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Climate Change on the Albemarle Peninsula

Developing Strategies for Adaptation and Resilience

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Albemarle Pamlico National Estuary Program
Science and Technical Advisory Committee
May 2006

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- *Review TNC's approach to conservation planning.*
- *Explain briefly how we're applying the process in this landscape.*
- *Review results to date and explain next steps.*

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Conservation Planning

Ecoregional Assessment → **Conservation Action Planning** → **Conservation Action** → **Measuring Success**

- Portfolio of sites
- TNC action sites
- Identify multi-site strategies

Identify specific strategies at priority sites

- Maintain/restore viability of targets
- Reduce threats

In terms of:

- Biodiversity health
- Integrity
- Resilience
- Threat abatement

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Conservation Action Planning

SYSTEMS - Conservation targets

STRESSES - Destruction, degradation, impairment of systems

SOURCES - The proximate causes of stress

STRATEGIES -

Threat Abatement: actions taken to abate sources

Restoration: actions taken to enhance systems

SUCCESS -

Measures of Biodiversity Health: the viability of focal targets

Measures of Threat Status: the degree of critical threats

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Climate Change Planning Steps

1. Assume a regional perspective.
2. Consider sea-level rise.
3. Expand your planning horizon to at least 100 years.
4. Determine the local/regional climate context.
5. Clarify conservation targets and management goals.
6. Evaluate the sensitivity of local and/or regional resources/processes to climate change and define clear climate/threat/target relationships.
    - *Consider sea-level rise and severe weather events.*
    - *Consider temperature changes and other factors.*
7. Consider how climate change could exacerbate other dominant threats.
8. Develop alternate climate-driven management strategies.
    - *Do current management actions address or take climate into account?*
    - *Are there other actions that could address climate impacts?*
    - *What new strategies could more effectively adapt to climate change?*
9. Monitor, evaluate, reflect, learn, adapt.

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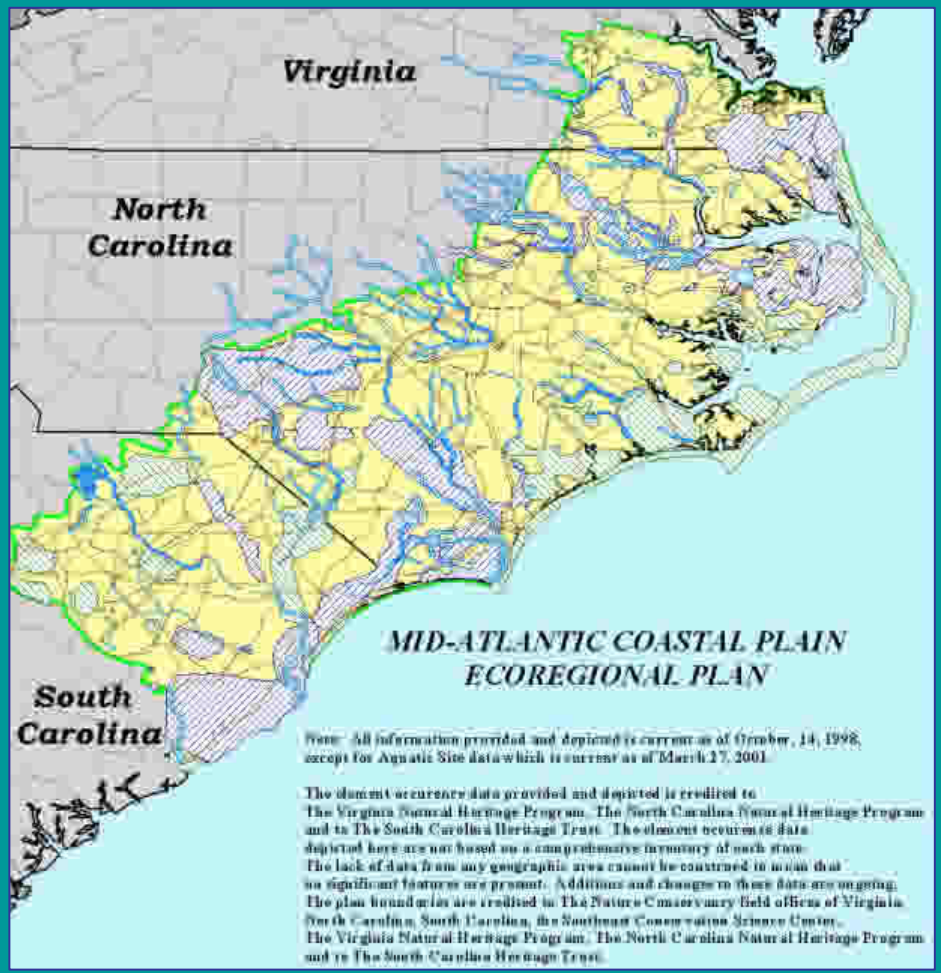
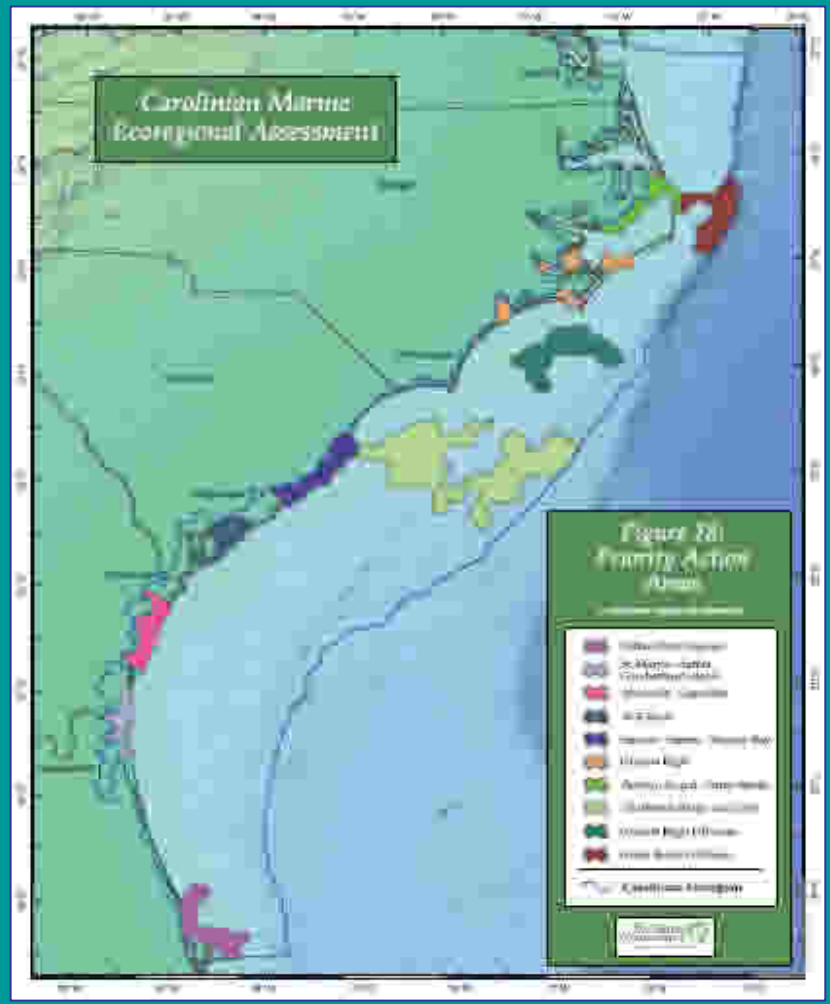
Assume a regional perspective





