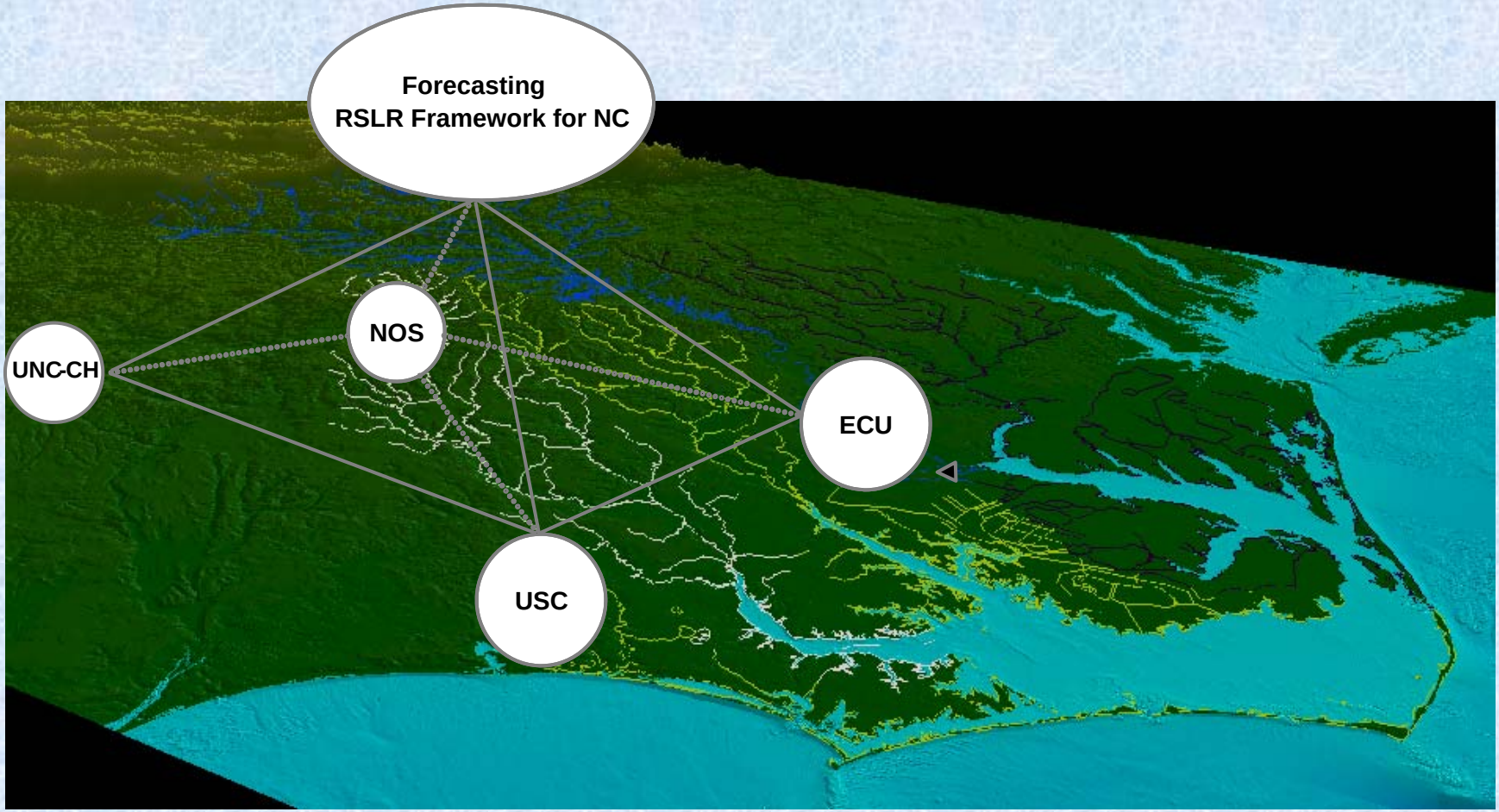
NOAA Ecological Effects of Sea Level Rise Program

EESLR – North Carolina



A
Neuse River

Shore-Zone Modification in Response to Sea Level Rise & Disturbance

JP Walsh, Reide Corbett, Lisa Cowart, David Kunze, Mark Brinson, Bob Christian, Ben Horton, and Stan Riggs

What is the shorezone, and what exactly are Corbett et al up to?

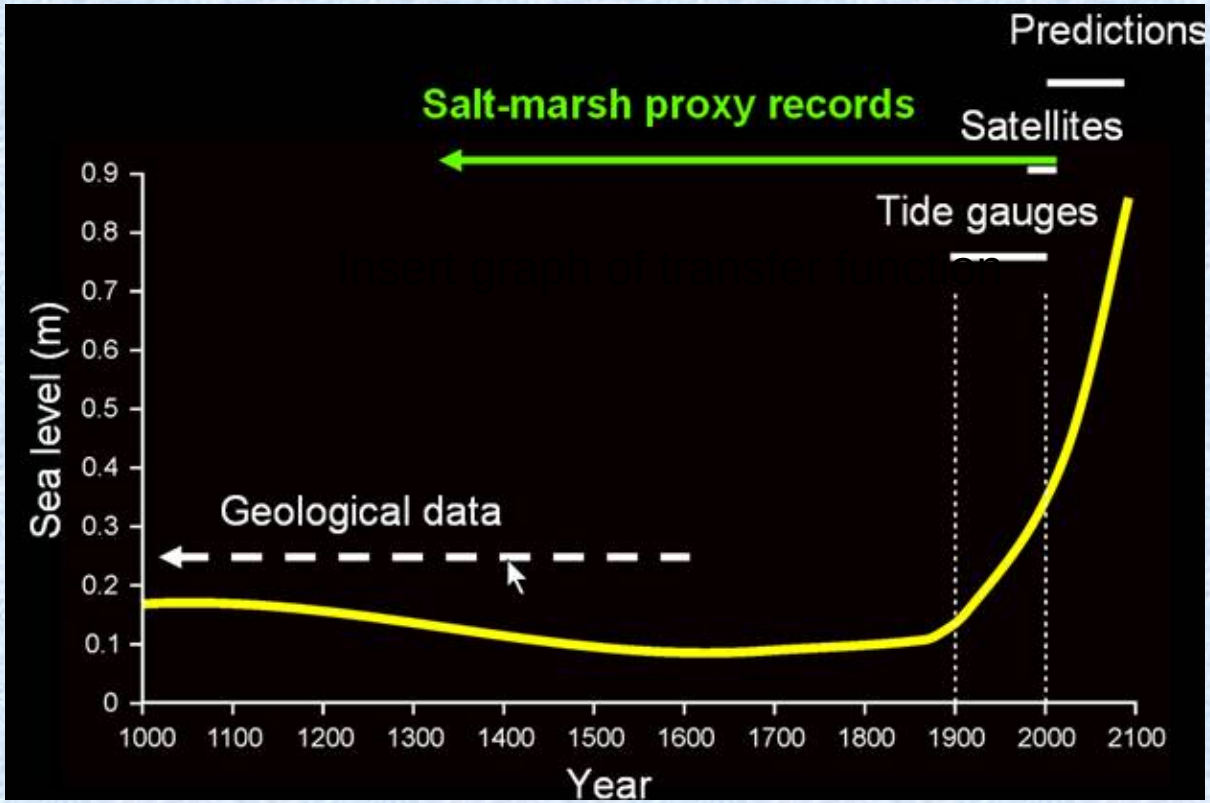
The shorezone is defined as the area of the coast from the coastline to the upland boundary of regular flooding.

