

Global Climate Change and Wetland Loss at Blackwater NWR

**Society for Wetland Scientists
May 28, 2008**



Global Warming Increases Sea Level Rise and Wetland Loss

James Island, June 2007



Sea Level Rise will impact mid-Atlantic states harder than anywhere in U.S. (Uni of MD)

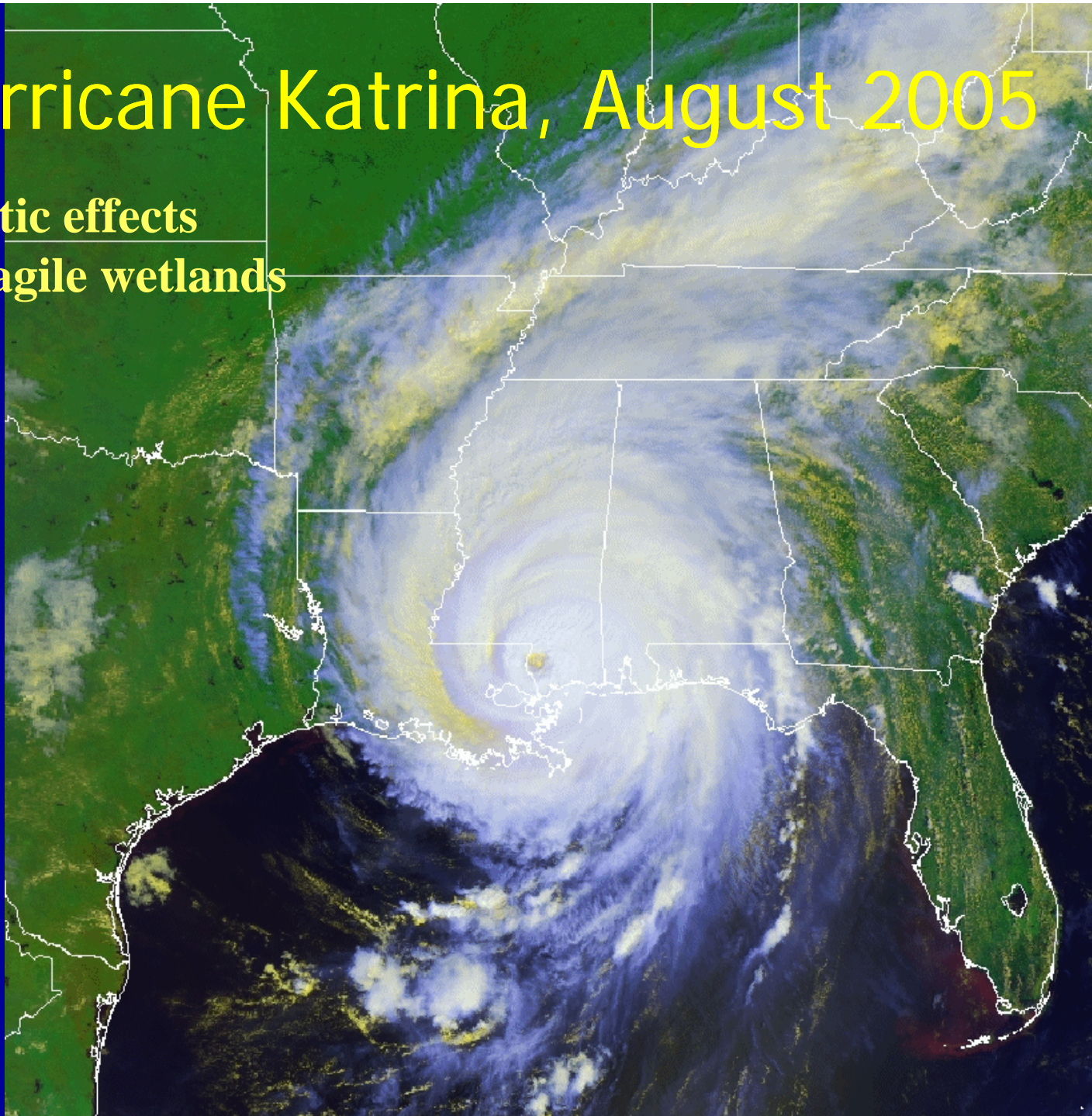


Mid-Atlantic sea levels will rise by 20 inches by 2100



Hurricane Katrina, August 2005

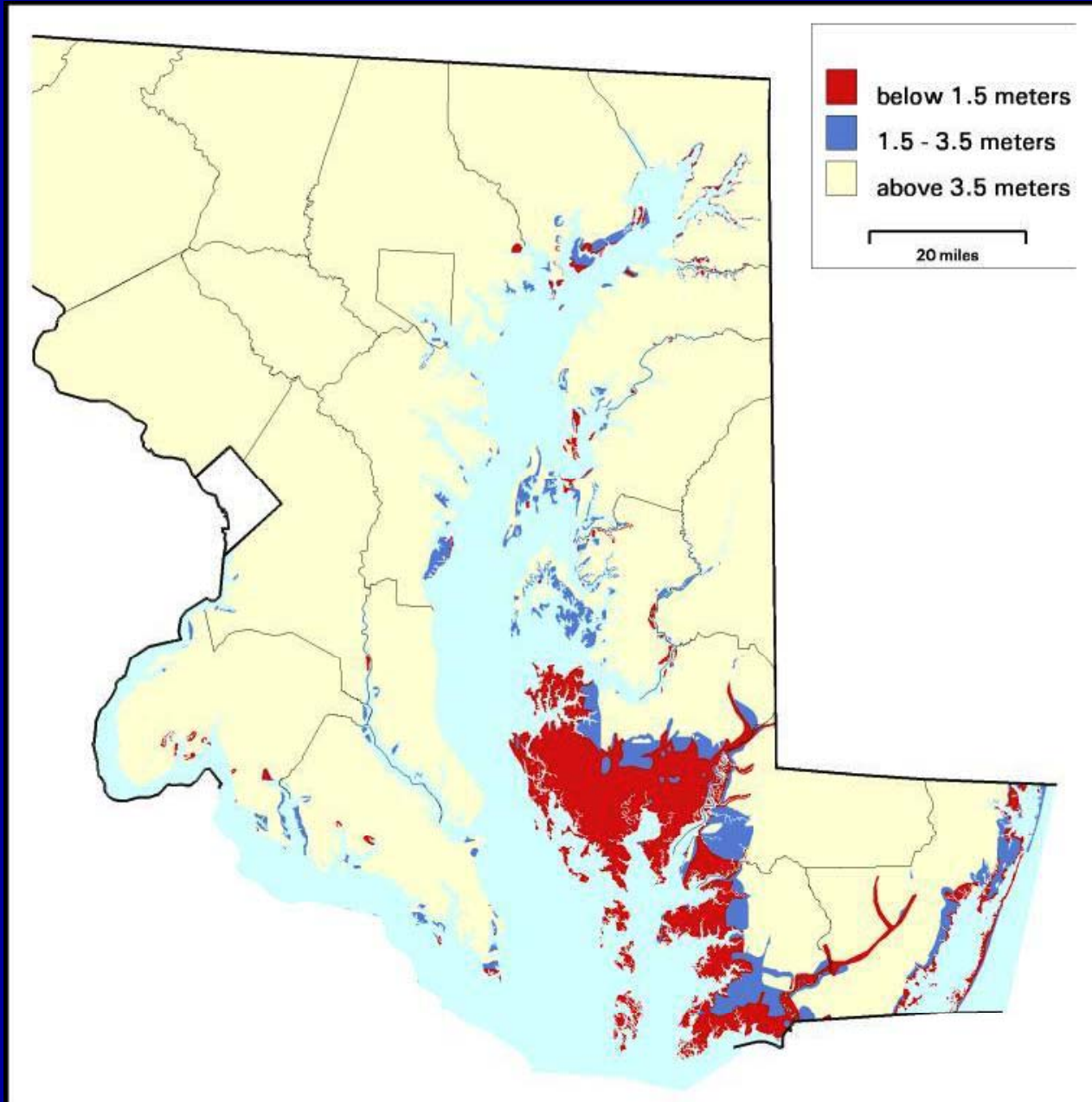
**Drastic effects
to fragile wetlands**



Hurricane Isabelle, Sept. 2003