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Consider sea-level rise

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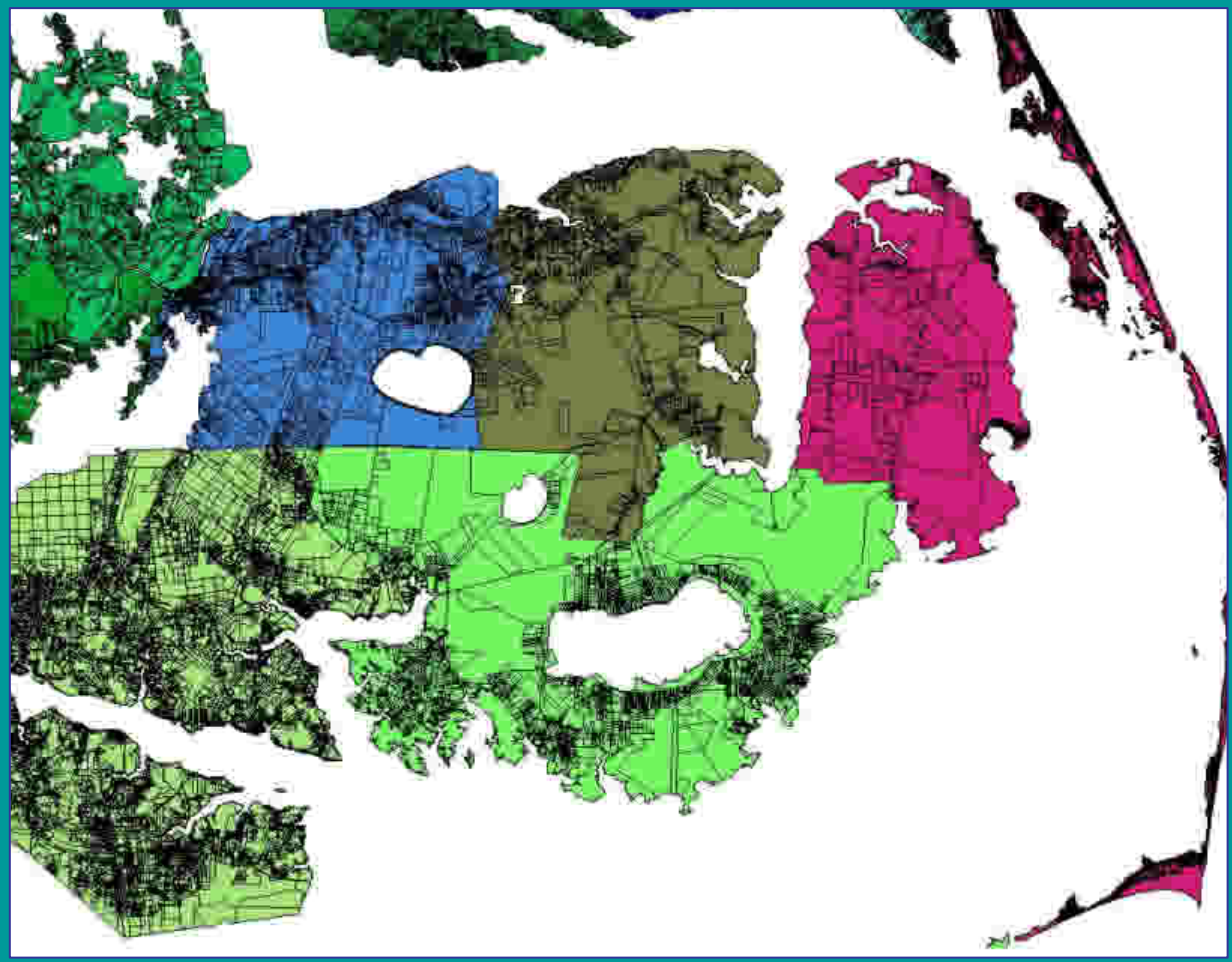
TNC – EPA sea-level rise work plan

- GIS database of land ownership.
- Mapping at-risk lands and setting priorities.
- Creating new sea-level rise easements.
- High-resolution digital elevation models.
- Detailed vegetation maps.
- Land-owner contacts
- Land acquisition and restoration to allow for wetland migration.



