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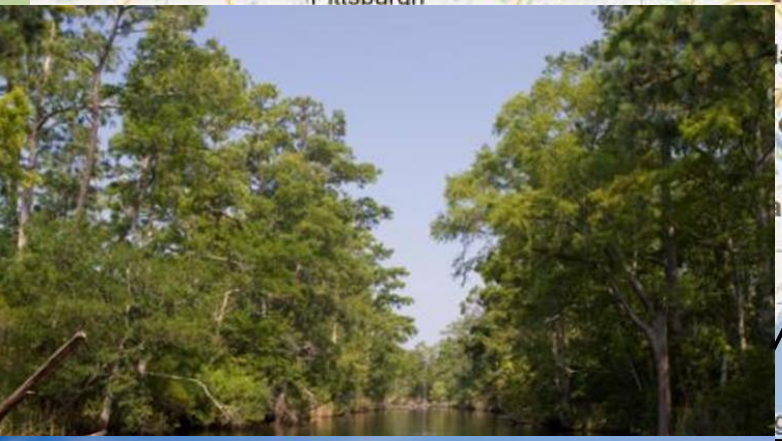
Albemarle-Pamlico Peatland Enhancement Project: Water Management Implementation

November, 20th 2013

Chuck Peoples, Christine Pickens and Brian van Eerden




adelphia
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Albemarle Sound

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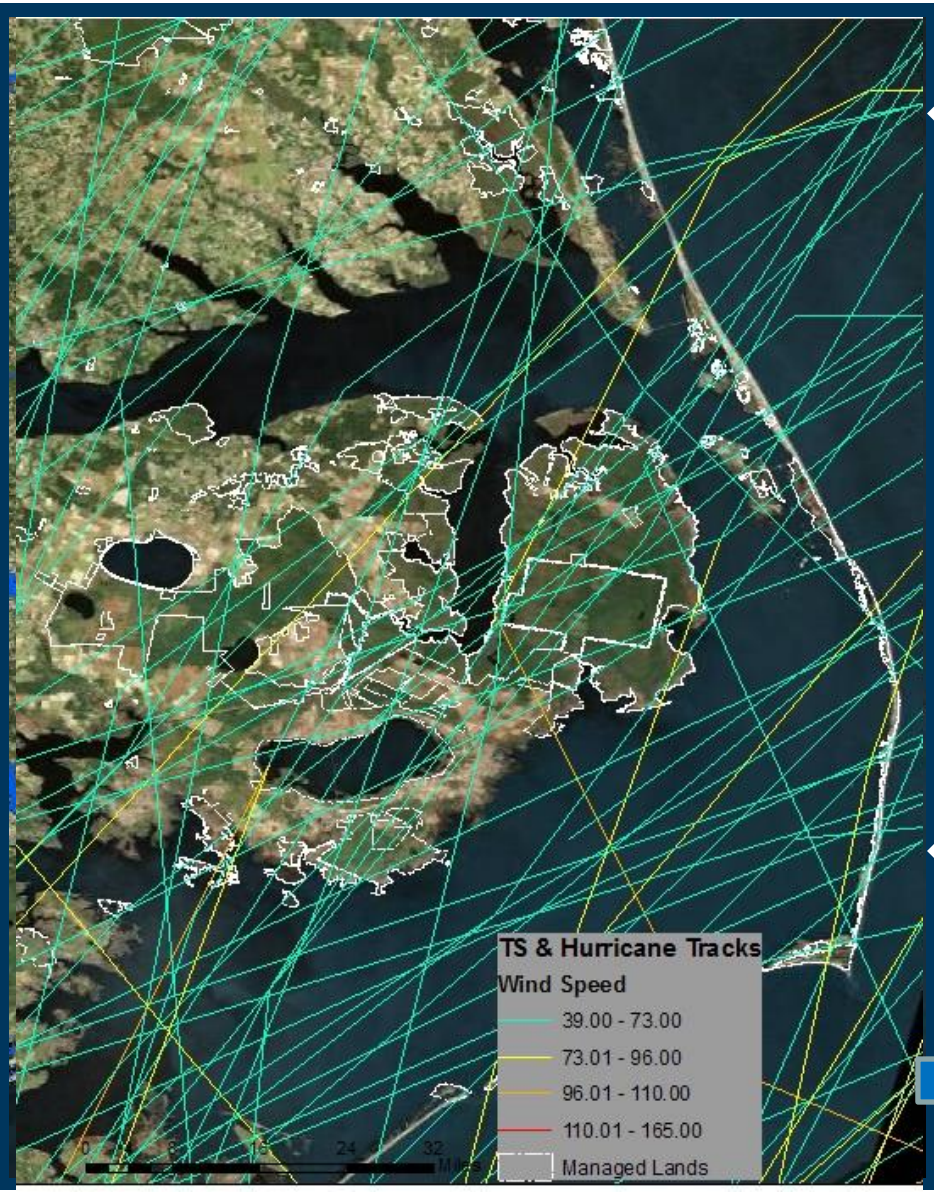
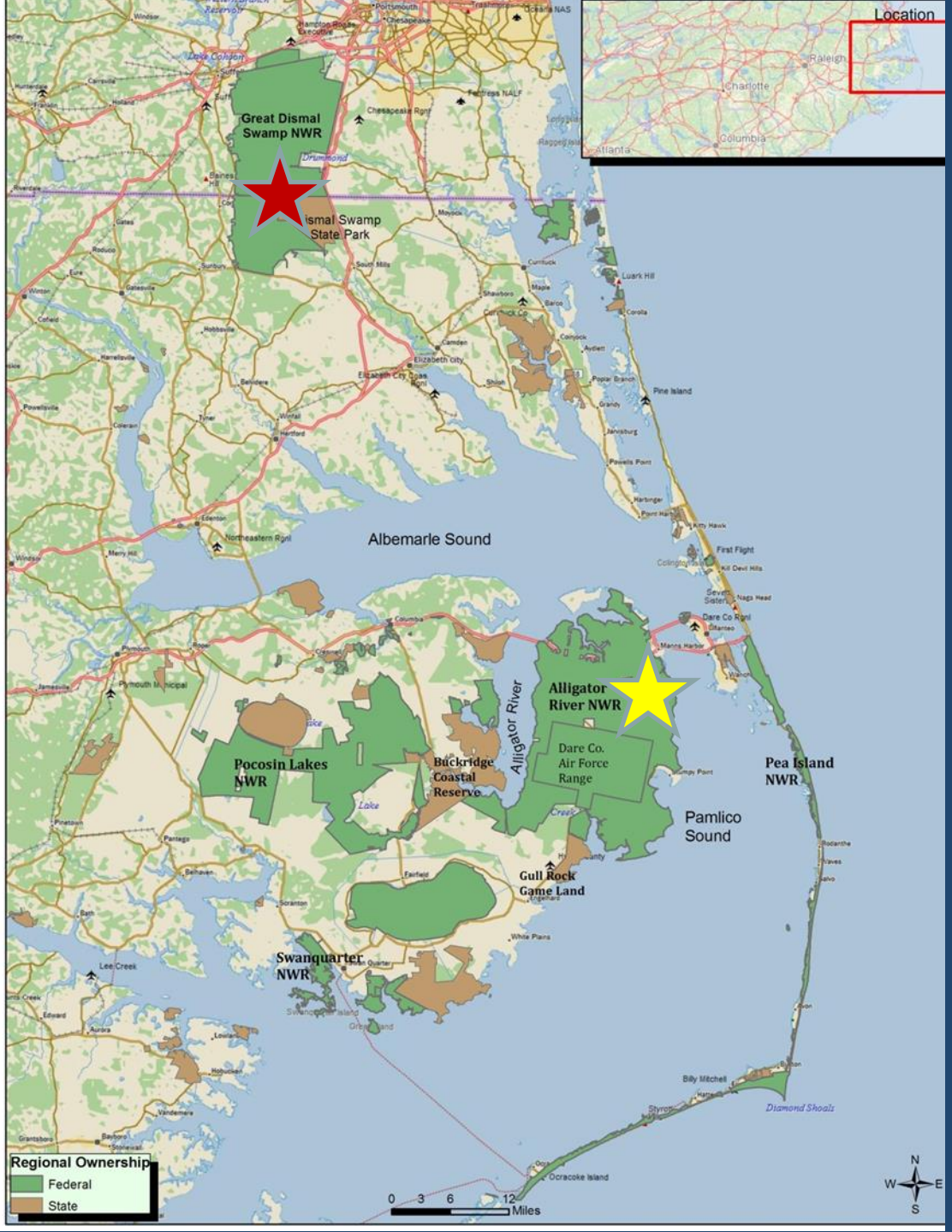
Vulnerability of the Albemarle Region