Severe flooding
Dorchester County

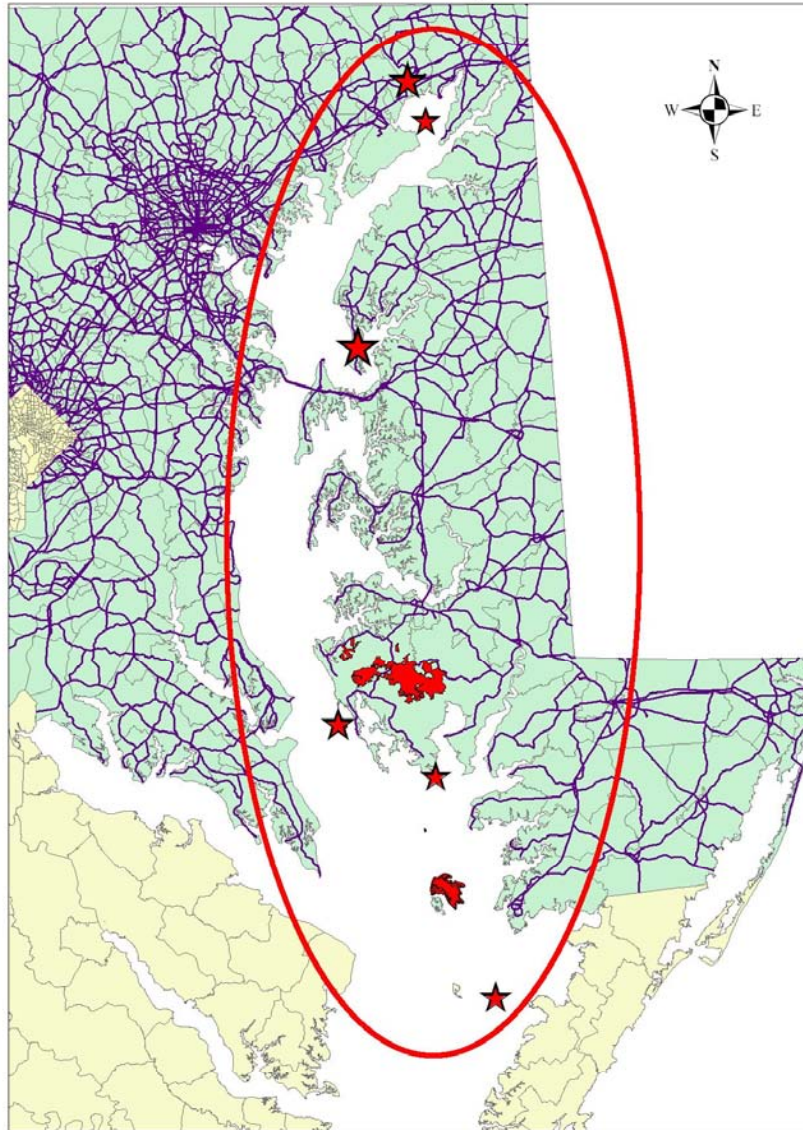




Inundation Model: Towson State Uni. 2006

**Dorchester County
is at the greatest
risk from rising
sea levels**

Chesapeake Marshlands National Wildlife Refuge Complex
Radio Plan Coverage Area

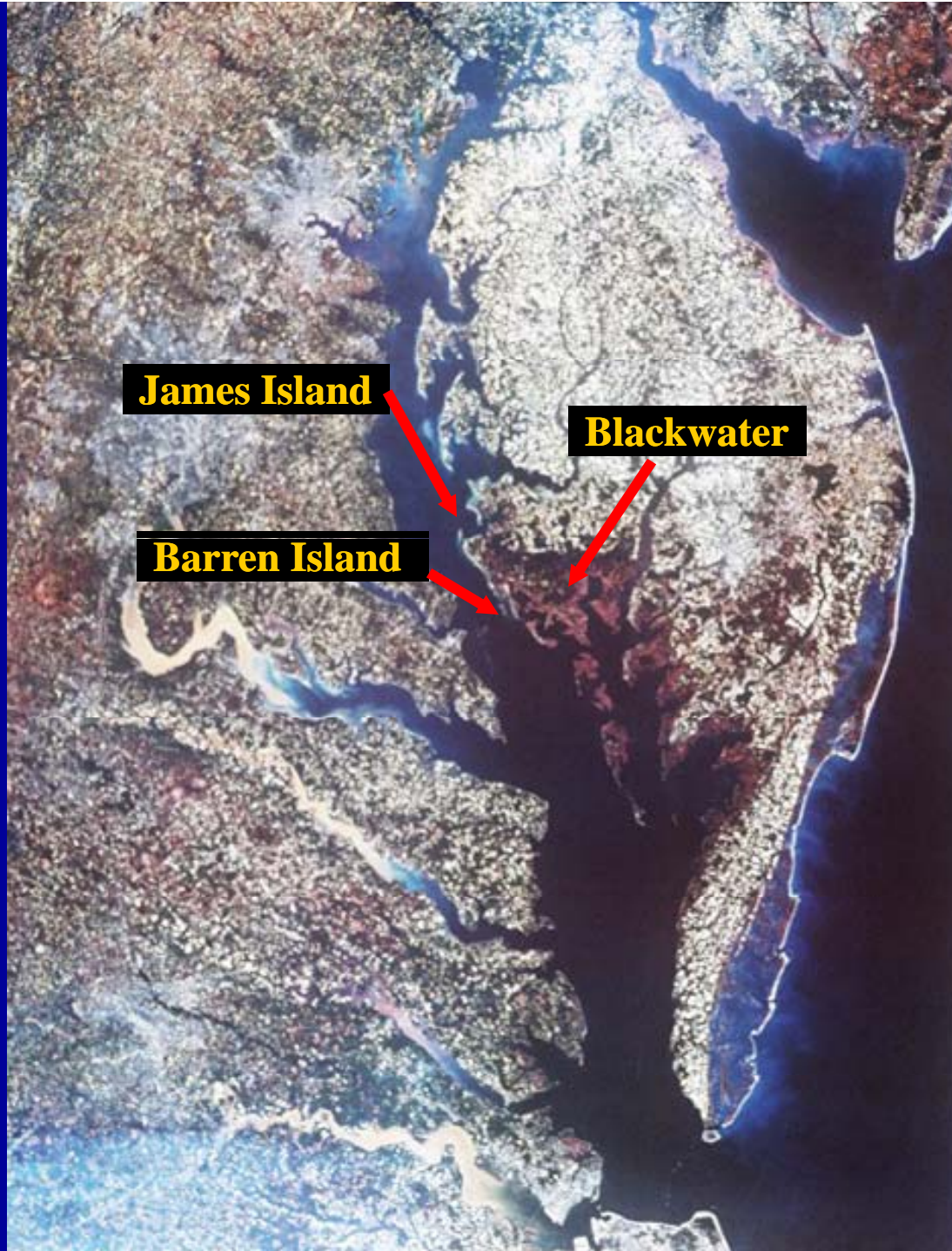


Blackwater NWR is part
of the **Chesapeake
Marshlands
National Wildlife Refuge
Complex:**

Blackwater NWR
Eastern Neck NWR
Martin NWR
Susquehanna NWR
Watts Island
Bishops Head Point
Spring Island
Barren Island