The ECU-UPenn effort is answering questions about change in the shorezone over the last century including:

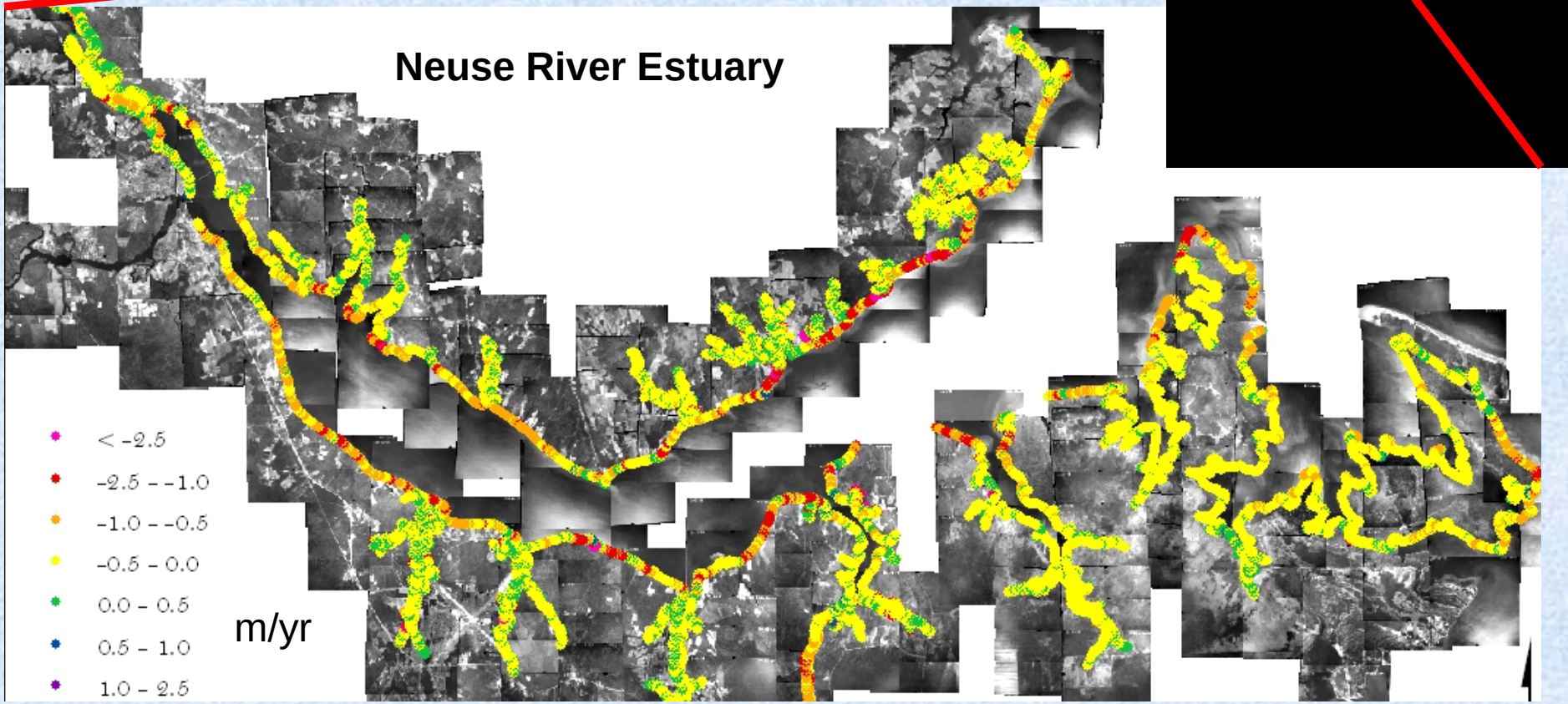
1) How has sea-level risen over the last century?
2) How, where, and why has the shoreline position changed?
3) How does land-cover vary in the NRE region and has the shorezone changed (e.g., wetland loss) over this period.

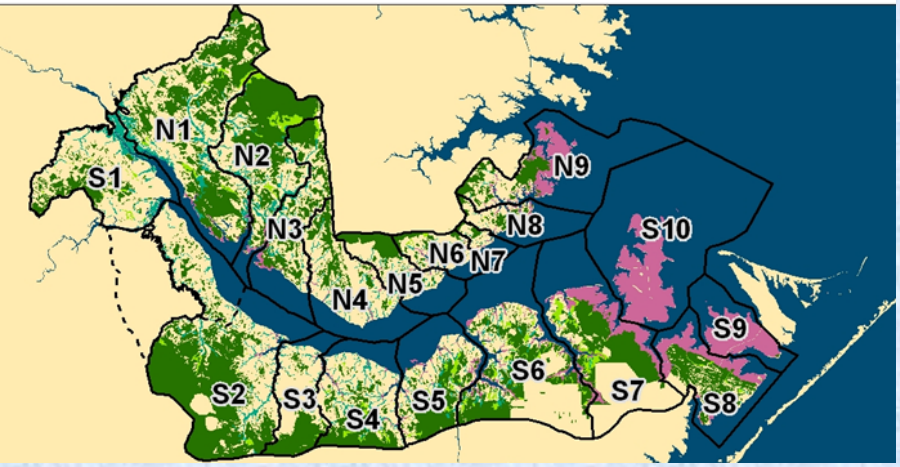
Has SLR changed with time?

- Unfortunately our tide gauge records are only as good as their length and their locations.
- We must use the geological record to look farther back and in areas without gauge data.



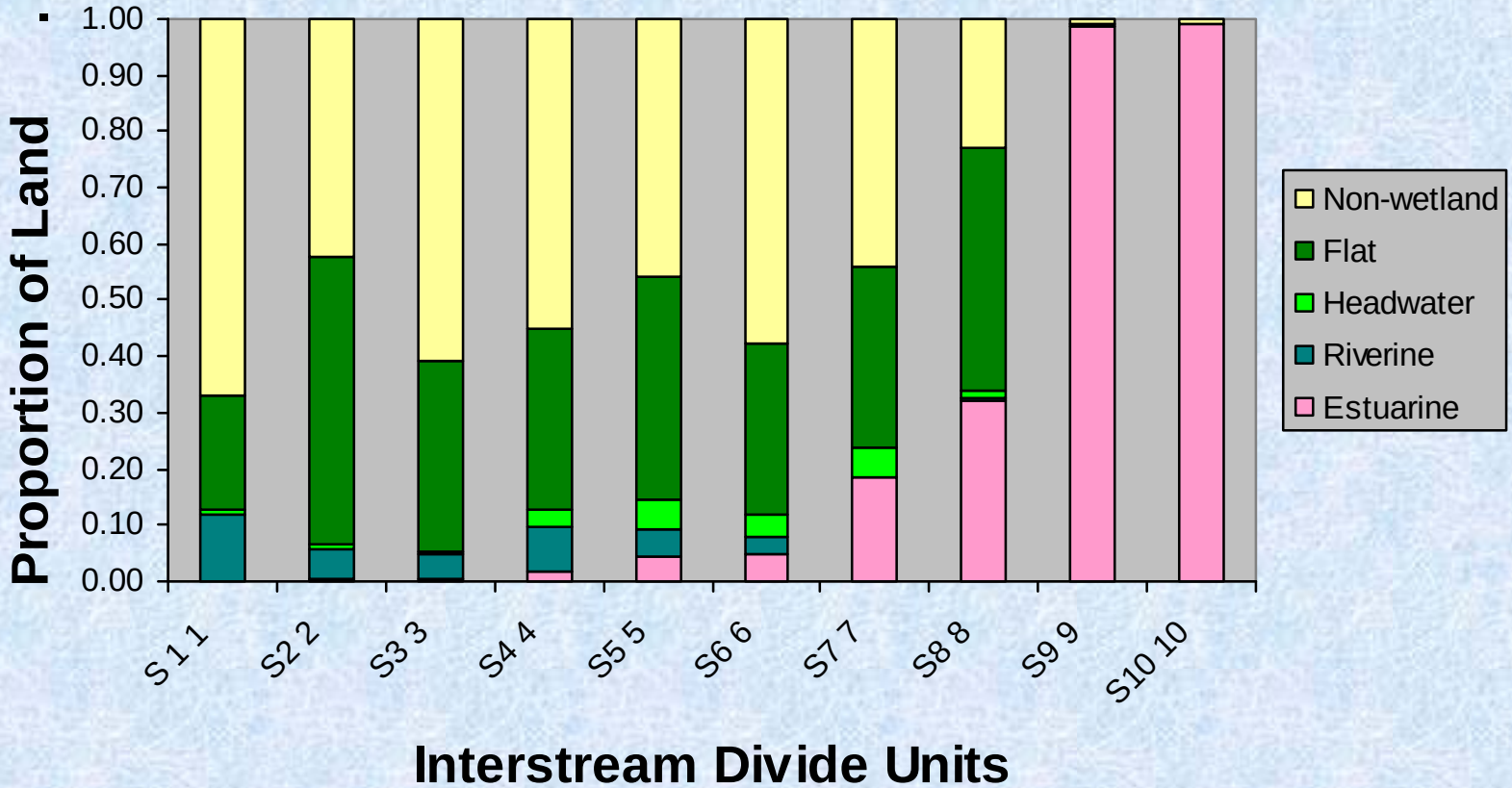
- Estuarine erosion rates show great variability; however, they are large (>2 m/yr) in some locations.
- Prediction cannot easily be accomplished as many factors (e.g., fetch, hardening) are important.