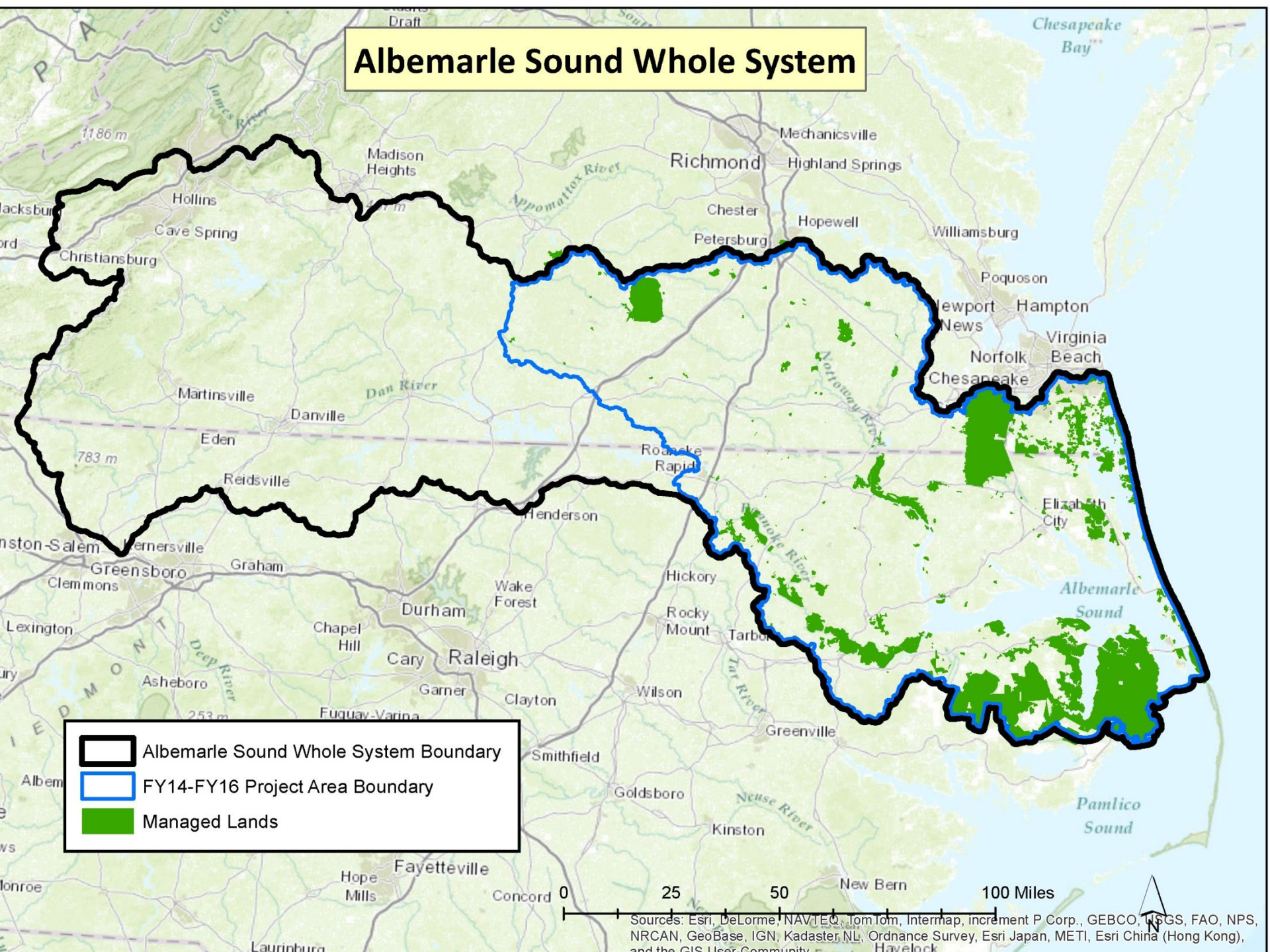
- Extremely flat with low elevation
  - Area is one of the most vulnerable regions in N. America to impacts of sea-level rise
  - Over 415,000 acres of public lands lie within 1m of sea-level
- Susceptible to tropical storms hurricanes and nor'easters

1M SLR, Bathtub Model
with Hydrologic Connectivity



- Over 665,000 acres of public managed lands
  - Long-term TNC investment in regional land acquisition
- Strategic partner-
  - US Fish & Wildlife Service
    - 9 refuges, 490,000 acres
    - 40% of FWS ownership on eastern seaboard within this one region

Albemarle Sound Whole System



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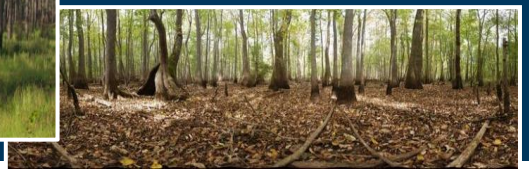
Healthy Forests , Healthy Rivers = Healthy Estuary