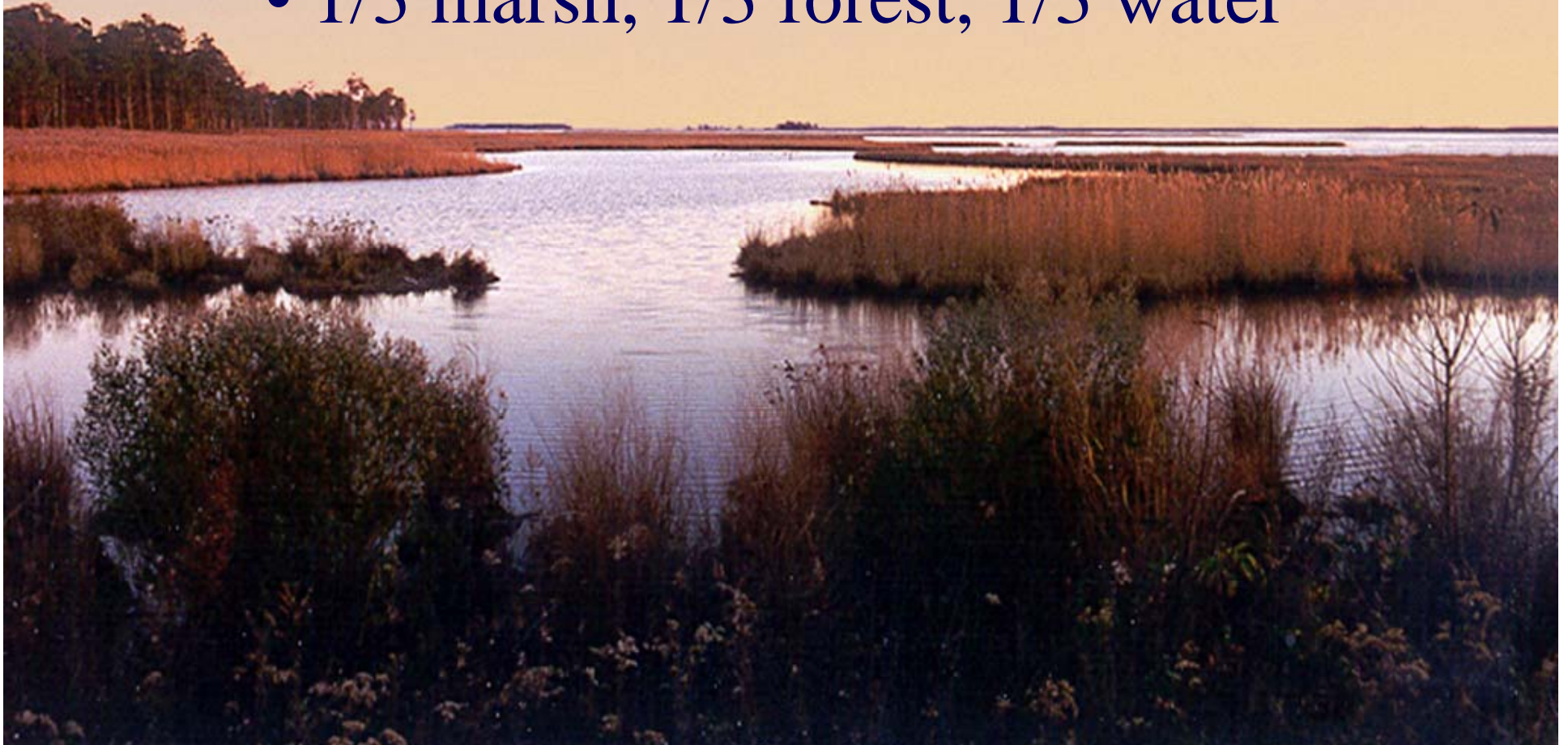
Chesapeake Bay

Remaining
marsh
shown
in red



Blackwater National Wildlife Refuge

- Established 1933
- 28,000 acre complex
- 1/3 marsh, 1/3 forest, 1/3 water





Significance of Blackwater Wetlands

**Wetlands of International Importance
(Chesapeake Bay RAMSAR site)**

**1 of 6 priority wetland areas by North
American Waterfowl Management Plan**

**The Nature Conservancy: one of the “LAST
GREAT PLACES”**

Poster Child for Global Warming

- Over 50 researchers: Uni of MD, USGS, NOAA, & partners
- Carbon Sequestration Potential
- Ability to leverage partnerships and science through grants



Internationally Important Bird Area: American Bird Conservancy

85 nesting songbird species

34 waterfowl species

52 shorebird species

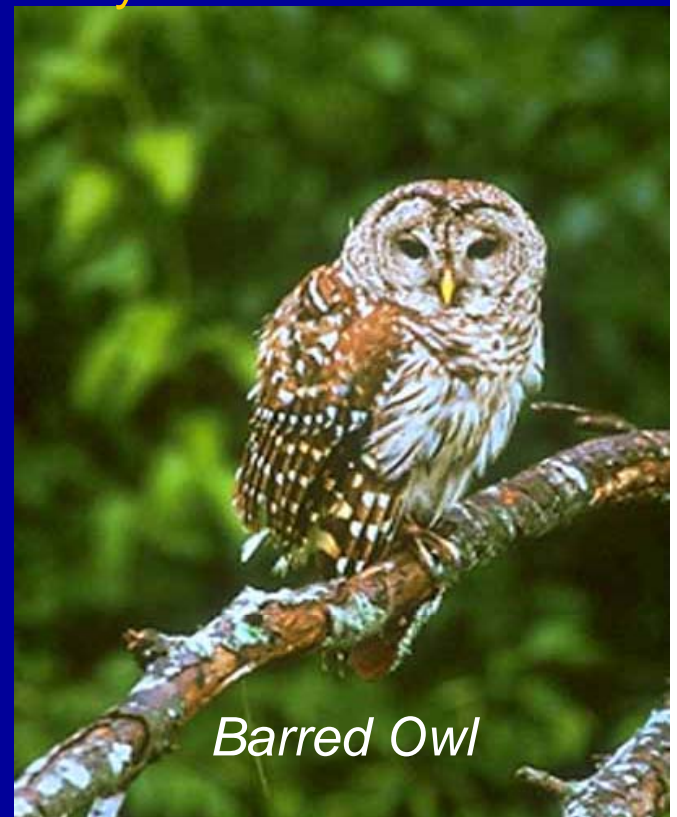
30 marsh and wading birds

24 raptor species

Over 350 bird species annually



Prothonotary Warbler



Barred Owl

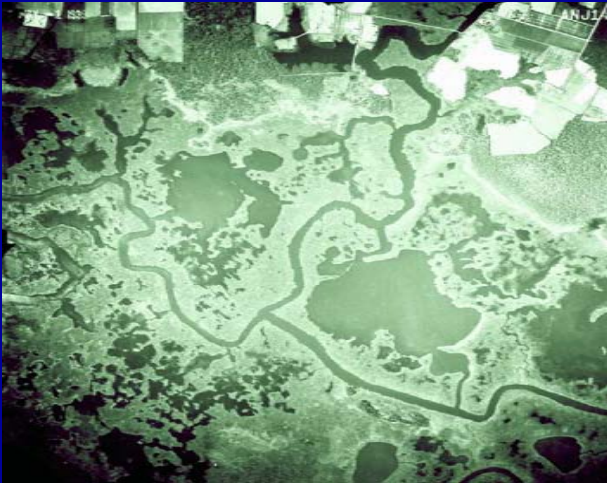
Biodiversity



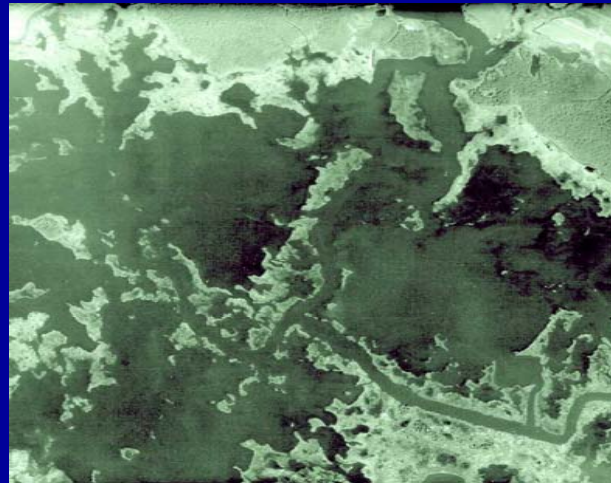
Endangered Delmarva Fox Squirrel



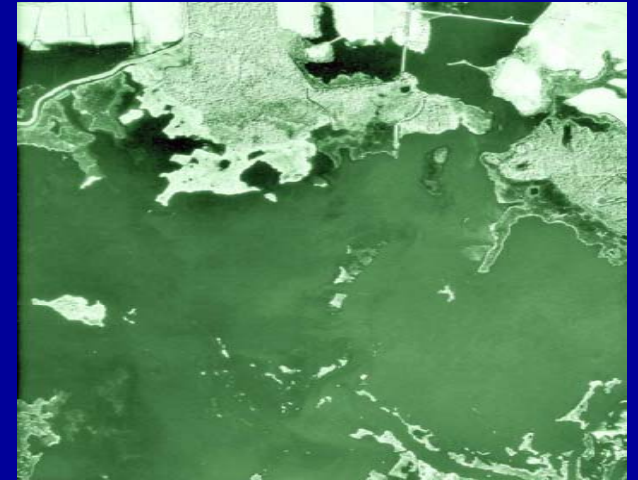
Blackwater's Disappearing Wetlands



1938



1974



1989

2008: "Lake Blackwater"

