

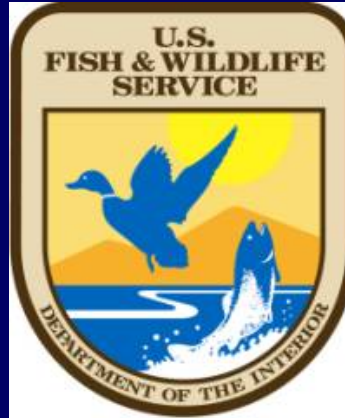
Beneficial Use of Clean Dredged  
Material to Restore Wetlands at  
Blackwater National Wildlife Refuge

Dixie Birch and Rebekah Packett

# Strategic Partnerships



**US Army Corps  
of Engineers**  
Baltimore District



**NATIONAL AQUARIUM  
IN BALTIMORE.**

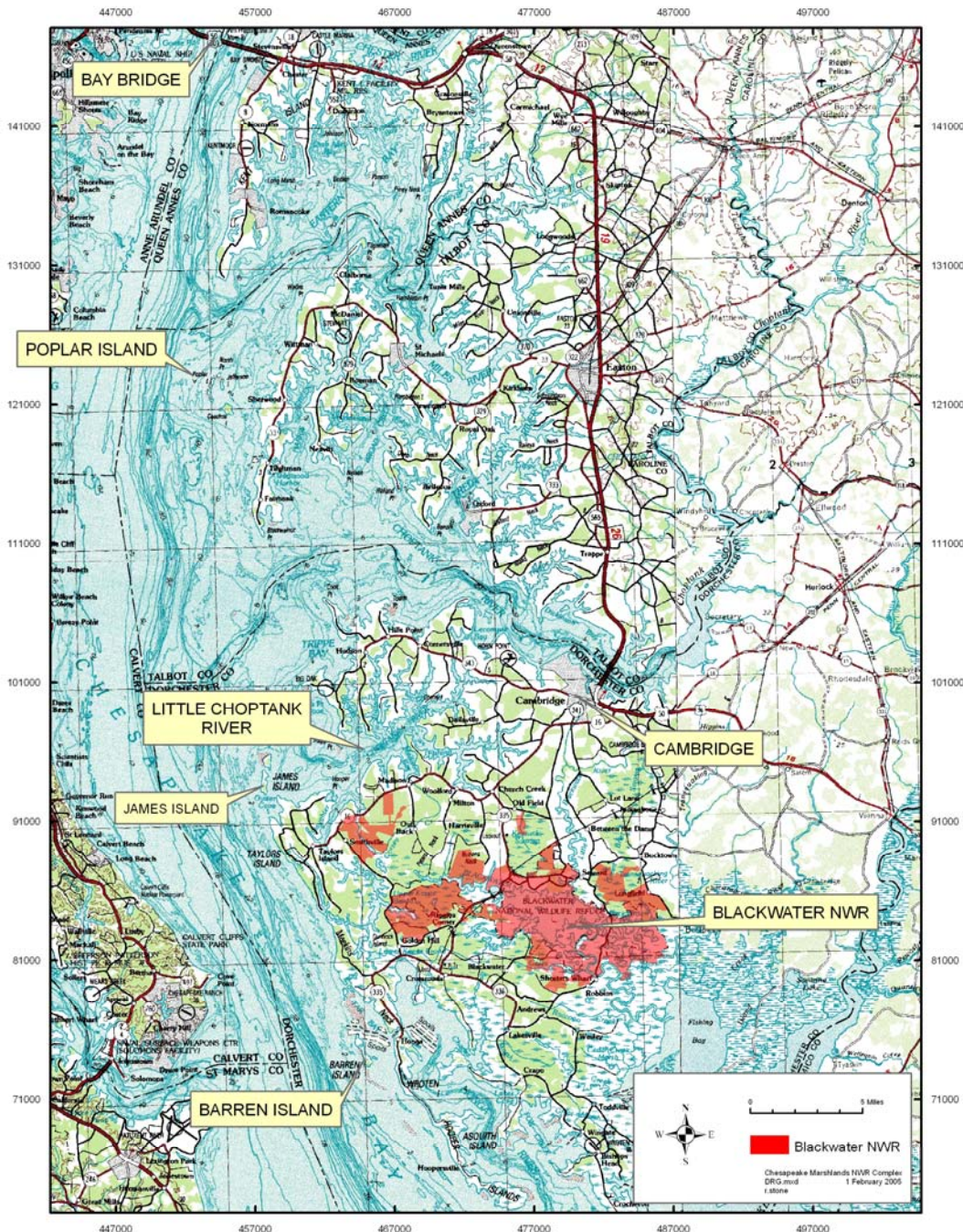


Remaining  
marsh  
shown  
in red



**Blackwater**





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

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

**Blackwater NWR**  
Chesapeake Marshlands NWR Complex  
DRG.mxd  
1 February 2005  
f:stone



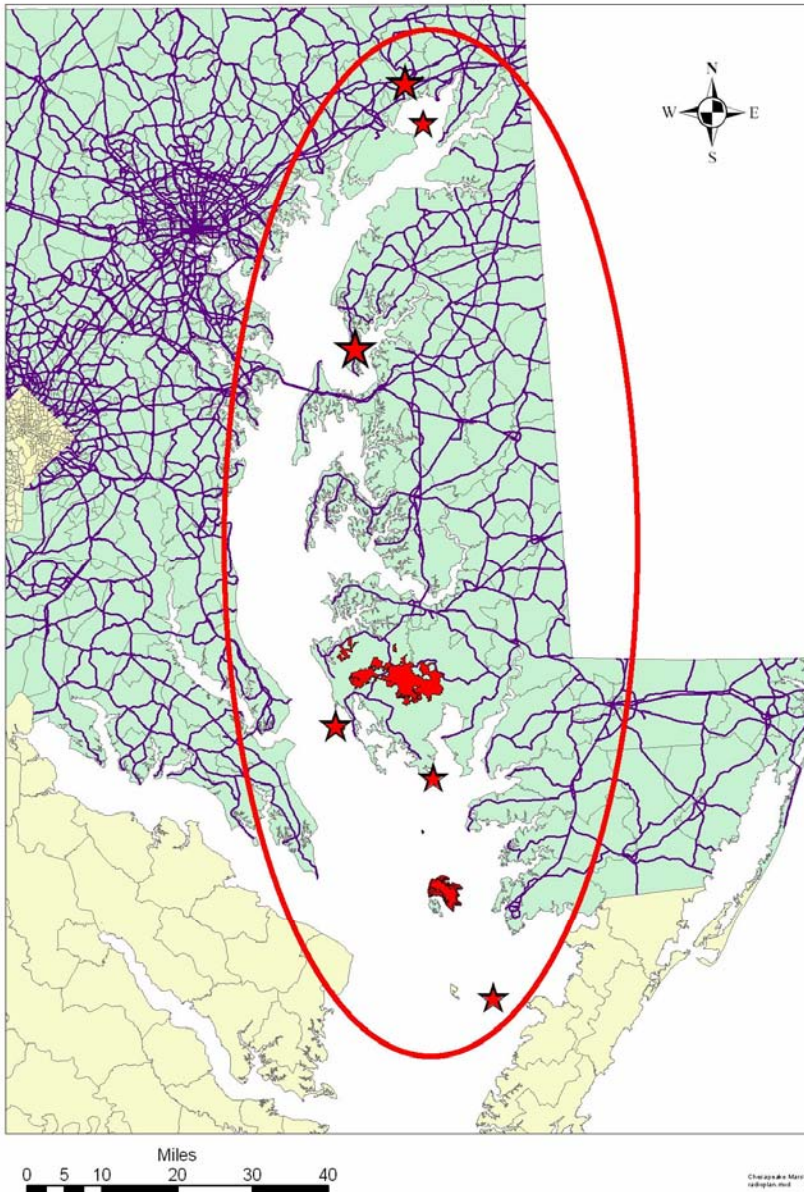
# Blackwater National Wildlife Refuge

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



## 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



# **Significance of Blackwater Wetlands**

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

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

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



# Blackwater Watershed

- “The Everglades of the North”
- Exceptional Recreational and Ecological System Waters (ERES)
- Over 1/3 of all tidal wetlands in MD
- Northernmost 3-square bulrush marshes in the U.S.