61% of WS land cover is forested

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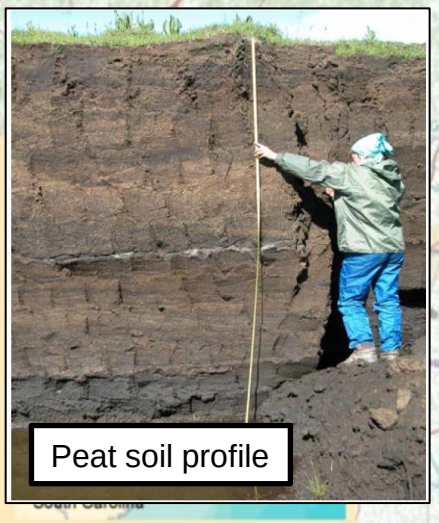
Albemarle Sound FWS-owned Peatlands

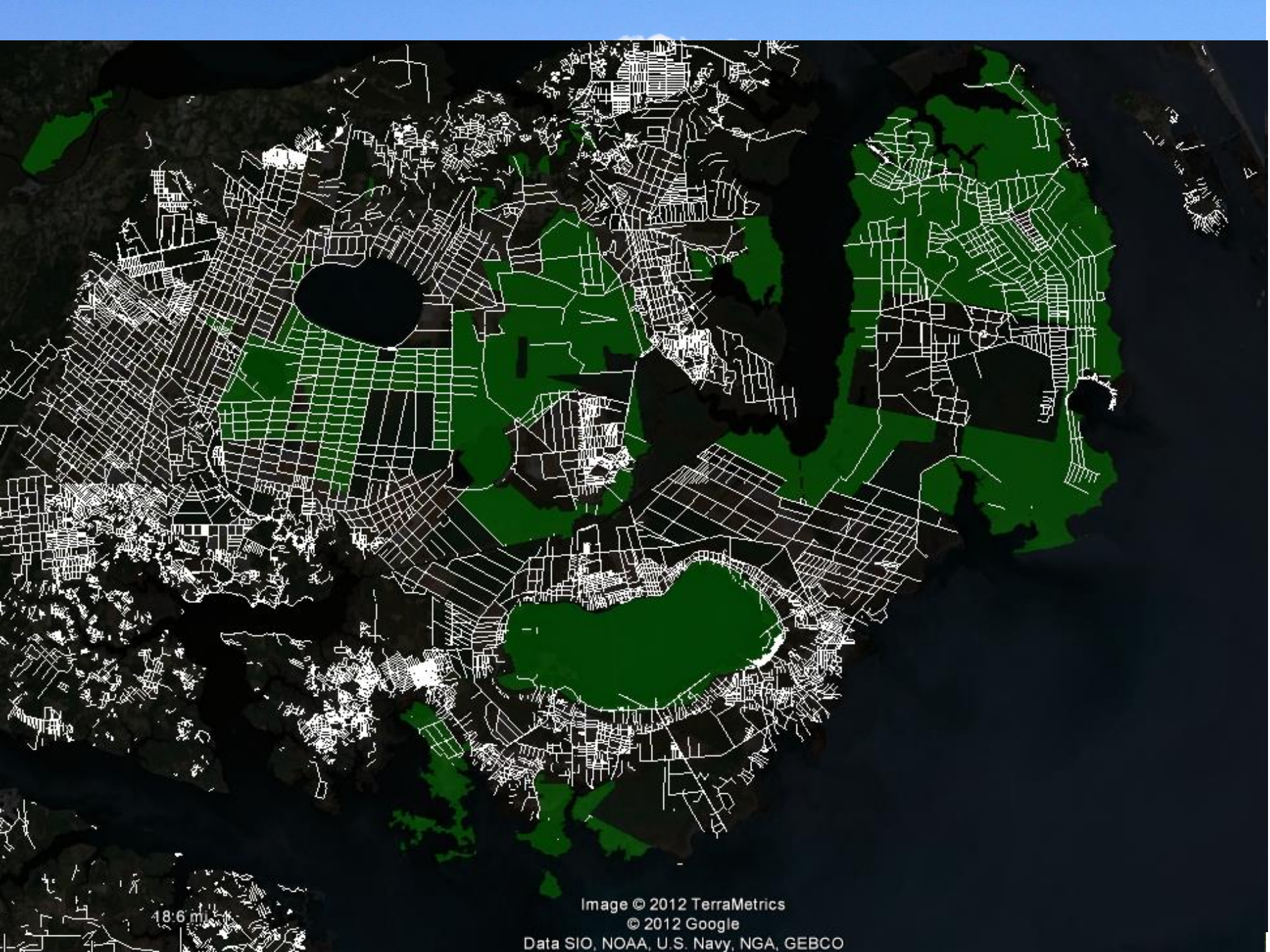


Peat soil profile

Dismal Swamp NWR/SP: 126,000 ac.

Alligator River NWR: 154,000 ac

Pocosin Lakes NWR: 110,000 ac


18.6 mi
Image © 2012 TerraMetrics
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Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Ditching and Drainage

Ditches

- Dries out peat soil, breaks down
  - Land sinks slowly
- Export water low in DO high in nutrients and mercury
- At lower elevations - salt water moves in toward inner swamps (salt water intrusion)
  - Vegetation die off / change
- Increased risk for soil ignition catastrophic fire

Roads

- Reduce water movement across the surface of the ground
- Can create ponding effect

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Regional cost of drainage and catastrophic fires

4 Pocosin Forest Wildfires from 2008 - 2011

- 97,000 acres
- 20 million metric tons of carbon released
- $57 million in suppression costs
- 567 days from ignition to out

	Acres	*Cost*	*Days*
Evans Road	41,060	$19,000,000	215
Pains Bay	45,294	$14,000,000	120
South One	4,884	$11,000,000	121
Lateral West	6,377	$12,500,000	111
	97,615	$56,500,000	567

Estimated that the 20 million metric tons of carbon released in four fires would equate to annual greenhouse gas emissions from over 14,000,000 passenger vehicles


HEINZ
VINEGAR
MORTON
IODIZED SALT
THIS SALT SUPPLIES IODIDE, A NECESSARY NUTRIENT
NET WT. 26 OZ. (1 LB., 10 OZ.) 737 g
CAPE COD
Kettle Cooked
POTATO CHIPS

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Working on the front lines:
Alligator River National Wildlife Refuge

Significant opportunities

- Contiguous public lands (200k ac.) and shoreline
- Hydrologic alteration via ditching
- Pocosin wetlands and peat deposits