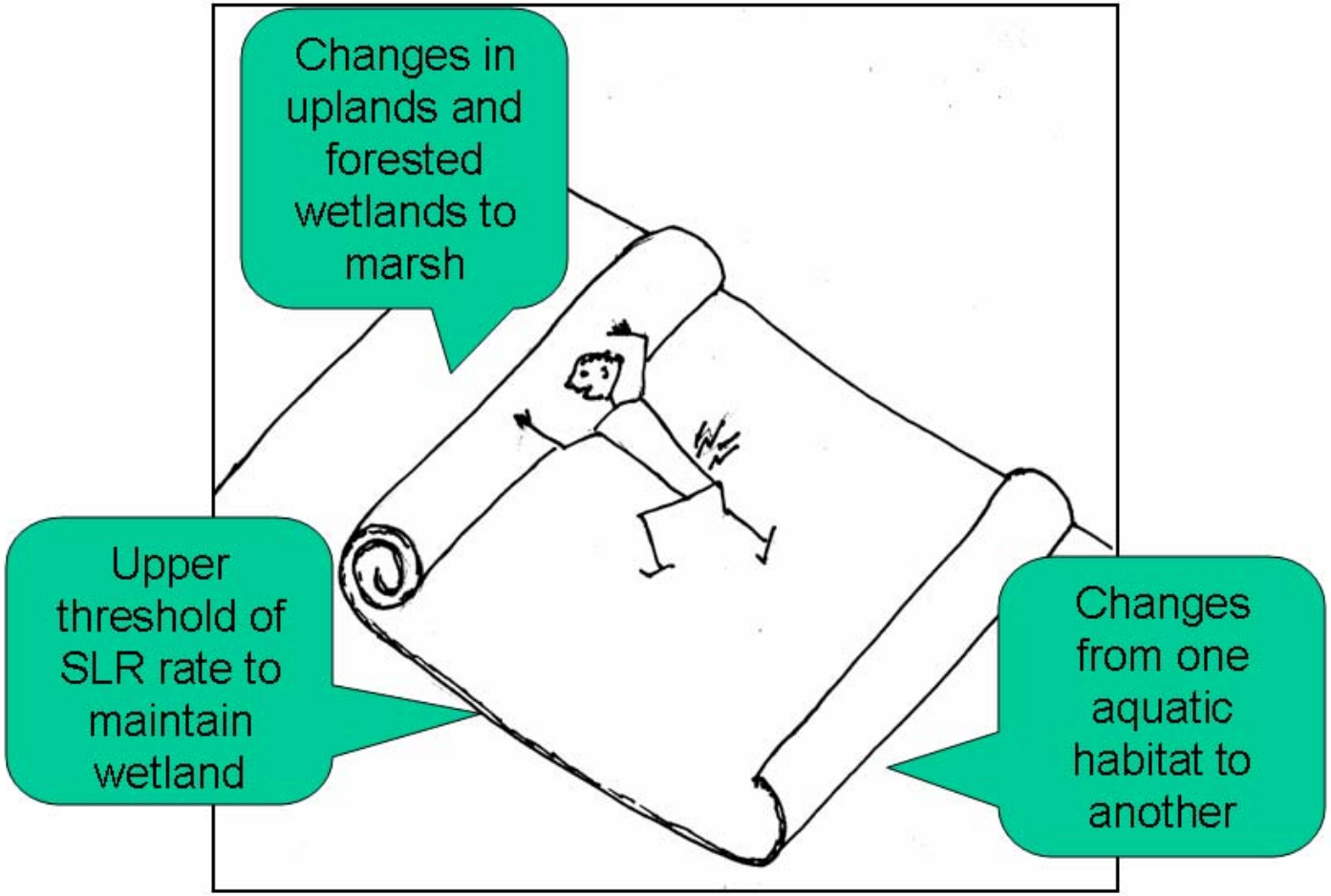


Note, the modern land-cover distribution along the NRE changes down the system reflecting the varying degree of flooding.

South Shore Wetland Proportions

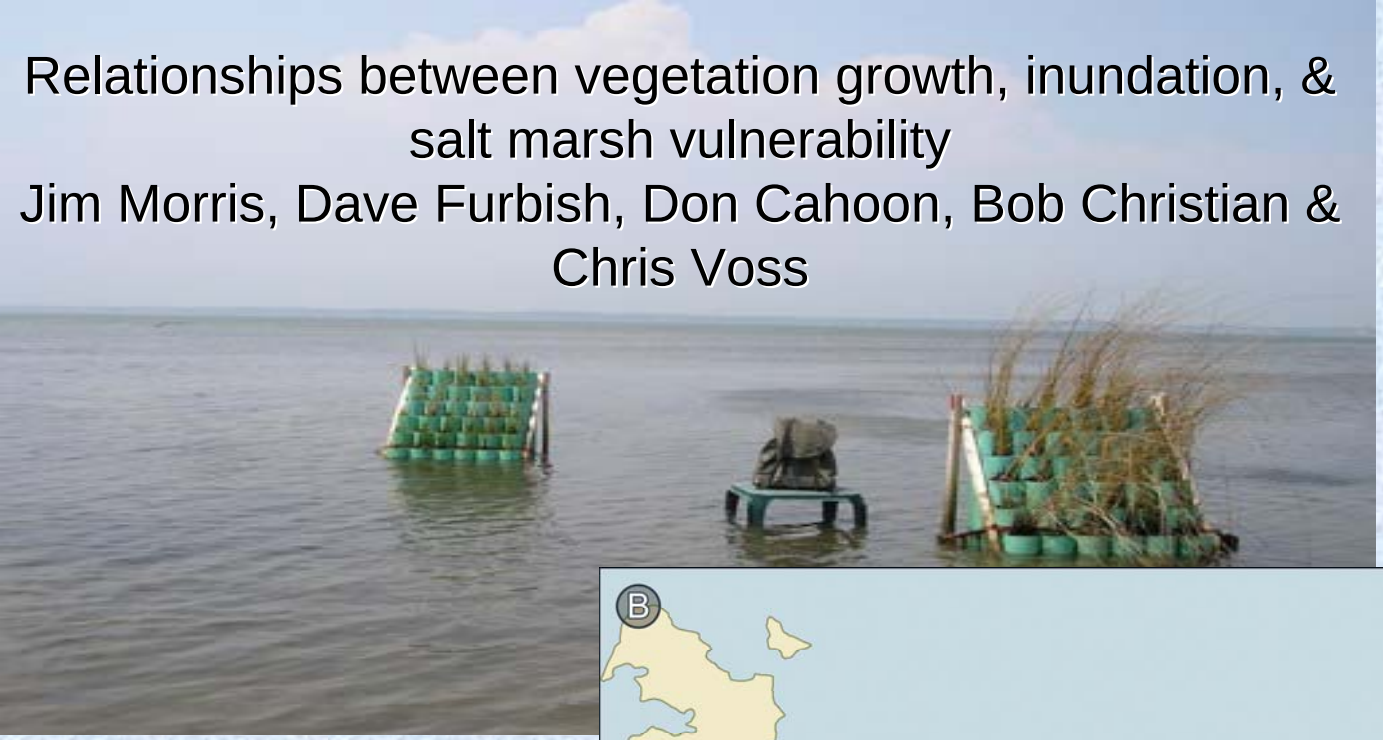


The carpet model, predictions



Relationships between vegetation growth, inundation, & salt marsh vulnerability

Jim Morris, Dave Furbish, Don Cahoon, Bob Christian & Chris Voss



To understand and predict relationships between Spartina & Juncus

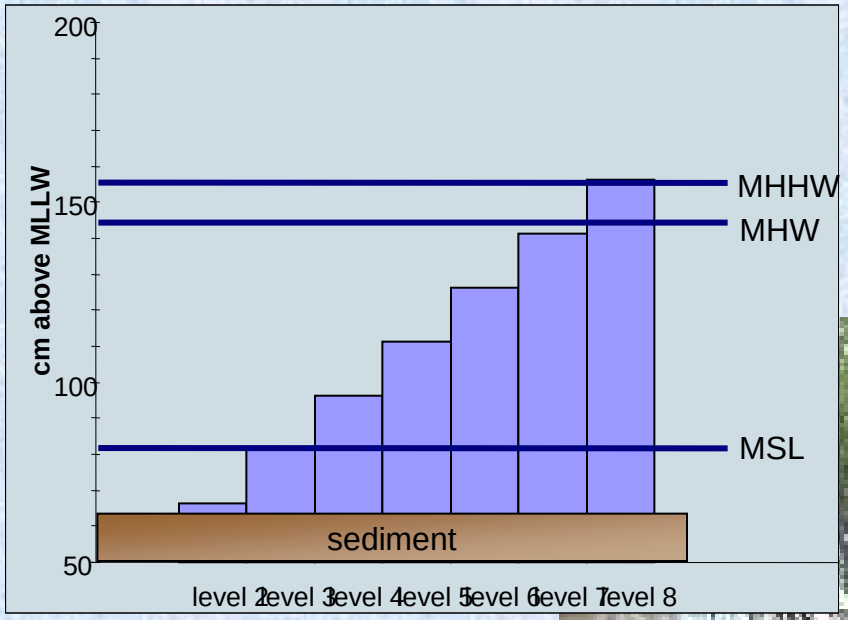
In 2007 we observed:

- Demographics
- Aboveground biomass
- Belowground biomass
- Production/time

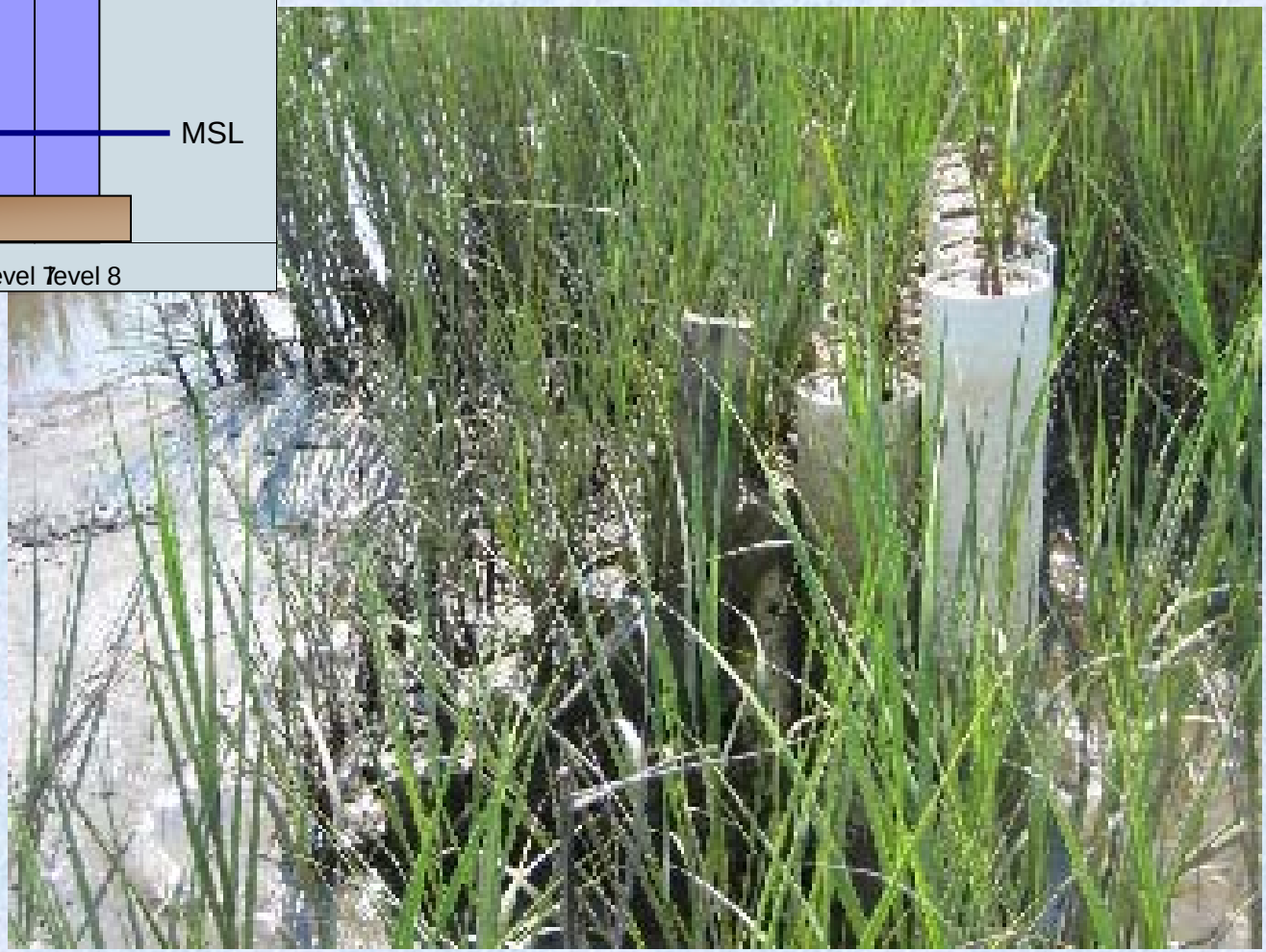
  of *Spartina* & *Juncus* (co-planted) at experimentally altered elevations, both species under astronomically- & meteorologically- tidal regimes

- Vegetation community shifts in marsh platform perturbation plots at *Spartina-Juncus* margin, at both astronomically- & meteorologically- tidal sites

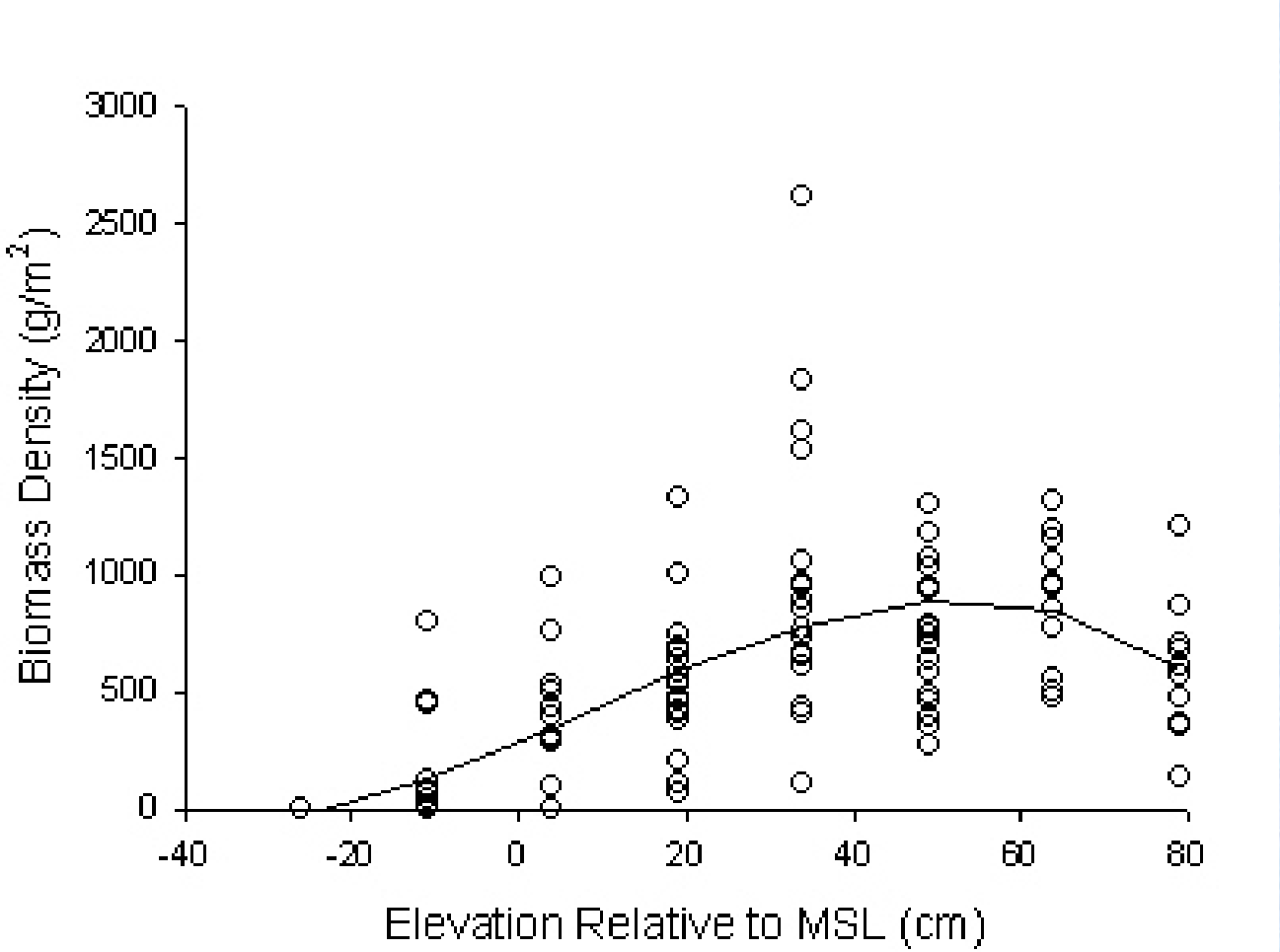
- 2007 data under analysis



NORTH INLET SPARTINA ALTERNIFLORA MARSH ORGAN



"Marsh organs" have been used to measure the growth of Spartina alterniflora as a function of the elevation of the marsh within the tidal frame.