# 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

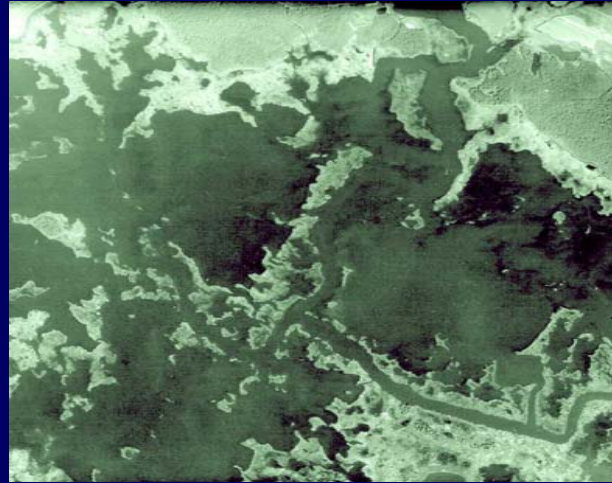




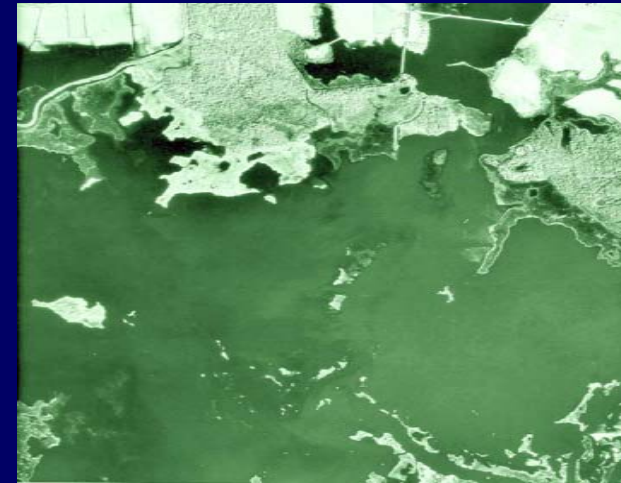
# The Disappearing Marsh



1938



1974



1989

# **Wetland types that are decreasing at Blackwater**

**Palustrine emergent**

**Palustrine forested**

**Palustrine scrub-shrub**

**Estuarine intertidal emergent**