Significant impacts evident

- Shoreline erosion
- Saltwater intrusion
- Vegetation transition

Demonstration/Pilot Project Site

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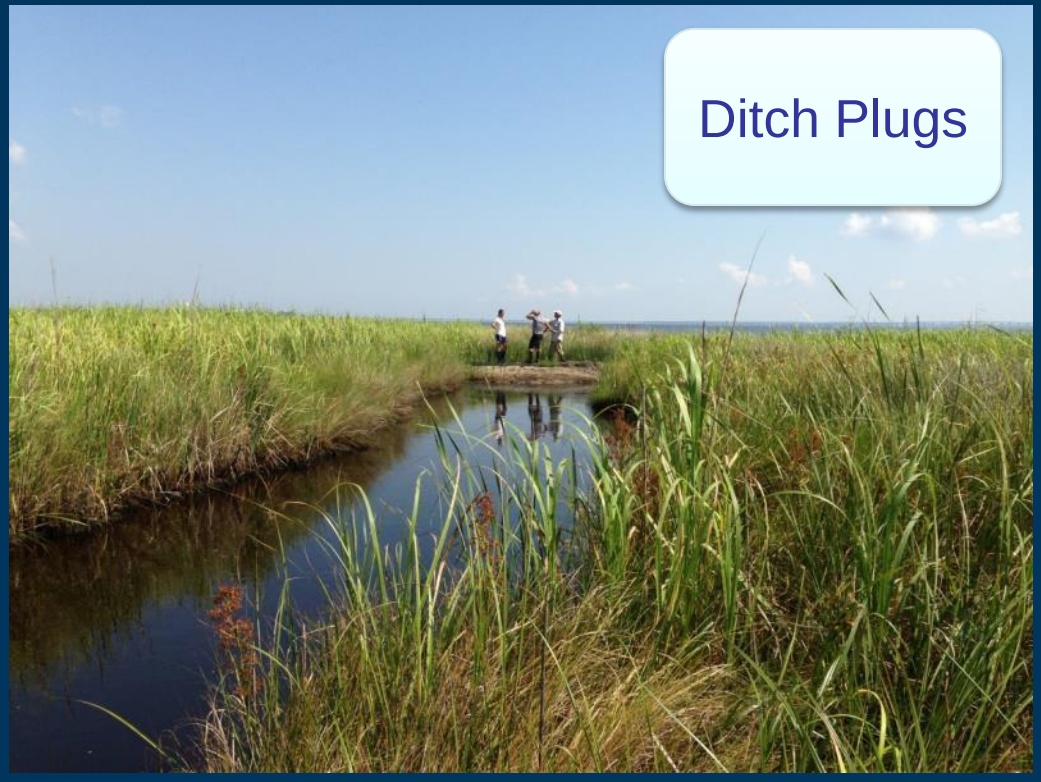
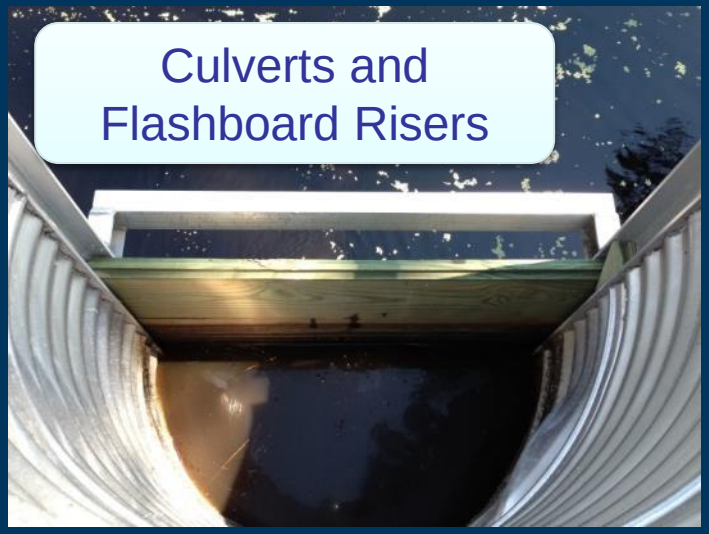
Approach: Hydrologic Restoration

We are reducing salt water intrusion, improving water quality in the sound and reducing vulnerability to wildfires.



Ditch Plugs



Culverts and Flashboard Risers

Check Valves

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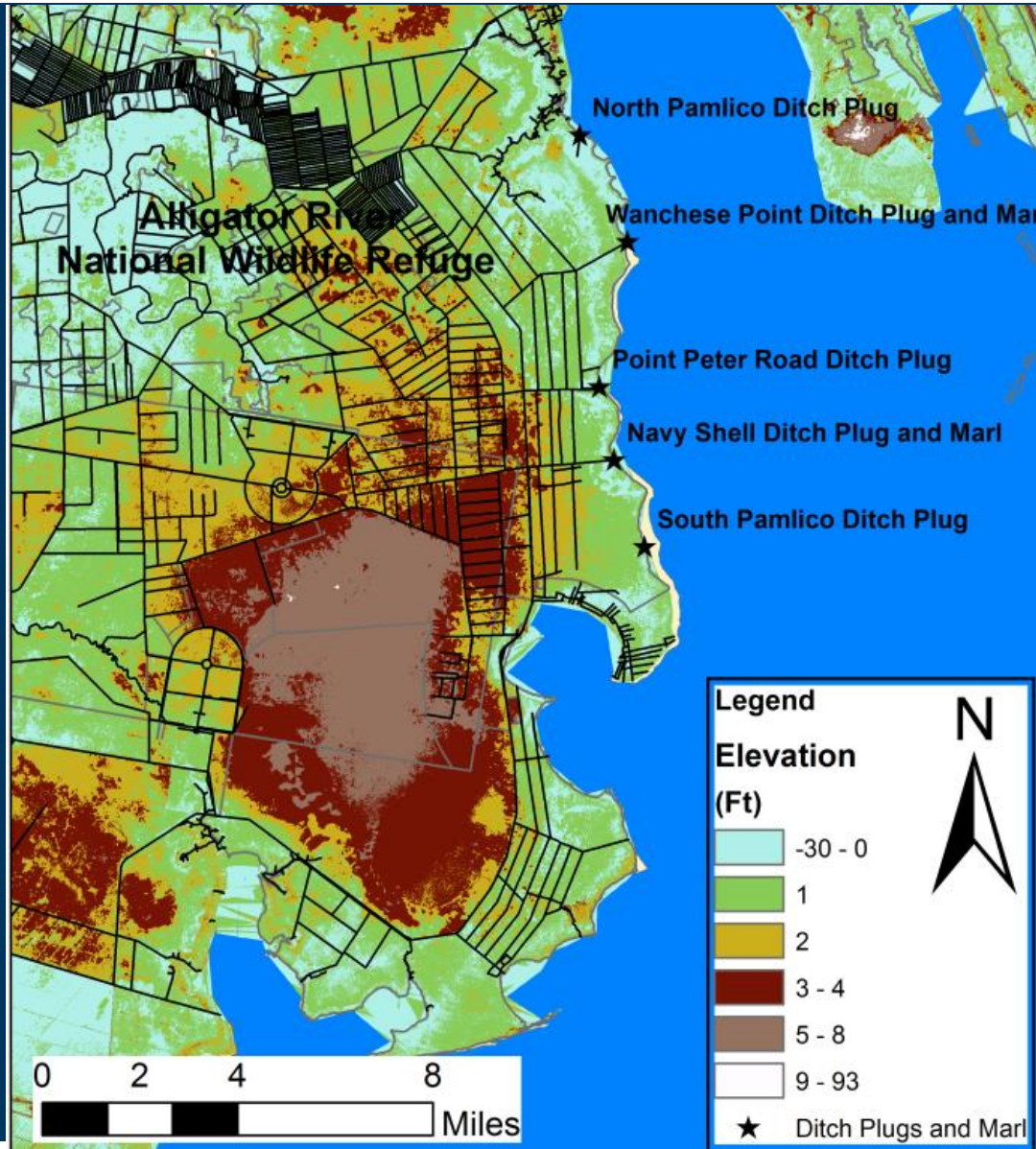
Ditch Plugs at ARNWR

