

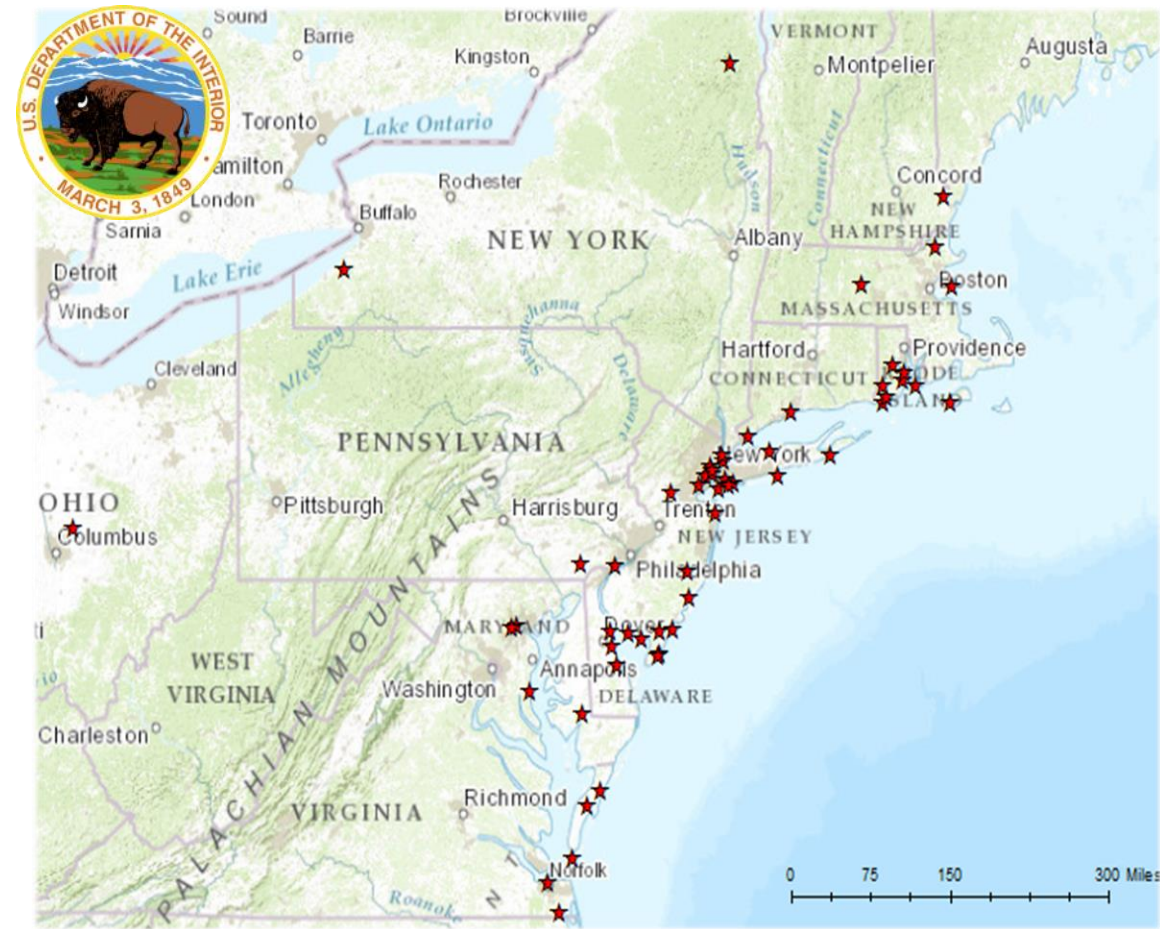


Northeast Regional Ocean Council

Mandy Chesnutt, Senior Conservation Planner – April 27, 2018

Volunteers and
NFWF staff
help study
red knots

Hurricane Sandy Coastal Resiliency Program



- In August 2013, the DOI selected NFWF to administer its Hurricane Sandy Coastal Resiliency Program.
- Projects that reduce communities' vulnerability to coastal storms and associated threats by strengthening natural ecosystems that also benefit fish and wildlife
- DOI provided \$100M in grant funding dedicated to competitive process and NFWF committed \$3 million from private sources or settlements
- \$102M was awarded to 54 projects.

210 Communities Positively Impacted

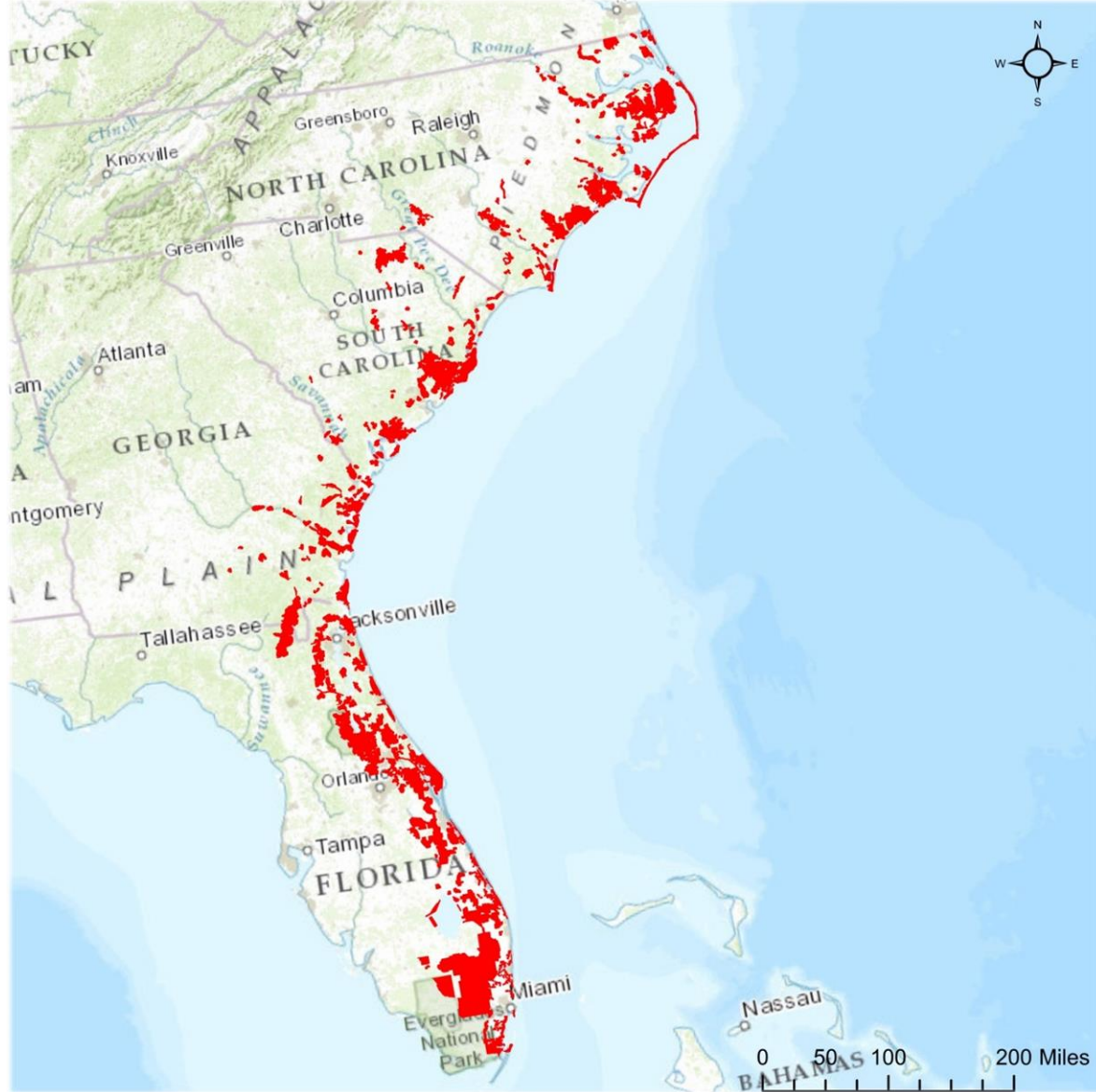
6,600 Acres of Wetlands/Marshes Created or Restored