**Estuarine intertidal forested**

**Estuarine intertidal scrub-shrub**





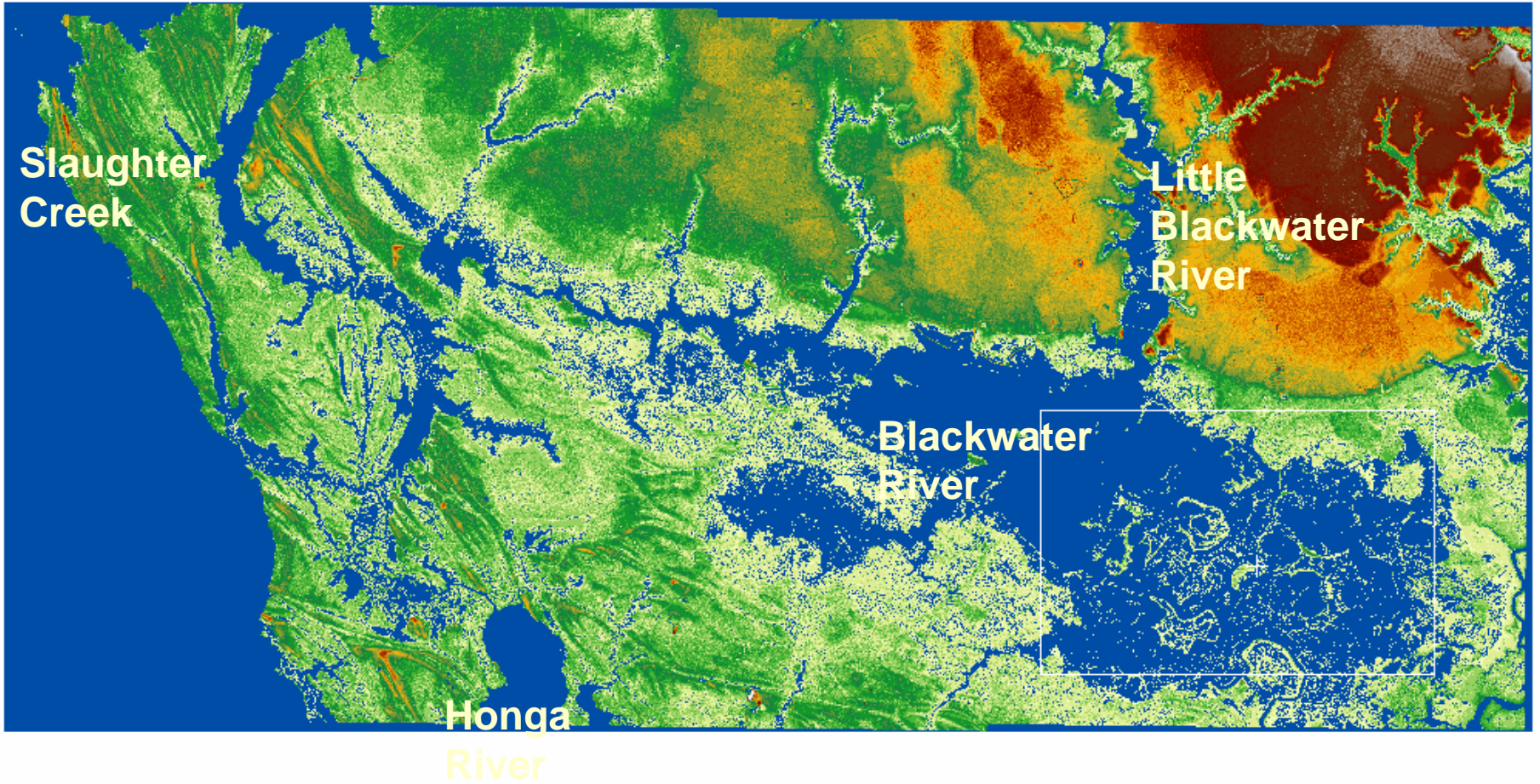


# Marsh Loss

- 8,000 acres or 12 sq. miles have been lost
- 150 acres lost/year



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

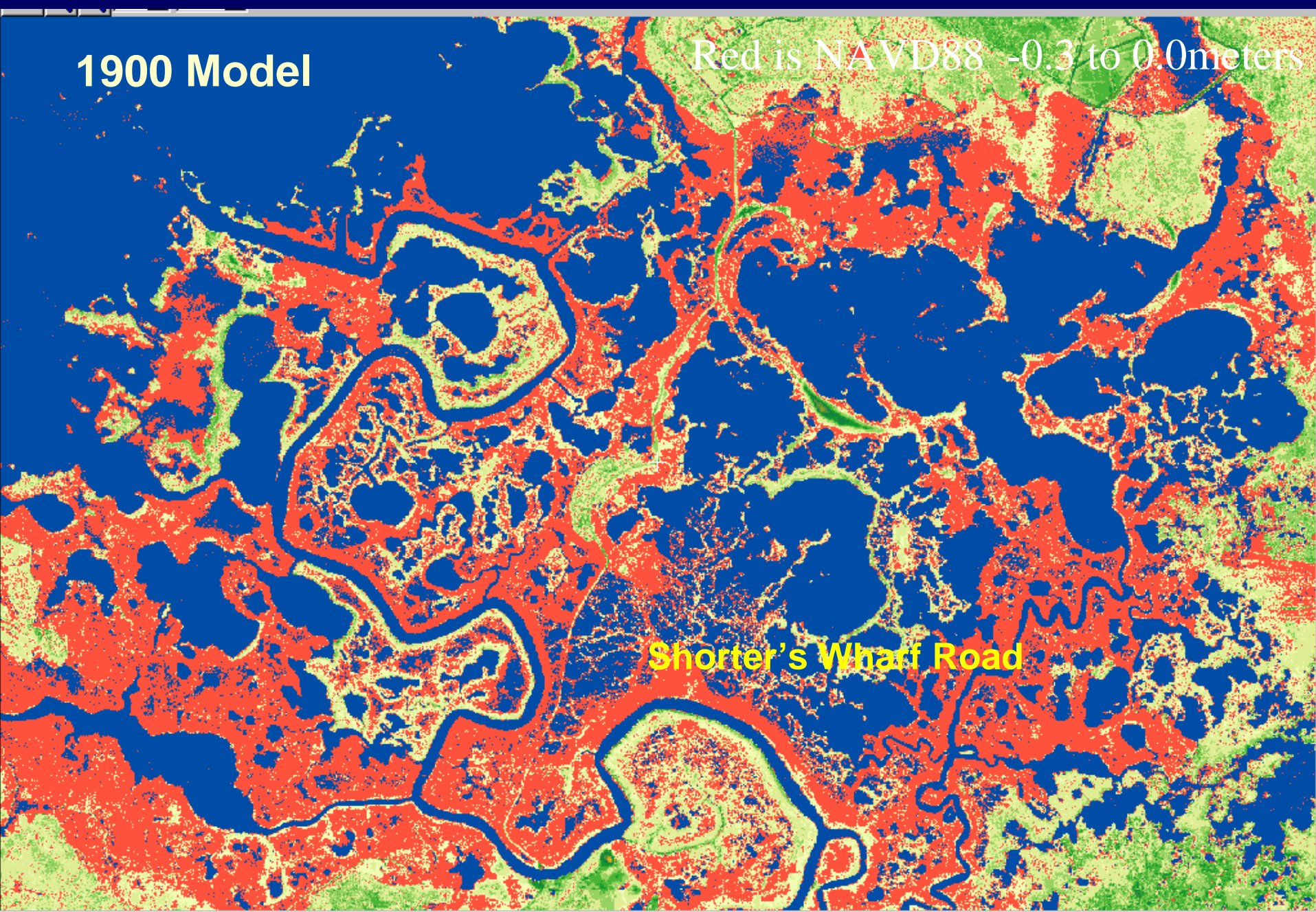


Blackwater National Wildlife Refuge LIDAR NAVD88 @ 0.0ft