- North Pamlico
- Navy Shell
- South Pamlico
- Point Peter
- Wanchese Point



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North and South Pamlico Ditch Plugs

North Pamlico Ditch Plug

South Pamlico Ditch Plug

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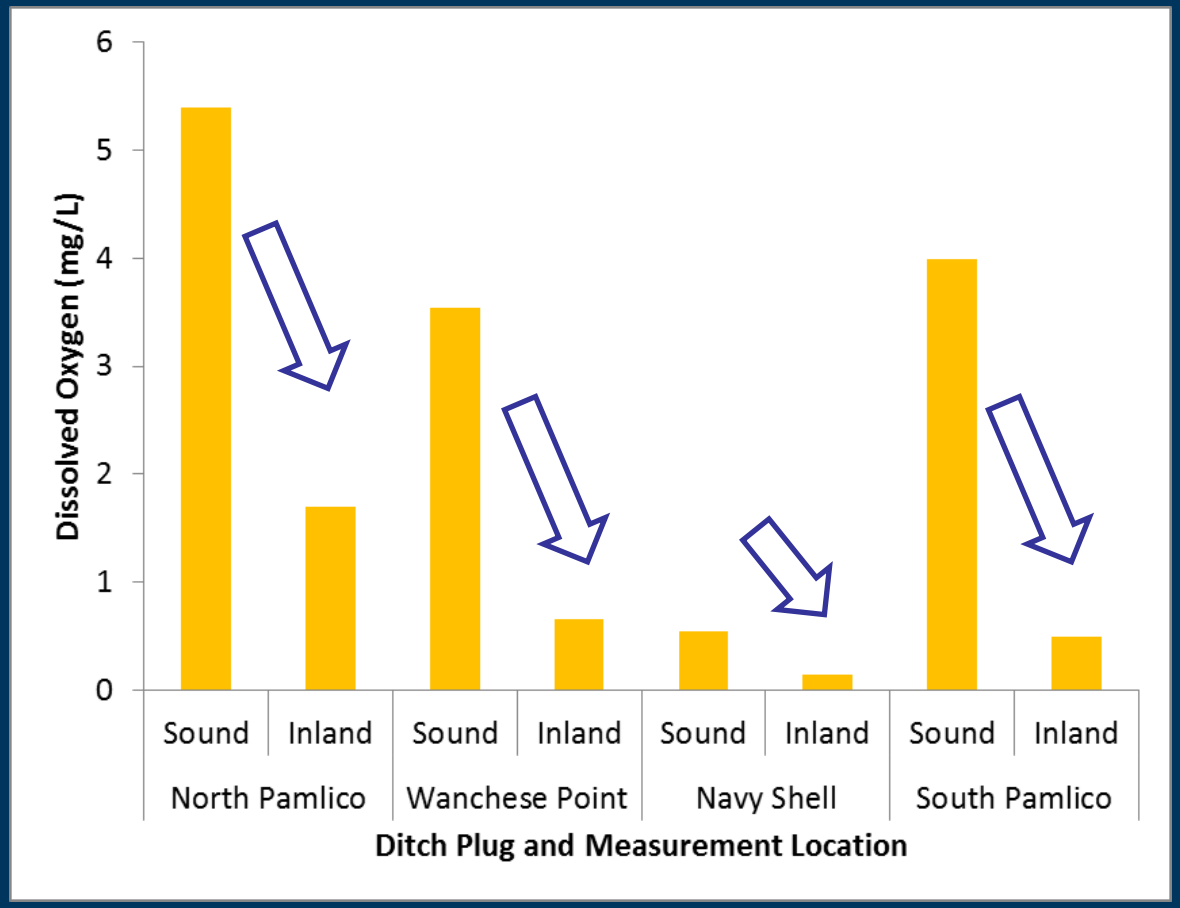
Navy Shell Ditch Plug and Marl

Behind the plug: water in the ditch floods into surrounding marsh

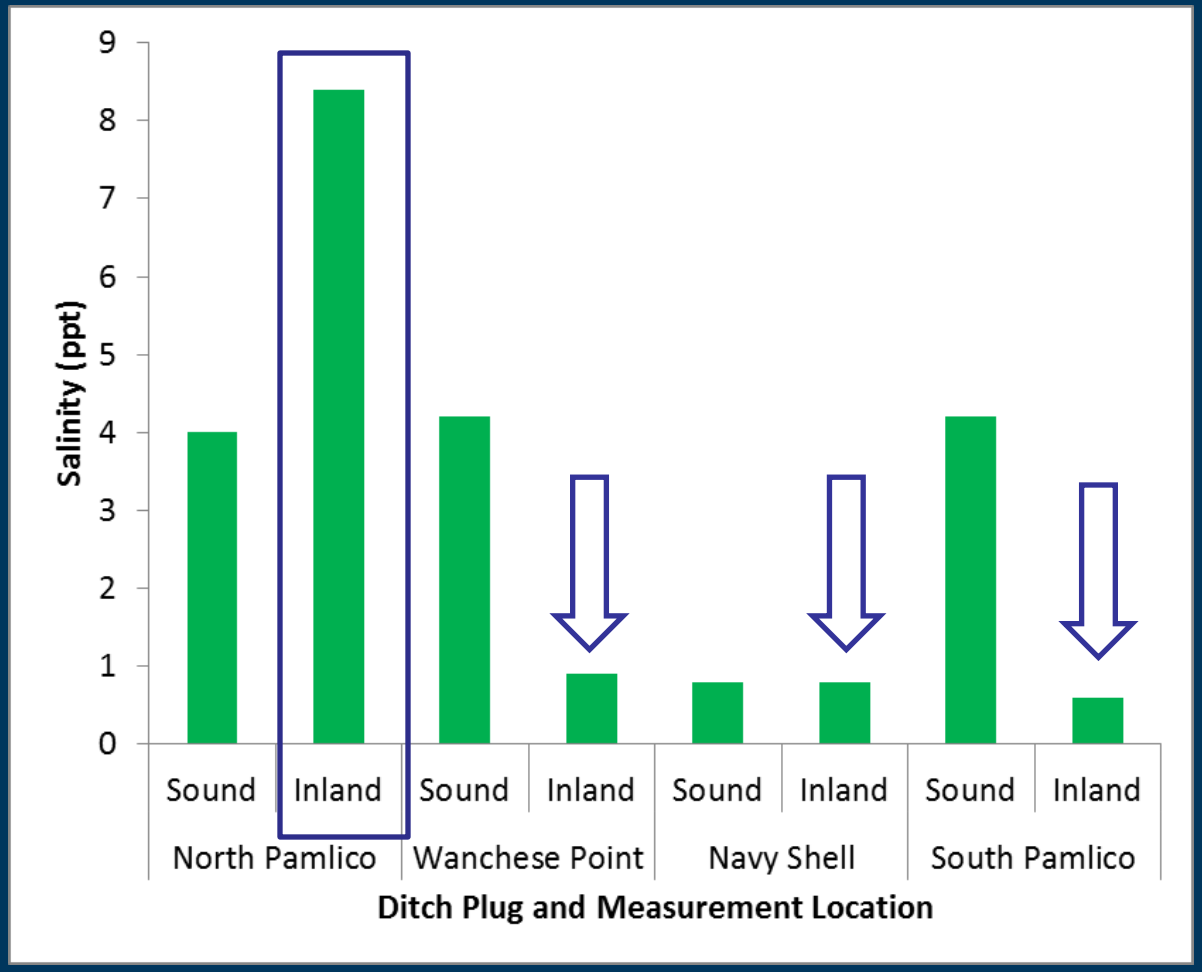
In front of the plug: marl reef supports oysters and prevents erosion