225 Acres of Beach and Dune Restored

182 Million Gallons of Stormwater Prevented

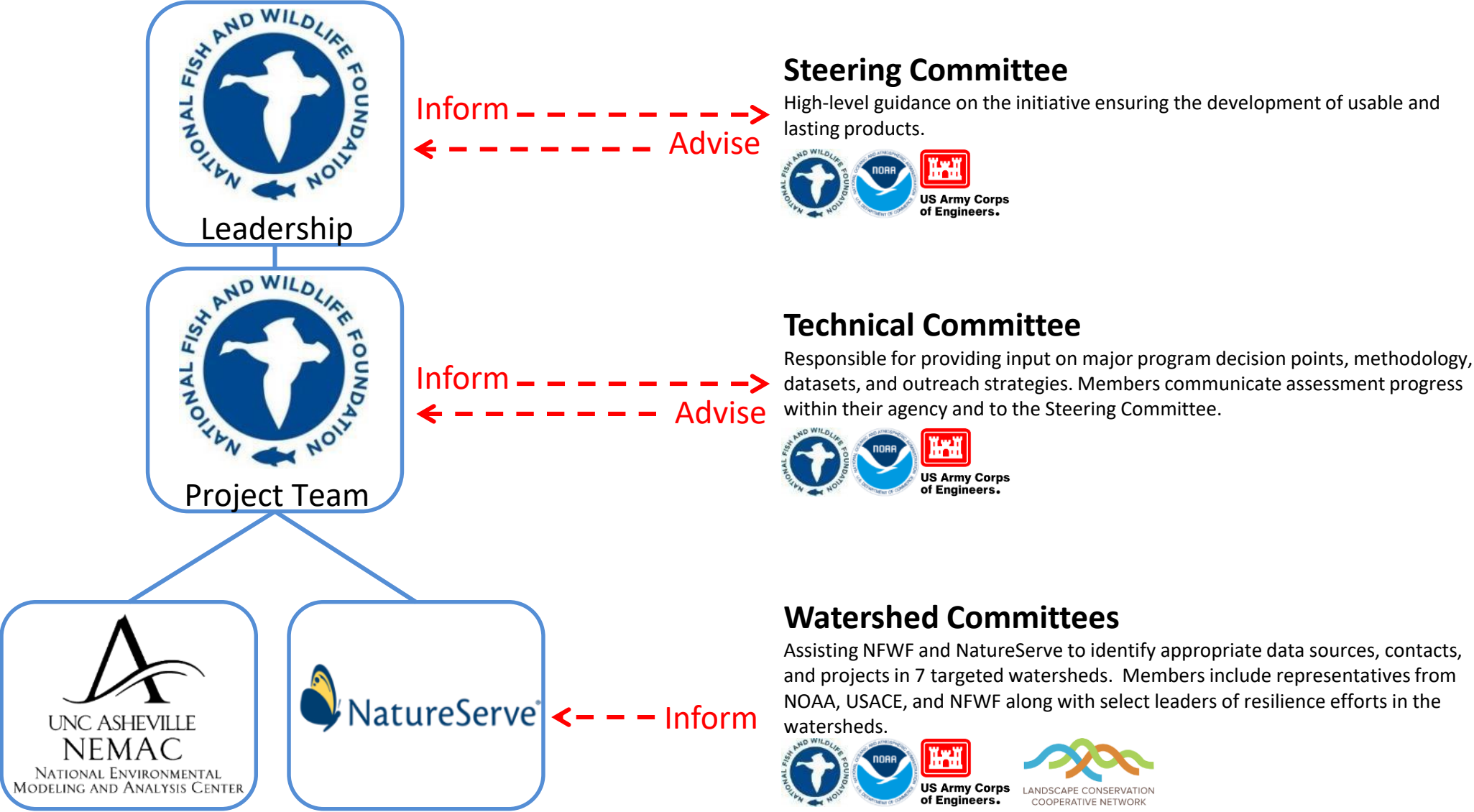


Resiliency Hubs

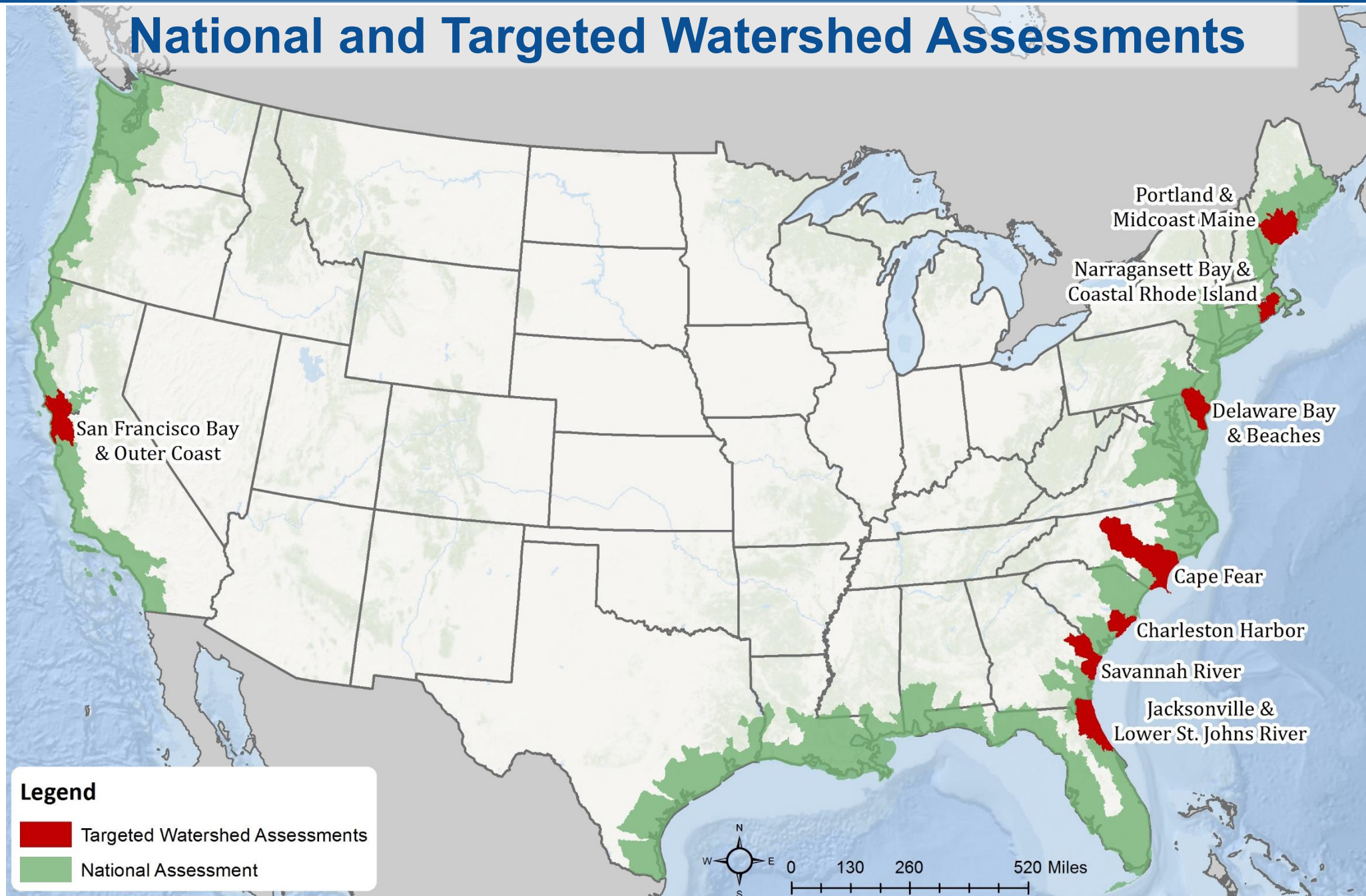


- Large, contiguous tracts of habitat or open space
- Typically contain complex of ecosystems and “nature-based infrastructure”
- Provide communities protection and buffering from storms
- Ideal for restoration, enhancement and expansion projects
- Look at these places through the lens of community exposure and critical fish and wildlife habitat

Expanding Partnerships



National and Targeted Watershed Assessments



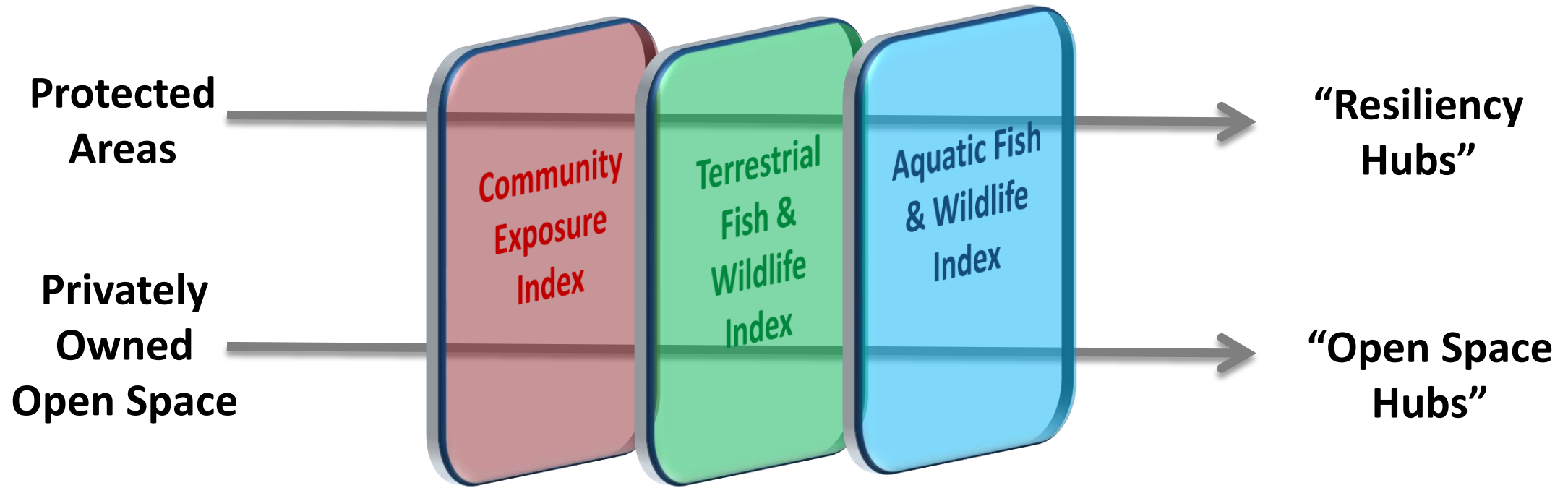
Objectives

- Identify areas on the landscape where implementation of conservation actions will have maximum benefit for ***human community resiliency and fish and wildlife habitat***
- Account for coastal and inland storm events
- Regional assessments create a contiguous and standardized data set for US coastlines
- Targeted watershed assessments identify projects that build community and ecological resilience



Regional Assessments

The Model



1. Community Exposure Index

Threat Index

Flood and Severe Storm-Related Threats

- Flood-prone areas
- Storm surge scenarios
- Sea level rise scenarios
- Impermeable soils
- Erodible soils
- Areas of low slope
- Land subsidence
- Landslide susceptibility
- Coastal geomorphology

Asset Index

Community Assets

- Population density
- Social vulnerability
- Critical facilities
- Dams
- Water treatment facilities
- Transportation infrastructure
- Power and fuel resources
- Hazardous materials sites