The median elevation for North Inlet salt marshes is also midway between MSL and MHHW. This is a tipping point. At North Inlet we have found that the optimum elevation is midway between MSL and MHHW (above). Differences among elevations are significant. This may be an ominous signal for North Inlet marshes. These results will be useful in predicting the response of Pamilco Sound marshes if and when the barriers are breached and the Sound experiences a significant tide.

Bogue Sound
Atlantic Ocean

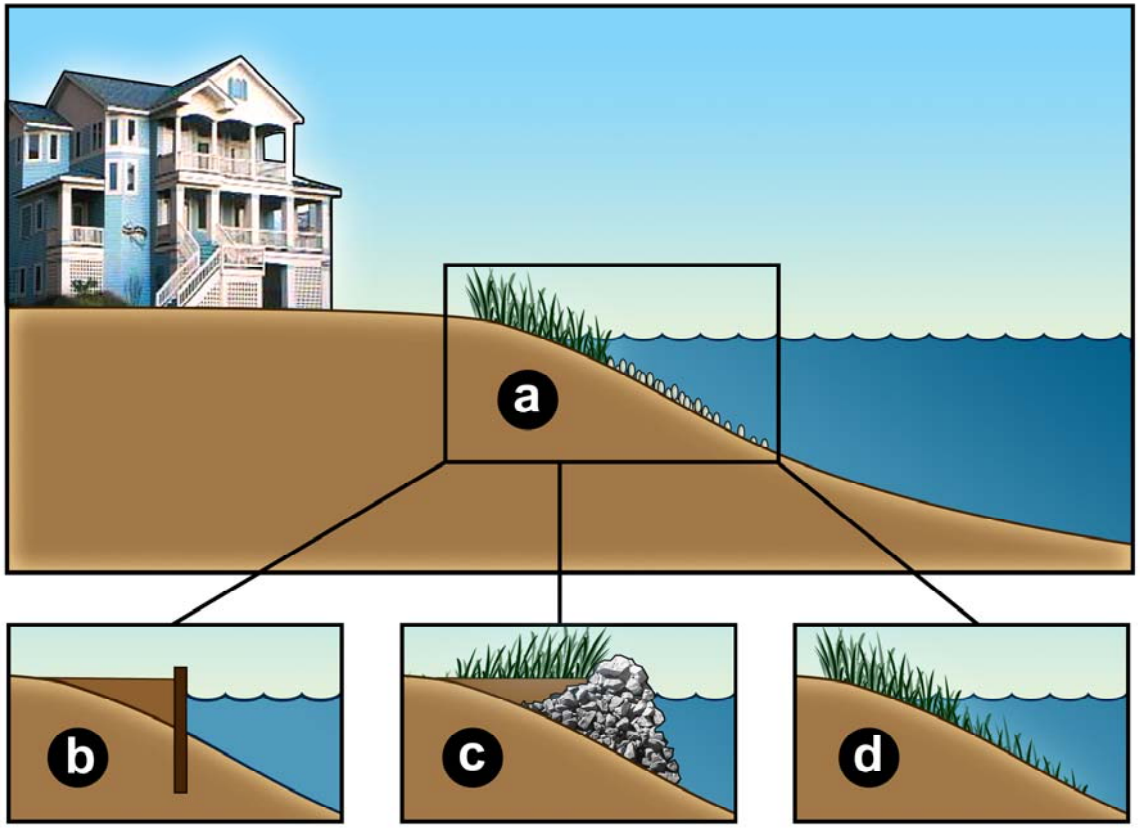
Modeling habitat-specific impacts of sea-level rise on estuarine production as a function of shoreline management alternatives

Pete Peterson, Mike Piehler, Rick Luettich and Chris Buzzelli

UNC Chapel Hill Institute of Marine Sciences

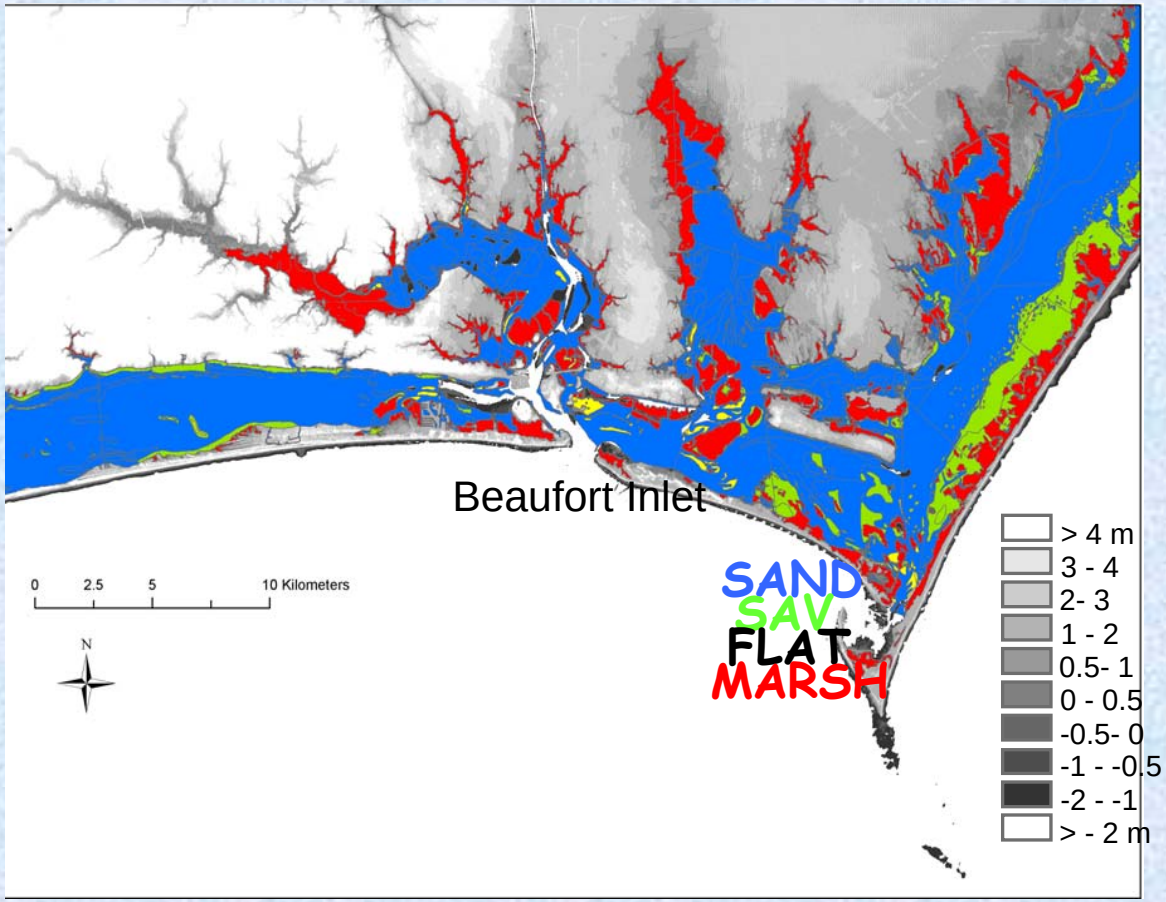
In cooperation with Carolyn Currin and Mark Fonseca