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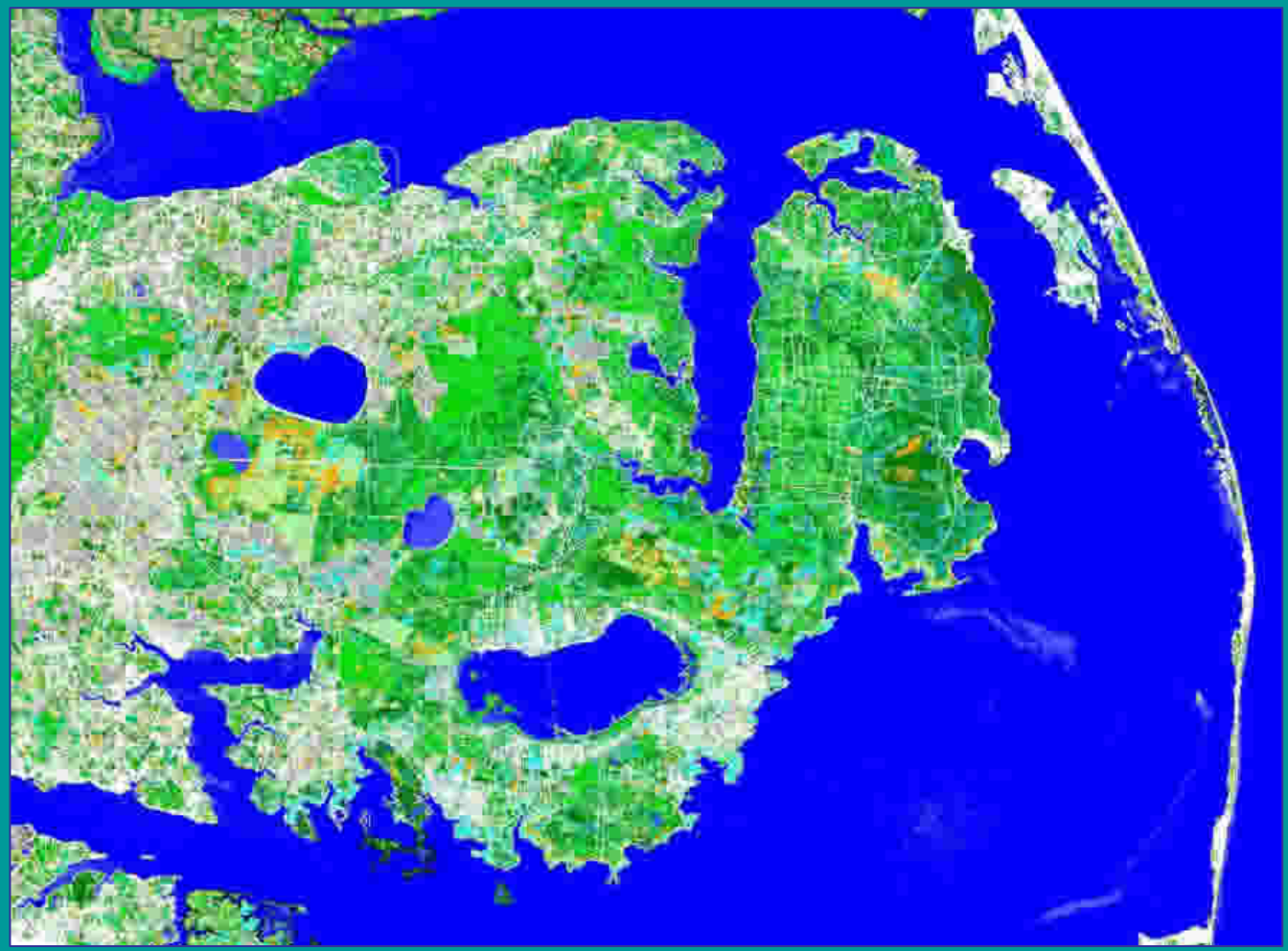
Current setting – *Average relative sea-level rise = 4.4mm/year*