**1900 Model**

Red is NAVD88 -0.3 to 0.0meters



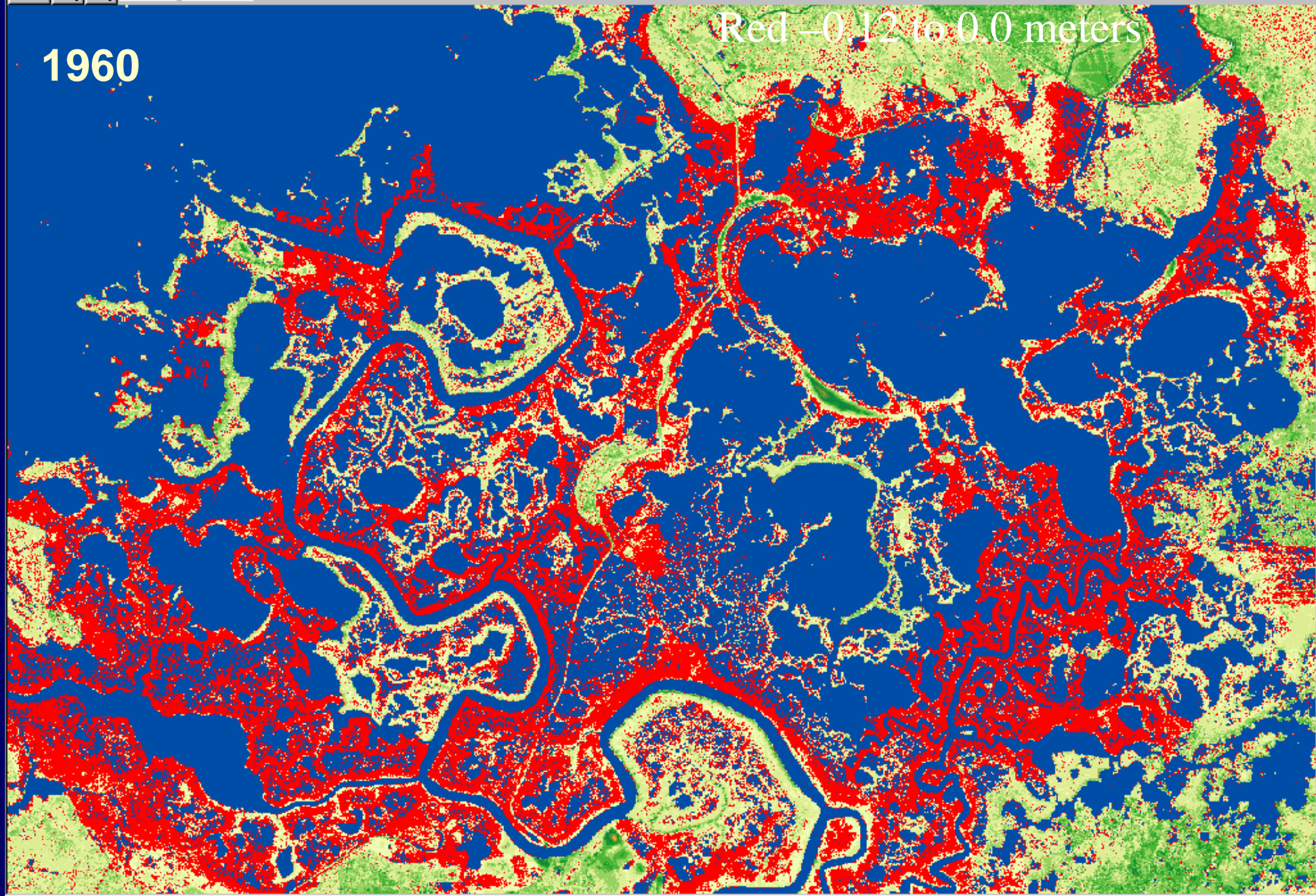
**Shorter's Wharf Road**

MHHW 1900



1960

Red -0.12 to 0.0 meters

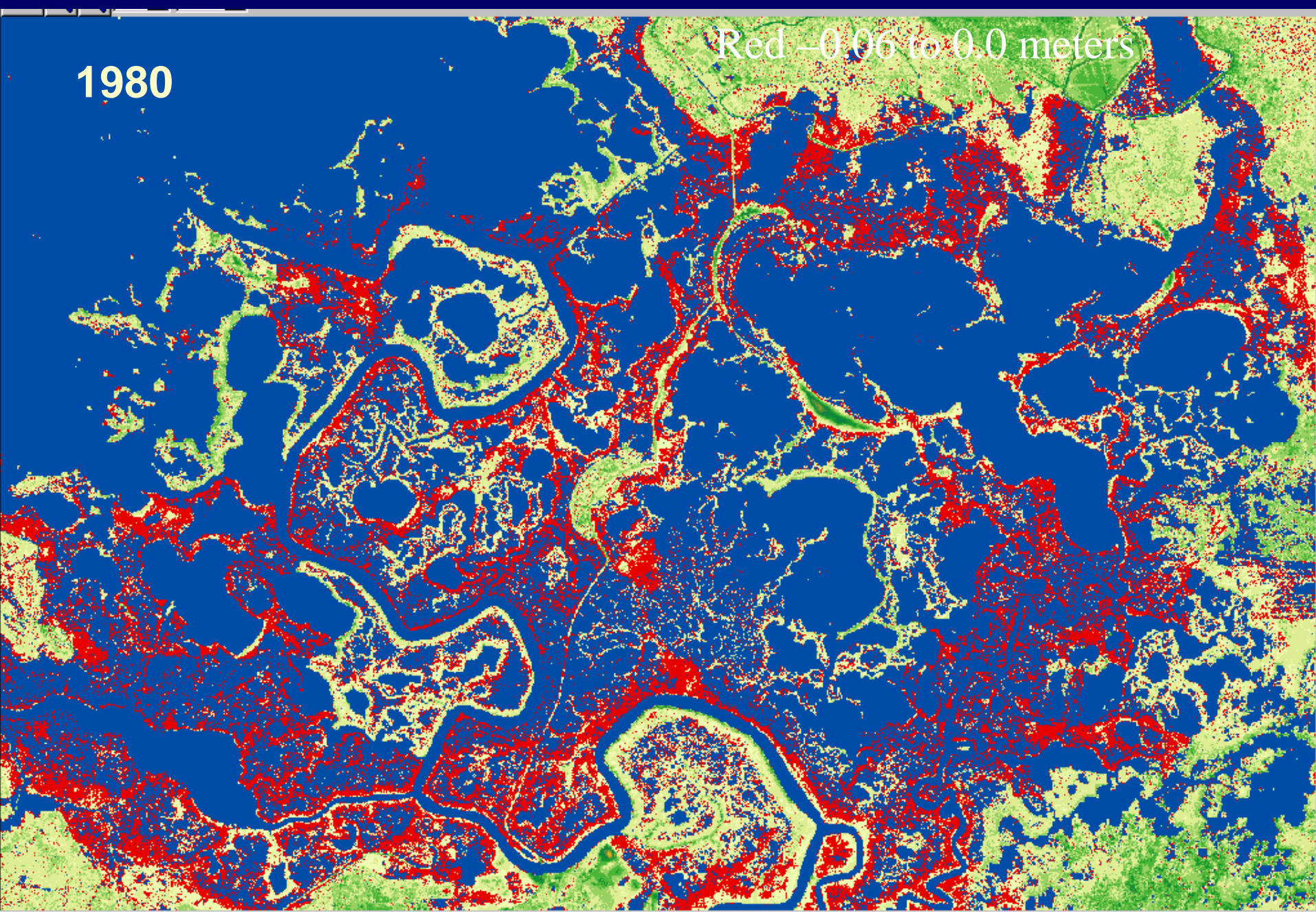


MHHW 1960



1980

Red -0.06 to 0.0 meters



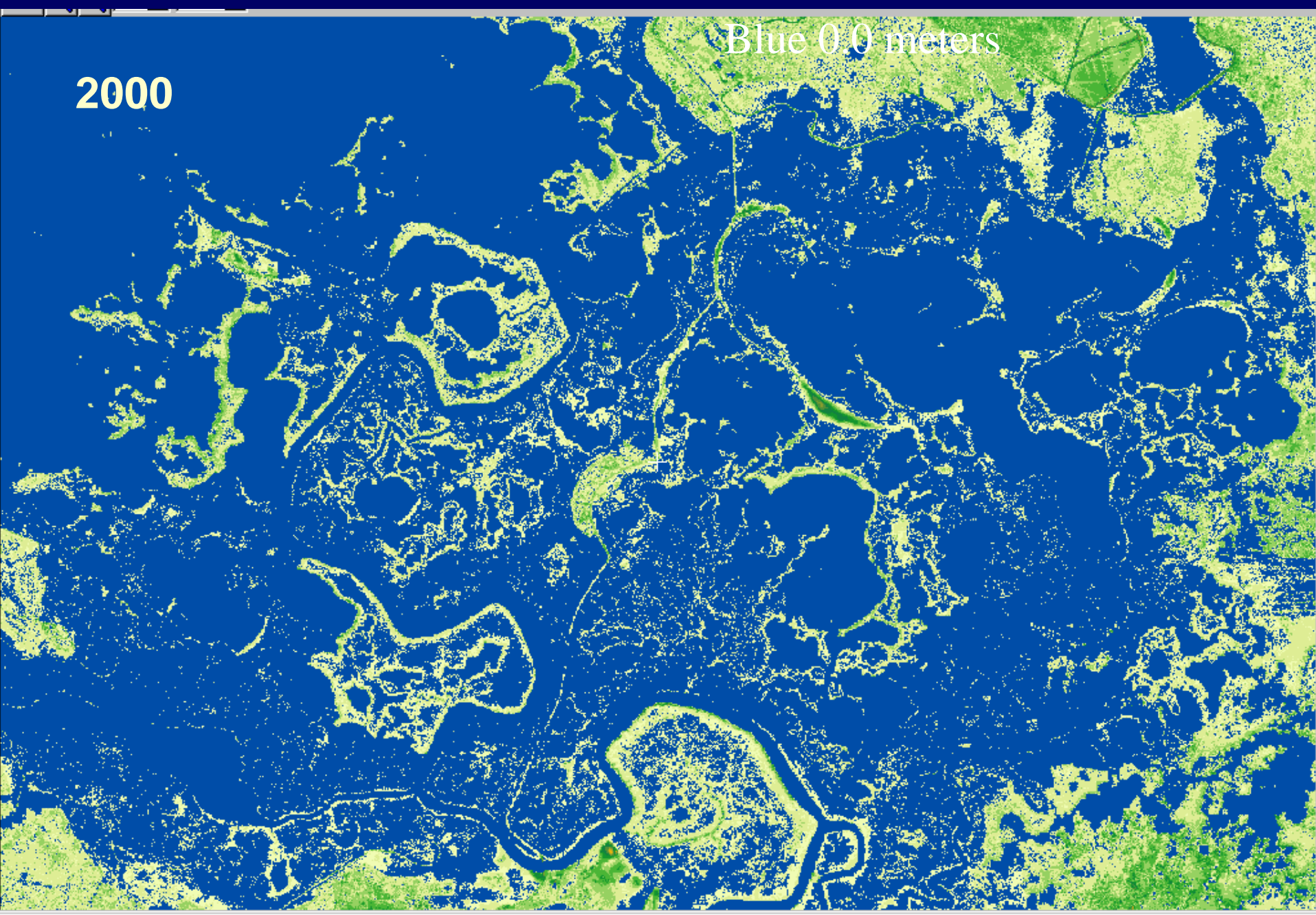
MHHW 1980



2000

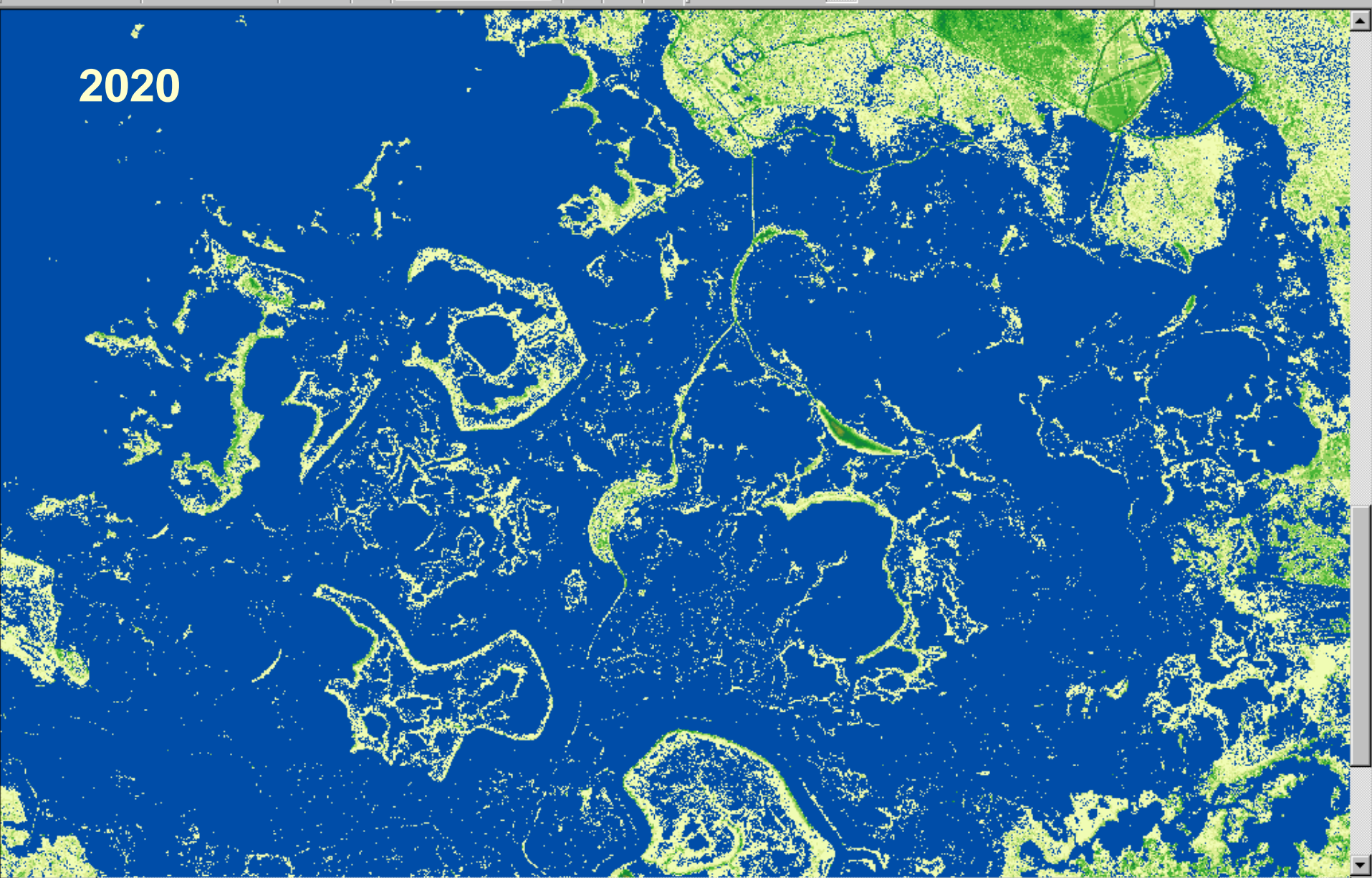