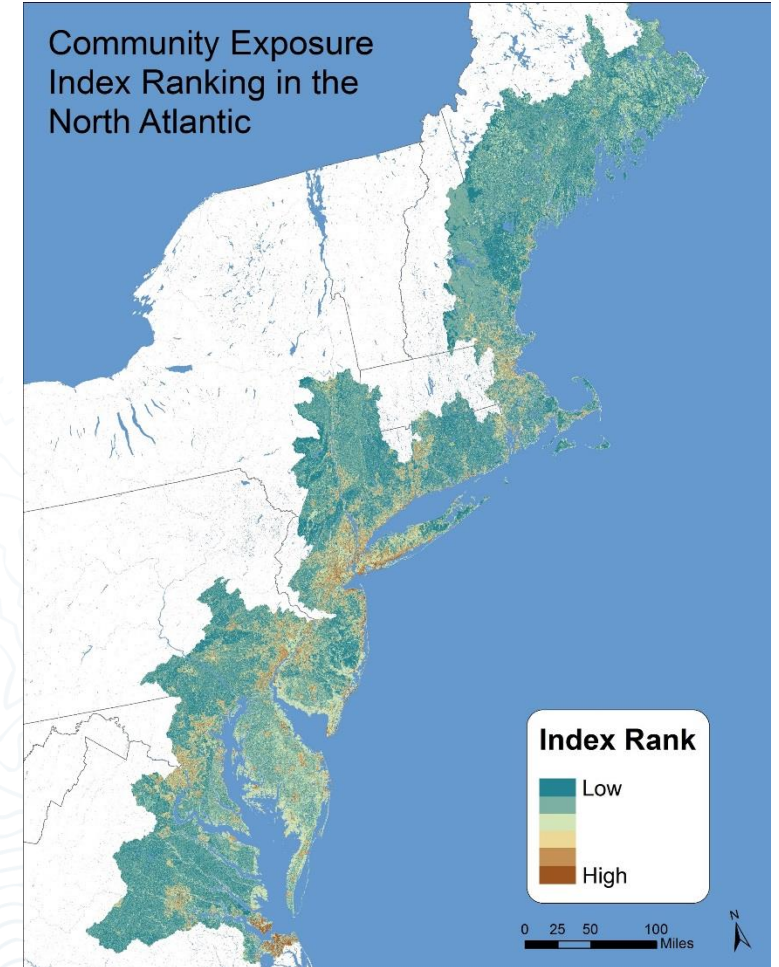
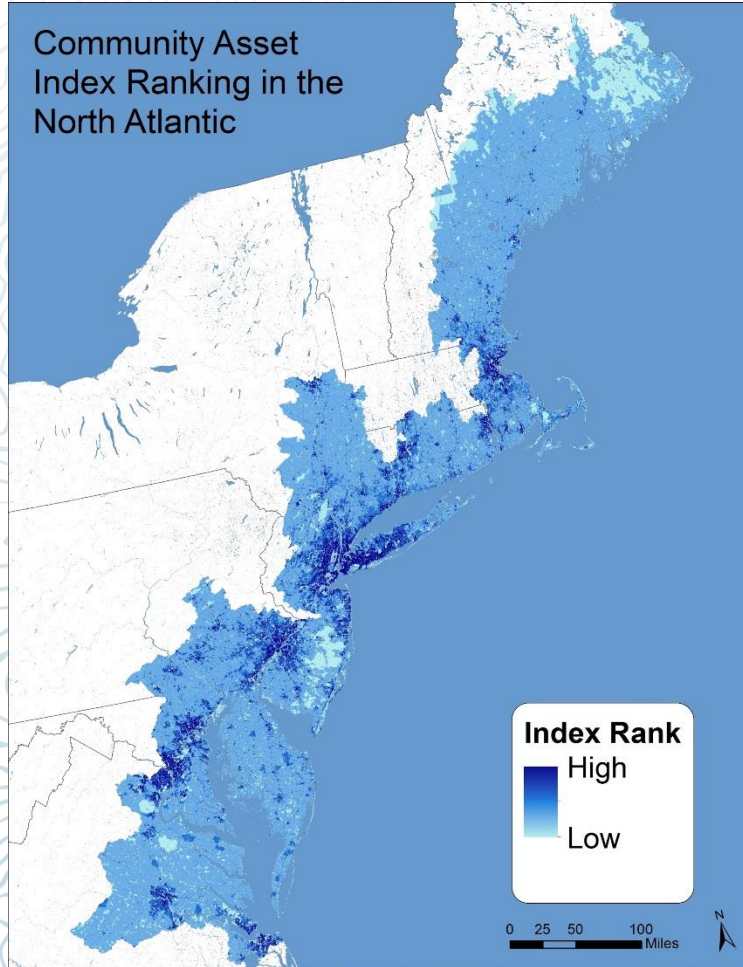
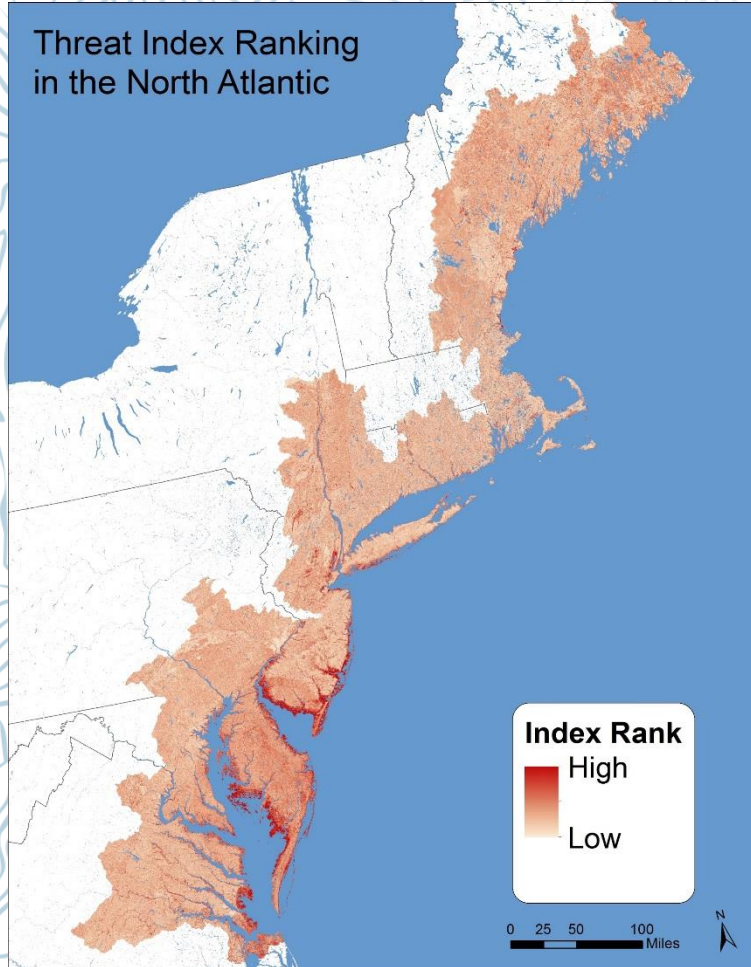
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Exposure Index

Identifies areas where community assets are potentially exposed to impacts from flooding or severe storm events

- Each input rasterized, 30x30 m cell resolution
- Ranked according to impact of threat and presence of asset on the landscape

Community Exposure Index: Regional Scale



Threat Index

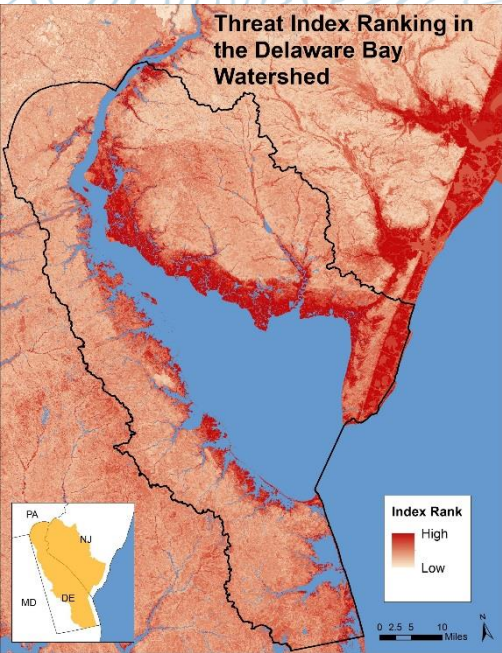
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Community Asset Index

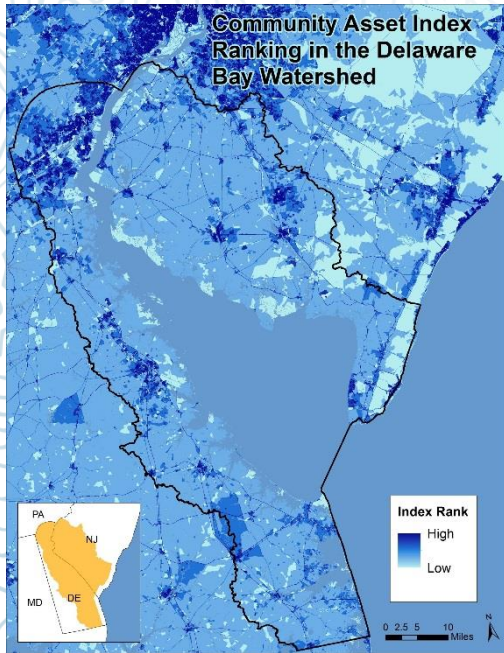
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Community Exposure Model