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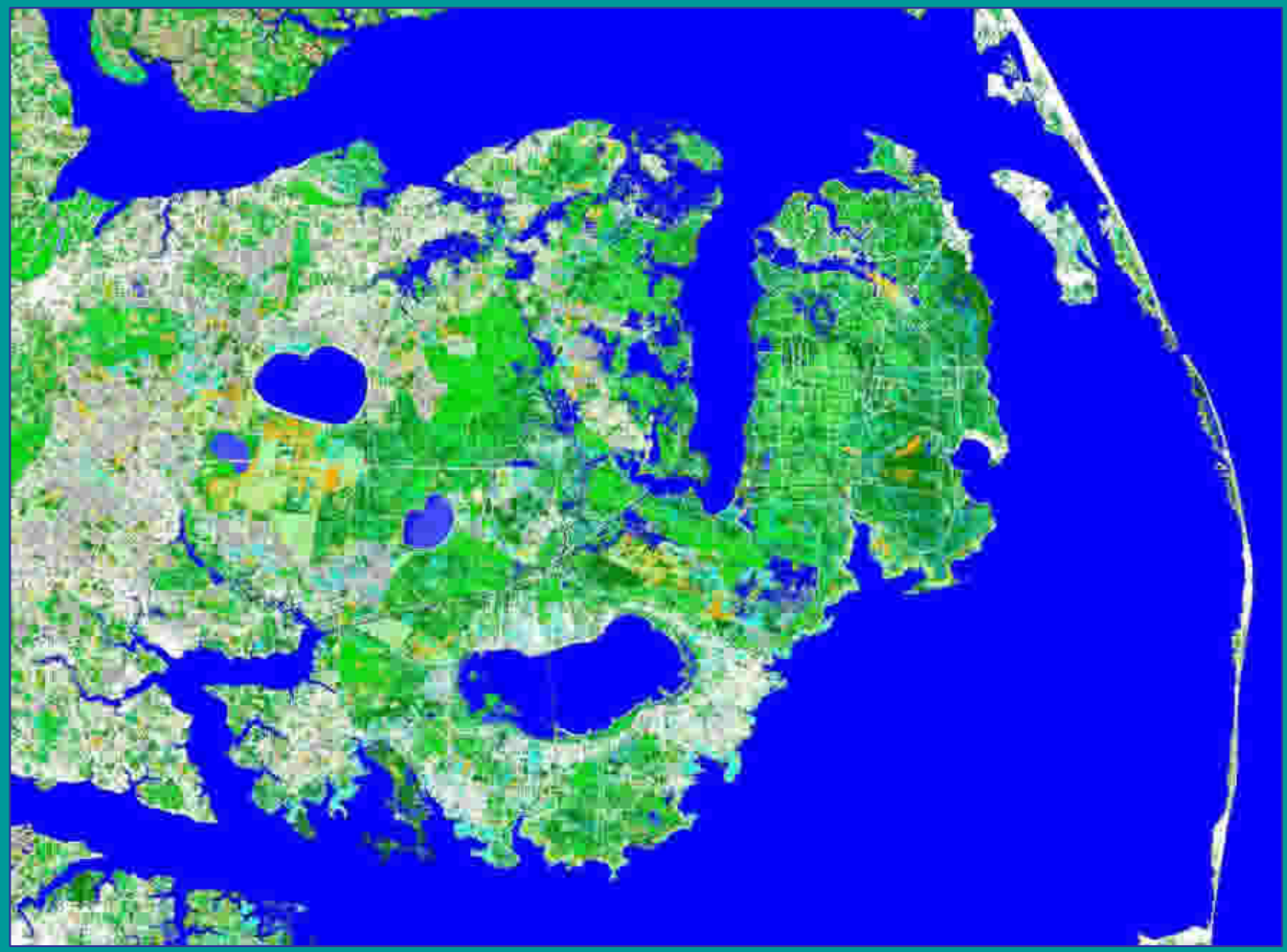
Relative sea-level rise = 10cm/4 inches (20 years or sooner)



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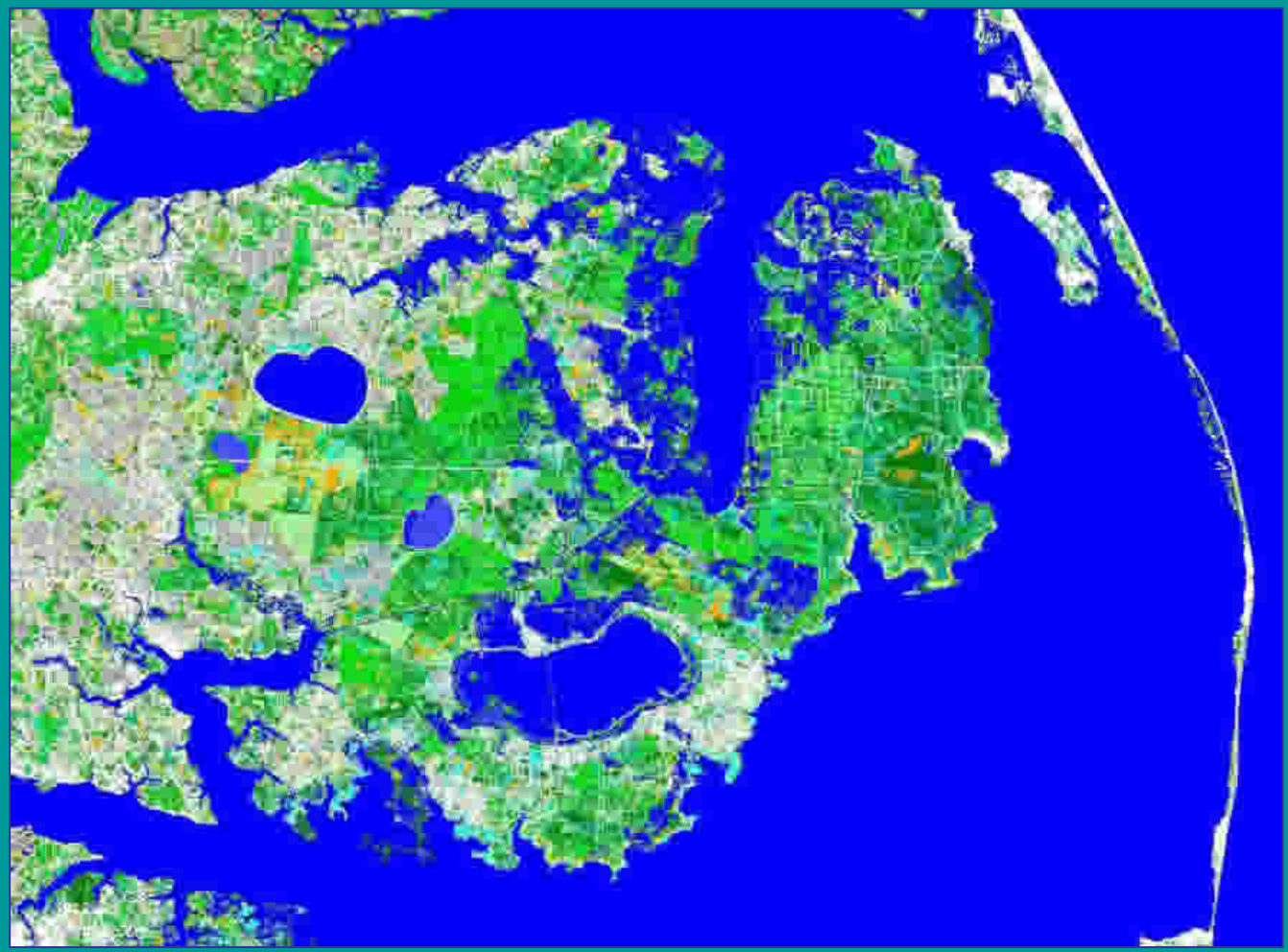
Relative sea-level rise = 23cm/~9 inches (40 years or sooner)



