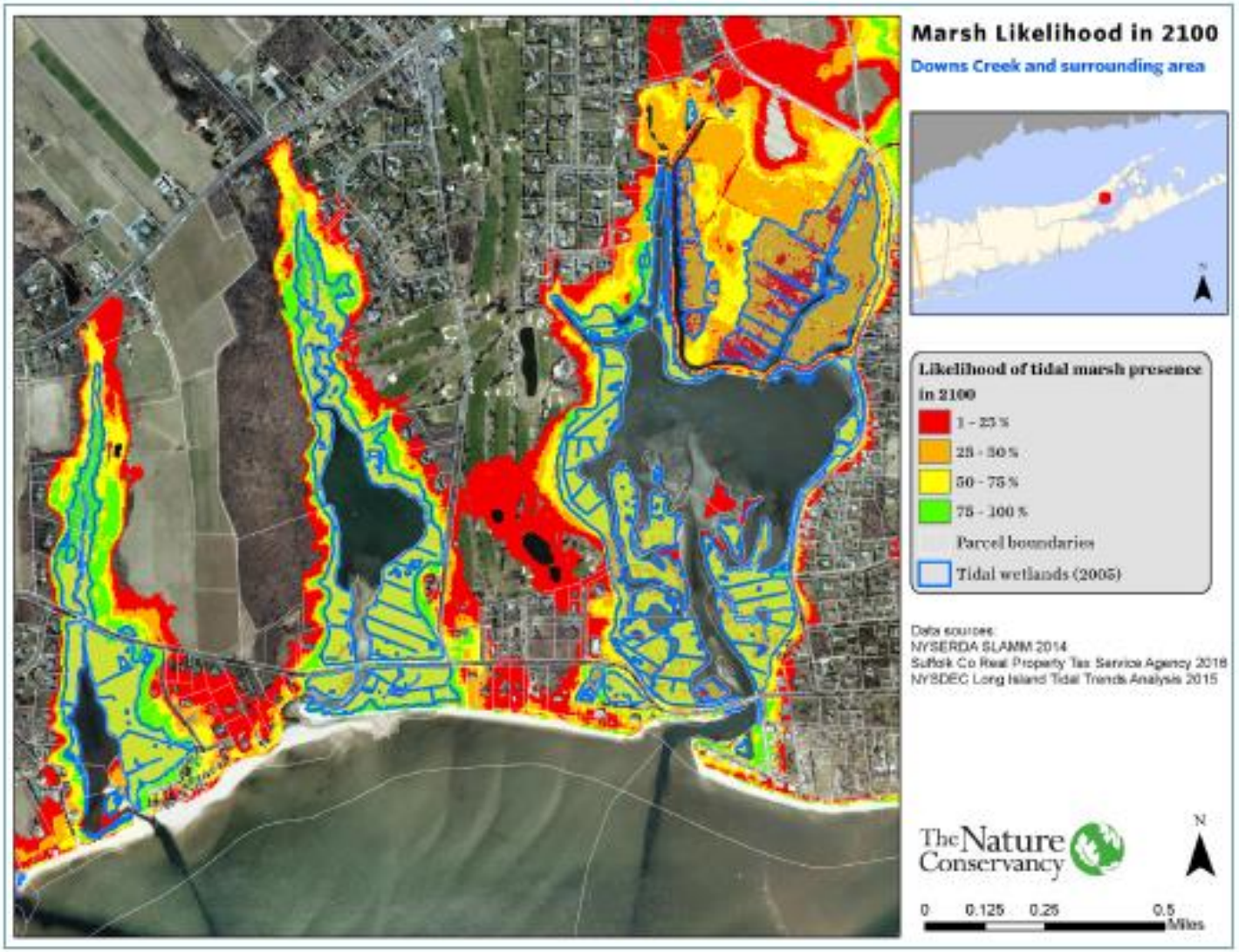
Step 1: Reprioritization of Parcels

- Develop new CLPS screening criteria and priorities
  - shoreline advance
  - increasing precipitation intensity
  - storm event frequency
- Changes may also alter coastal dynamics, sediment migration, erosion, and water quality

Developing New Criteria

- Considerations:
  - Parcels predicted to return to underwater or wetland habitat
  - Inland properties that could transition to shoreline positions under climate change scenarios
  - Existing living shoreline and opportunities for new living shorelines under climate change scenarios
  - Parcels that would be at risk for erosion under future climate change scenarios and may require shoreline protection if developed
  - Areas appropriate for inland wetland migration in the face of rising sea level