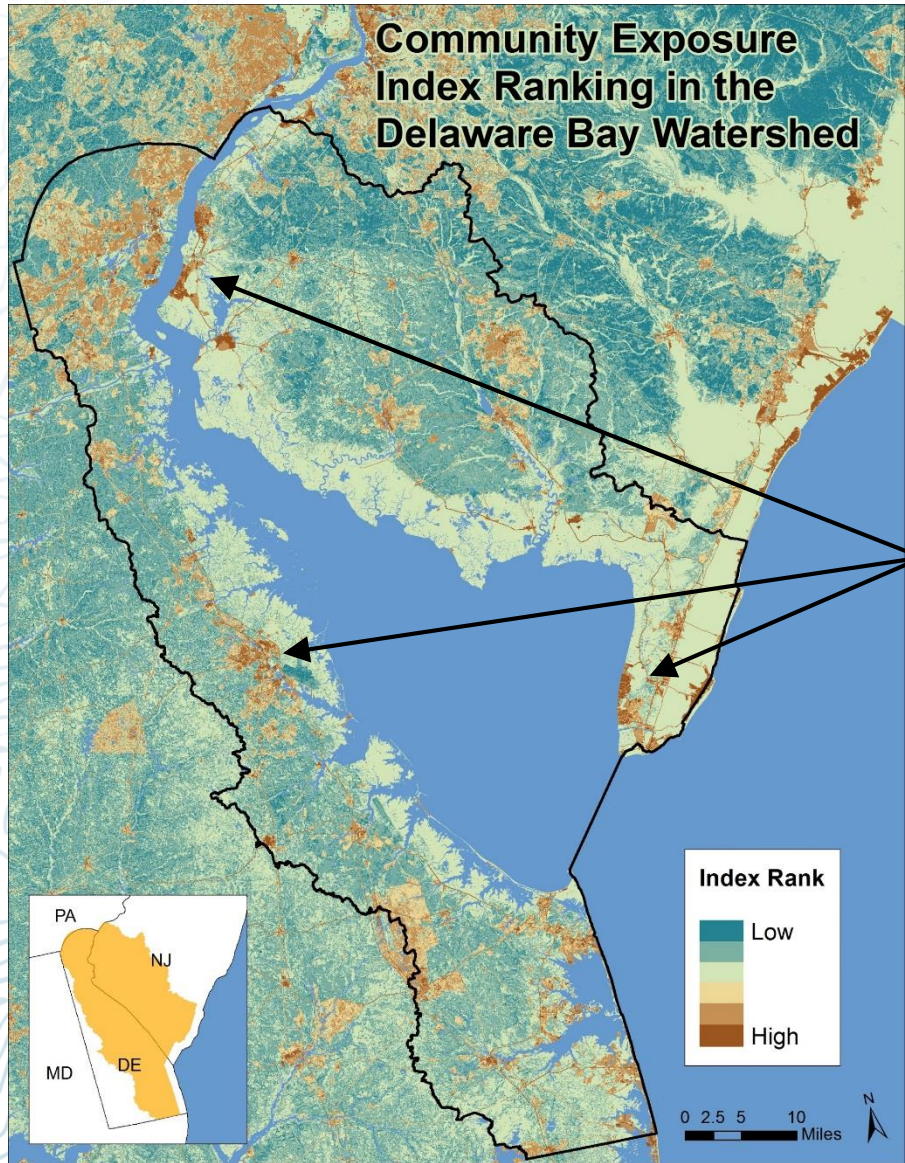
Community Exposure Index



X



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Helps communities understand where the most people and assets are exposed

Threat Index Ranking

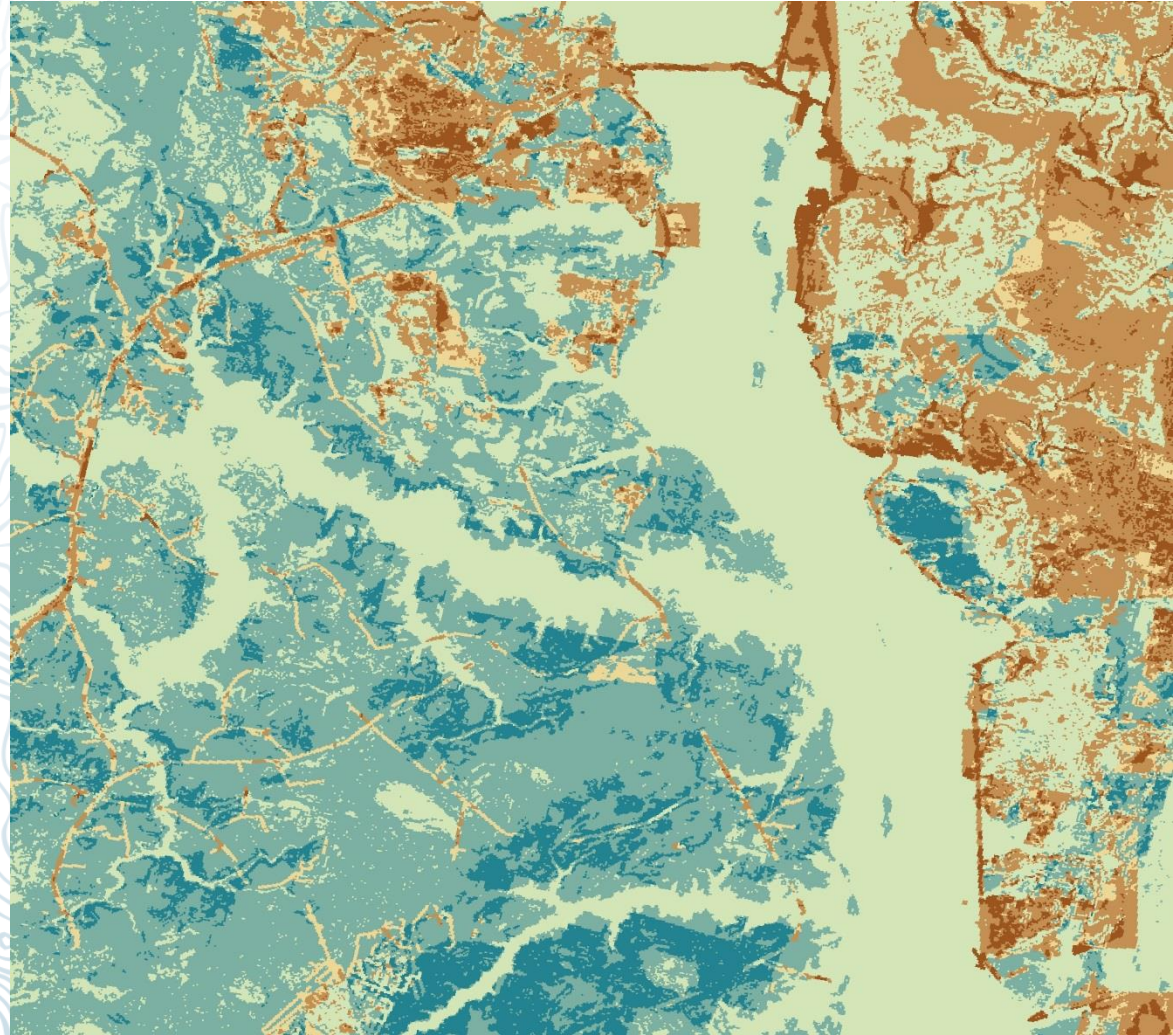
	1 - Low	2 - Med	3 - High
3 - High	3	6	9
2 - Med	2	4	6
1 - Low	1	2	3

Asset Index Ranking

Community Exposure Index: Local Scale

Useful to identify where projects could be implemented

- Community planning
- Stormwater management
- Restoration projects
- Gray infrastructure



2. Fish and Wildlife Assessment

Fish & Wildlife Terrestrial Assets

Identifies areas where terrestrial assets exist on the landscape

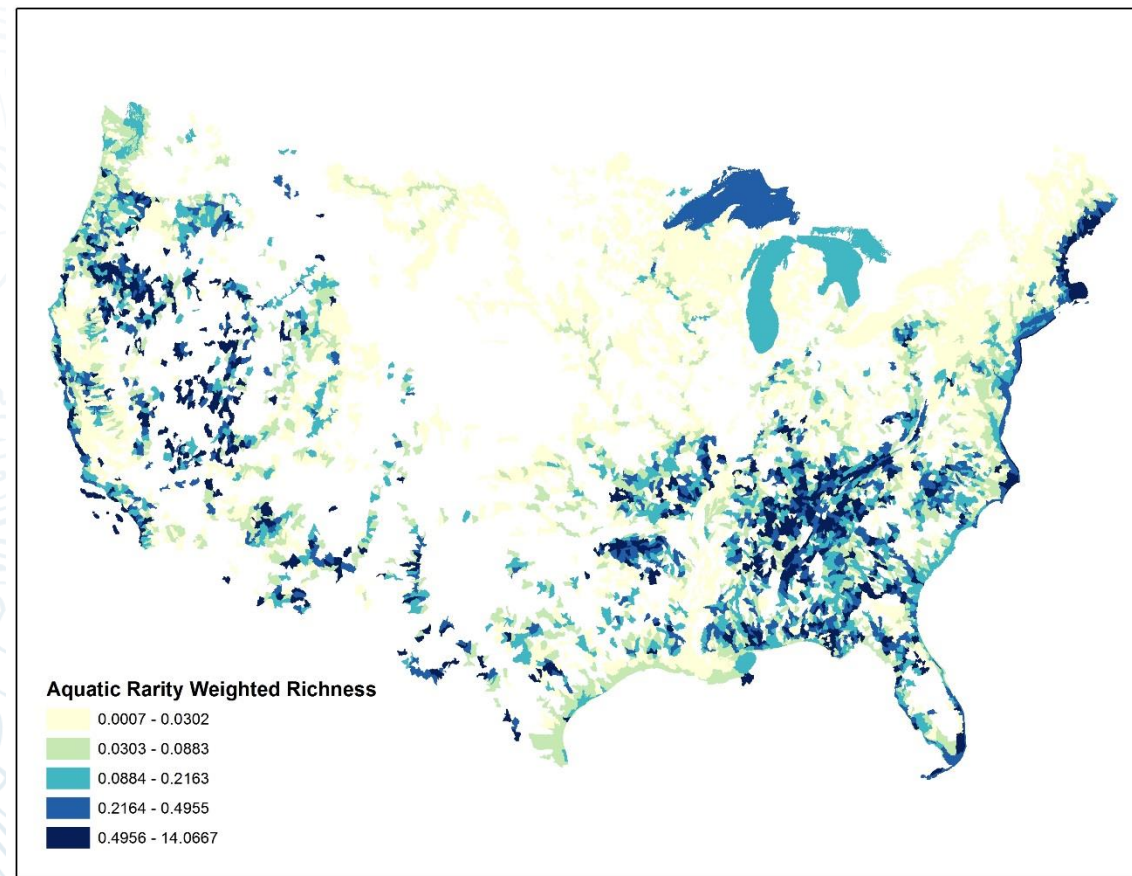
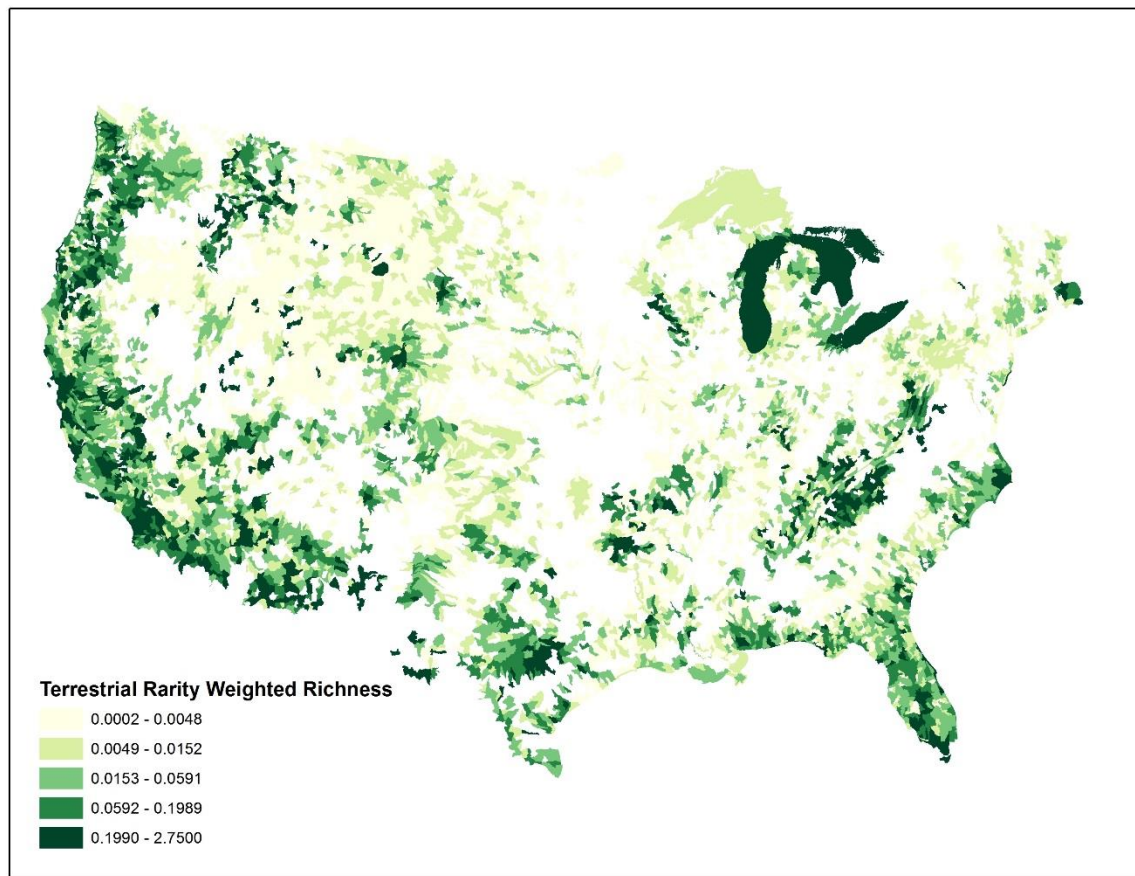
- NatureServe HUC-12 watershed data for terrestrial species: G1-G3, Federal T&E species, by Rarity-Weighted Richness
- Important Bird Areas