Blue 0.0 meters

MHHW 2000 NAVD88





2020

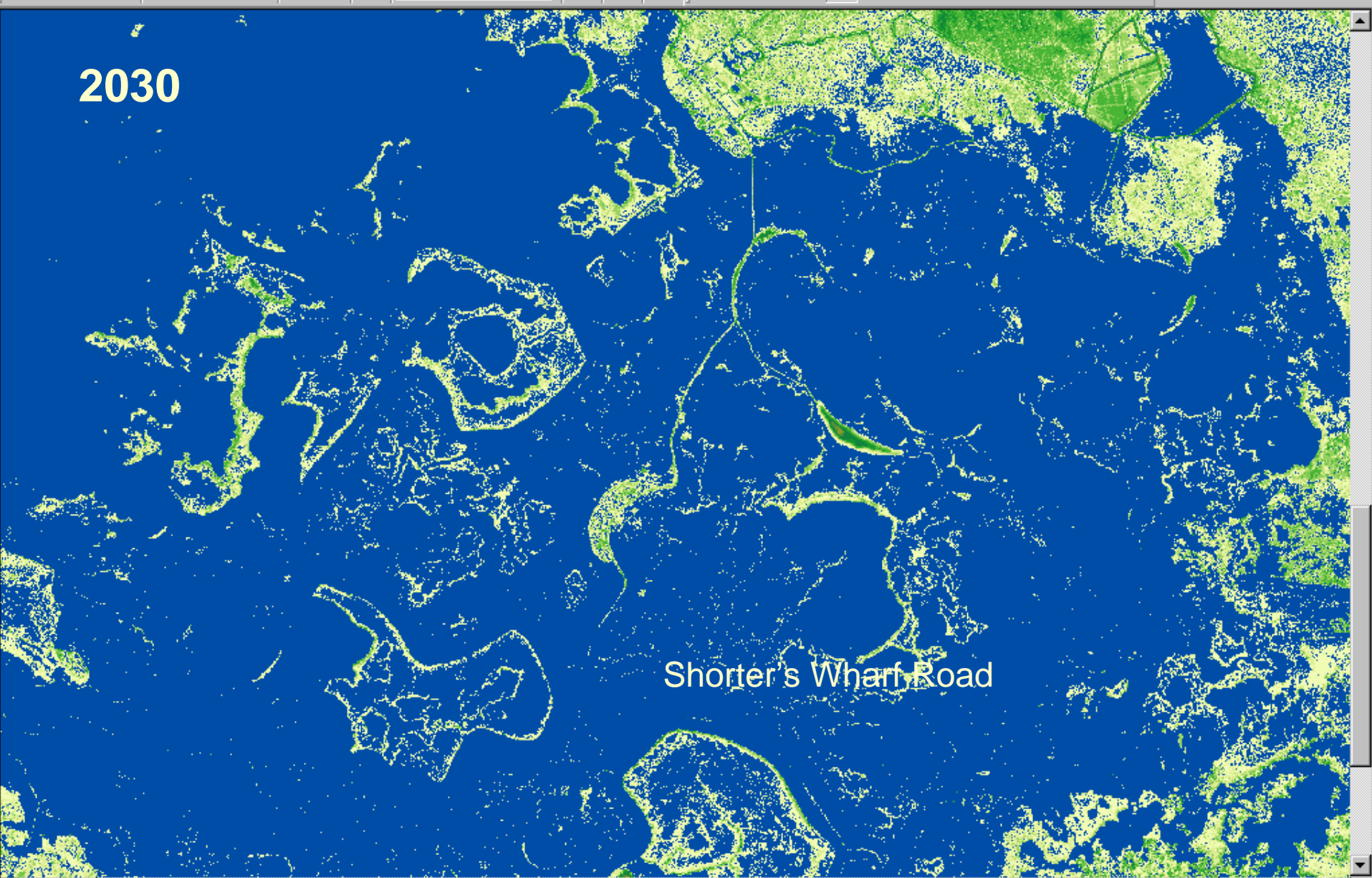


MHHW +20 years

Blue is 0.06 meters



2030



Shorter's Wharf Road

MHHW + 30 years

Blue is 0.09 meters



2050



Fishing Bay  
WMA

MHHW + 50 years

Blue is 0.15 meters



# Causes of Marsh Loss

A wide-angle photograph of a marsh landscape. The foreground is dominated by dense, tall reeds and grasses, some of which are partially submerged in shallow water. The water reflects the sky and the surrounding vegetation. In the middle ground, the marsh extends towards a flat horizon line. The sky is a pale, clear blue, suggesting a bright day. The overall scene depicts a natural, undisturbed marsh environment.

