

COASTAL RESILIENCE

Adapting Natural and Human Communities to
Sea Level Rise and Coastal Hazards

2.0



Tools to Support Adaptation and Hazard Mitigation



THE UNIVERSITY OF
SOUTHERN
MISSISSIPPI



coastalresilience.org

nature.org/marine

Sarah Murdock

November 22, 2013
NACC NNBF Mtg.

Climate & Disaster Risk Reduction- Key Work Areas

Focus on coastal and riverine floods

Science

Role and Cost-Effectiveness of Natural Solutions
Assessing Risk Vulnerability & Solutions
see www.coastalresilience.org/resources

Decision Support Systems

Coastal Resilience
Climate Wizard

Action

Demonstration Projects

NE US (NY, CT, NJ)

Gulf of Mex

Small Is. Developing States (SIDS)

MesoAm Reef – Mexico

Policy and Finance

International – e.g., UNFCCC, UNISDR

US Policy

Corporate engagement

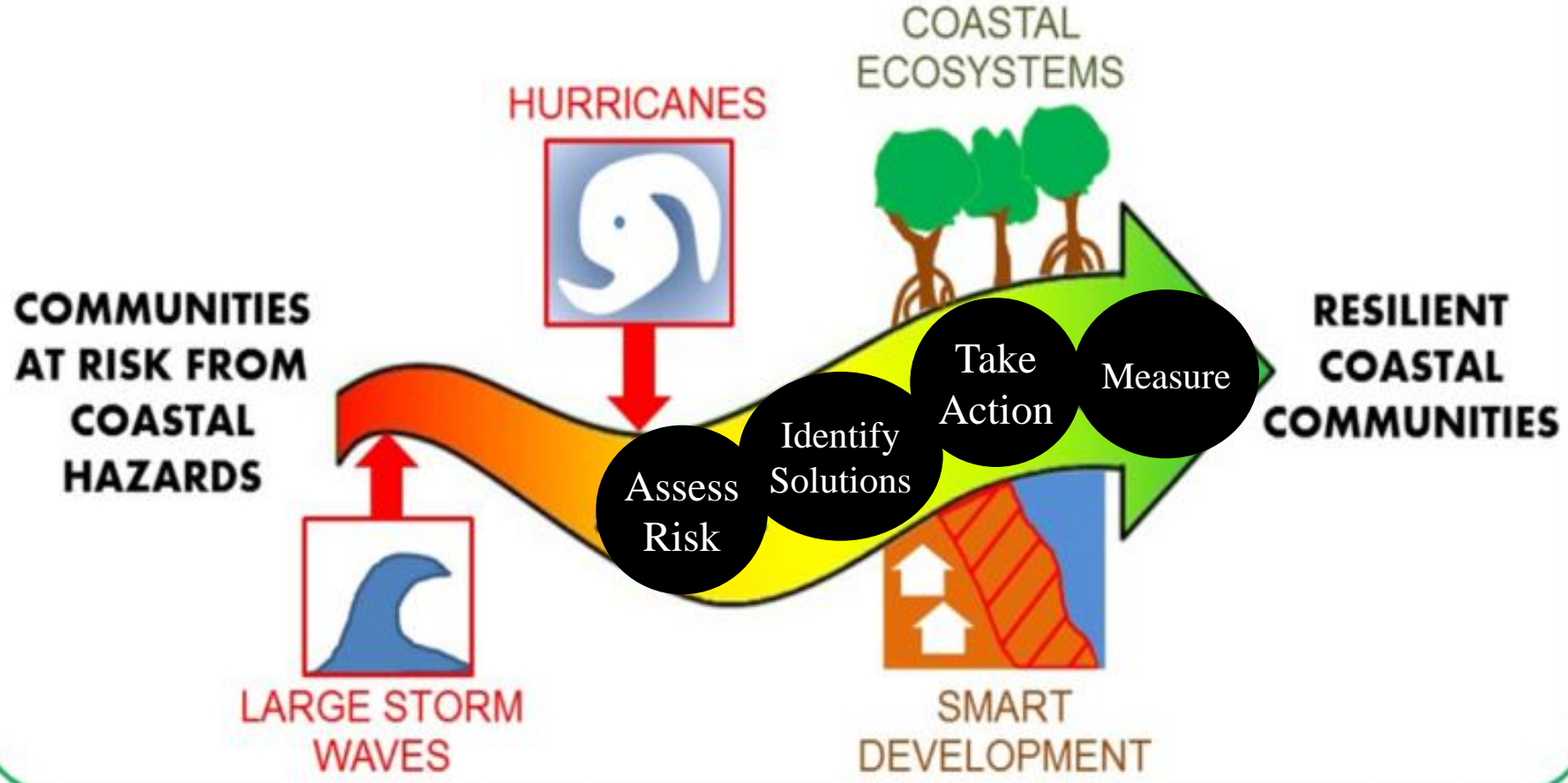
Re-Insurance

Engineering



Coastal Resilience aims to reduce socio-economic & ecological risks of coastal hazards