Fish & Wildlife Aquatic Assets

Identifies areas where aquatic assets exist on the landscape

- NatureServe HUC-12 watershed data for terrestrial species: G1-G3, Federal T&E species, by Rarity-Weighted Richness
- NOAA Critical Habitat data
- NOAA Essential Fish Habitat data

- Each input rasterized, 30x30 m cell resolution
- Ranked according to presence of priority fish and wildlife



3. Resiliency & Open Space Hubs

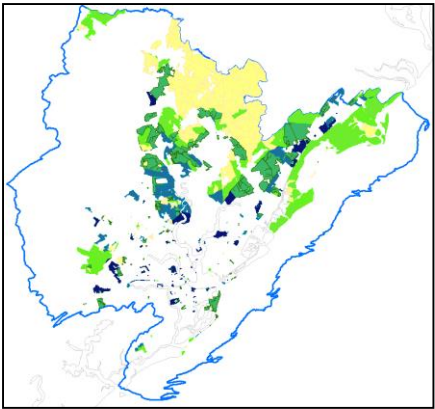
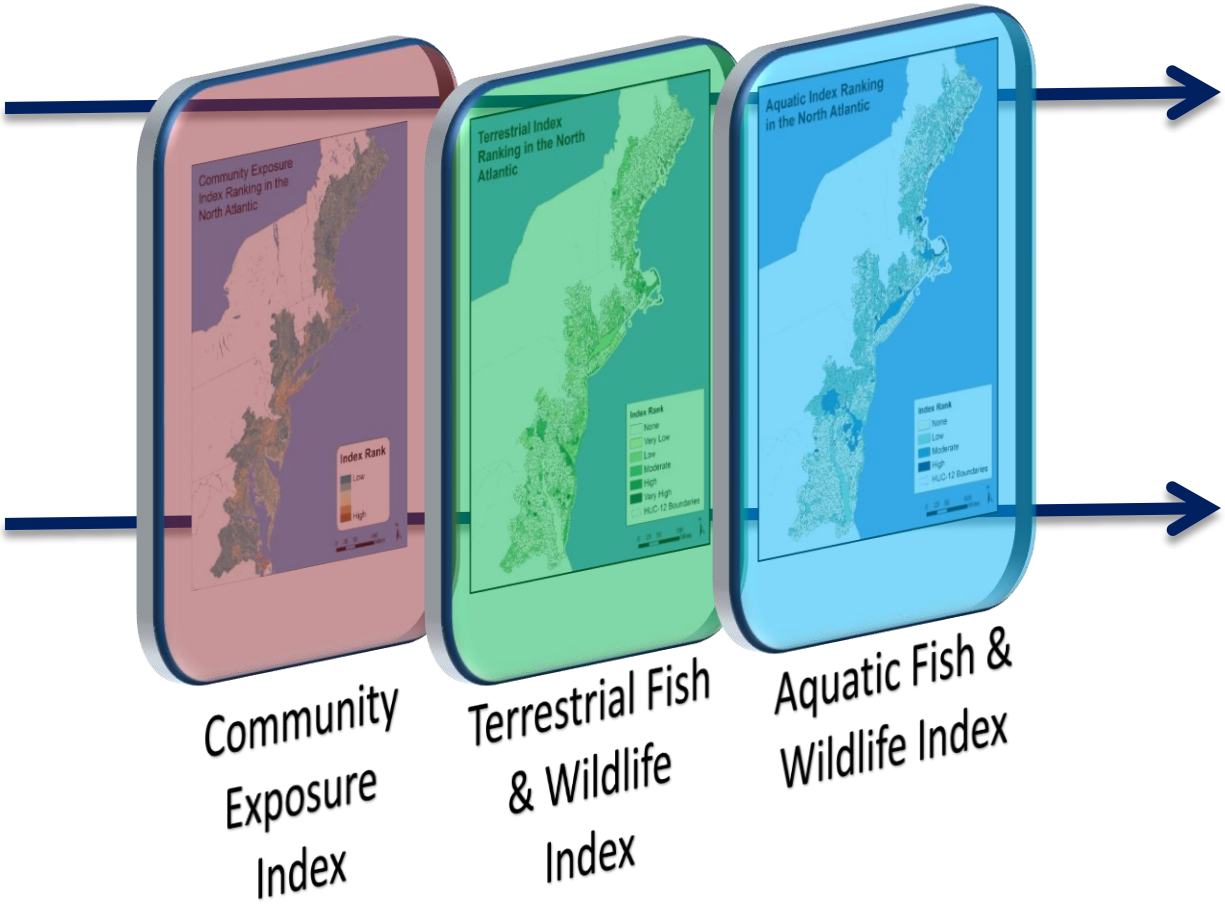
Protected Areas & Open Space