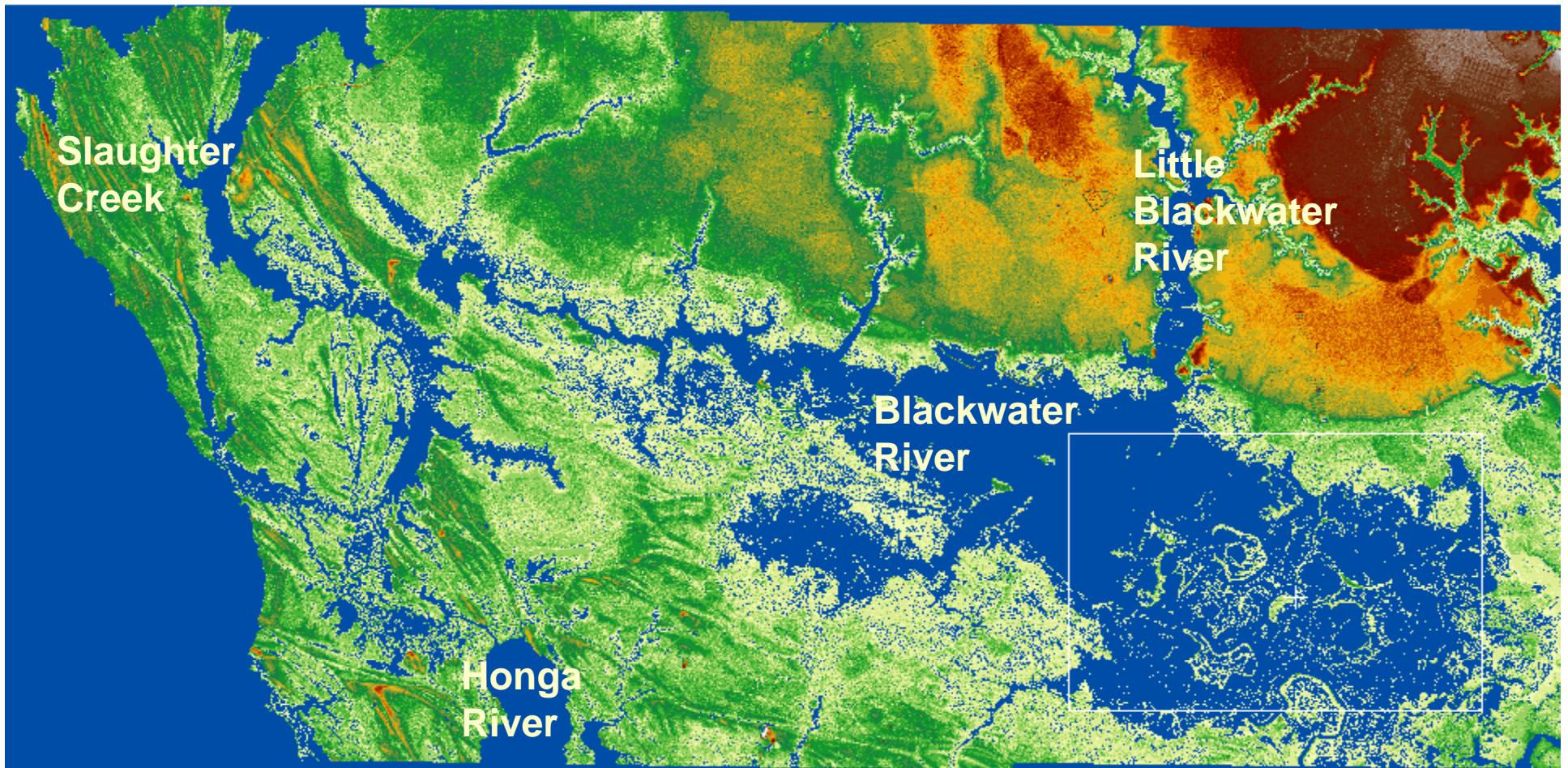


Over 8,000 acres lost

A scenic view of Blackwater Lake, framed by pine trees in the foreground. The water is calm and reflects the sky. In the distance, a small island or peninsula is visible. The text "Blackwater Lake: Historic River Channels Under water" is overlaid in purple.

**Blackwater Lake:
Historic River Channels
Under water**

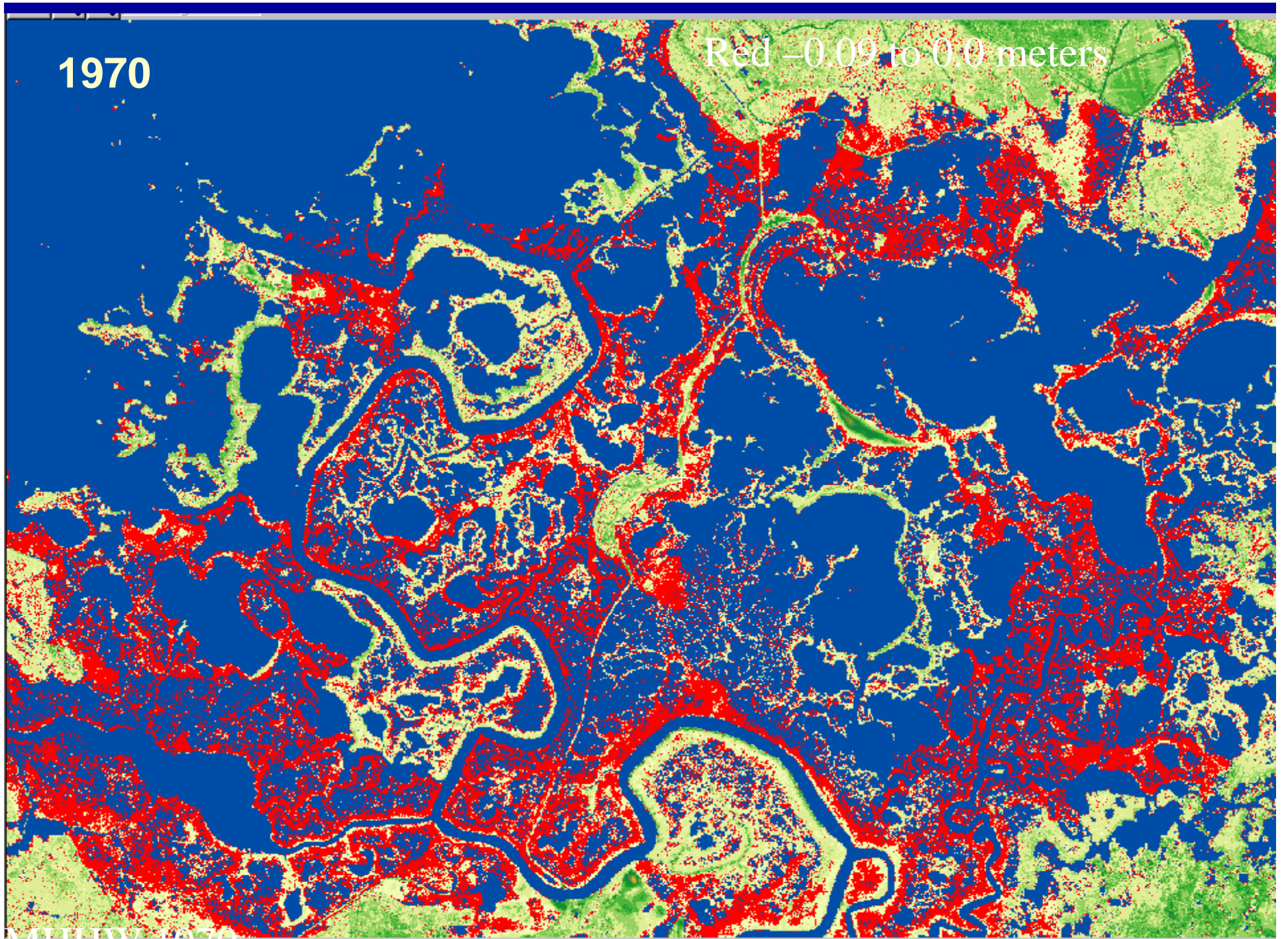
Curt Larsen (USGS) Model of Sea Level Rise over next 50 years