- Sea level rise
- Subsidence
- Erosion
- Salt water intrusion
- Invasive species - herbivory



# 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



**Control  
Resident  
Canada Geese**

**Eliminate  
Nutria**





# Nutria Extirpated from Blackwater Watershed



**Marsh Areas Recovering**

By 2006, over 9,500 nutria removed

Monitoring continues to eliminate “new” nutria

Trapping efforts expanded to State and Private Lands



**Three-square transplanted in 1982 restoration project**





# 1982 Restoration Site in 2005



FEB 13 2005



# 1983 Restoration Site in 2005



FEB 13 2005



# 2003 Wetland Restoration Partners

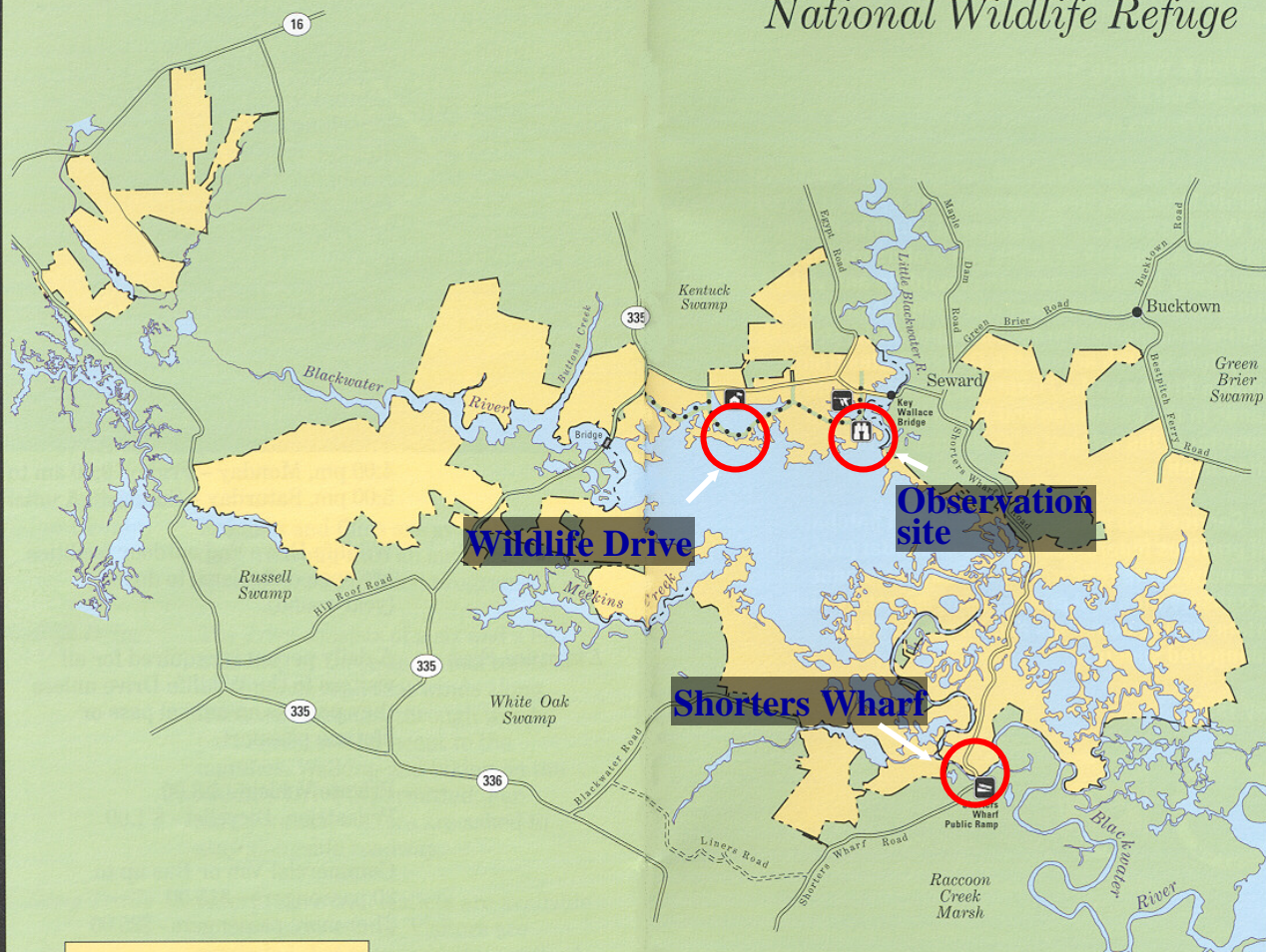
An aerial photograph of a wetland restoration site. The foreground and middle ground show a complex network of waterways, including a large, dark, winding river on the left and several smaller, interconnected ponds and channels. The surrounding land is a mix of vibrant green marsh vegetation and darker, more saturated areas. In the background, a dense, dark green forest covers a hillside. The overall scene depicts a natural, restored wetland environment.

- National Aquarium
- Army Corps of Engineers
- Friends of Blackwater
- Salisbury Zoo
- U.S. Fish and Wildlife Service



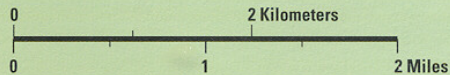
**3 sites**

# Blackwater National Wildlife Refuge



**Legend**

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





# Methods

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



# *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**





Dredge

Wildlife Drive

Wildlife Drive Cells



# Shorters Wharf

Shorter's Wharf Road





**Dredge slurry: 10% sediment and 90% water**  
**Overall sediment containment was successful**





**Hydro-seeding and  
Hand-planting were used;  
no fertilization necessary**





May 2003



Volunteers planted 70,000 units combined of **Olney's 3-square** (*Schoenoplectus americanus*), **salt marsh bulrush** (*Schoenoplectus robustus*), and **smooth cordgrass** (*Spartina alterniflora*)



# Photo Station Documentation



Compare permanent photo stations over time  
to assess sediment and vegetation  
sustainability