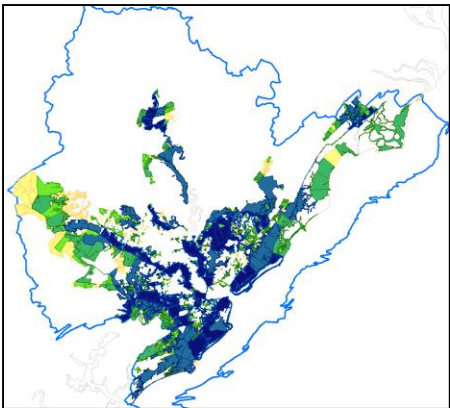
**Protected
Areas**



**Privately
Owned
Open Space**



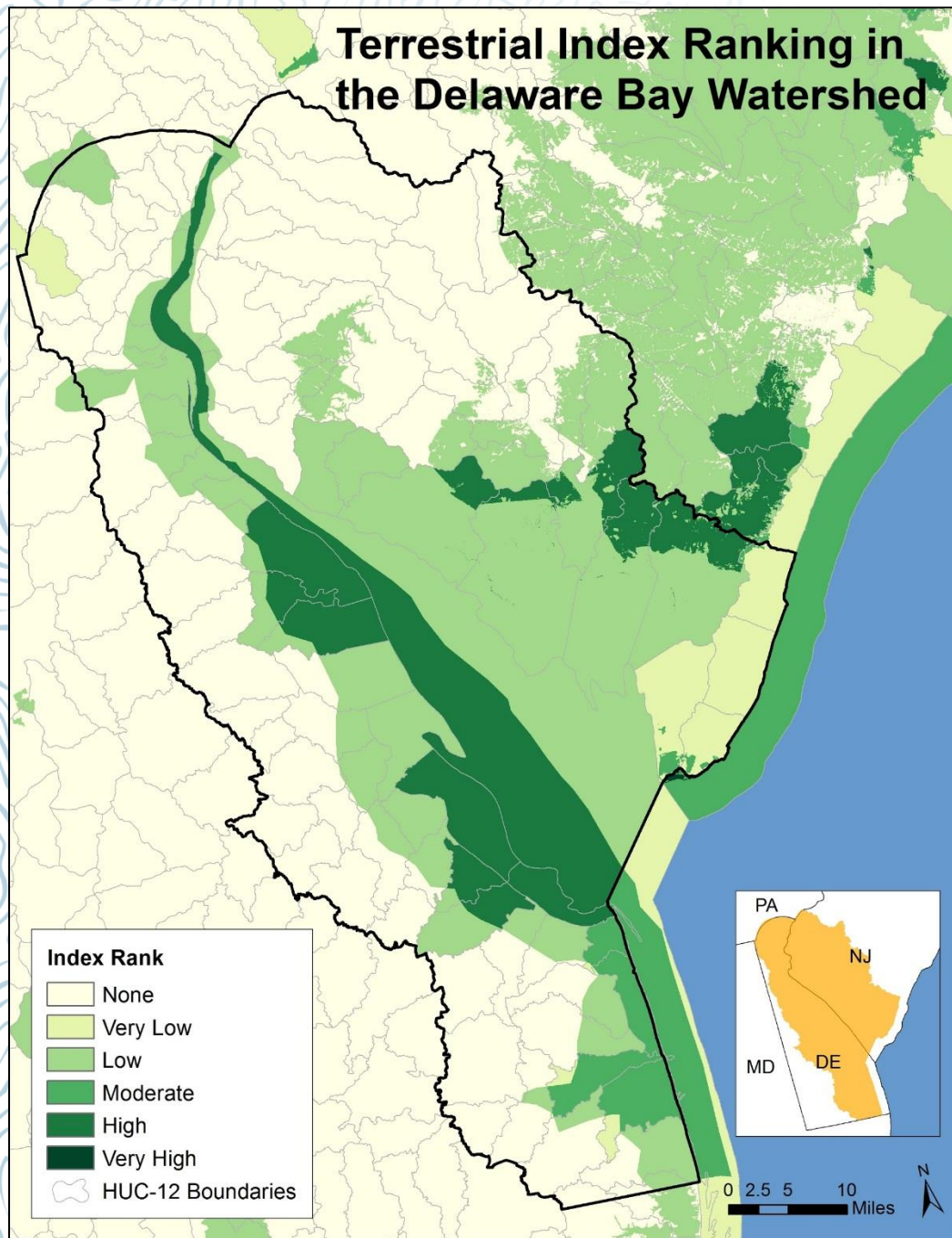
**Scored
Resiliency
Hubs**



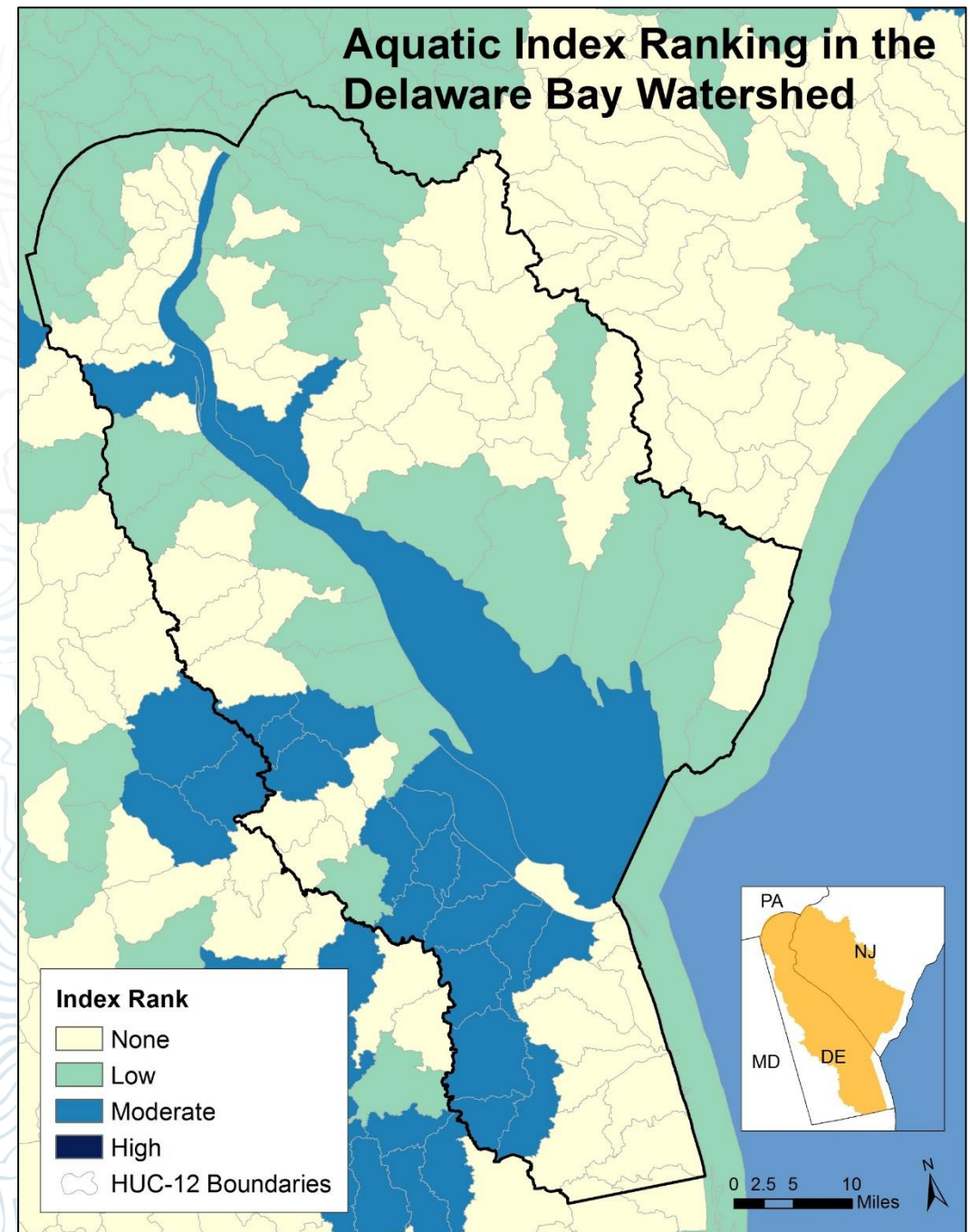
**Scored Open
Space Hubs**

Targeted Watershed Assessments

Terrestrial Index Ranking in the Delaware Bay Watershed



Aquatic Index Ranking in the Delaware Bay Watershed



Coastal Flooding Threats & Wildlife Stressors

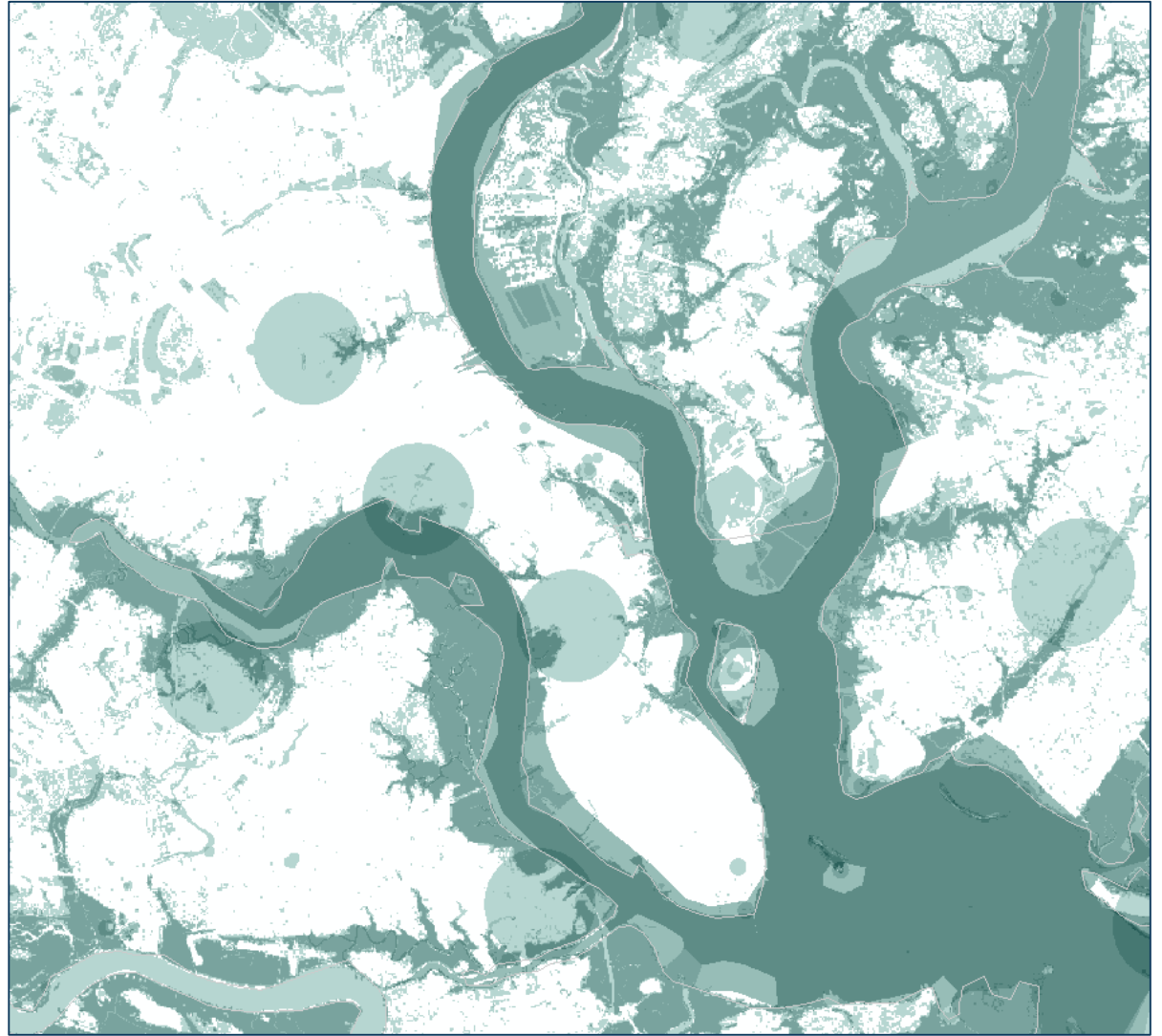
Stressor/Threat from Regional Analyses	Data Sources
Sea Level Rise	NEMAC SLR (NOAA)
Storm Surge	NEMAC (SLOSH)
Flood prone areas	NEMAC (soils and FEMA)
Commercial & Industrial Areas	NEMAC terminals, airports, and power plants
Railroads	NEMAC railroads
Dams & Reservoirs	NEMAC dams