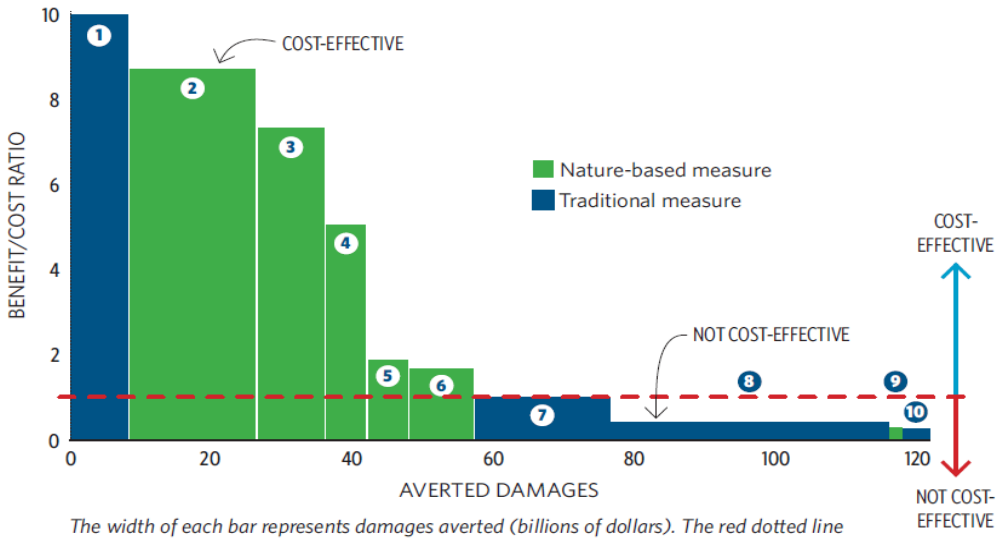
Step 2: Map It


Marsh Likelihood in 2100
Downs Creek and surrounding area
Likelihood of tidal marsh presence in 2100
1 - 25 %
25 - 50 %
50 - 75 %
75 - 100 %
Parcel boundaries
Tidal wetlands (2005)
Data sources:
NYSERDA SLAMM 2014
Suffolk Co Real Property Tax Service Agency 2018
NYSDEC Long Island Tidal Trends Analysis 2015
The Nature Conservancy
N
0 0.125 0.25 0.5
Miles

Step 3: Solutions

- Address multiple goals
  - Preservation
  - Conservation
  - Restoration

Comparison of the costs and benefits of Risk Reduction measures

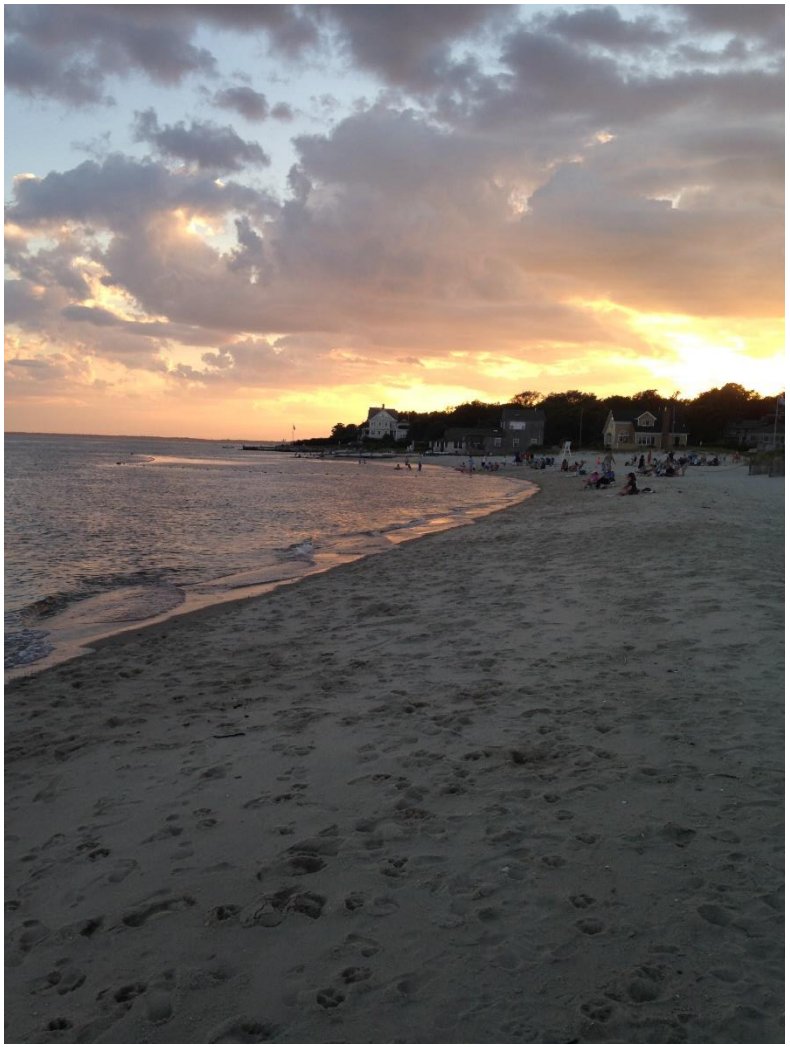


The width of each bar represents damages averted (billions of dollars). The red dotted line indicates a benefit to cost ratio of 1. Measures above the line are cost-effective.