Dissolved Oxygen Assessment



Ditch plugs are fairly successful at preventing water with low dissolved oxygen from going into the Sound.

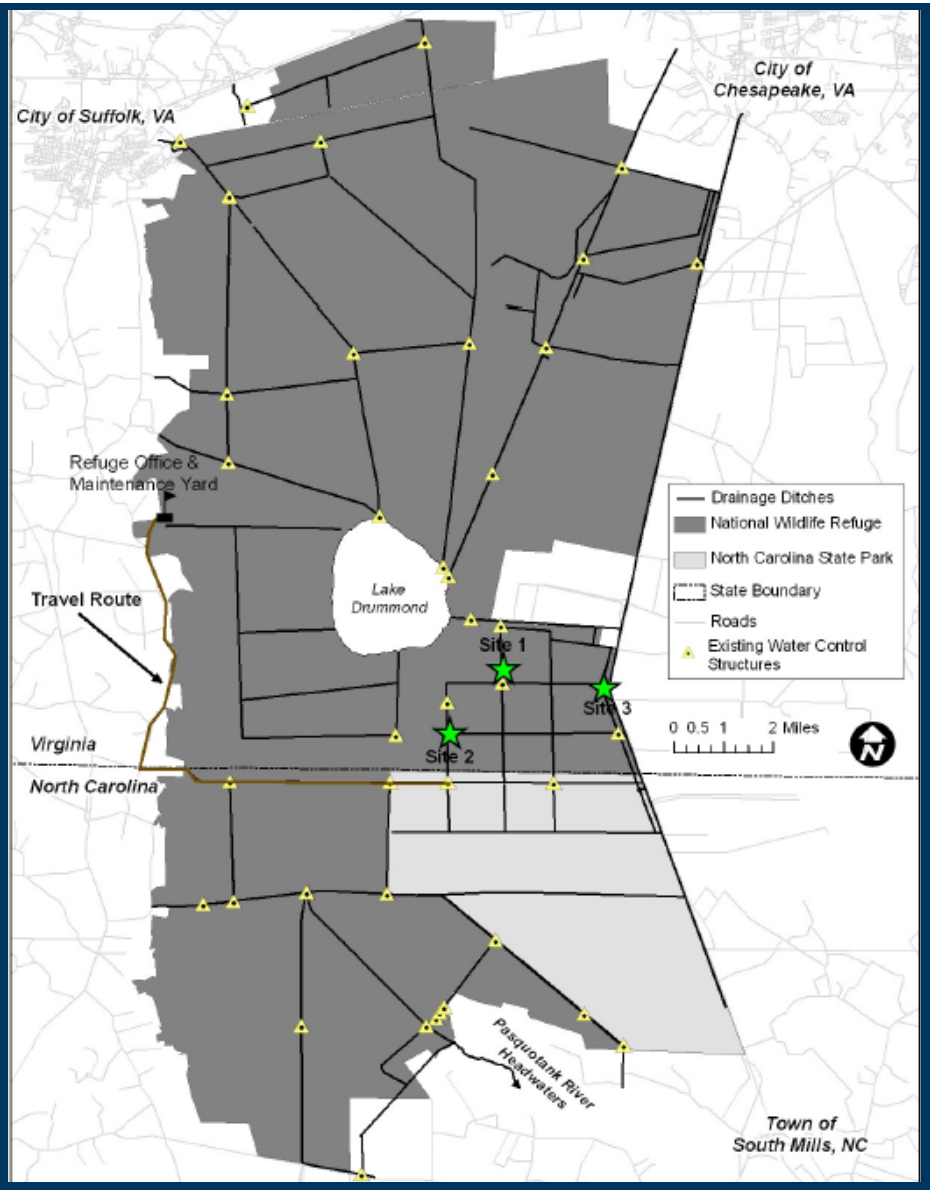
Salinity Assessment



Salinity remains low inland for all ditch plugs except North Pamlico, because this area is influenced by brackish marsh and a tidal creek directly to the north.

Great Dismal Swamp NWR Water Control Structures

- Myrtle Ditch (2)
- Sycamore and Western Boundary Ditches
- Persimmon and South Martha Washington Ditch