TNC's Coastal Resilience Approach



COASTAL RESILIENCE

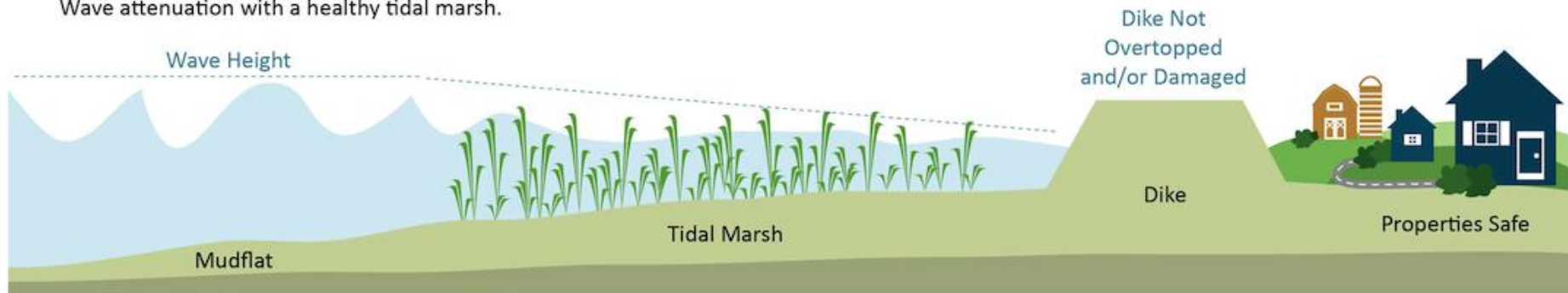
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Coastal Defense

Coastal Defense

Coastal Defense quantifies how natural habitats (oyster reefs, tidal marshes, seagrass ...) protect coastal areas by reducing wave-induced erosion and inundation. It uses standard engineering techniques to help you estimate how and where to restore or conserve critical habitat, and increase the resilience of your coastal community and infrastructure.

Wave attenuation with a healthy tidal marsh.



Wave attenuation with a degraded tidal marsh.



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The Network

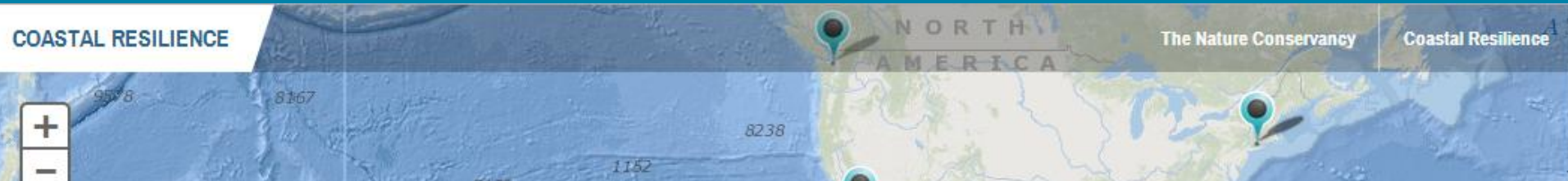
“The Coastal Resilience Network supports a community of practitioners around the world who are applying the approach, planning methods and tools to coastal hazard and adaptation issues.”



