

Erosion of Aquatic Habitat in the LCF Estuary: Are There Important Consequences for Fisheries Productivity?

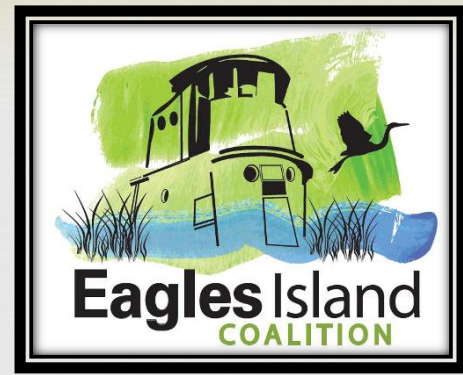


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Cape Fear River Partnership
Habitat Meeting
Raleigh, NC
November 8, 2018



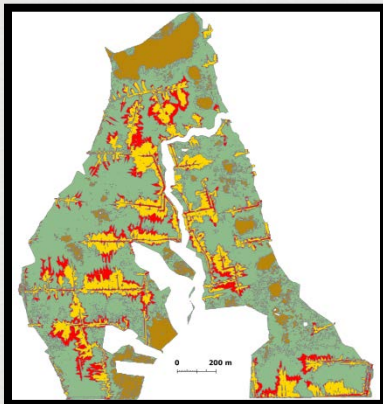
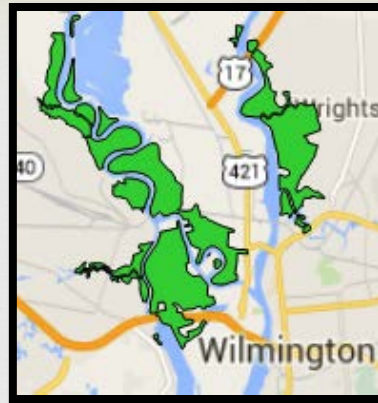
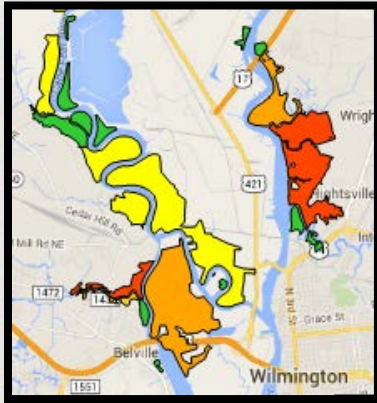
Aquatic Habitat Goals of the Eagles Island Coalition



- ❧ **Conservation Management Plan (2015)**
 - ❧ Goals (GIS explicit)
 - ❧ Identify and map the highest priority habitats, species, and cultural resources in need of conservation attention on Eagles Island
- ❧ **Conservation of Natural Resources (Habitats and Biota)**
 - ❧ Tidal Freshwater Marsh Habitat
 - ❧ Primary Nursery Areas
 - ❧ Fisheries--key anadromous and endangered species mentioned
- ❧ **Habitat Erosion**
 - ❧ Apparent on former rice fields on Eagles Is. and former rice growing areas elsewhere in the LCFE
 - ❧ Perceived as a potential threat to aquatic habitats