Additional Stressor/Threat Data	Data Sources
Developed areas	NLCD
Silviculture - intensive	NatureServe ecological systems map
Intensive Agriculture	NatureServe ecological systems map
Ruderal (maintained pasture, old field)	NatureServe ecological systems map
Roads (Primary, secondary, local, dirt)	TIGER roads
Water Quality	EPA 305(b) Assessed Waters for South Carolina

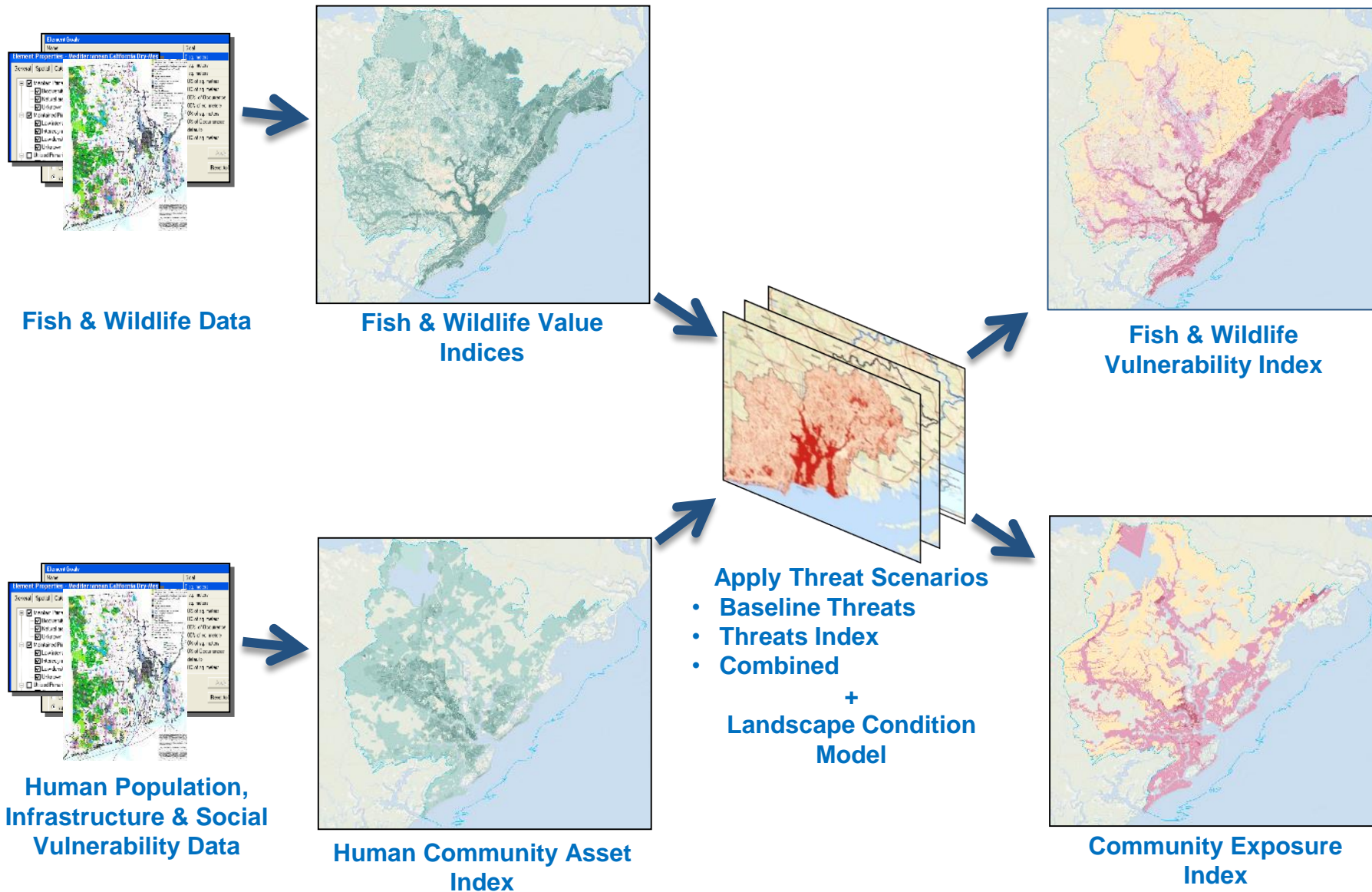
Fish & Wildlife Elements

Fish & Wildlife Element	Data Sources
Barrier Island Liveoak Hammock Forest and Scrub	NatureServe ecological systems map along with input from Billy McCord at SCDNR
Beach and Dune	SALCC shorebirds layer
Cypress Swamps/Domes Potential Habitat	SC soils deemed suitable by SCDNR staff
Diadromous Fish Habitat	Layer generated with expert guidance from SCDNR and NOAA
Forested wetlands (non-tidal)*	National Wetlands Inventory
Freshwater Emergent Wetlands*	National Wetlands Inventory
Important Riverine Systems*	SCDNR Red drum data
Interior Liveoak Maritime Forest	NatureServe ecological systems map along with input from Billy McCord at SCDNR
Marsh and Tidal Creek*	National Wetlands Inventory
Open Pine habitat*	NatureServe ecological systems map
Oyster Beds/Reefs	SC DNR intertidal oyster reefs
Prioritization areas	Audubon IBAs (none overlapping), SALCC blueprint, SWAP
River Mussel Habitat*	Data gap
Sea Turtle Nesting Hotspots	SCDNR nesting density map
Shrimp Essential Fish Habitat	NOAA Shrimp EFH map
Snapper/Grouper Essential Fish Habitat	NOAA Snapper/Grouper EFH map
Tidal Hardwood Swamp Forest*	NatureServe ecological systems map
Wading Bird and ally colonies*	SC NHP EOs