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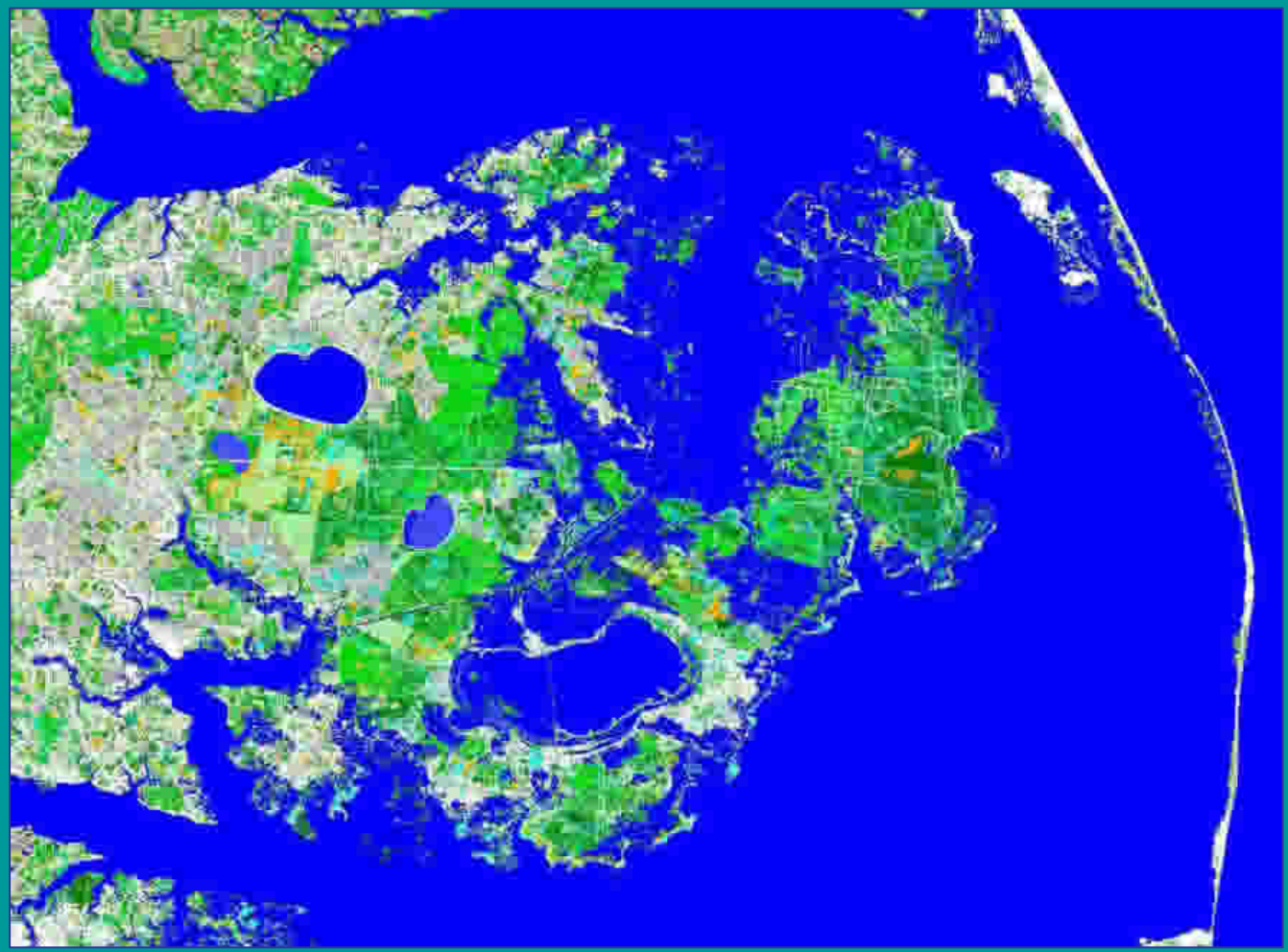
Relative sea-level rise = 40cm/~15 inches (75 years or sooner)