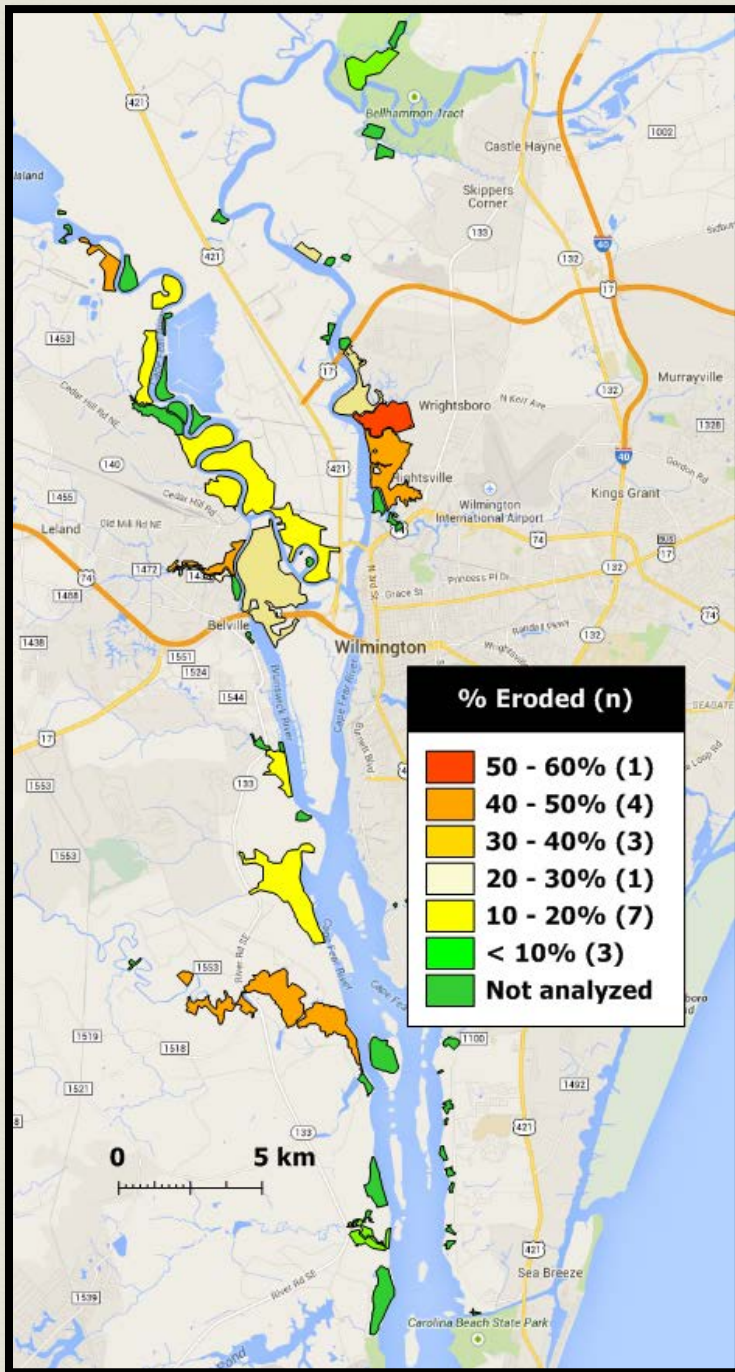
Analytic Tasks & Data

- ❧ Inventory of eroded areas
 - ❧ 2014 LiDAR & GE
 - ❧ Historical Views
- ❧ Extent and depth of erosion
 - ❧ 2014 LiDAR (20 cm contour intervals)
- ❧ Balance between erosion and accretion
 - ❧ 2001 & 2014 LiDAR (contouring, overlay)
- ❧ Historical erosion rates
 - ❧ Aerial photos, GE, 2001 & 2014 LiDAR



Inventory of Eroded Habitats

- ❧ Eroded former rice fields and canals = 2,772 ha at 63 locations
- ❧ 1,887 ha in 19 areas analyzed (68%)
- ❧ Habitats by area
 - ❧ 25% Freshwater Forested/Shrub Wetland
 - ❧ 72% Freshwater Emergent Wetland
- ❧ Eroded area:
 - ❧ Less than 20% at about half of locations
 - ❧ But ranges up to 60%



Depth of Erosion Among Habitats

☞ Depth of erosion (19 locations)

