

Carolinian Marine Ecoregional Assessment



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Global Marine Initiative

Setting Priorities for Marine Conservation

Objectives

- Develop Assessments with partners
- Enable Objective Decision Support
- Develop Advancements in Methods
- Support Action on Marine Priorities



Ecoregional Assessments



SAVING THE LAST GREAT PLACES ON EARTH

Process

- Identify conservation targets-- ecosystems & spp.
- Gather available information
- Set conservation goals
- **Identify costs/suitability factors**
- Develop initial priority sites using Marxan
- Evaluate results with experts
- Develop final portfolio of TNC action sites

Products:

data
decision support
site priorities



Carolinian Assessment

- Developed by Marine Geospatial Ecology Lab (MGEL- Duke University)



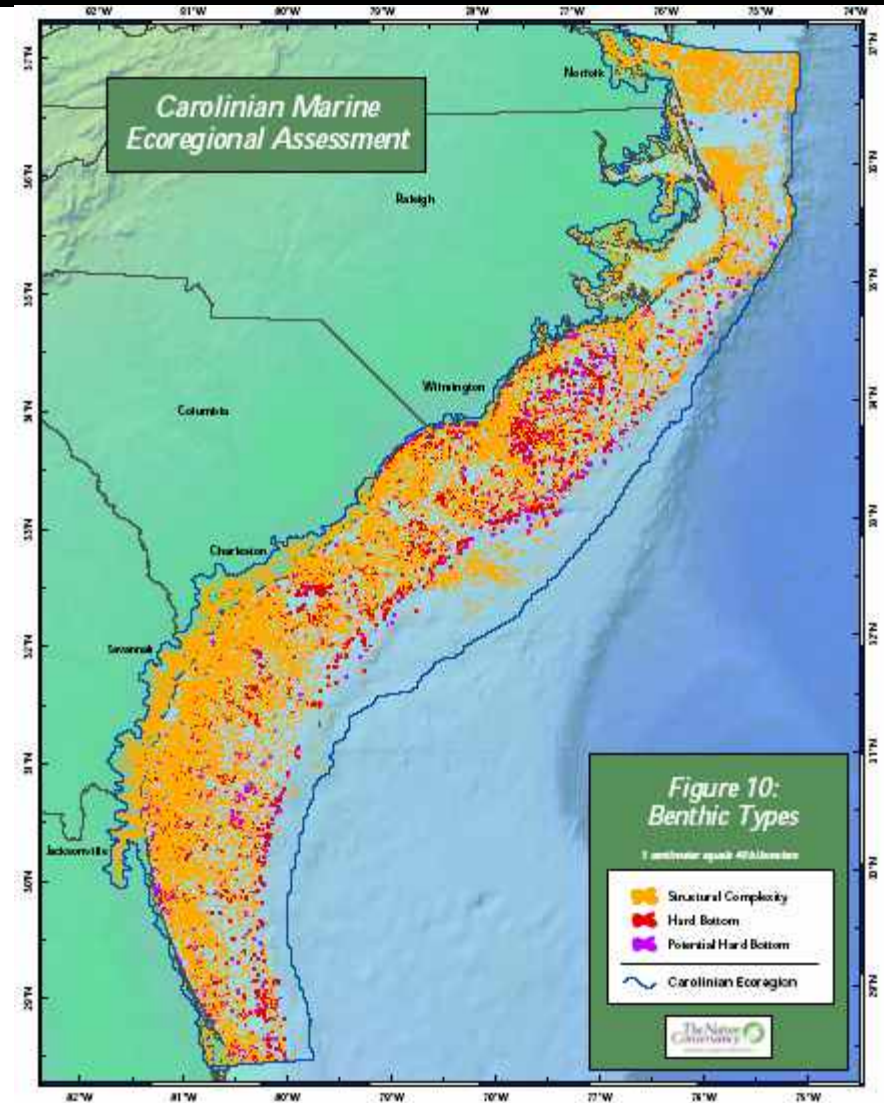
- Coastal waters of VA, NC, SC, GA, FL
- Tidal marshes to continental shelf (200 m)
- Funded by EPA Office of Water