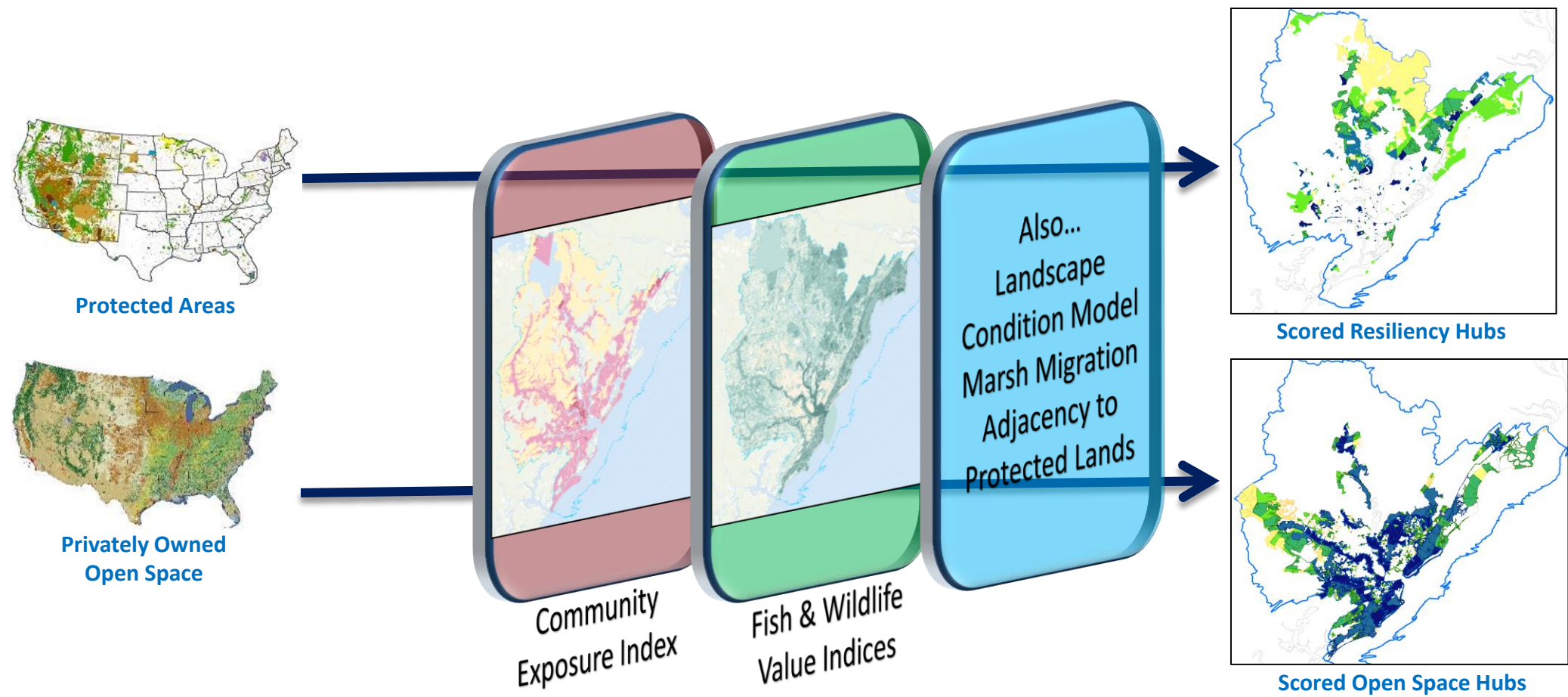
Fish & Wildlife Richness



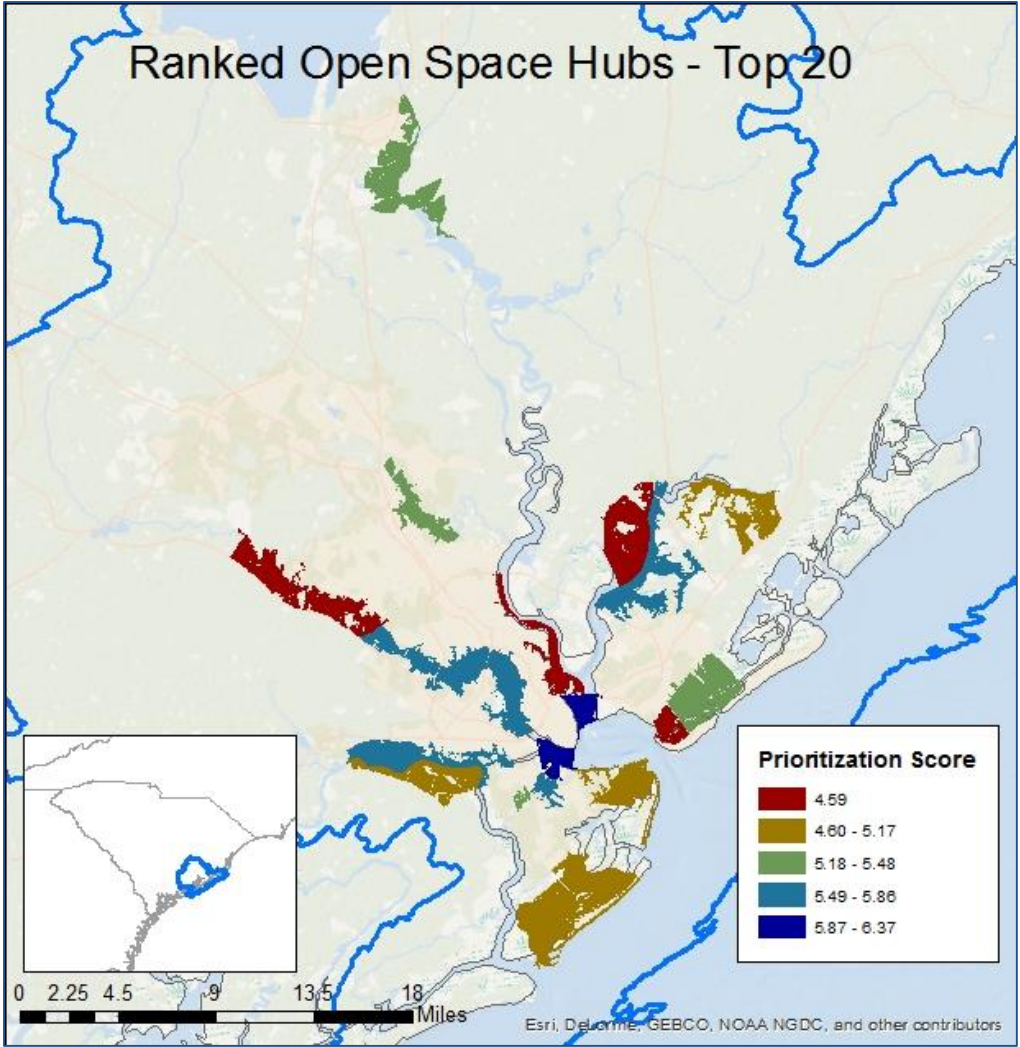
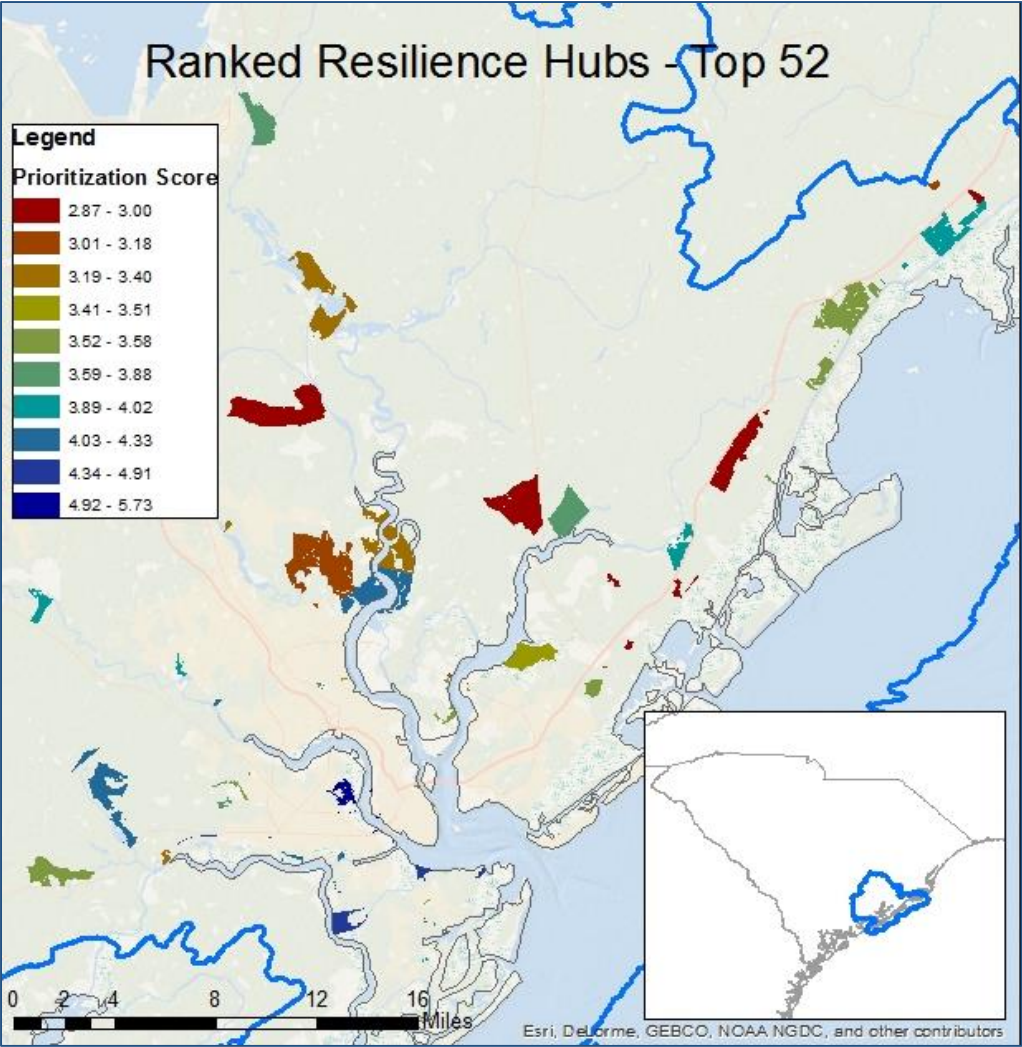
Vulnerability Assessments



Resiliency and Open Space Hubs



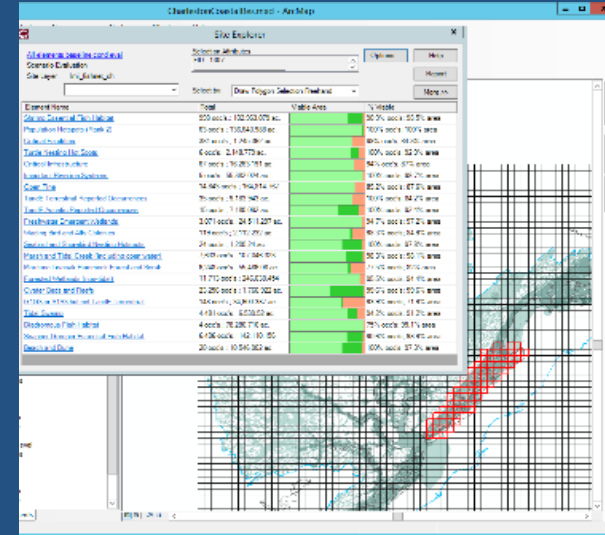
Resiliency and Open Space Hubs



Project Analysis



ANALYSIS OF EACH PROJECT



Threat Index
Fish & Wildlife Value Indices
Human Asset Index
Community Exposure Index
Vulnerability Indices
Landscape Condition Model
Marsh Migration Modeling
Resiliency Hubs Map

DATA CALCULATED FOR EACH PROJECT

- **Calculated Size (acres)**
- **Number and Types of Threats Impacting Project Site**
- **Proximity of Site to Resilience Hub**
- **Community Exposure Near Project Site**
- **Number and Types of Human Assets Near Project Site**
- **Viability of Human Assets Near Project Site Given Threats Scenario**
- **Number and List of Wildlife Elements at Project Site**
- **Viability of Fish and Wildlife Elements Near Project Site Given Threats Scenario**

Regional Assessment Final Products

- Regional Community Exposure Index Map
- Regional Fish & Wildlife Assessment Map
- Resiliency Hub Map
- Open Space Hub Map
- Summary of methodology and final report

To ALSO include:

- Comparison of our model to others
- Case Studies

Targeted Watershed Assessment Final Products

- Local Community Exposure Index Map
 - Including local datasets if applicable
- Local Fish & Wildlife Assessment Map
 - Local data to be obtained through in-person stakeholder workshops and other outreach
- Map of Ranked/Scored Resiliency Hubs
- Maps of Open Space Hubs
- Project Portfolio (not specifically for USACE)
 - All projects proposed by stakeholders from concept stage to shovel-ready stage
 - Attempt to quantify potential benefits or outcomes of proposed projects*
 - 3 Case Studies
- Final Report
 - More detailed analysis of the area BEYOND the GIS mapping results – written report on current conditions, threats, assets, fish & wildlife, barriers to change, etc.
 - Assess how project portfolio or top projects impact watershed resilience & F/W (VISTA)
- Access to data and NatureServe's VISTA scenario building software

Delivery

Post-Assessment Stakeholder Workshops

NFWF Website hosting the entire suite of products

Final Reports & Final Map Products in PDF Format

GIS Datasets (and source datasets) Available for Download

NatureServe's VISTA Decision Support Tool Available for Download

ArcGIS Online Viewer and Tool

Model Data Updates in One Year