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Local to Global Scale Tools



Coastal Resilience 2.0 available at
<http://maps.coastalresilience.org>



Coastal Resilience Network

A major part of Coastal Resilience is providing easy access to and training for interactive support tools and other resources that help decision-makers **Assess Risks** - social, economic and ecological - from current and future coastal hazards including storm surge and sea level rise, and **Identify Solutions** in conservation and development decisions to help effectively reduce those risks. We are working extensively with partners, collaborators and decision-makers in each of these geographies around the world.

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2.0 Release
October 7, 2013



Map Layers

Community
Planning

Coastal
Defense

Floods &
SLR

Future
Habitats

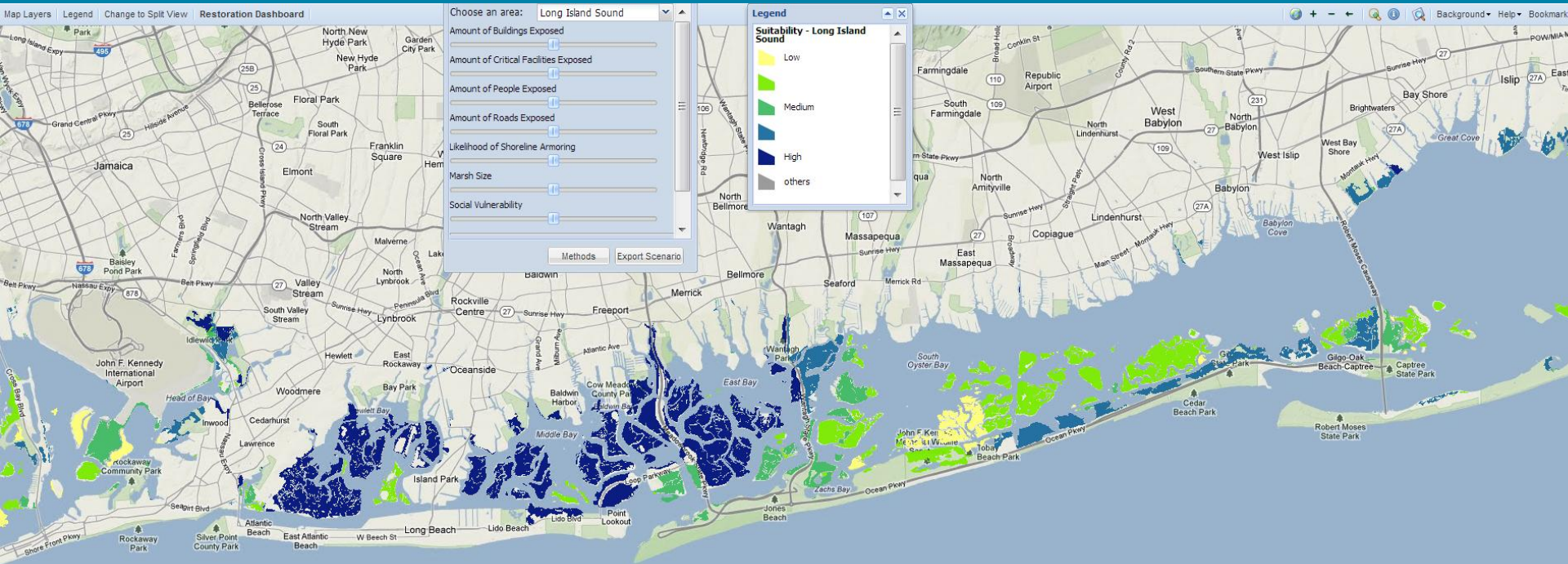
Risk
Explorer

Restoration
Explorer

Habitat
Explorer

Apps that address specific coastal issues

Habitat Explorer: Building a Recovery Tool in Response to Hurricane Sandy

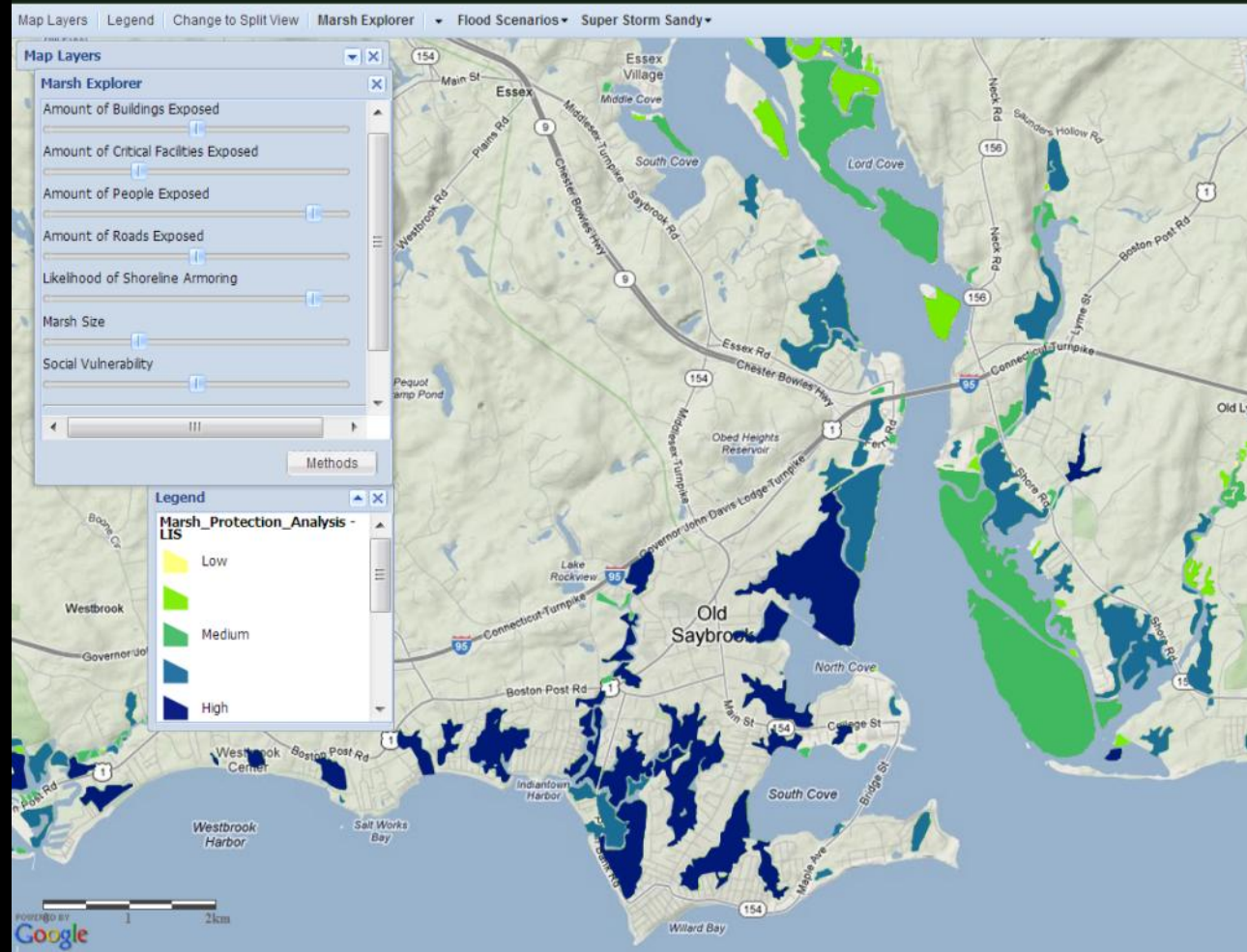


Marsh protection analysis with 5-meter inundation

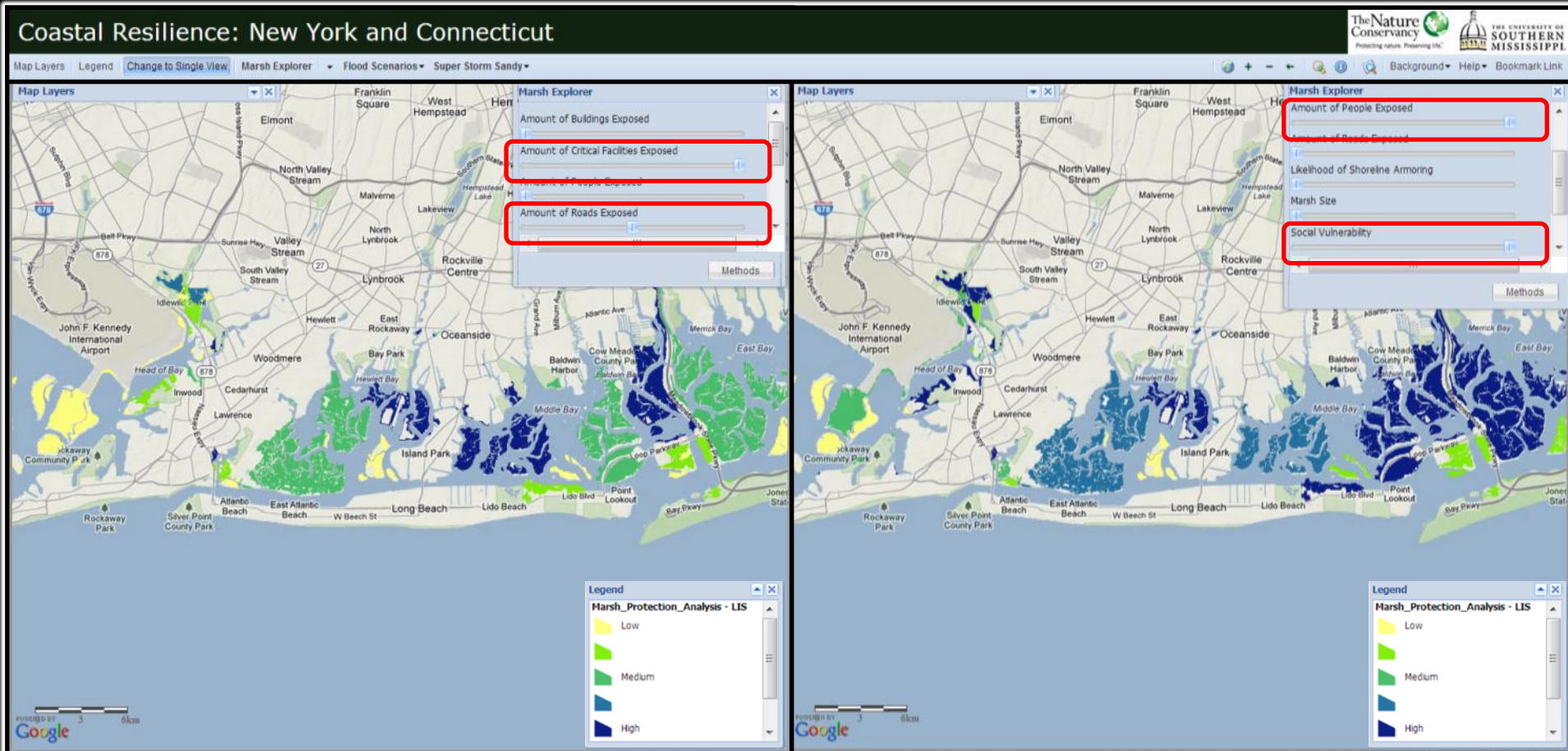
Evaluating social and economic assets behind marsh complexes