Carolinian Targets

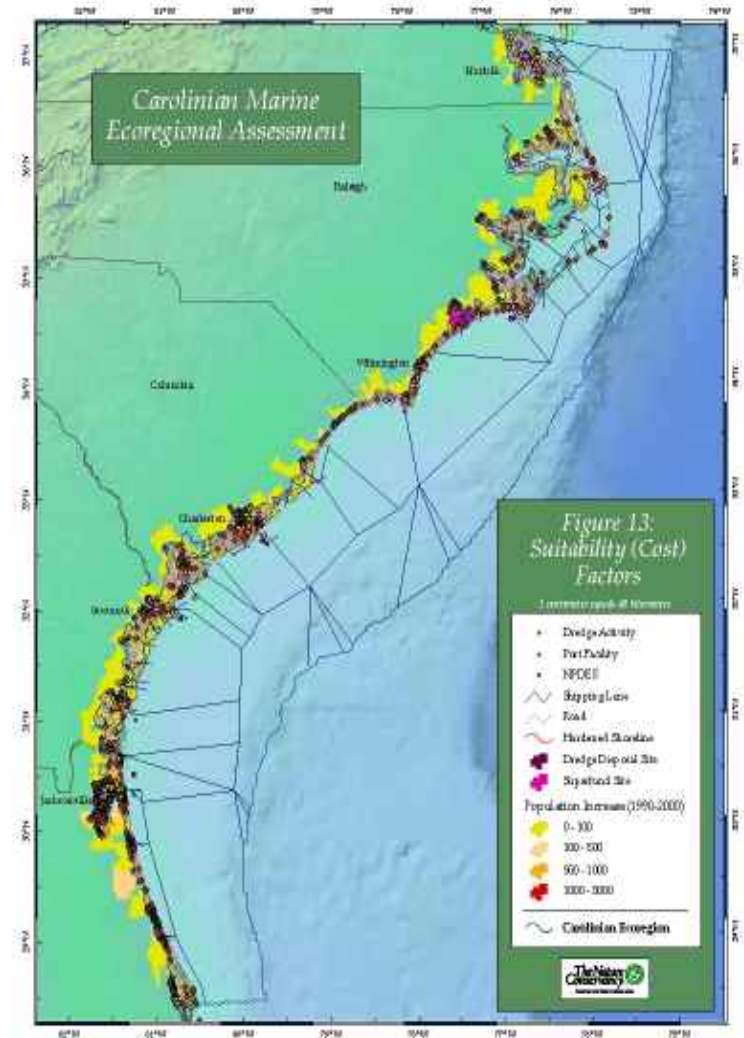
36 conservation targets:

- Salt and brackish marshes
- Oyster reefs
- Seagrasses
- Shoreline types
- Sea turtle nesting beaches
- Shorebird and water bird habitat
- Right whale calving grounds
- Short-nose sturgeon habitat
- Offshore hard-bottom areas
- Benthic habitat types
- HAPCs



Index of Ecological Integrity: Cost Surface Factors

Factor	Unit	COST POINTS	Data Source
Basic cost per planning unit	11,903 planning units (1,500 hectare hexagons)	35	
Mean population change	- 10% increase 10 – 25% increase 25 – 50% increase > 50% increase	0 5 10 20	U.S. Census
Housing density	0 – 100 housing units 100 – 25 units 250 – 1000 units > 1000 units	0 5 10 20	U.S. Census
Road density	0 km 0 – 25 km 26 – 50 km > 50 km	0 5 10 20	U.S. Census
Major ports	# port facilities	5 each	ACOE- Navigation Data Center
Major shipping lanes	0 tons shipped 1 - 2 million tons 2 – 5 million tons 5 – 10 million tons > 10 million tons	0 5 10 15 20	ACOE- Navigation Data Center
Dredged shipping channels	# dredging projects	5 each	ACOE- Navigation Data Center
Hardened shorelines	0 km 1 - 10 km 10 - 20 km > 20 km	0 10 20 30	NOAA-ESI and NWI



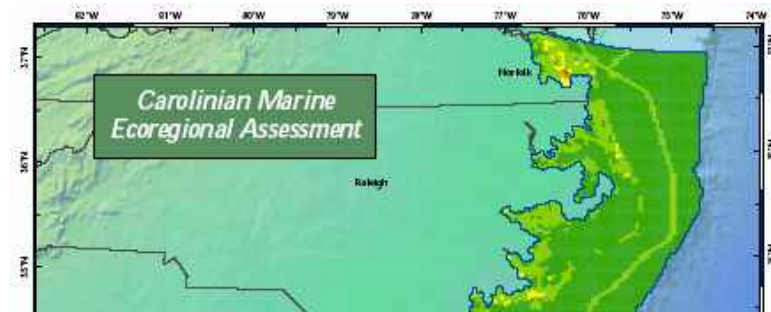
Conservation Costs and Suitability Index