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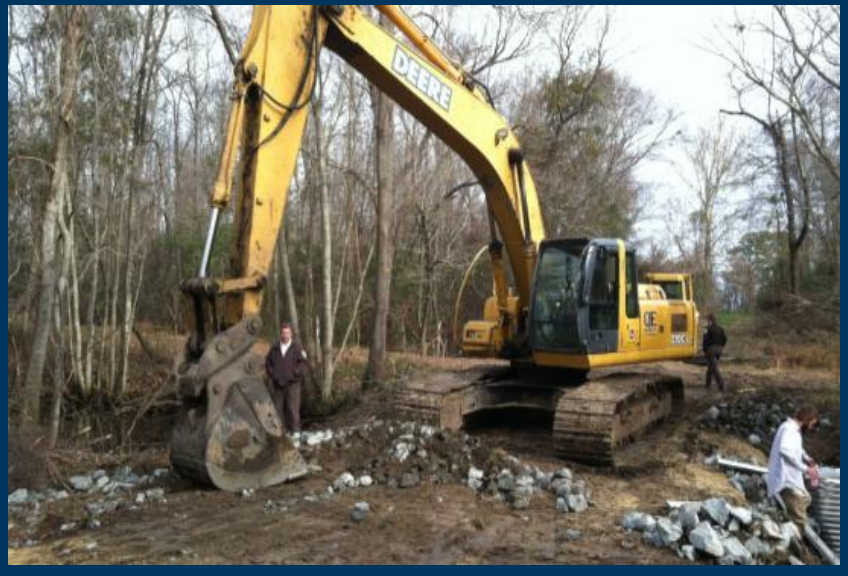
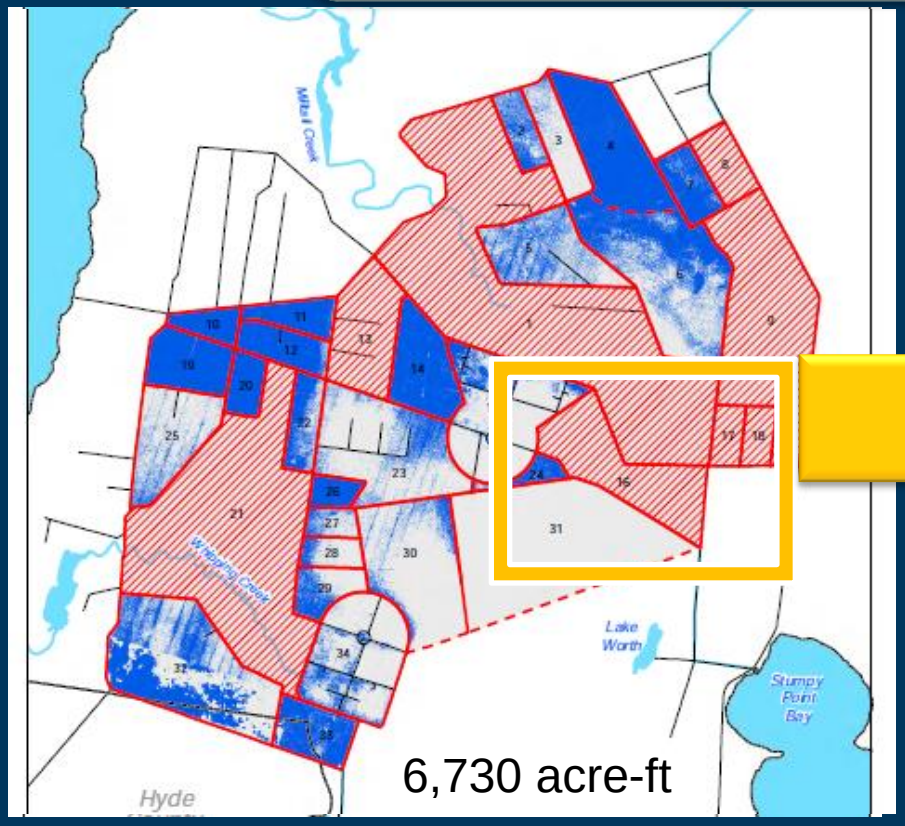
Great Dismal Swamp NWR

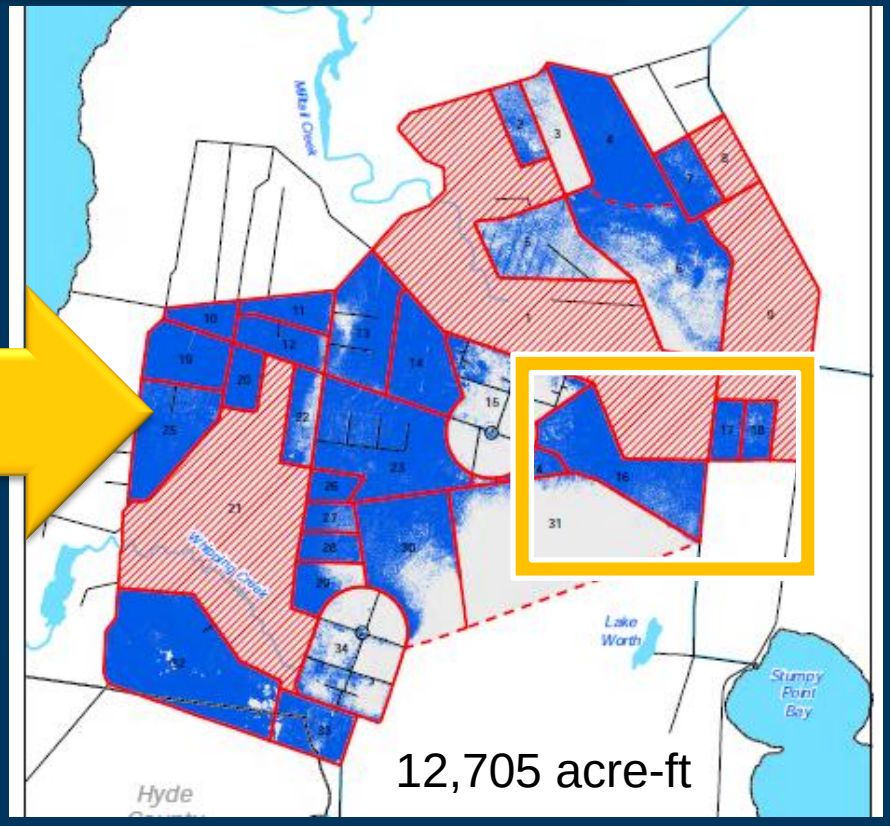


Four structures were installed in November 2012 and contribute to water control at GDSNWR and DSSP.

Water Management Plan

TNC initiated a Cooperative Agreement between the U.S. Fish and Wildlife Service and the U.S. Air Force to conduct the water management plan. We are getting input from N.C. Forest Service to prioritize actions.