MEASURE	CRITERIA
1 Sandbags	Used in 2.9 million houses for all category 3 hurricanes across all counties in the study area
2 Wetland Restoration	6 counties with the highest losses in assets where at least 25 miles of salt marsh could be restored by bay
3 Oyster Reef Restoration	1,000 miles restored in all counties with high suitability
4 Barrier Island Restoration	All Mississippi coastal counties
5 Wetland Conservation	125 miles of wetlands protected
Beach Nourishment (6 East Coast and 9 West Coast)	All coastal counties in Florida (East Coast) and Texas (West Coast)
7 Local Levees Priority	6ft "hills" built to protect 532,000 existing houses on the 6 counties that experience most damages
8 Home Elevation	Elevate 481,841 existing houses by 8ft in 6 counties that experience the most damages
10 Shoreline Levees	20ft levees constructed around Houma & New Orleans, LA - 340 miles

Ecosystem Based Adaptation

"The use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change." -TNC



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PLoS one

The Protective Role of Coastal Marshes: A Systematic Review and Meta-analysis

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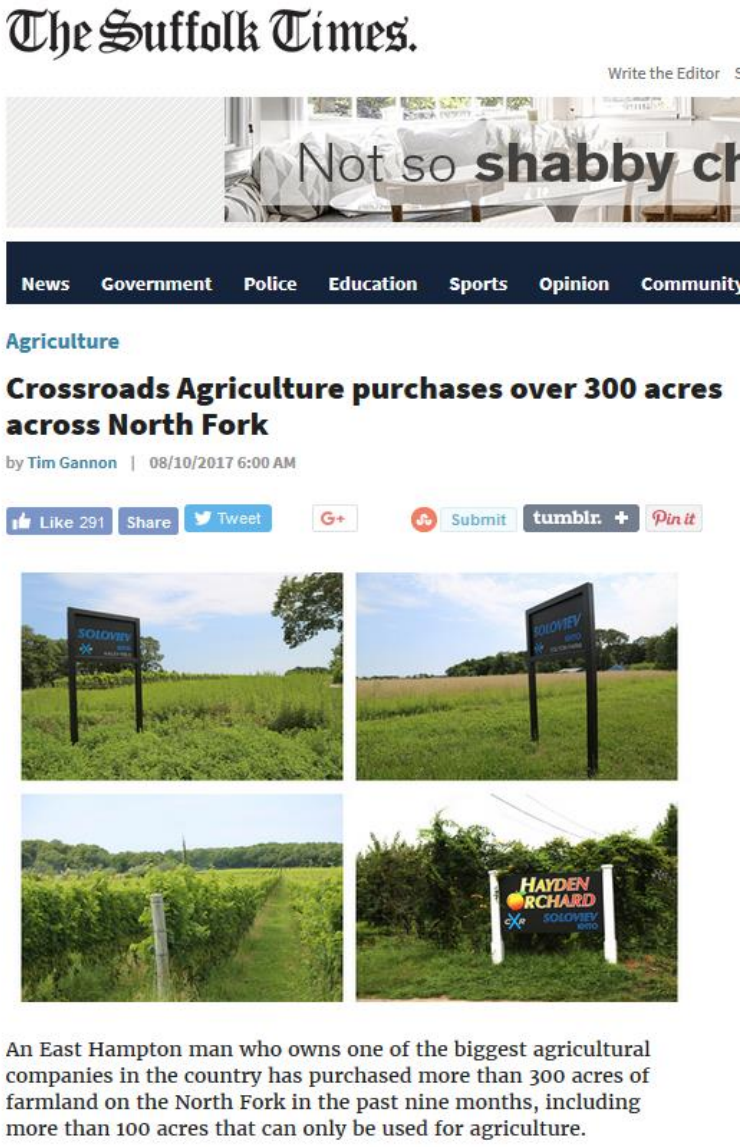
Abstract

Background: Salt marshes lie between many human communities and the coast and have been presumed to protect these communities from coastal hazards by providing important ecosystem services. However, previous characterizations of these ecosystem services have typically been based on a small number of historical studies, and the consistency and extent to which marshes provide these services has not been investigated. Here, we review the current evidence for the specific processes of wave attenuation, shoreline stabilization and floodwater attenuation to determine if and under what conditions salt marshes offer these coastal protection services.