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Mapped data for 10 “cost factors” to develop a Suitability Index:

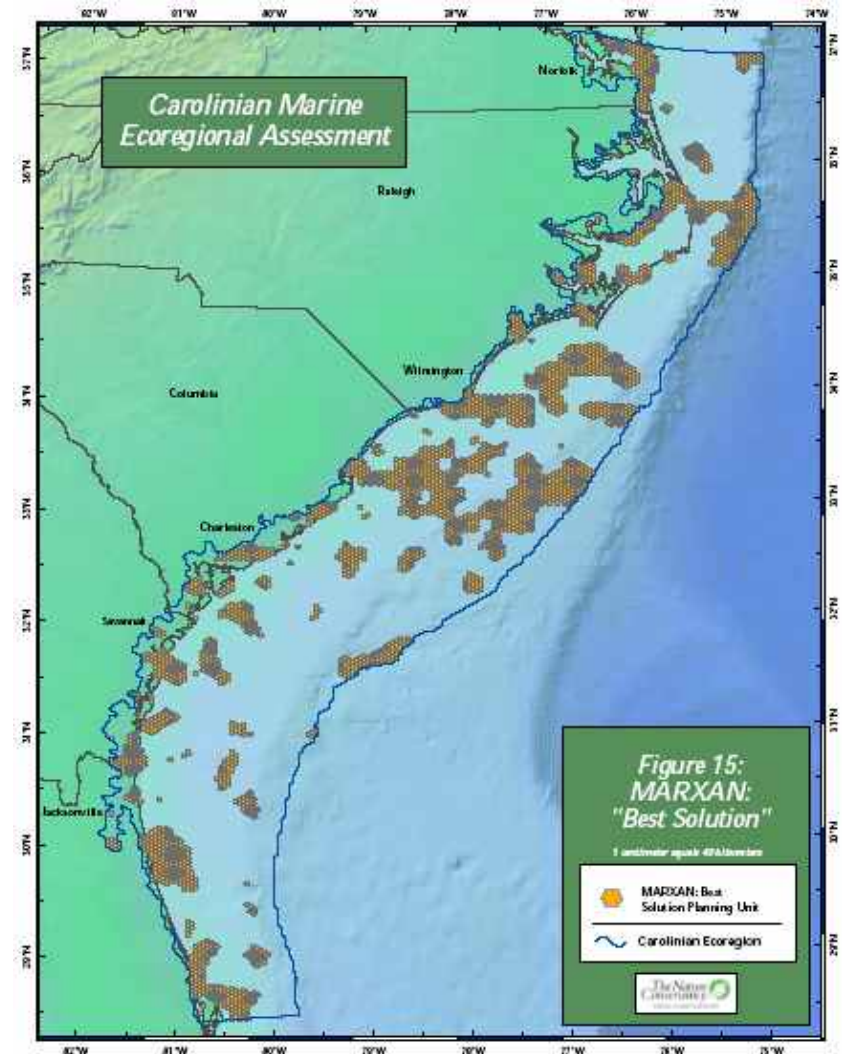
- Population growth
- housing density
- road density
- major port facilities
- shipping lanes
- dredged channels
- hardened shorelines
- Superfund sites
- NPDES permits
- dredge disposal sites.



Assessment Results: MARXAN “Best Solution”