Blackwater National Wildlife Refuge LIDAR NAVD88 @ 0.0ft

1970

Red -0.09 to 0.0 meters

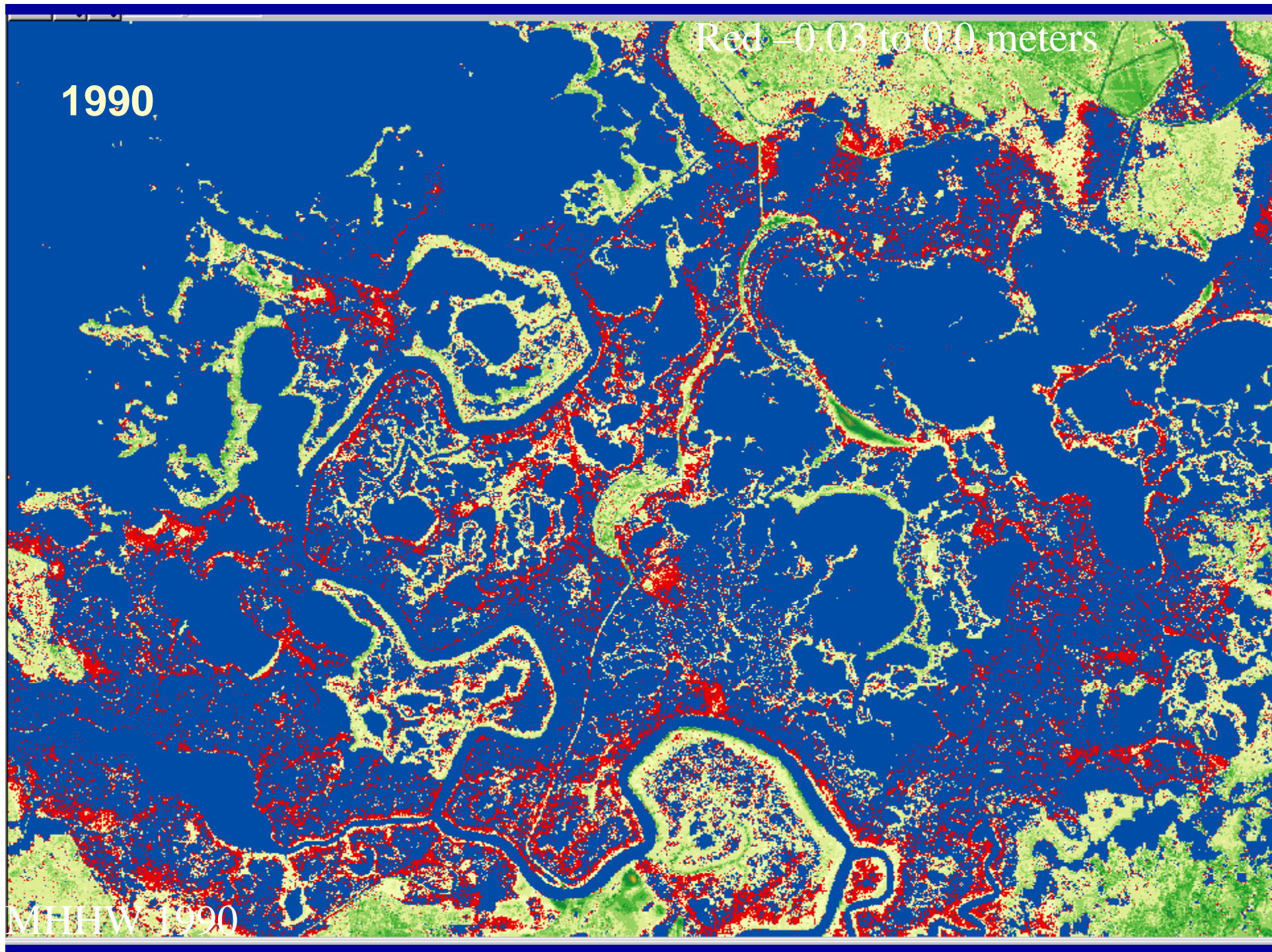


MUW 1970

Red -0.03 to 0.0 meters

1990

MHHW 1990

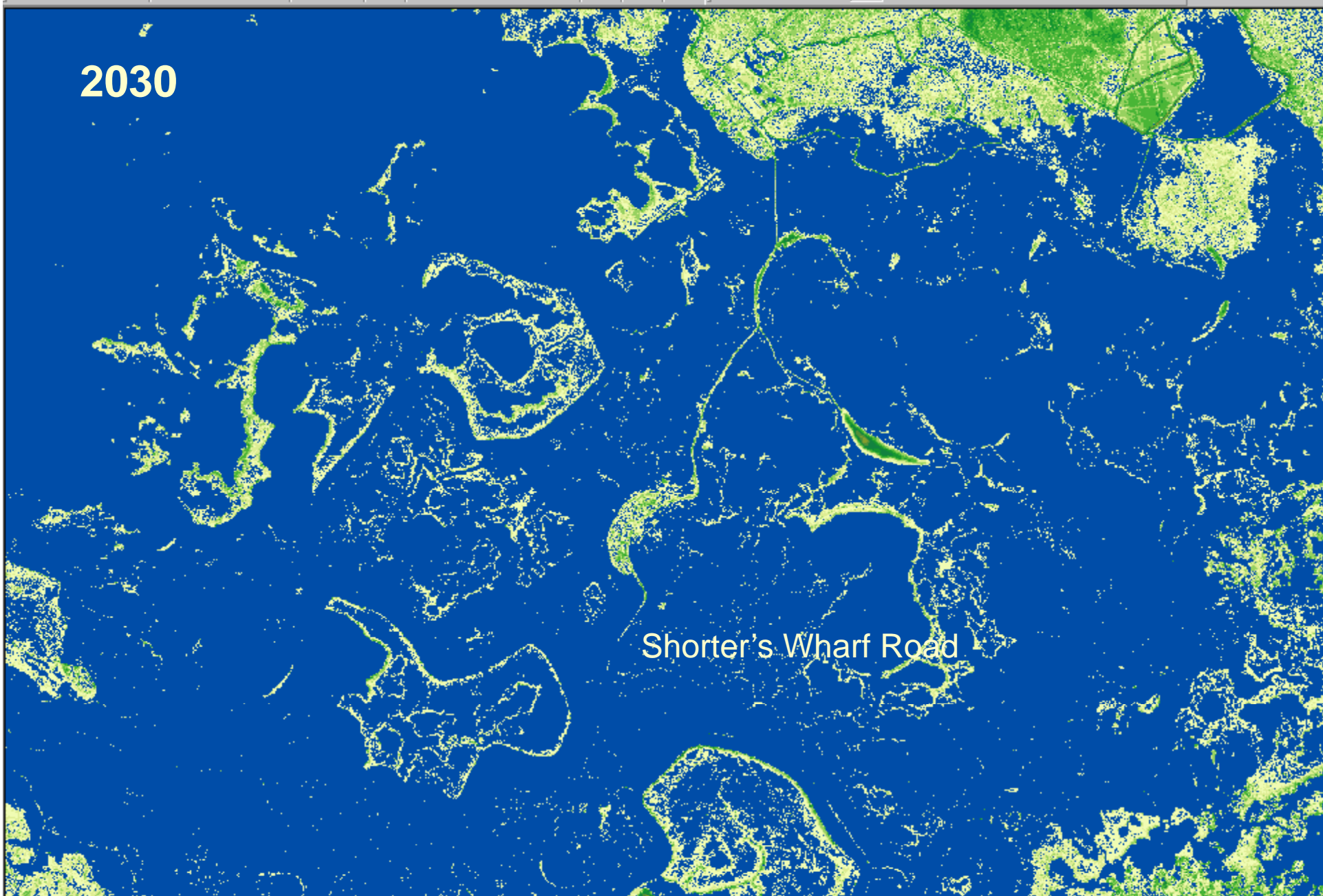


2030

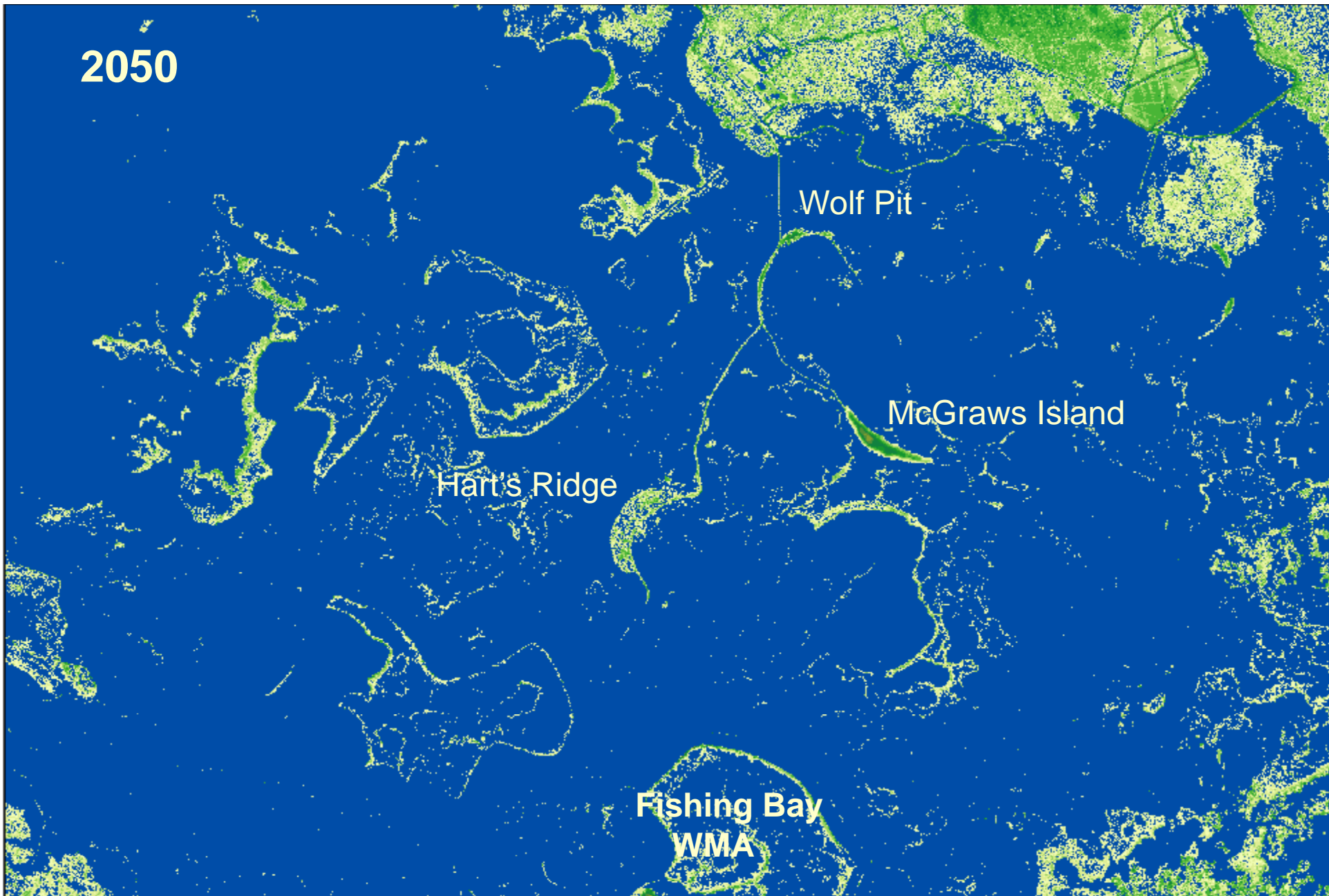
Shorter's Wharf Road

MHHW + 30 years

Blue is 0.09 meters



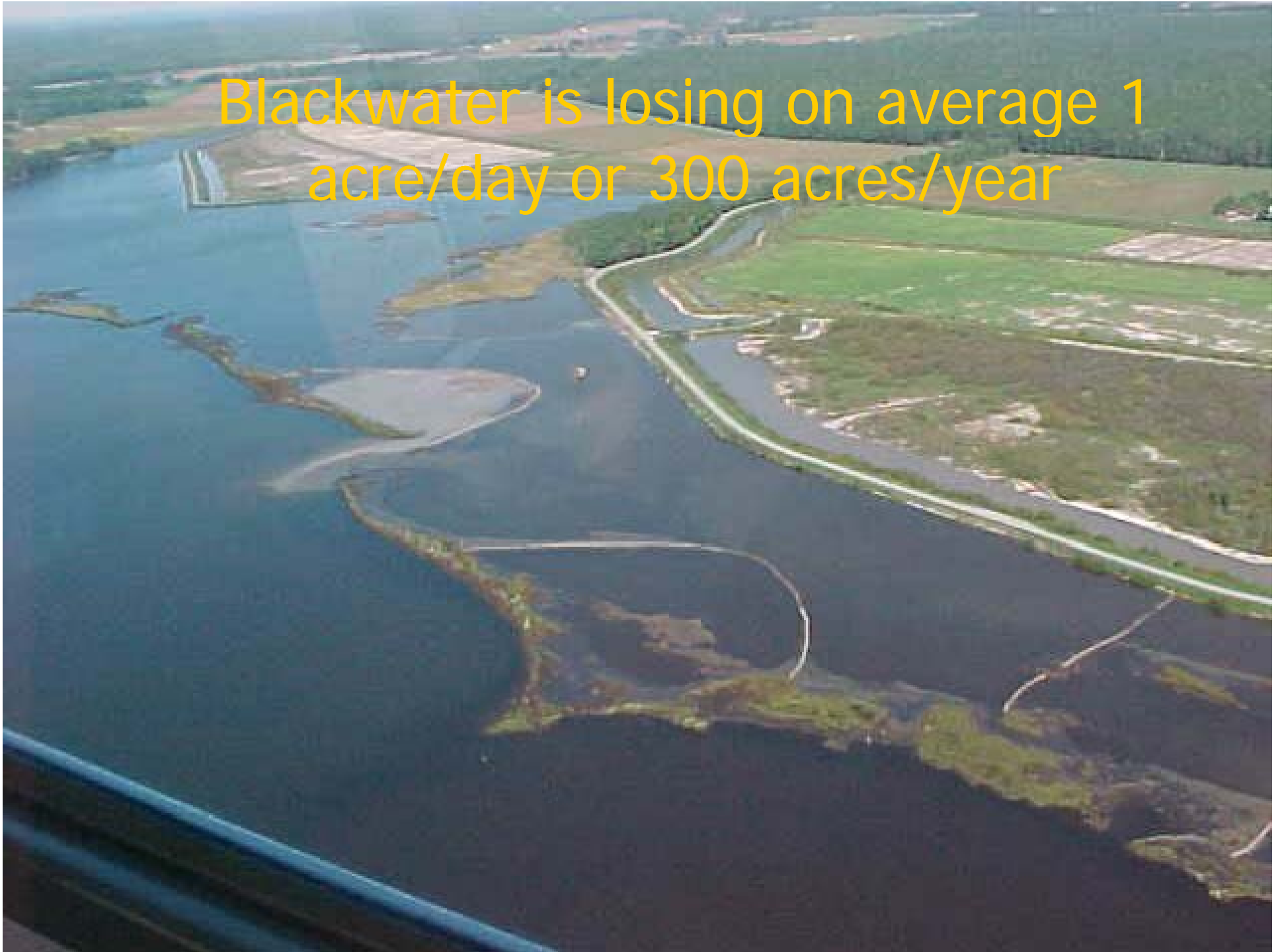
2050



MHHW + 50 years

Blue is 0.15 meters

Blackwater is losing on average 1
acre/day or 300 acres/year



MARSH LOSS AT BLACKWATER



Efforts to Restore Blackwater Wetlands



- Reduce salt water intrusion
- Extirpate nutria
- Reduce resident Canada geese
- 1980s Wetland Restoration of 12 acres
- 2003 Wetland Restoration of 8 acres

Installation of Weir: Stewart's Canal





**Control
Resident
Canada Geese**

**Eliminate
Nutria**



Three-square transplanted in 1982 restoration project



1982 Restoration Site in 2005



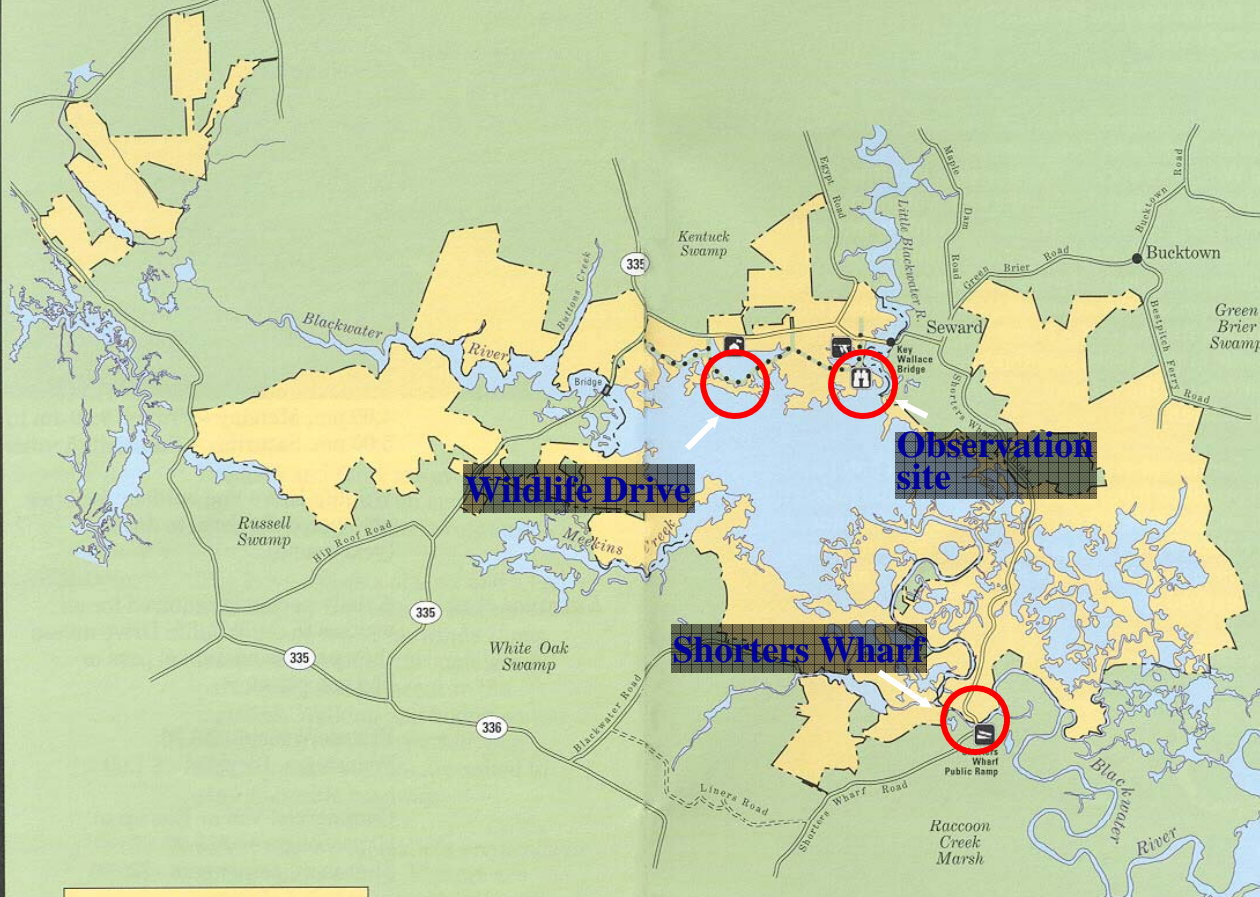
FEB 13 2005

2003 Wetland Restoration