NOAA CCFHR

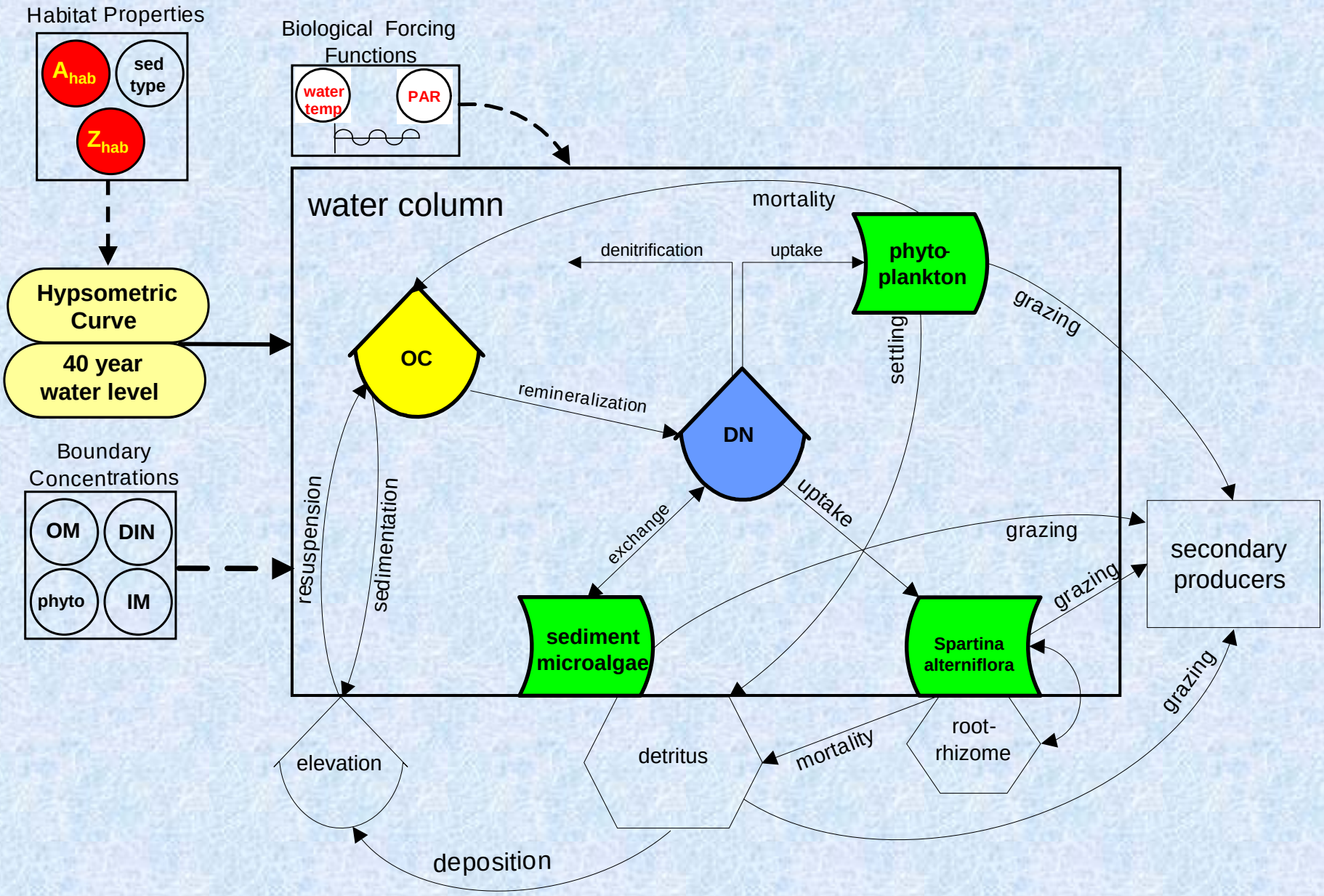


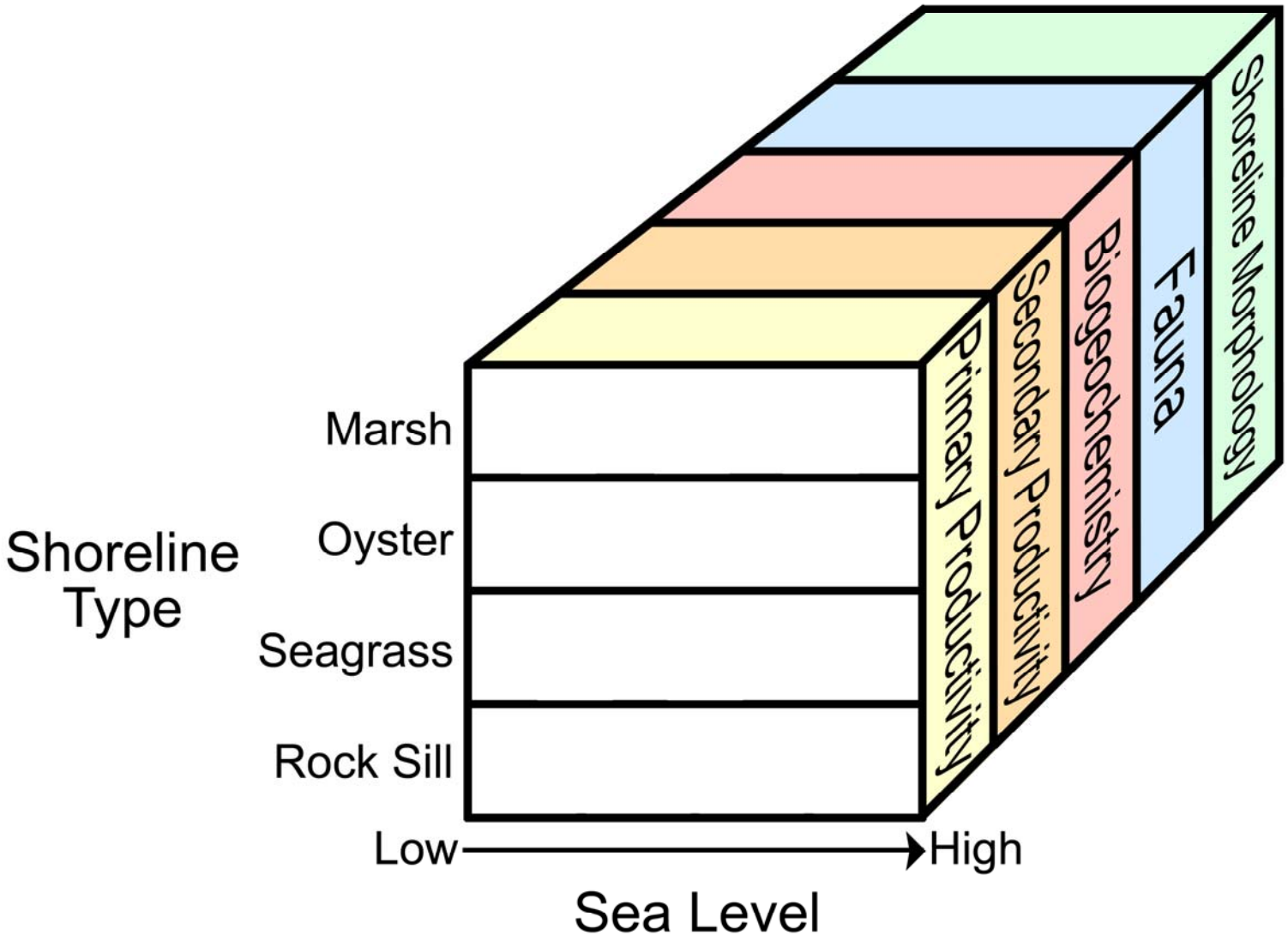
What are we doing?