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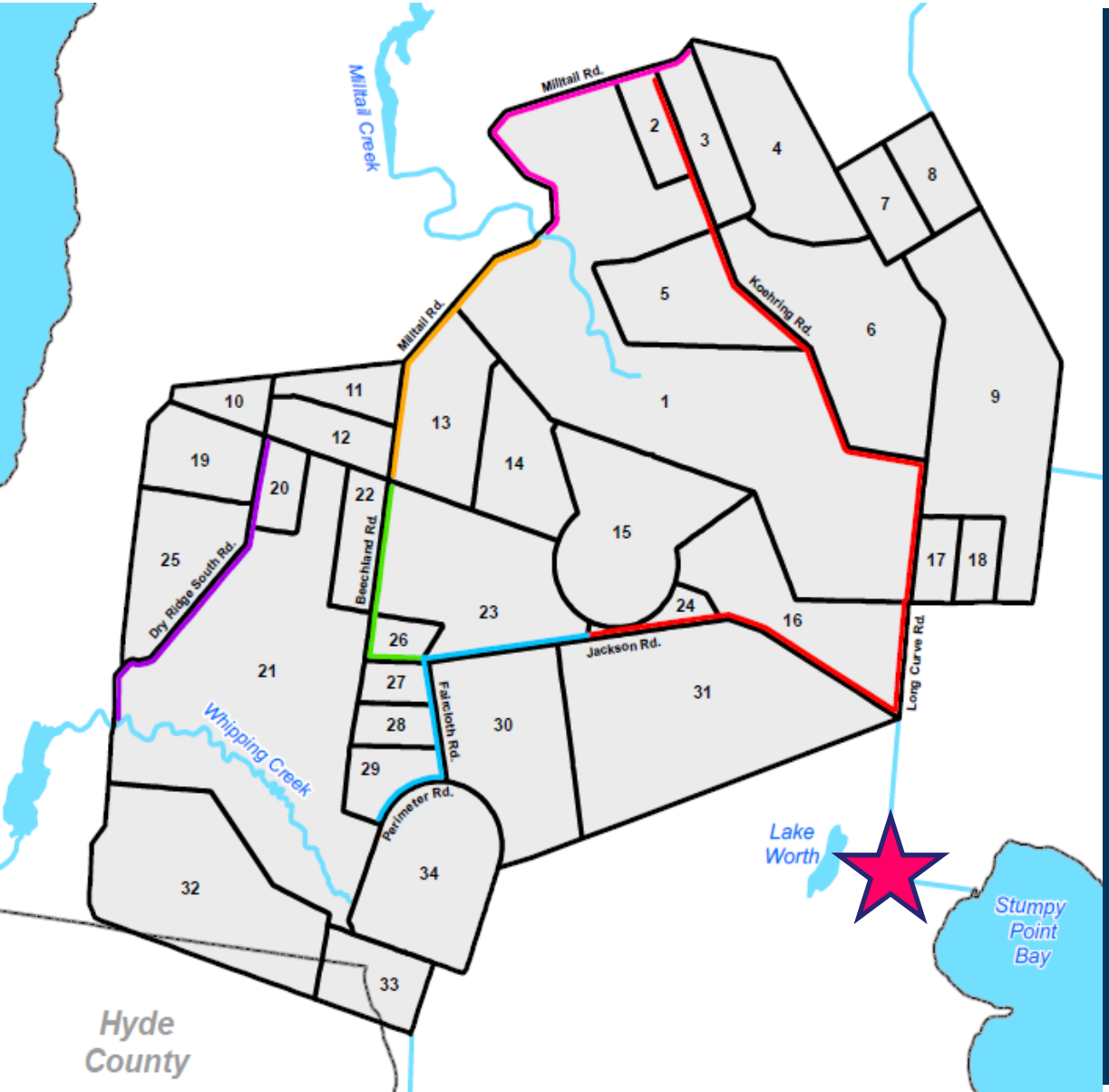
Important Water Reaches



- 6 Major Reaches that allow water to flow through the area
- Water movement is wind-tide dependent
- Salt water intrusion is a major issue
- #1 Priority structure would add control to the longest reach in the most fire-prone area

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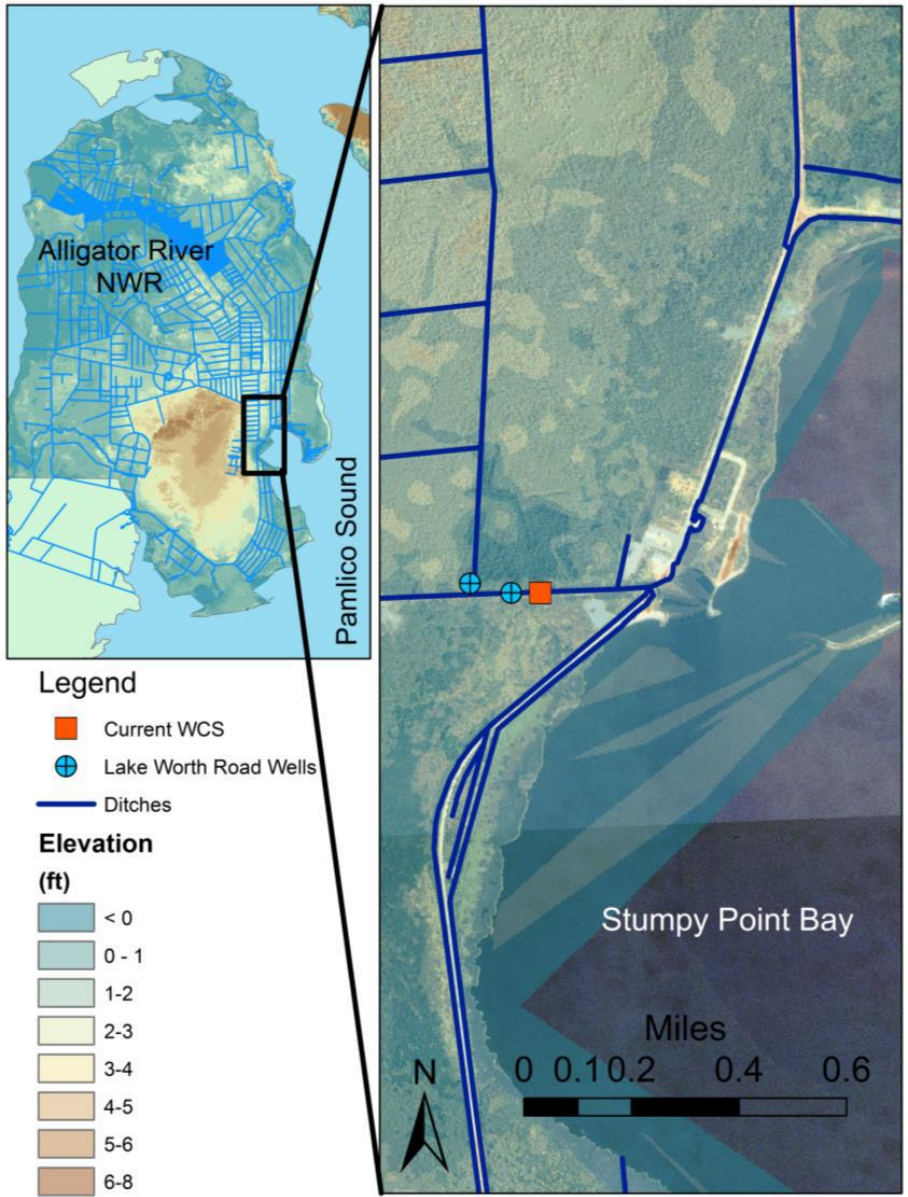
Lake Worth Road Water Control Structure



- Major source of salt water intrusion
  - Water data evidence
  - Plant community evidence
- Located just east of the #1 priority water control structure for fire management

Acknowledgements

Funding

- **Albemarle-Pamlico National Estuary Program**
- **FWS Cooperative Agreement**
- **DOD – USAF**
- Duke Energy
- TNC-NOAA Community-based Restoration Program
- SARP-NOAA Community-based Restoration Program
- FAF-NOAA Community-based Restoration Program
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- Grady-White Boats
- Private donations

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- Christine Pickens, Aaron McCall, Kate Murray, Brian Boutin, Brian van Eerden

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