- Restore 8 acres of tidal wetlands at 3 sites
- Plant 70,000 marsh grass units
- Monitor plant success
- Sediment containability

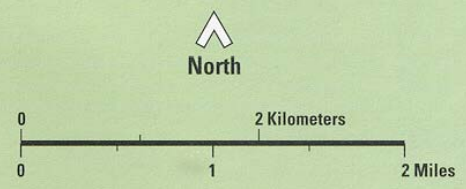
**3 sites restored
in 2003**

Blackwater *National Wildlife Refuge*



Legend

- Refuge Boundary
- Refuge Headquarters
- Visitor Center
- Wildlife Drive
- Public Boat Ramp
- Observation Site



Initial Containment

Installation of Straw Bales and Wooden Stakes



Water Depths were often too deep for thin layering and required 1 to 1.5 feet of fill



Floating Excavator moved pipeline

**2003: 8 acres restored using
on-site material**



May 2003



June 2003



August 2003



August 2004



August 2006



MD Port Administration: Channel Dredging to maintain access to Port of Baltimore

- Maintenance dredging of 3.5 to 4 million cubic yards per year



Chesapeake Channel Sediments Used To Restore Wetlands: Poplar Island



[www.nab.usace.army.mil/projects/Maryland/Poplar Island](http://www.nab.usace.army.mil/projects/Maryland/Poplar%20Island)