☞ <20 cm at 42%

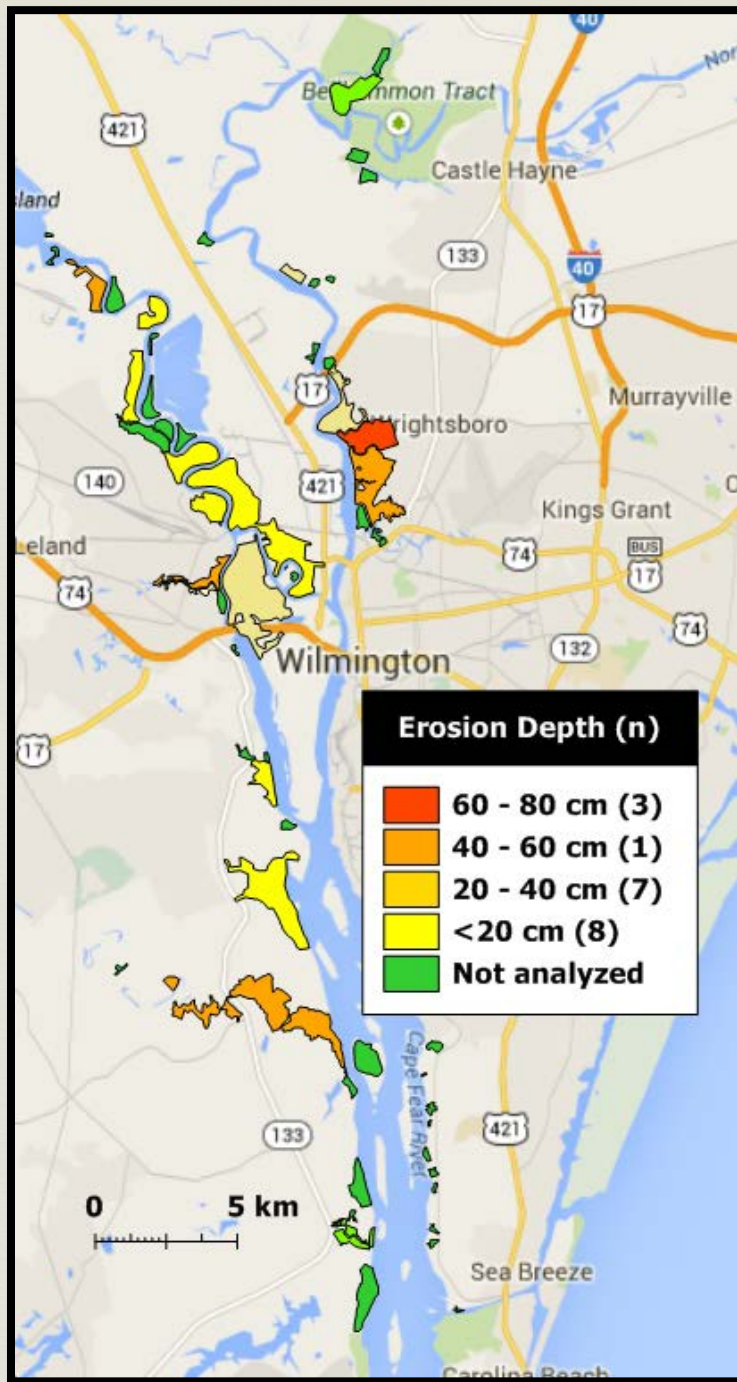
☞ 20 - 40 cm 37%

☞ Ranges up to 60 - 80 cm

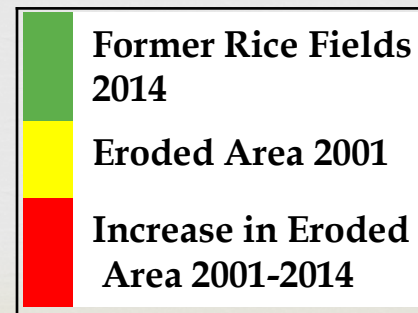
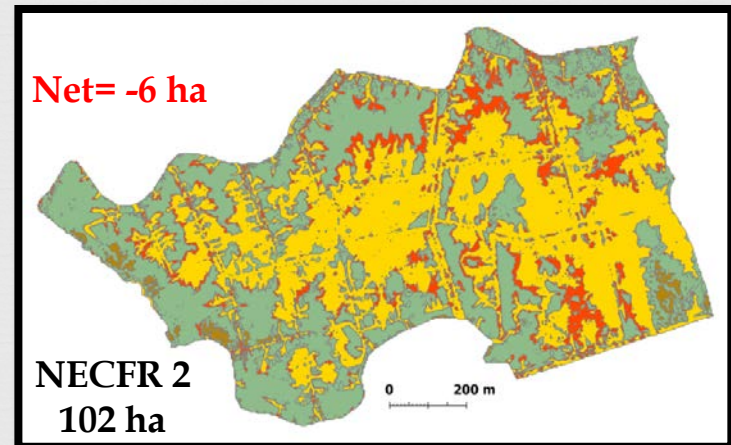
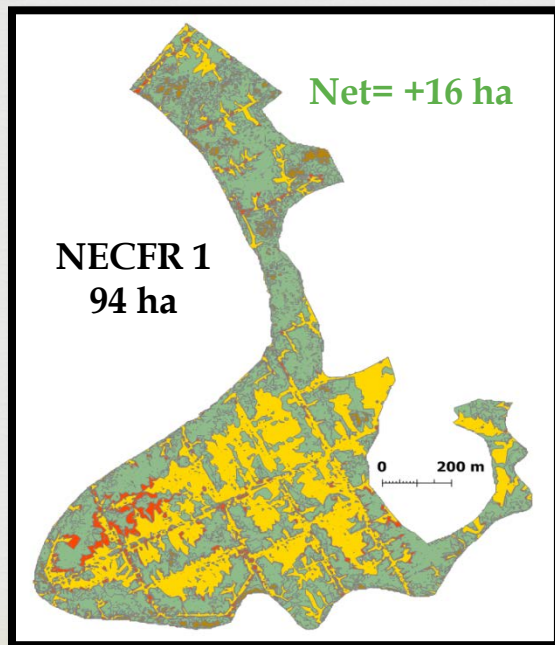
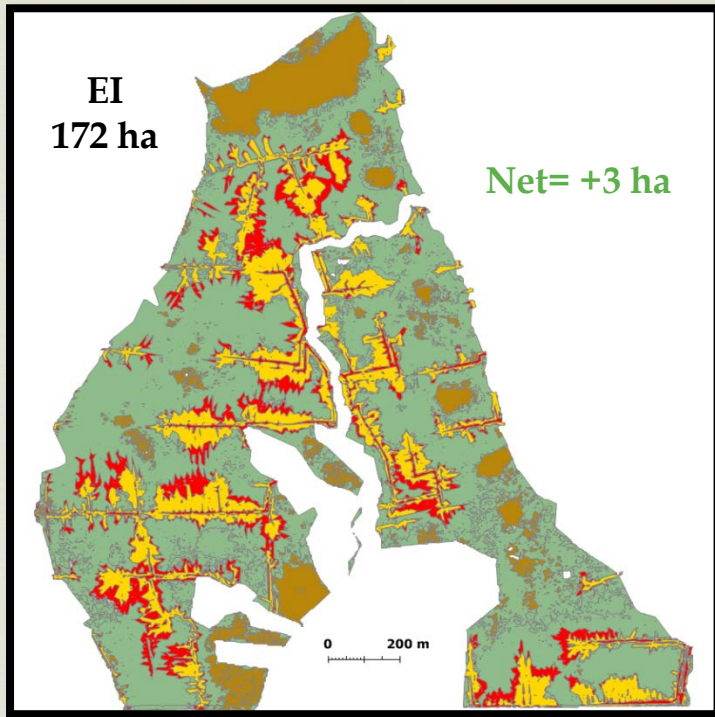
☞ Indicative progression of erosion:

☞ Relatively slow development at most locations

☞ Are the most eroded locations good predictors of future erosion at lesser eroded locations?



What was the balance
between erosion & accretion
from 2001 to 2014?



Ponding on Eagles Island



Google Earth 3/18/2007

For how long has habitat erosion been taking place and at what rate has it been progressing?

Erosion Rates (ha/y)		
Location	Historical 1949 to 2001	Recent 2001 to 2014
EI	0.7	1.6
NECFR 1	1.1	0.4
NECFR 2	1.1	1.0

Salient Points



- ❧ Erosion is widespread among two major aquatic habitats in the LCFE
- ❧ Marsh erosion can be traced back to the 1940's
- ❧ At most locations eroded area and depth of erosion are at the lower end of their ranges, but ranges are broad
- ❧ Deepening of erosion causing a permanent die off of vegetation could become a threat to aquatic productivity
- ❧ The balance between erosion and accretion is highly variable among locations
- ❧ Marked spatial variability among key metrics of erosion indicates the need to broaden the scope of the research to account for the variation

Use and Integration



- ❧ Key questions raised by the results so far
 - ❧ Will continued erosion of aquatic habitats significantly affect fisheries productivity?
 - ❧ Will deepening erosion cause a vegetation die off to the detriment of aquatic productivity?
- ❧ Methodologies
 - ❧ Methods have been developed to determine locations and areas of erosion and accretion along with indicative rates
- ❧ Integration
 - ❧ Data used are freely downloadable
 - ❧ Analytics are basic GIS so easily adopted by others
 - ❧ Results are exportable
- ❧ Future research
 - ❧ Continue monitoring of erosion with special attention to possible vegetation die offs
 - ❧ Integrate the research into a CFRP project of broader scope
 - ❧ Better address the key questions by including specialists in marsh soils and marsh vegetation dynamics

*“...And in that Heaven of all their wish,
There shall be no more land, say fish.”*

From *Heaven* by Rupert Brooke (1915)

“Fish, be careful of what you wish for!”

From *Jim Kapetsky* (2018)

Thank you!

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