- Developing a habitat simulation model linked to the NOS coastal flooding model
- Generating a map series of the changes in habitat distribution



METHODS – HABITAT CONCEPTUAL MODEL



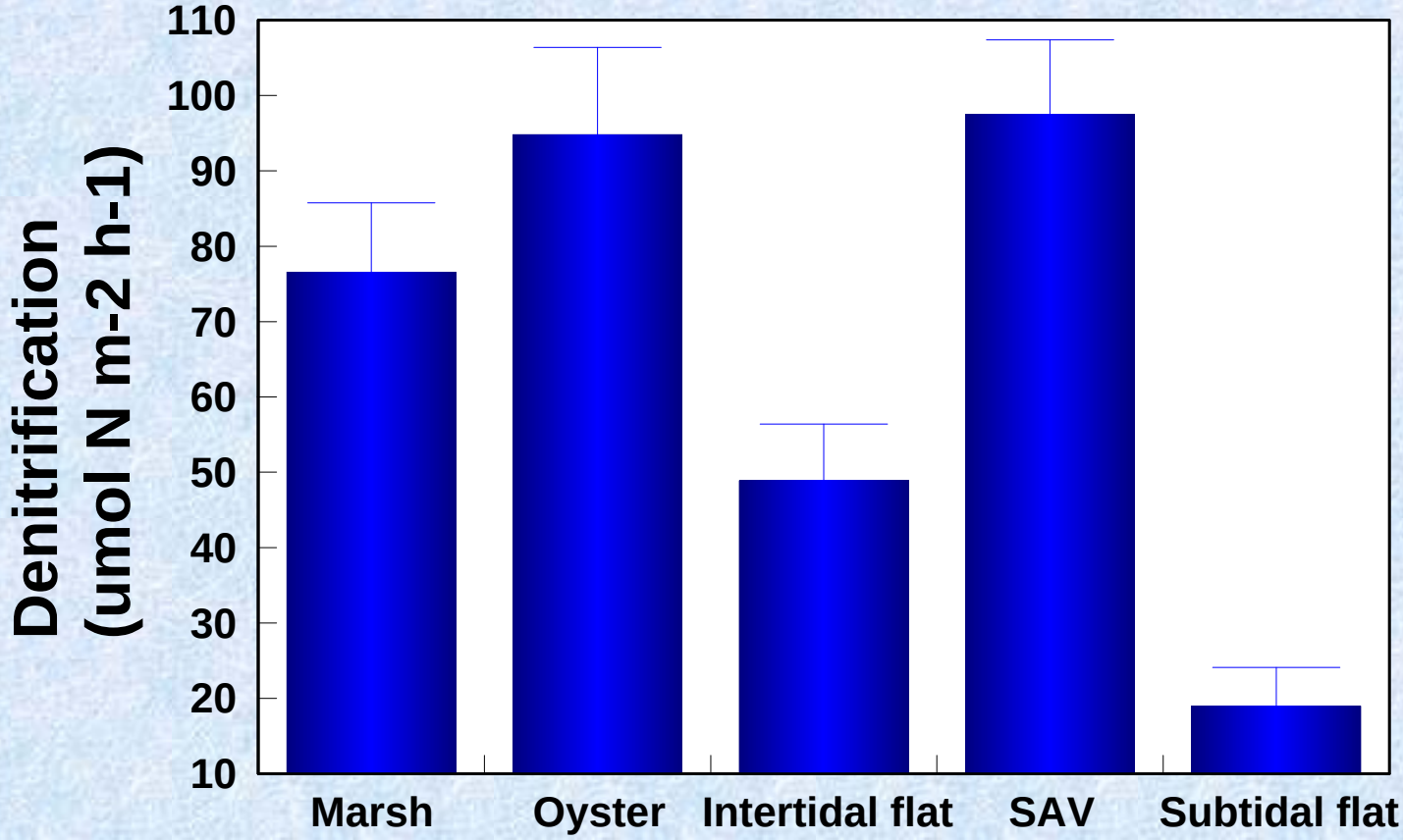

Shoreline Morphology
Fauna
Biogeochemistry
Secondary Productivity
Primary Productivity
Shoreline Type
Marsh
Oyster
Seagrass
Rock Sill
Low
High
Sea Level

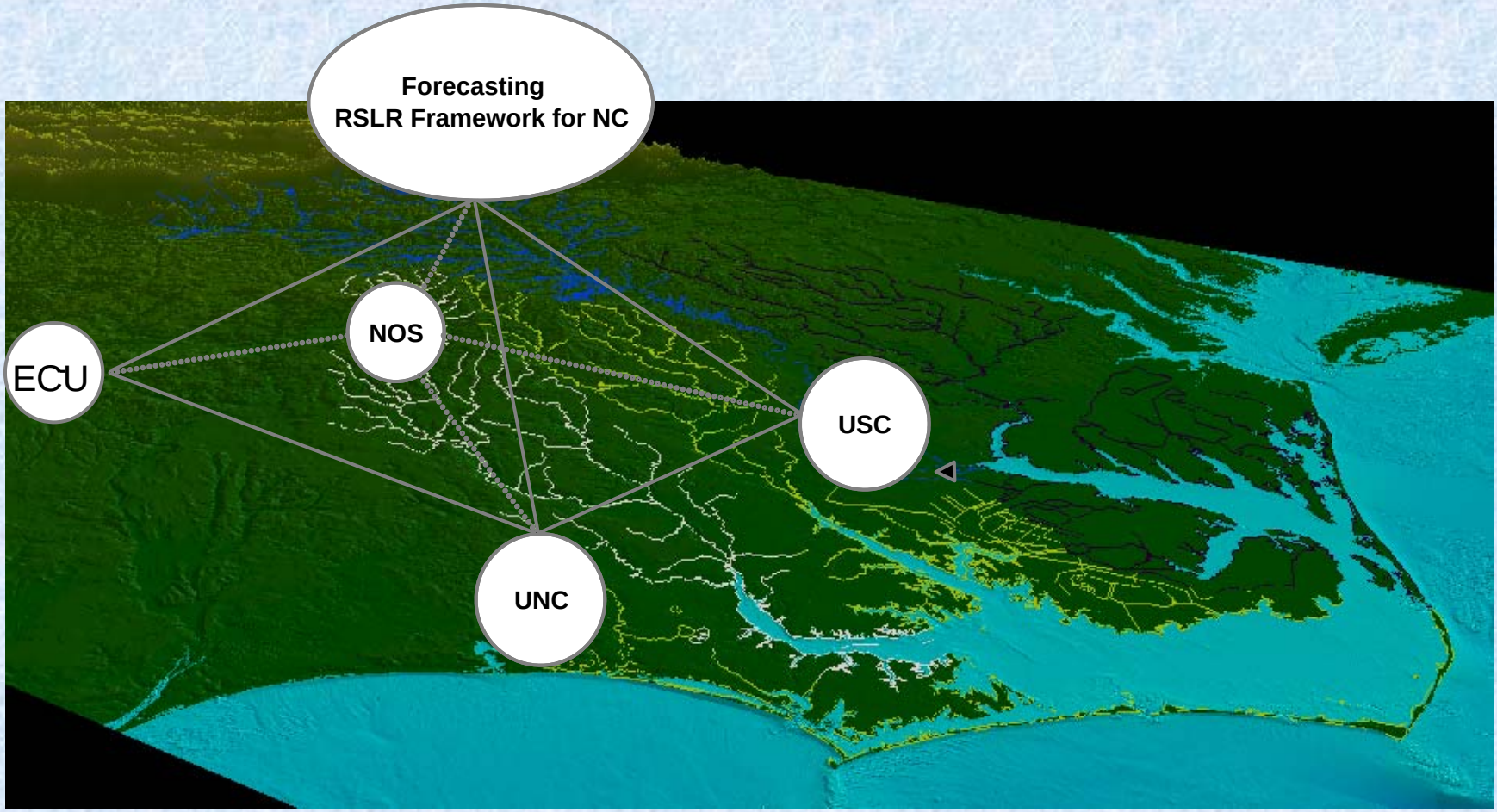
ECOSYSTEM TROPHIC TRANSFER (gC m^{-2} y^{-1})

Trophic level	MARSH	IT FLAT	ST FLAT	SAV	OYSTER
Primary	548	222	135	975, 2000	<50?
Secondary	47	74	101	81	1562
Tertiary	22	19	21	8	50

Peterson et al. 2008

Annual Average




Forecasting
RSLR Framework for NC
ECU
NOS
USC
UNC

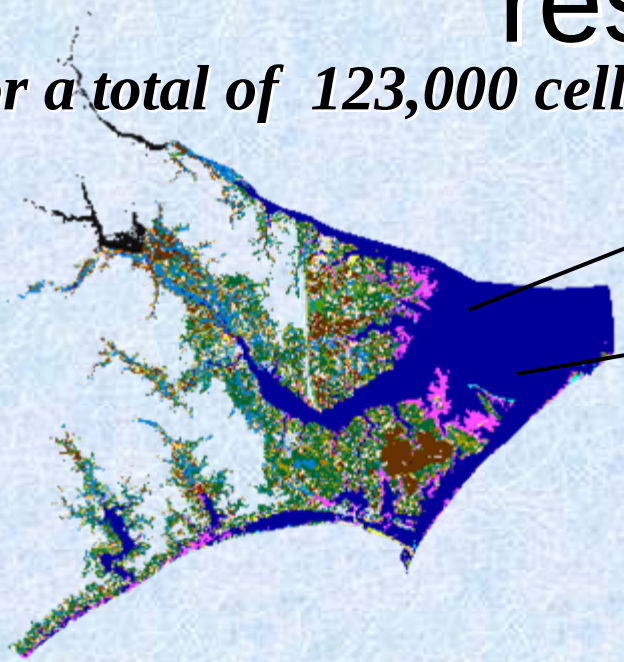
Sea Level Modeling – The NC Landscape

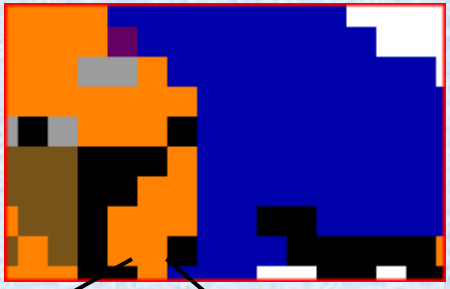
Create a landscape model focused at the mid and long -range temporal & spatial scales for eastern North Carolina that explores the near-shore hydrodynamics and the wetland interactions.