Habitat Explorer In action

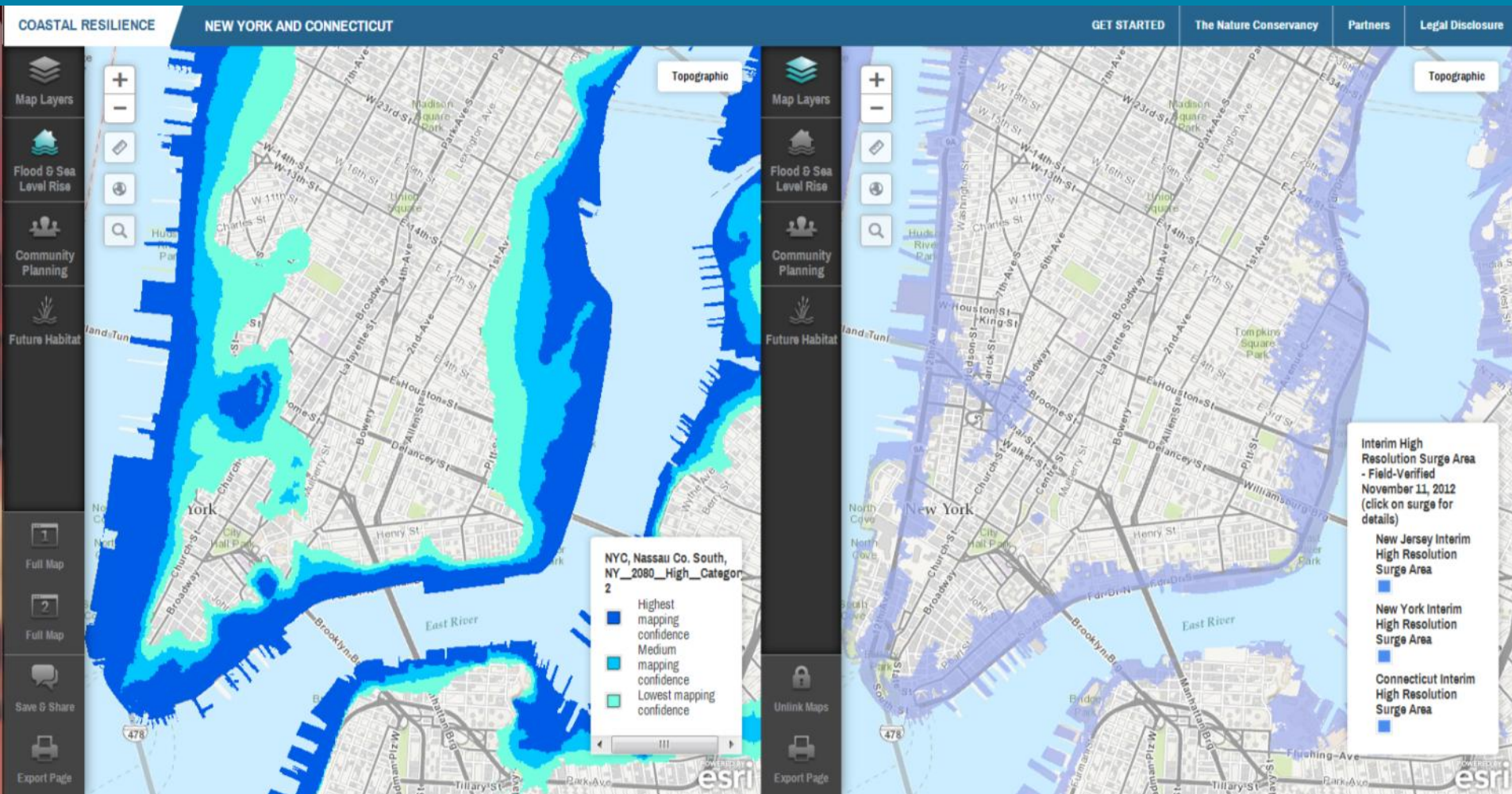
Coastal Resilience: New York and Connecticut