U.S. Army Corps Env. Impact Statement

3 Options:

1. Expansion of
Poplar Island
(Funded in WRDA 2007)

2. Barren & James Islands:
anticipated 2017

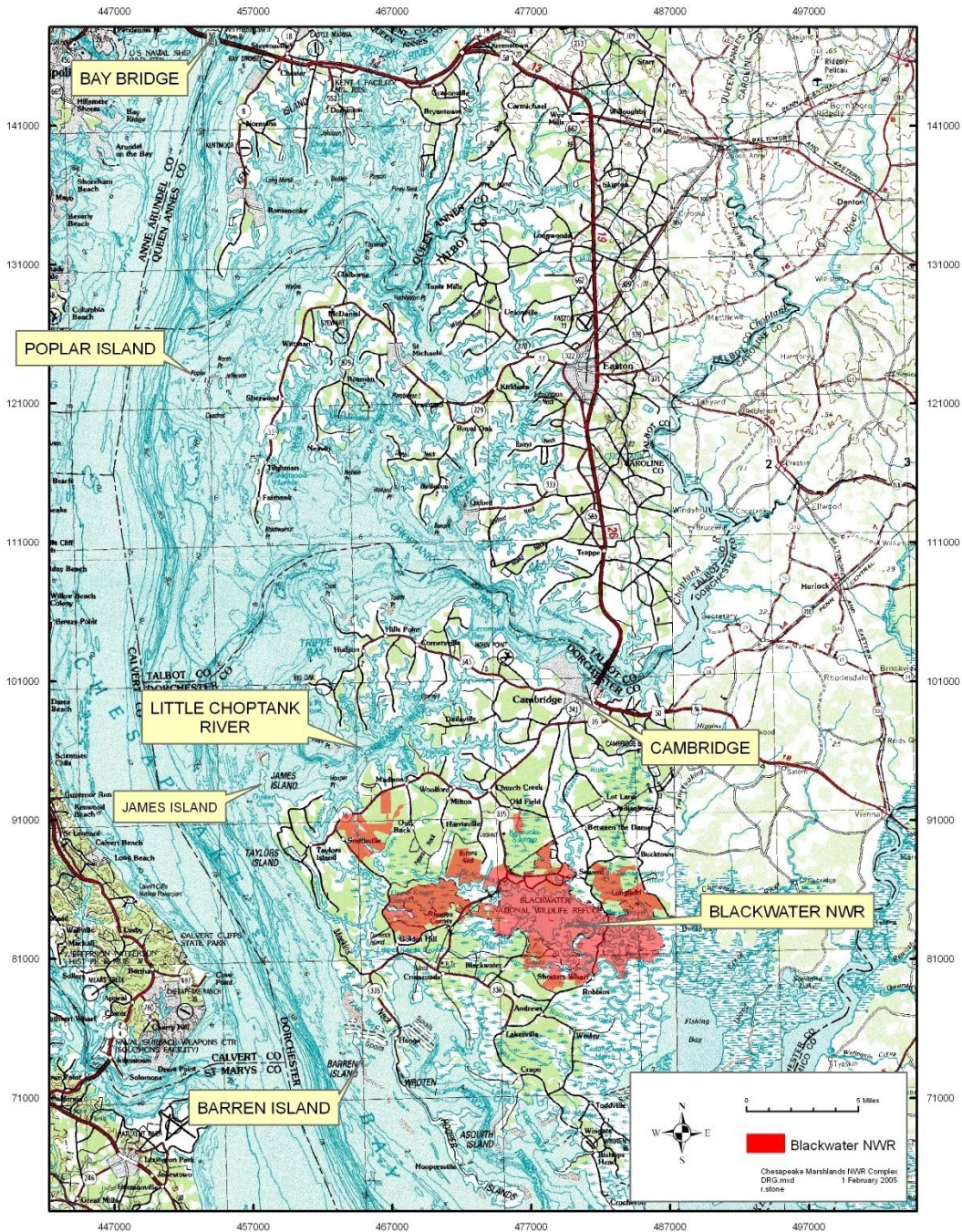
3. Blackwater/Dorchester
County: anticipated 2038



**\$197,999 Appropriation for Army Corps
to Study Blackwater in FY 2008**



MAY 15 2006



**Roughly 60 miles
from the
Bay Bridge
by land**

**Blackwater is
31 miles from
Poplar Island and 5
Miles from James
Island by water**

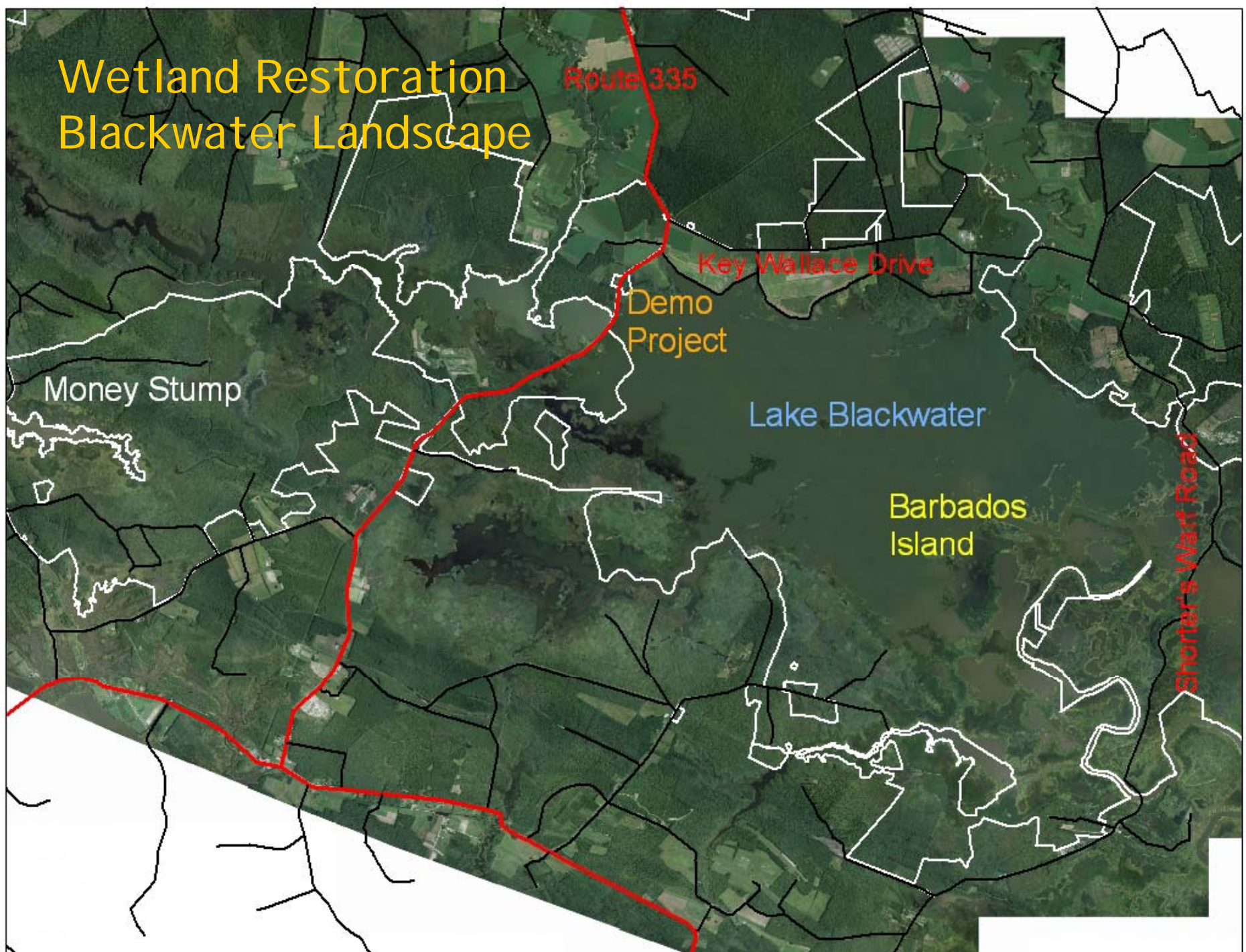
**Dorchester Restoration:
placement areas
for dredged material
for 50 to 100 years**