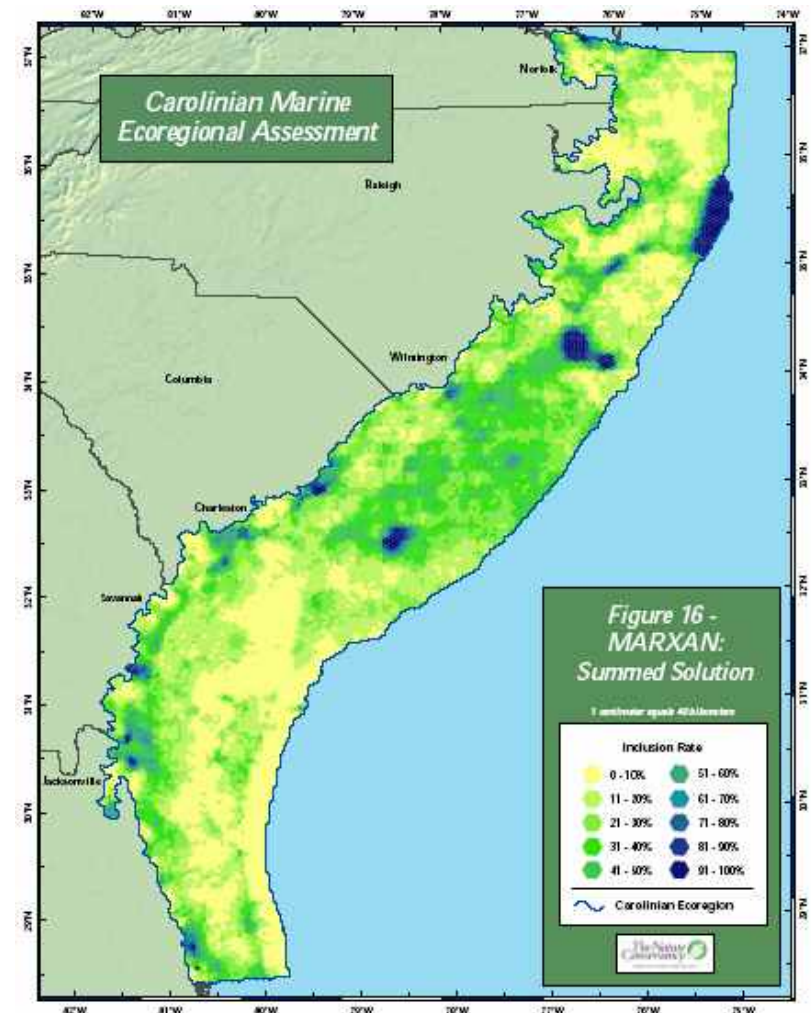
Use MARXAN to identify efficient (‘cheapest’) solutions that meet conservation goals for all targets

- 78 areas in ‘best solution’
- Represent ~22 percent of the ecoregion (3.9 million hectares)
- Goals were met for all targets and exceeded for



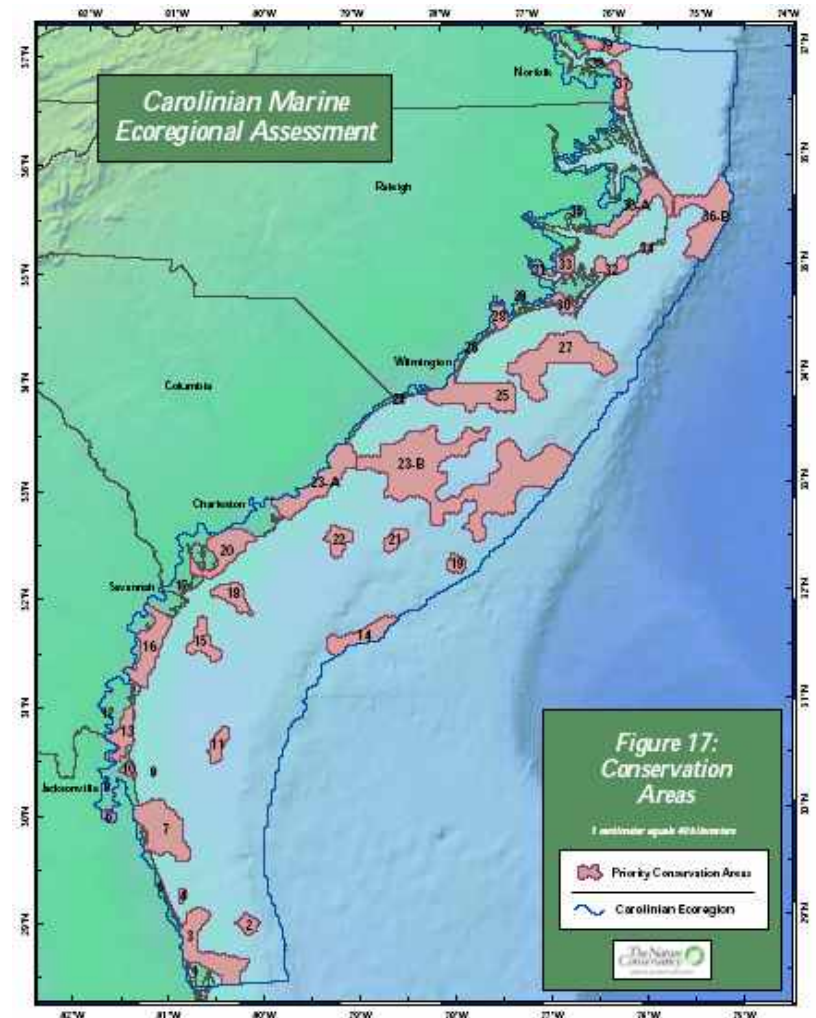
Assessment Results: MARXAN “Summed Solution”

- Shows how many times each planning unit was selected
- Measures an area’s potential conservation value.
- Used to identify potential core areas for final portfolio.