Evaluating social and economic assets behind marsh complexes



Floods with social and economic data, and a view to tomorrow



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Risk Explorer

COASTAL RESILIENCE

GULF OF MEXICO

GET STARTED

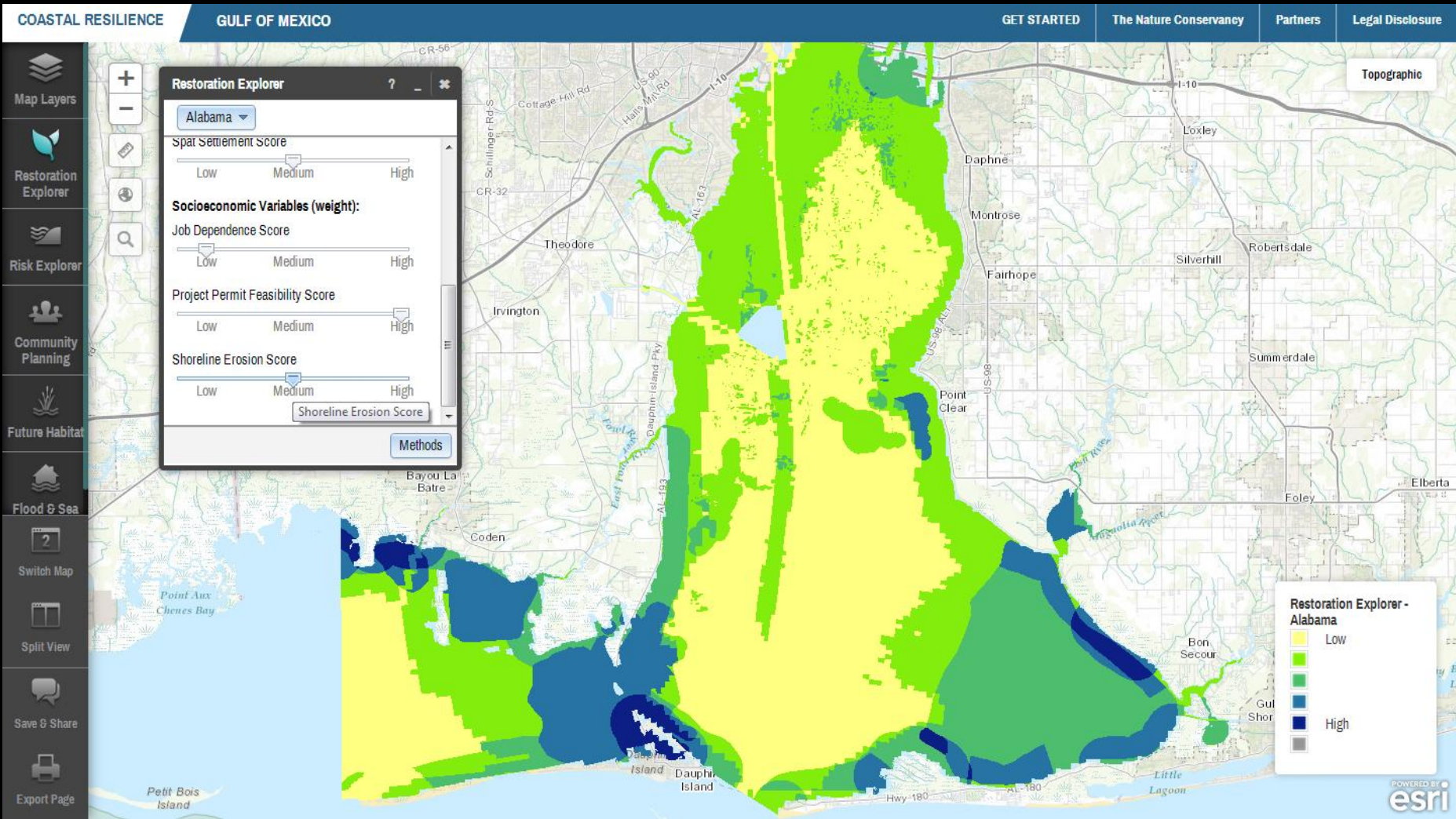
The Nature Conservancy

Partners

Legal Disclosure



Restoration Explorer: Mobile Bay, AL





Coastal Defense: Gulf of Mexico



COASTAL RESILIENCE GULF OF MEXICO

Map Layers

- Coastal Defense
- Community Planning
- Flood & SLR
- Future Habitat
- Habitat Explorer
- Restoration

Map Controls: Zoom (+/-), Search, Split View, Save & Share, Help, Export Page

Nearshore Waves Tool

Help: The reef length along the shore.

Units: Meters Feet

Reef Shape: Trapezoidal Dome

Height: 0.3

Base Width: 10

Crest Width: 4

Wave: Strong wave conditions

Distance from Shore: 60

Reef Length: 2000

Bathymetry (Check to Turn On)

Buttons: Reset Form, New Reef Location, Submit

Legend

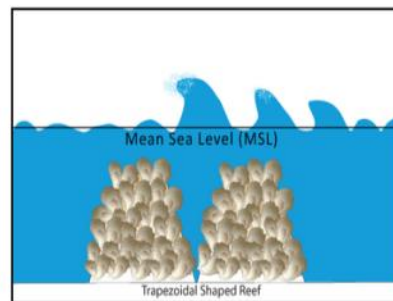