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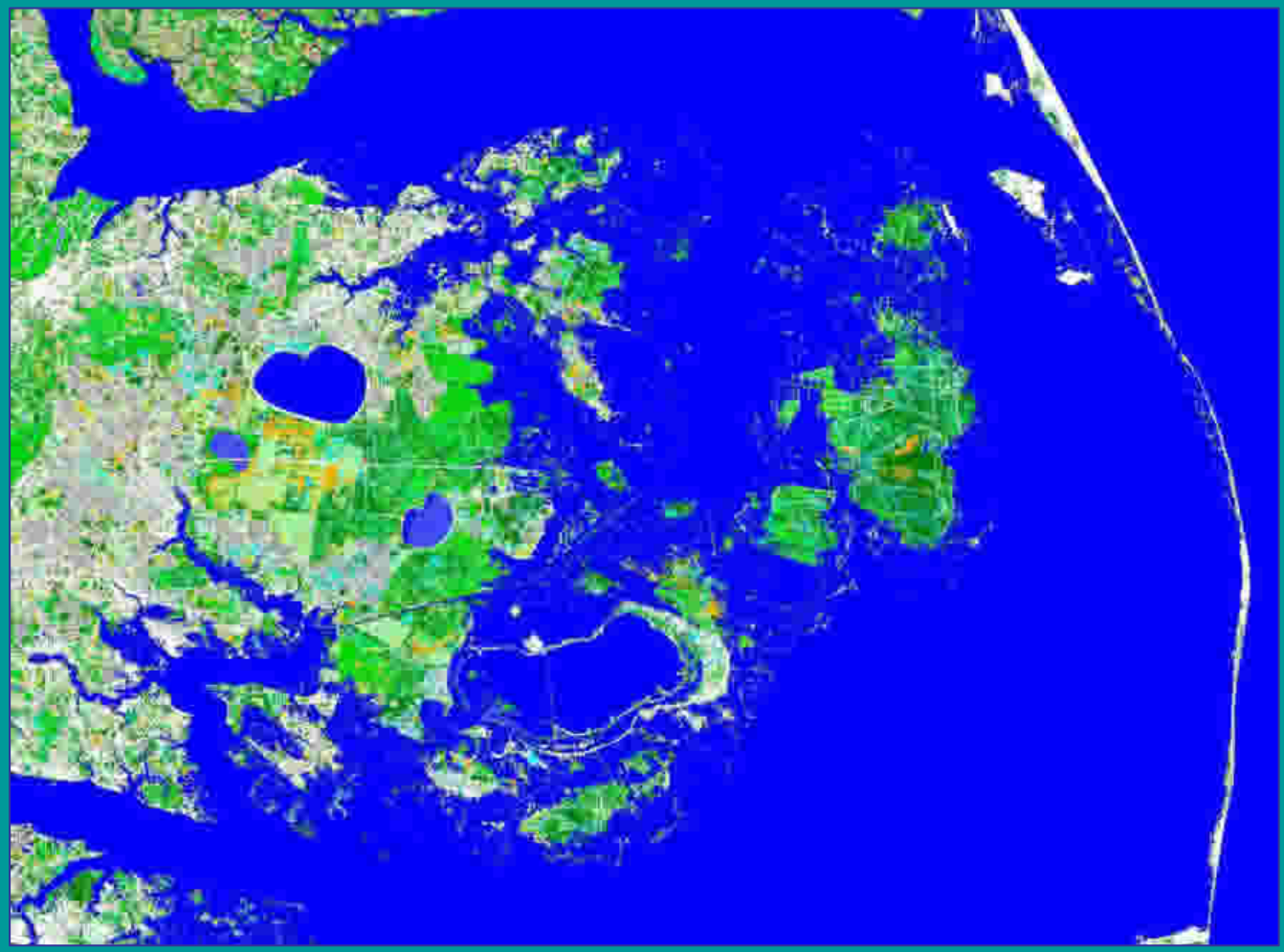
Sea-level rise = 61cm/~24 inches



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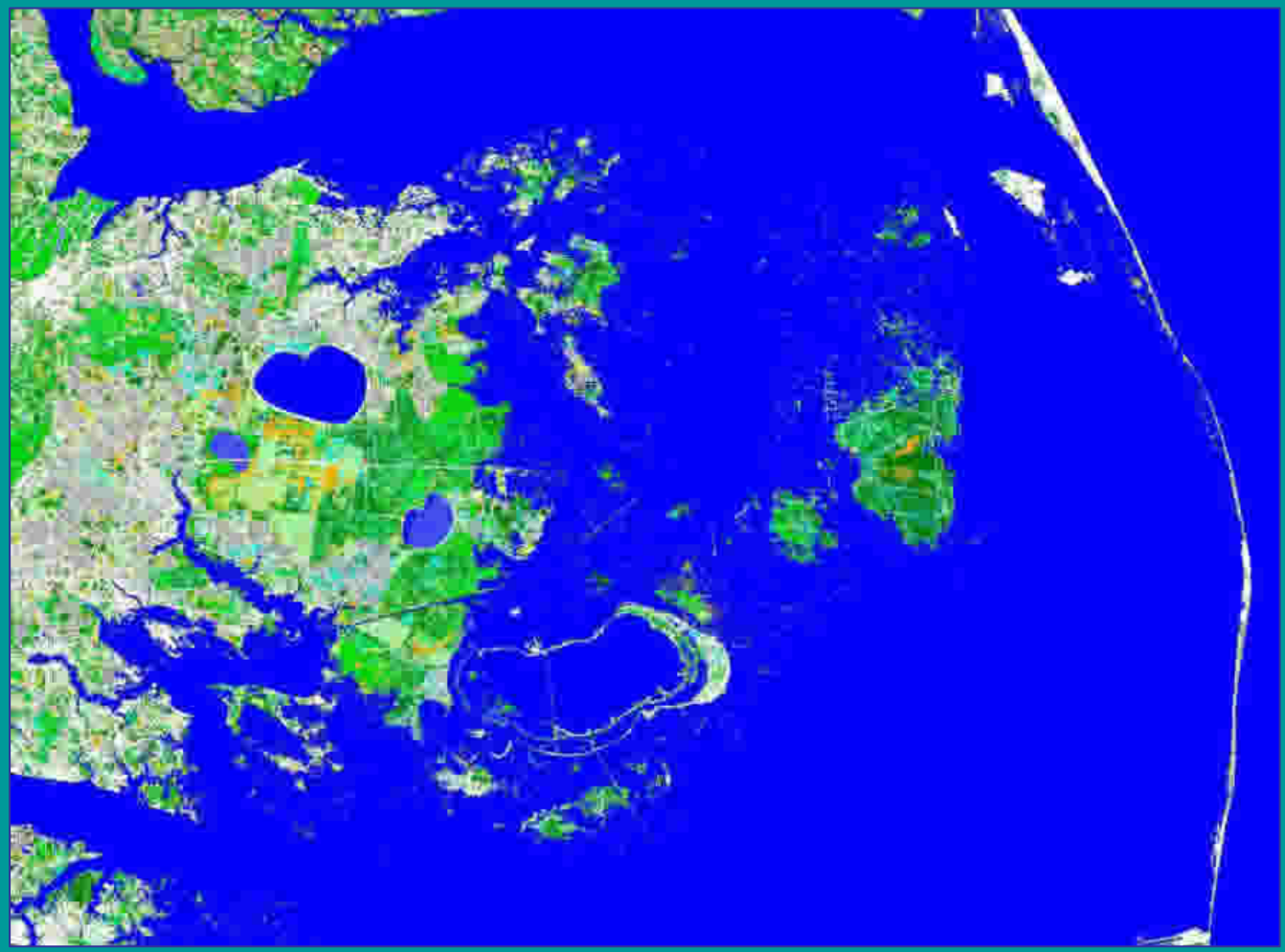
Sea-level rise = 82cm/~32 inches