Assessment Results: Final Conservation Areas

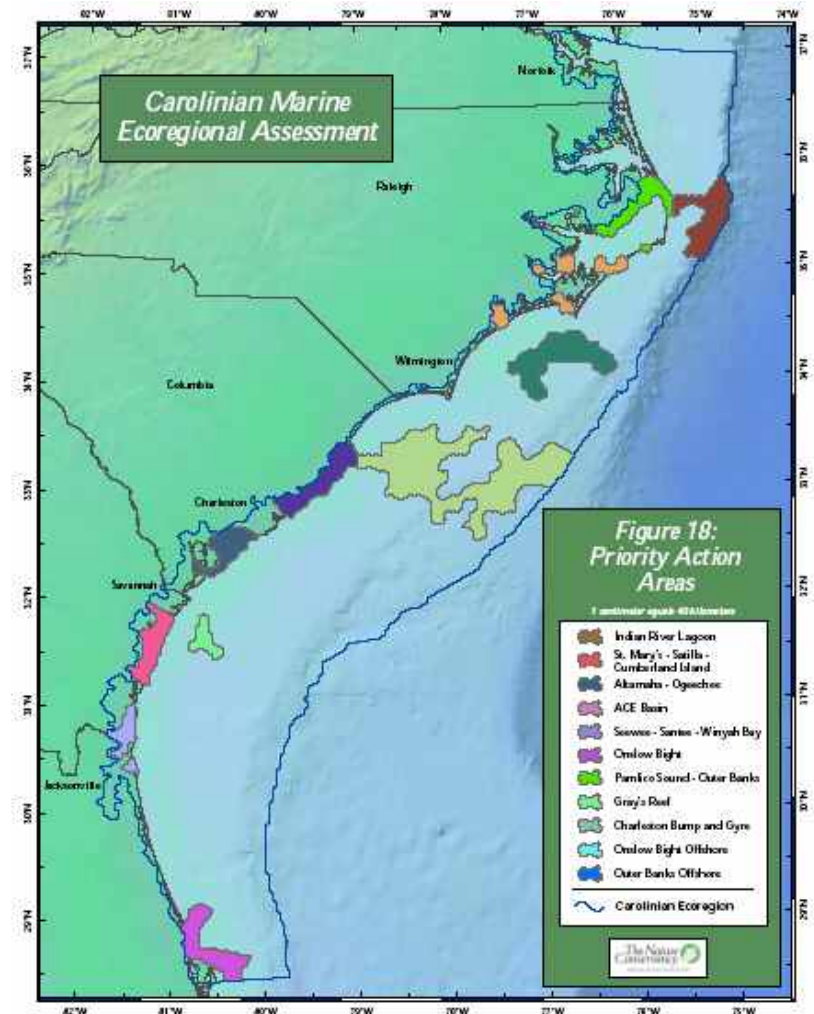
- 41 areas, ~21 percent of the ecoregion (3.77 million hectares)
- Experts recommended few changes to MARXAN results
- Experts suggested how to cluster units into more biologically meaningful sites



TNC's Priority Action Areas

Ten areas selected as initial priorities

- Indian River Lagoon
- St. Mary's-Satilla-Cumberland Is.
- Altamaha-Ogeechee
- ACE Basin
- Sewee-Santee-Winyah Bay
- Onslow Bight
- Pamlico Sound-Outer Banks
- Charleston Bump and Gyre
- Onslow Bight Ocean Complex
- Outer Banks Ocean Complex