- Reef Centerline Point
- Reef Point (~25m from centerline)
- Reef footprint (reef length)

Below oyster symbols courtesy of the Integration and Application Network, University of Maryland Center for Environmental Science (iand.usd.edu/umbona/)

Coastal Defense: Gulf of Mexico



Reef Characteristics

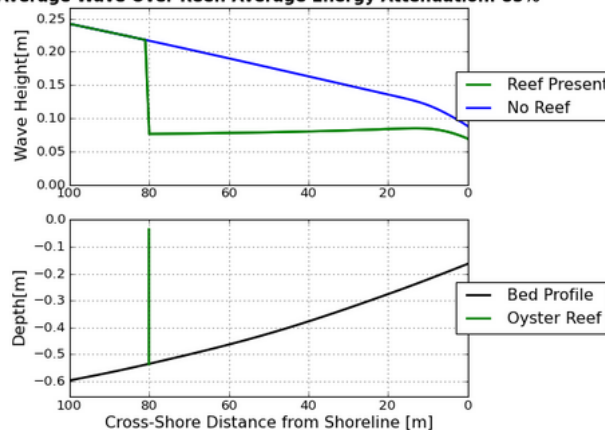


- Your oyster reef is 80.0m from the shoreline, with a base width of 10.0m, and a crest width of 4.0m.
- It is 0.3m tall, and the water depth is 0.53m: it is submerged.
- Offshore wave input conditions are: $H_o=0.51m$, and $T_o=3.04s$.

Model Outputs

Below are close-ups of average wave height and depth profiles near your reef - they were created by running our wave model over 7 bathymetry profiles that

Average Wave Over Reef. Average Energy Attenuation: 85%



- On average, wave heights in the region protected by your oyster reef were reduced by 52% (max=80%; min=23%).
- Wave energy was reduced, on average, by 71% (max=91%; min=41%).