Critical Need to Restore Wetlands

1. Watershed: 20,000 acres
2. Barbados Island: 100 acres
3. Demonstration: 10 acres
4. MoneyStump: 750 acres

Wetland Restoration Blackwater Landscape



Route 335

Key Wallace Drive

Demo
Project

Money Stump

Lake Blackwater

Barbados
Island

Shorter's Warf Road

CHESAPEAKE MARSHLANDS INTERIM PROJECTS

Demo

10 Acre Dredged Material
Wetland Development Project

Emergency Marsh Erosion
Protection Project

Barbados

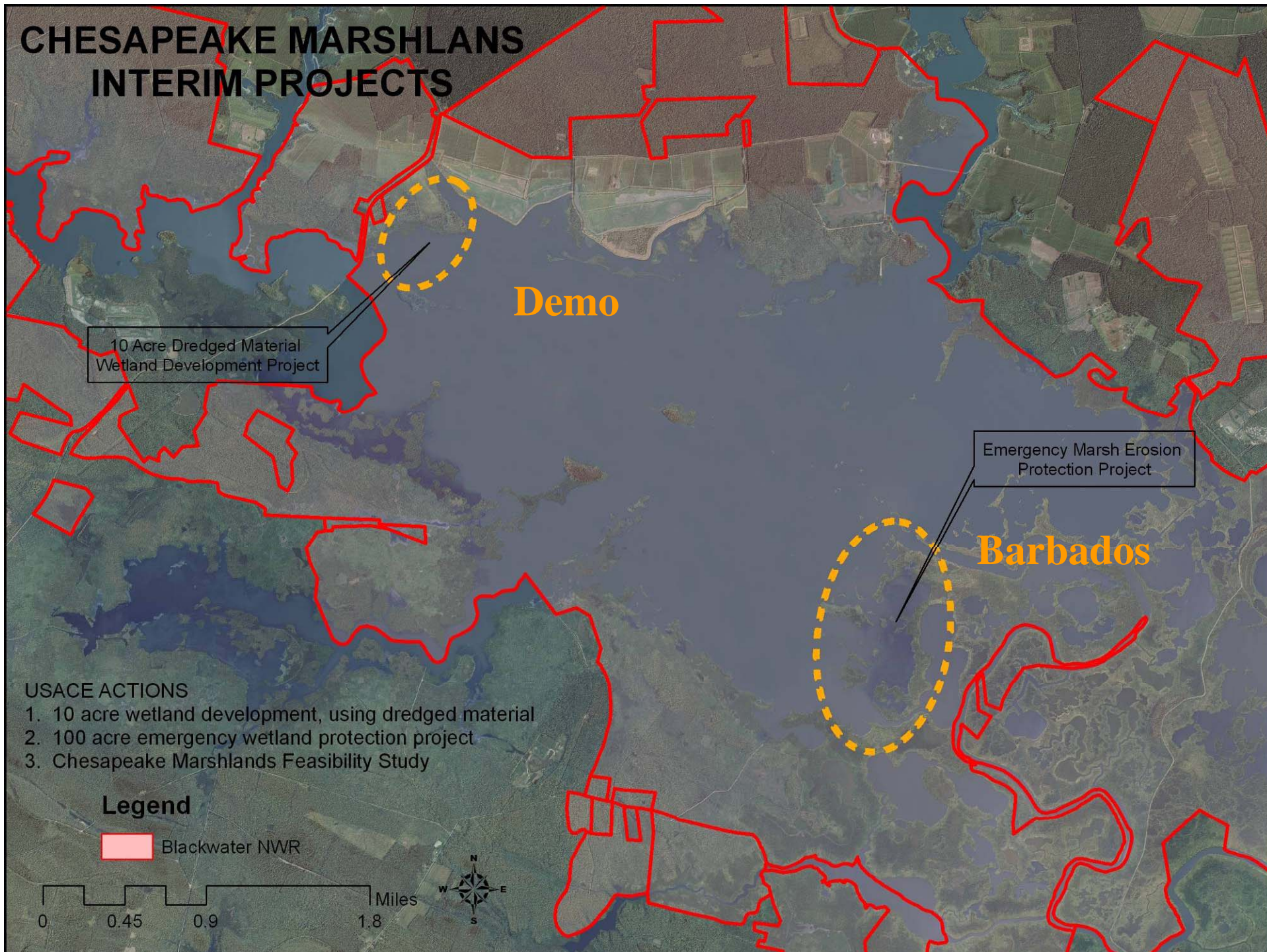
USACE ACTIONS

1. 10 acre wetland development, using dredged material
2. 100 acre emergency wetland protection project
3. Chesapeake Marshlands Feasibility Study

Legend

 Blackwater NWR

0 0.45 0.9 1.8 Miles



Barbados Island
Blackwater National Wildlife Refuge
Marsh Protection Project

Dike A:
1800 ft. High Marsh Berm

Potential Dike
Borrow Areas

Barbados
Island

BLACKWATER RIVER

Potential Source of
Organic Material

Potential Mineral Clay
Borrow Area

Marsh Cell 1
30 Acres

Marsh Cell 2
18 Acres

Marsh Cell 3
10 Acres

Marsh Cell 4
32 Acres

Marsh Cell 5
18 Acres

BARBADOS POND

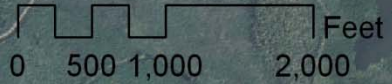
**Barbados Island
Restore 100 acres
On-site material**

Dike B:
1200 ft. High Marsh Berm

Equipment Access
Route/Staging Area

Dike C:
700 ft. High Marsh Berm

- Project Features**
- Features**
 -  High Marsh Berm
 -  Marsh Cell
 -  Potential Borrow Area



Demonstration Site

**Mimic Watershed
Restoration**



Purpose of Demo

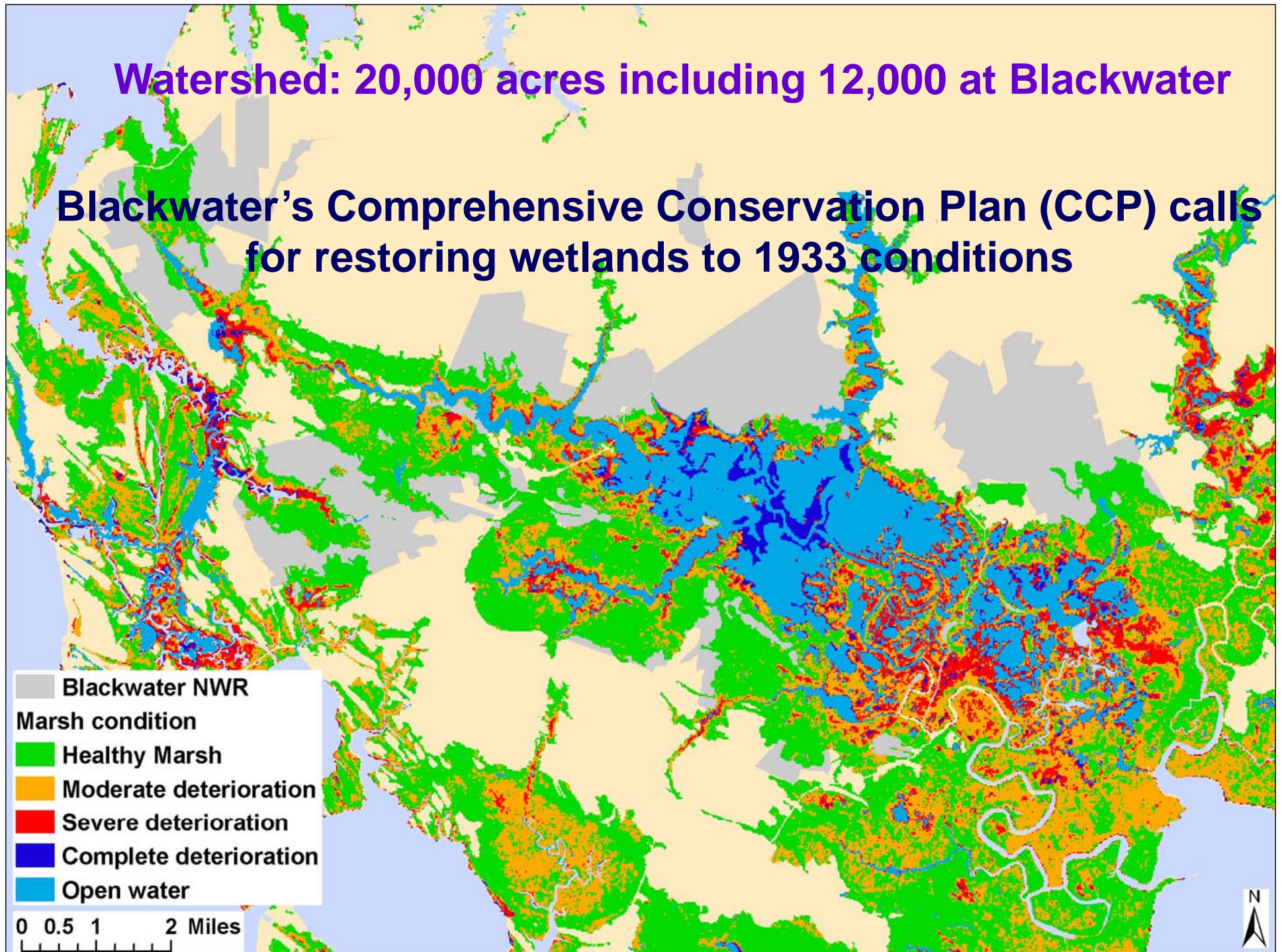
- Mimic the large-scale project:
Wave and Wind Energy
Water Depths
Bottom Foundation
Similar Habitats
Public Education



Transportation Routes for Demonstration Project

Watershed: 20,000 acres including 12,000 at Blackwater

Blackwater's Comprehensive Conservation Plan (CCP) calls for restoring wetlands to 1933 conditions



Moneystump: Smithville Road



Saltwater Intrusion: Pine Trees killed





**Plug this Old
Agricultural
Ditch**

Looking towards Smithville Road



POTENTIAL COSTS

1. **Demonstration: \$0.5 to \$3.2 million**
2. **Barbados Island Marsh Erosion Project**
 - Estimate: \$3,600,000 for 100 acres
3. **Chesapeake Marshlands Feasibility Study**
 - Estimate: \$10.5 Million for 4 year study
4. **Money Stump: unknown**



Timing is Critical for Blackwater



Wetland Loss is the Biggest Threat

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