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Planning process

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Planning process – next steps

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Conservation Action Planning workshop on climate issues

Focusing first on Alligator River Peninsula in partnership with Fish and Wildlife Service

Selected three conservation targets for initial consideration

- Pocosin bogs
- Brackish marshes
- Creeks

Workshop to begin identifying climate-related stresses and sources of stress

Conservation Action Planning workshop on climate issues

Assessment of Target Viability

Albemarle-Pamlico Peninsula Climate Change Project

Conservation Target Enter # of Target		Category	Key Attribute	Indicator	**Bold = Current** Indicator Ratings *Italics = Desired*				Current Rating	Desired Rating	Date of Current Rating	Date for Desired Rating
					Poor	Fair	Good	Very Good				
1	Pocosin Peatlands	Landscape Context	Fire regime - (timing, frequency, intensity, extent)	Fire return interval								
1	Pocosin Peatlands	Landscape Context	Fire regime - (timing, frequency, intensity, extent)	Intensity of fire								
1	Pocosin Peatlands	Landscape Context	Fire regime - (timing, frequency, intensity, extent)	Seasonality of fire								
1	Pocosin Peatlands	Landscape Context	Fire regime - (timing, frequency, intensity,	Size of burns								

Conservation Action Planning -- Pocosins

Key Ecological Attributes

(1) Fire regime

(2) Hydrologic regime

(3) Weather regime

(4) Presence of characteristic communities

(5) Size/extent of characteristic communities

(6) Soil structure and chemistry

(7) Water chemistry

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Conservation Action Planning -- Pocosins

Fire regime indicators	Stresses	Sources of stress
Fire return intervals	Exceptionally shorter intervals	Greater lightening frequency, less precipitation, higher fuel loading from increased storm damage
Fire intensity	Increased intensity	Higher fuel loading from storm damage, increased biomass from elevated CO2, greater chance of soil ignition
Seasonality	Seasonal switches	Altered seasonal weather patterns
Size of burns	Larger, faster fires	Higher fuel loading, increased biomass, wind field changes

Conservation Action Planning -- Pocosins

Hydro regime indicators	Stresses	Sources of stress
Depth to water table	Excessive water table drawdown	Higher evapotranspiration and less precipitation due to warmer, drier seasons
Depth to water table	Excessively high water table	Accelerated relative sea-level rise, higher precipitation, decomposition of peat soils
Hydroperiod/surface flooding	Increased duration of flooding	Changes in water balance

Conservation Action Planning -- Pocosins

Weather regime indicators	Stresses	Sources of stress
Storm frequency	Rapid vegetation changes from more frequent salt, wind, flooding	More frequent storms
Storm intensity	Increased erosion and salt intrusion	More intense storms due to higher water temperatures
Frost-free days	Shorter frost-free periods	Higher air and water temperatures
Presence of more southern species	Shorter frost-free periods	Higher air and water temperatures

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Planning process – next steps

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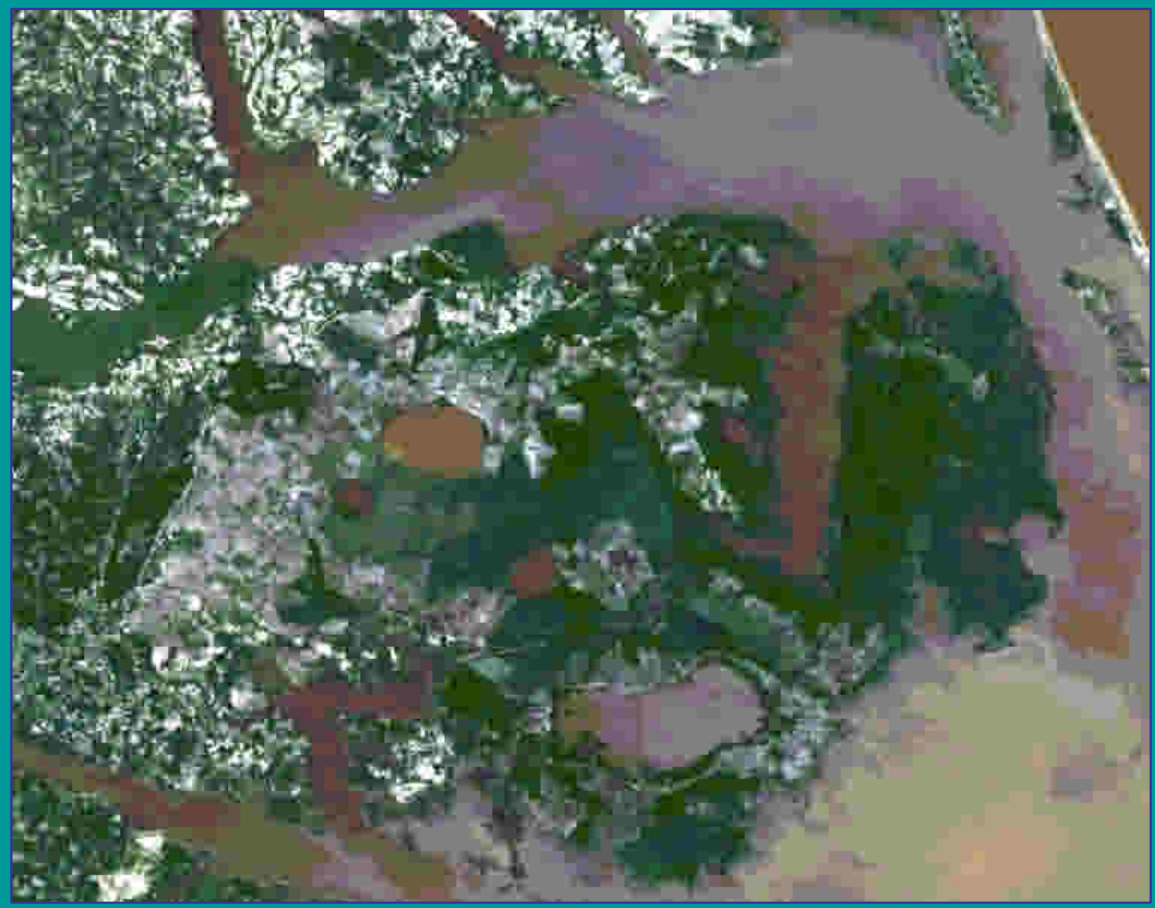
Saltwater intrusion