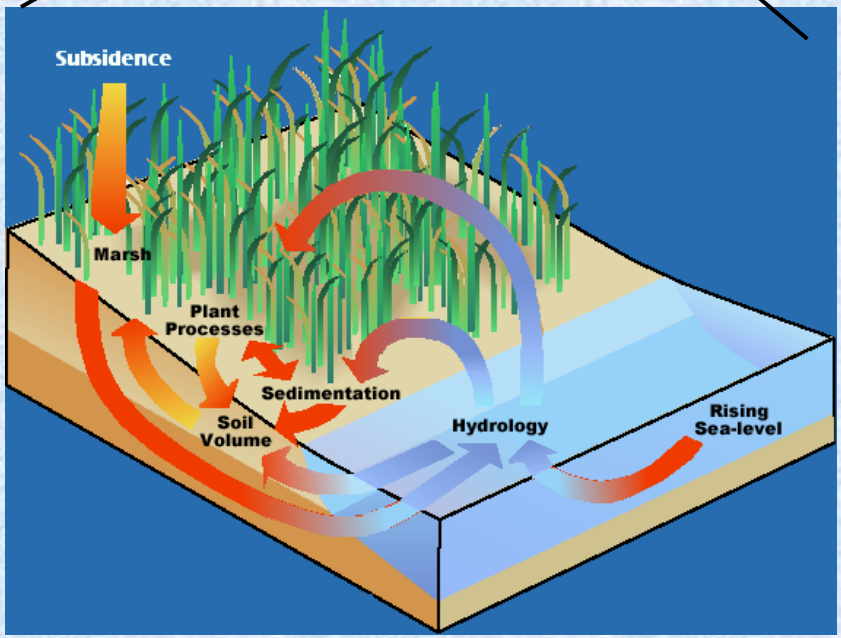
Enrique Reyes
East Carolina University

Model Domain (0.25 km^2 resolution)

For a total of 123,000 cells

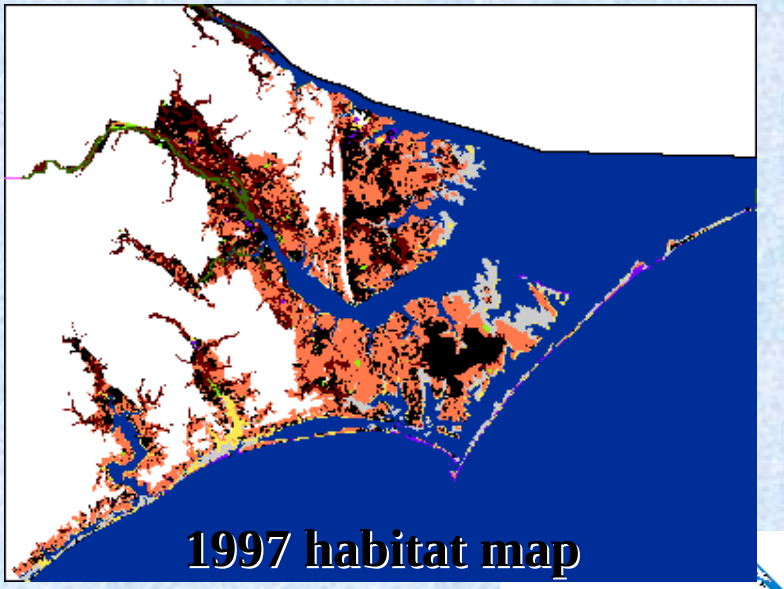


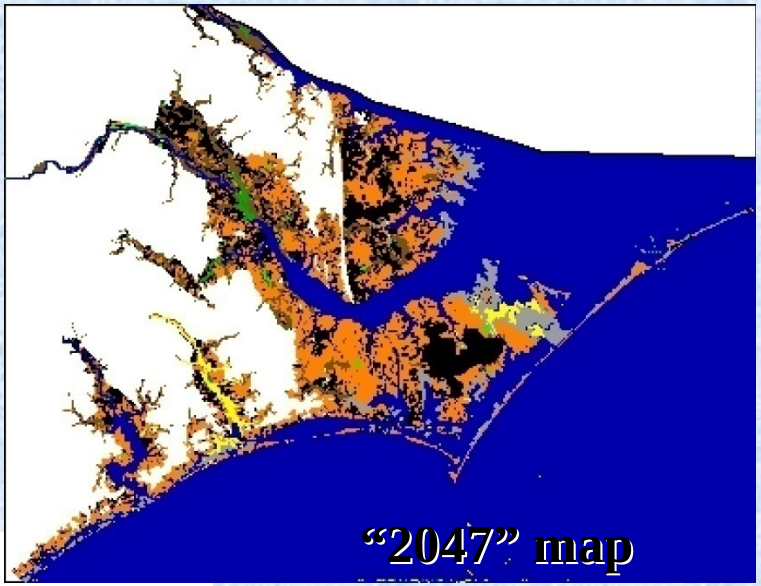


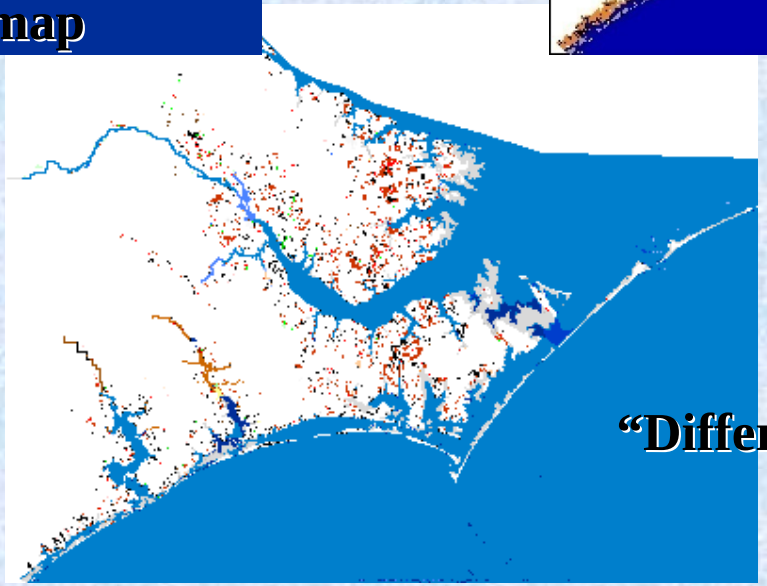


Each cell contains a *unit ecosystem model* representing a certain habitat type and incorporates location-specific algorithms.

1997 habitat map vs. 50 year simulation







“Difference” map

Real Estate Investors

REALTOR.com: Home and Real Estate Search - Microsoft Internet Explorer provided by East Carolina University

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38 properties match your search, 9 with multiple photos

There are **101** available properties in **Arapahoe, NC**

Search Results Page 2 of 4

Sort results by: Photos | Price | Featured Tour | %Match

9

$440,000
179 COUNTRY CLUB DRIVE
Minnesott Beach, NC 28510
2 Bed, 2 Bath
1,360 Sq. Ft.
0.5 Acres
100% Match

10

$459,900
394 CHINA GROVE ROAD
Arapahoe, NC 28510
Listing Not Mapped
3 Bed, 2 Bath
1,750 Sq. Ft.
0.3 Acres
100% Match

Note: not an actual shoreline erosion polygon.

Pages: Prev 1 2 3 4 Next

Go to page: GO

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