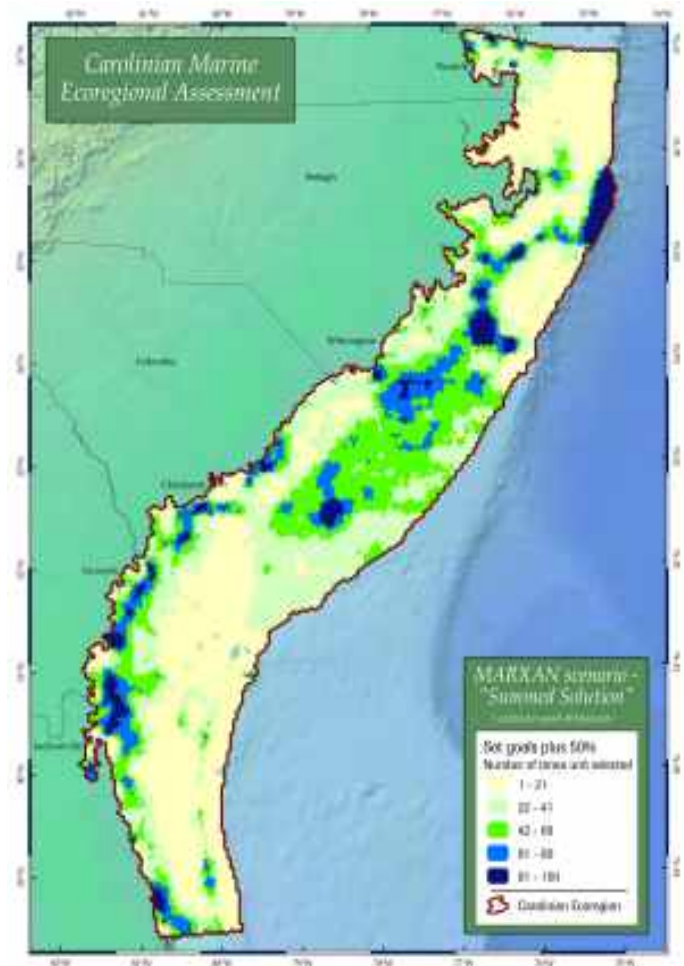
Spatial Variability: Goals -50%



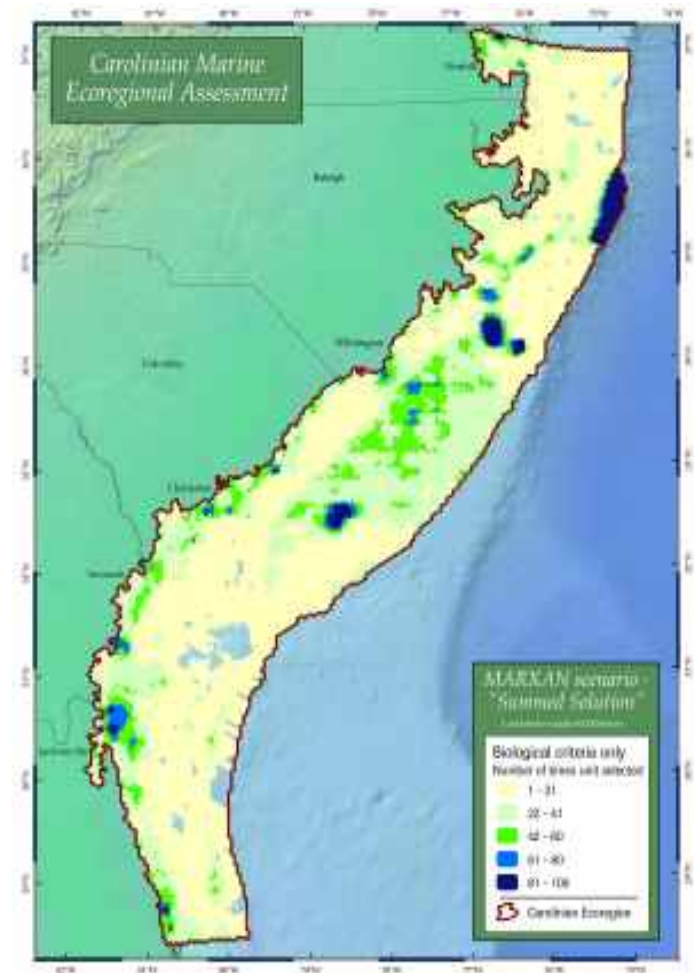
Spatial Variability: Goals +50%



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Spatial Variability: Flat Cost Scenario



Next Steps

- Develop E-BM toolkit in partnership w/ Packard Fdn
- Make tools available to inform E-BM, MPAs, Gap
- Possible Additions to Decision Support Model

Add Fisheries

Hazard mitigation- Storms & Sea-level Rise

Land-Sea Integration (NOAA CSC)

Benthic Model- Refine & Test