Methodology/Principal Findings: We conducted a thorough search and synthesis of the literature with reference to these processes. Seventy-five publications met our selection criteria, and we conducted meta-analyses for publications with sufficient data available for quantitative analysis. We found that combined across all studies (n = 7), salt marsh vegetation had a significant positive effect on wave attenuation as measured by reductions in wave height per unit distance across marsh vegetation. Salt marsh vegetation also had a significant positive effect on shoreline stabilization as measured by accretion, lateral erosion reduction, and marsh surface elevation change (n = 30). Salt marsh characteristics that were positively correlated to both wave attenuation and shoreline stabilization were vegetation density, biomass production, and marsh size. Although we could not find studies quantitatively evaluating floodwater attenuation within salt marshes, there are several studies noting the negative effects of wetland alteration on water quantity regulation within coastal areas.

Challenges

- PEP supports
  - 5 townships
  - 35 hamlets, towns, and villages, and SIN
  - Different economies at different times of the year
- Preserving all the remaining available lands within the estuary would provide the highest form of protection, but…
  - funding
  - existing priorities



The Suffolk Times.

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Agriculture

Crossroads Agriculture purchases over 300 acres across North Fork

by Tim Gannon | 08/10/2017 6:00 AM

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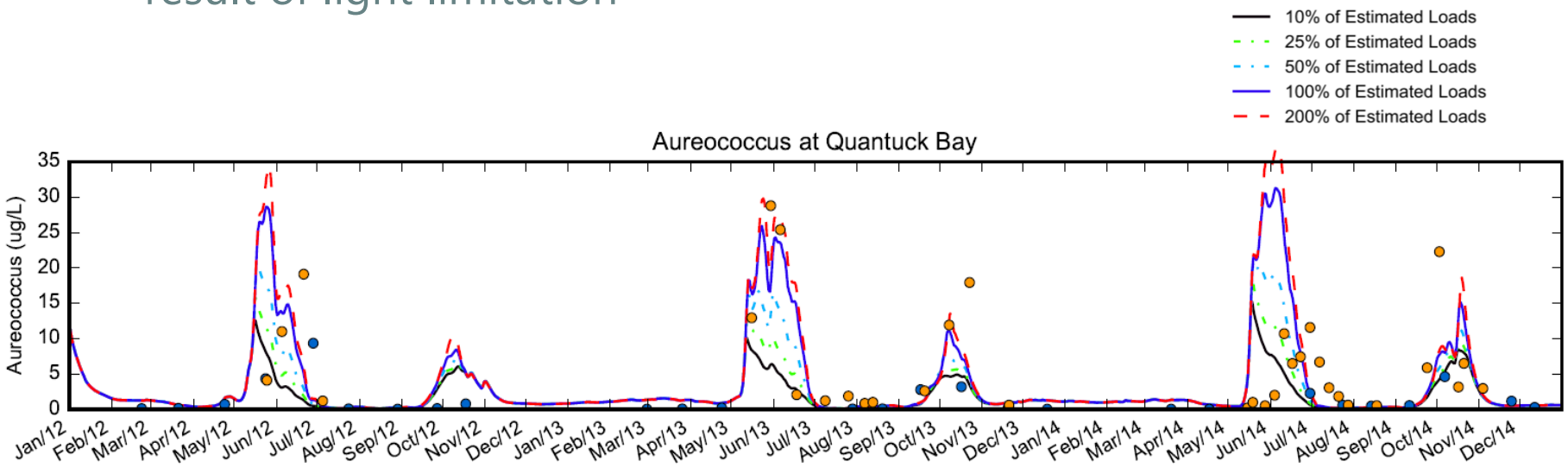
An East Hampton man who owns one of the biggest agricultural companies in the country has purchased more than 300 acres of farmland on the North Fork in the past nine months, including more than 100 acres that can only be used for agriculture.

Other Projects

Linked Hydrodynamic-HAB Model Developed for Quantuck Bay

- Brown tide blooms
- Hydrodynamic-HAB model developed and calibrated
  - Calibrated model ran at various nitrogen load reduction scenarios
- Results suggest system not nitrogen limited; observed algal patterns result of light limitation



TNC Culvert Mapping

Long Island Road-Stream Crossing Improvement Project



Investing in Road-Stream Crossings Benefits Communities & Natural Systems

Road-stream crossings, which include culverts and bridges, are an essential element of our transportation networks, allowing roads to pass over rivers, streams, tidal creeks, and marshes. Our communities and our economies depend on functioning road networks and safe crossings as well as healthy rivers, streams, wetlands and bays.

Undersized, poorly designed, or failing infrastructure at road-stream crossings restricts the flow of tidal and freshwater streams, which can lead to flooding, road closures, property damage, disconnected and degraded natural systems, and impaired water quality. During major storms, undersized culverts worsen flood impacts. Well-designed culverts bring environmental and safety benefits while also saving communities money, because they last longer and require less frequent maintenance.

Questions/Discussion