More than two centuries of altered hydrology.

- Peat oxidation.
- Disrupted sheet flow.
- Lower rates of peat formation and soil accretion.
- Accelerated peat reduction.

Developing a tool to identify which canals and ditches have greatest impact and where we can achieve the most benefit.



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Reef restoration to increase shoreline resilience

Properly sited and designed subtidal oyster reefs may baffle wave energy, reduce erosion rates and increase sediment accretion rates along shorelines.

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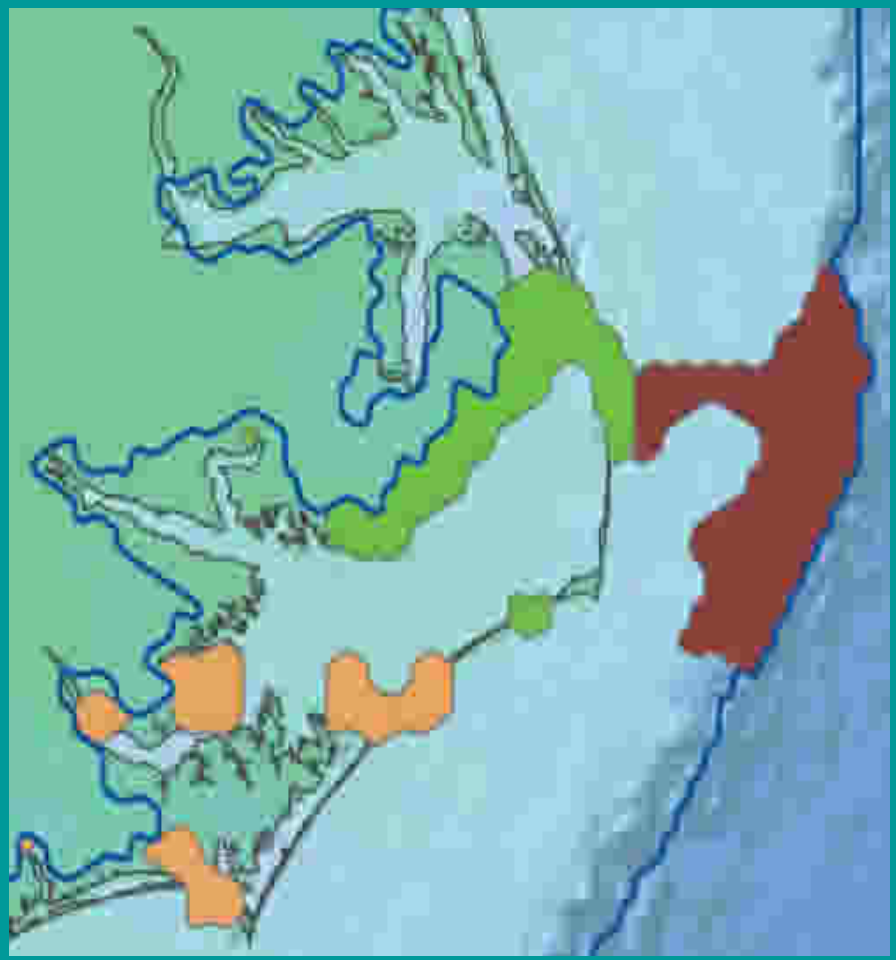
Conservation Action Planning for Sounds and Outer Banks



- Outer Banks from near Virginia border south to Cape Lookout.
- Oregon, Hatteras and Ocracoke Inlets.
- Albemarle, Pamlico, Currituck, Croatan and Roanoke Sounds.
- Albemarle-Pamlico Peninsula.
- Neuse, Tar-Pamlico, Pungo, Long Shoal, Alligator, Roanoke, Chowan, Perquimans, Pasquotank and North Rivers.
- Contiguous with Onslow Bight Landscape to the south.

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Conservation Action Planning for Sounds and Outer Banks

Targets selected at first workshop - early April

1. SAV Habitat
2. Shellfish Reef and Bottom Habitat
3. Tidal Marshes and Creeks
4. Coastal Tributary Wetlands
5. Anadromous Fish (Alocids)
6. Functional Primary and Secondary Nursery Areas
7. Barrier Island and Inlet Landforms
8. Sustainable Commercial Fishing Communities

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"Are you sure you are really interested in the preservation of the human race, once you and all the people you know are no longer living?"

Max Frisch
Fragebogen