**May 2003**





**June 2003**





**August 2003**





**August 2004**





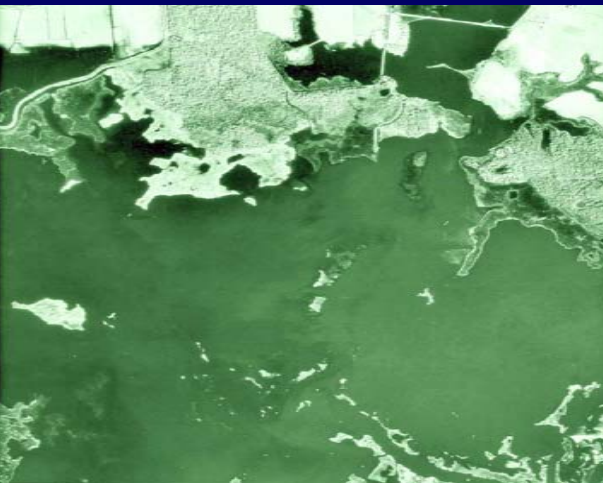
**August 2005**



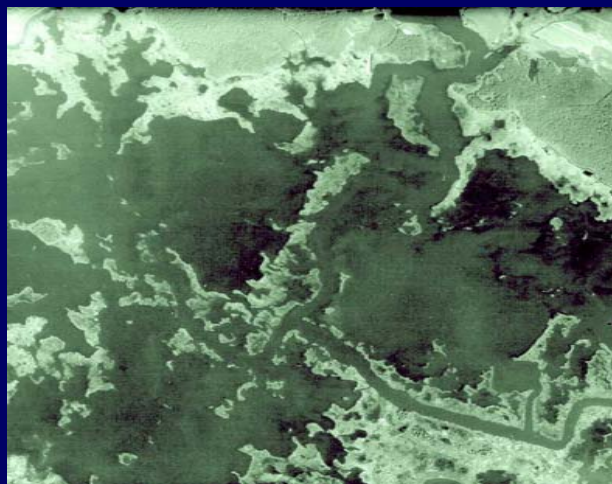


# What's Next?

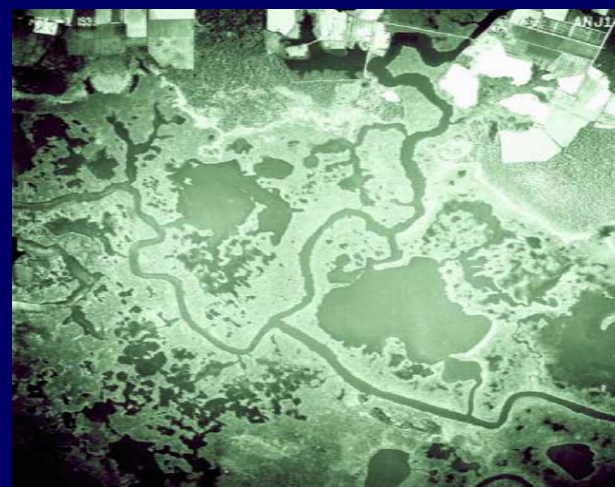
## Recreate the Lost Marsh



2005



2015

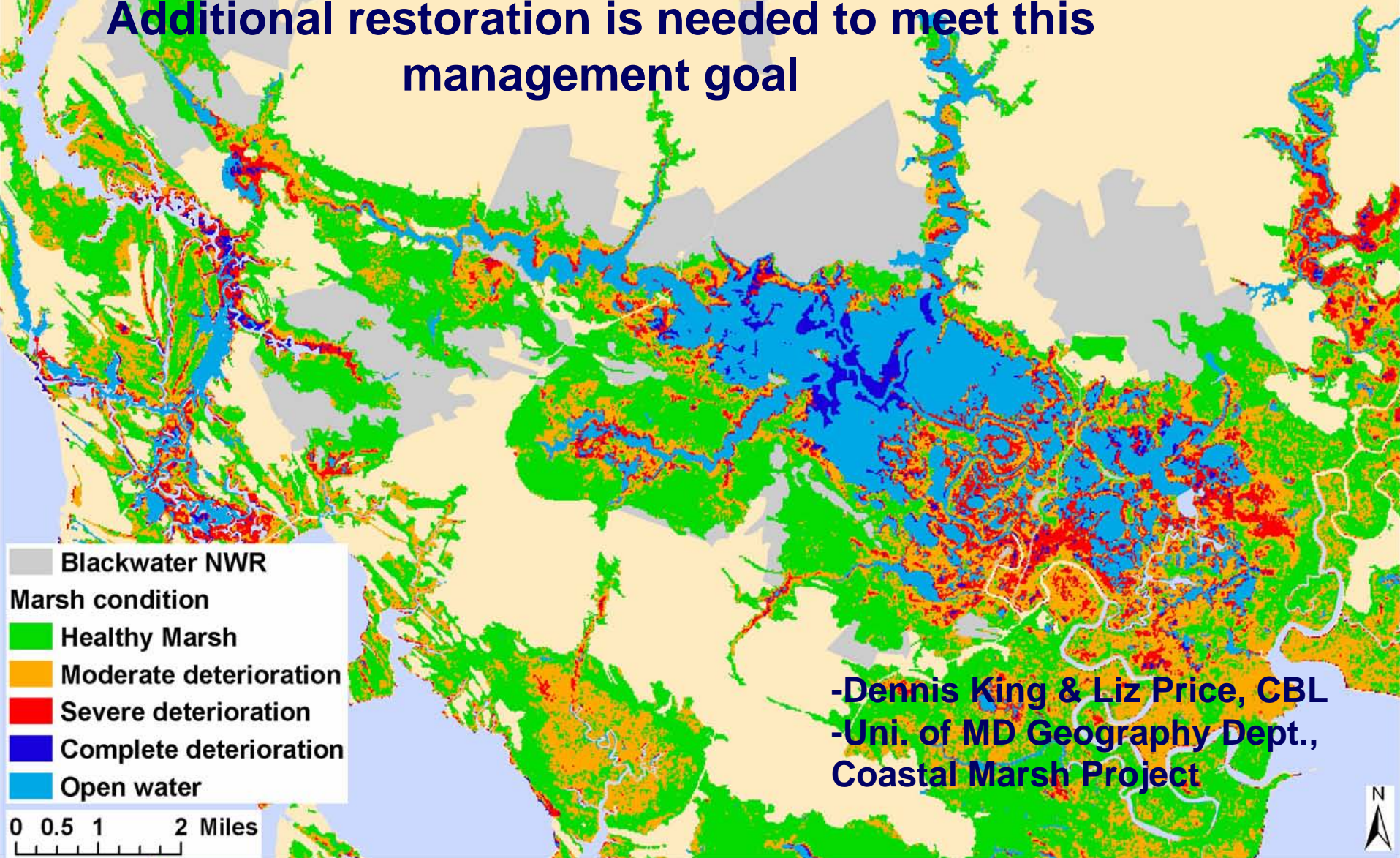


2020



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

Additional restoration is needed to meet this management goal



-Dennis King & Liz Price, CBL  
-Uni. of MD Geography Dept.,  
Coastal Marsh Project



# Dredge Material Placement

Total dredging needs for approach channels in MD portion of Chesapeake Bay is about 3 to 4 million cubic yards annually

Dr. Dennis King and Liz Price  
Chesapeake Biological Lab





# Tiered Environmental Impact Statement

## 3 Options:

1. Expansion of  
Poplar Island

2. Mid-Bay Islands

3. Blackwater/Dorchester  
County





# Use clean Dredged Material to Restore the Marsh

Restoring 8,000 acres (12 miles<sup>2</sup>) at:

\*1 foot requires **12,907,000** cubic yards

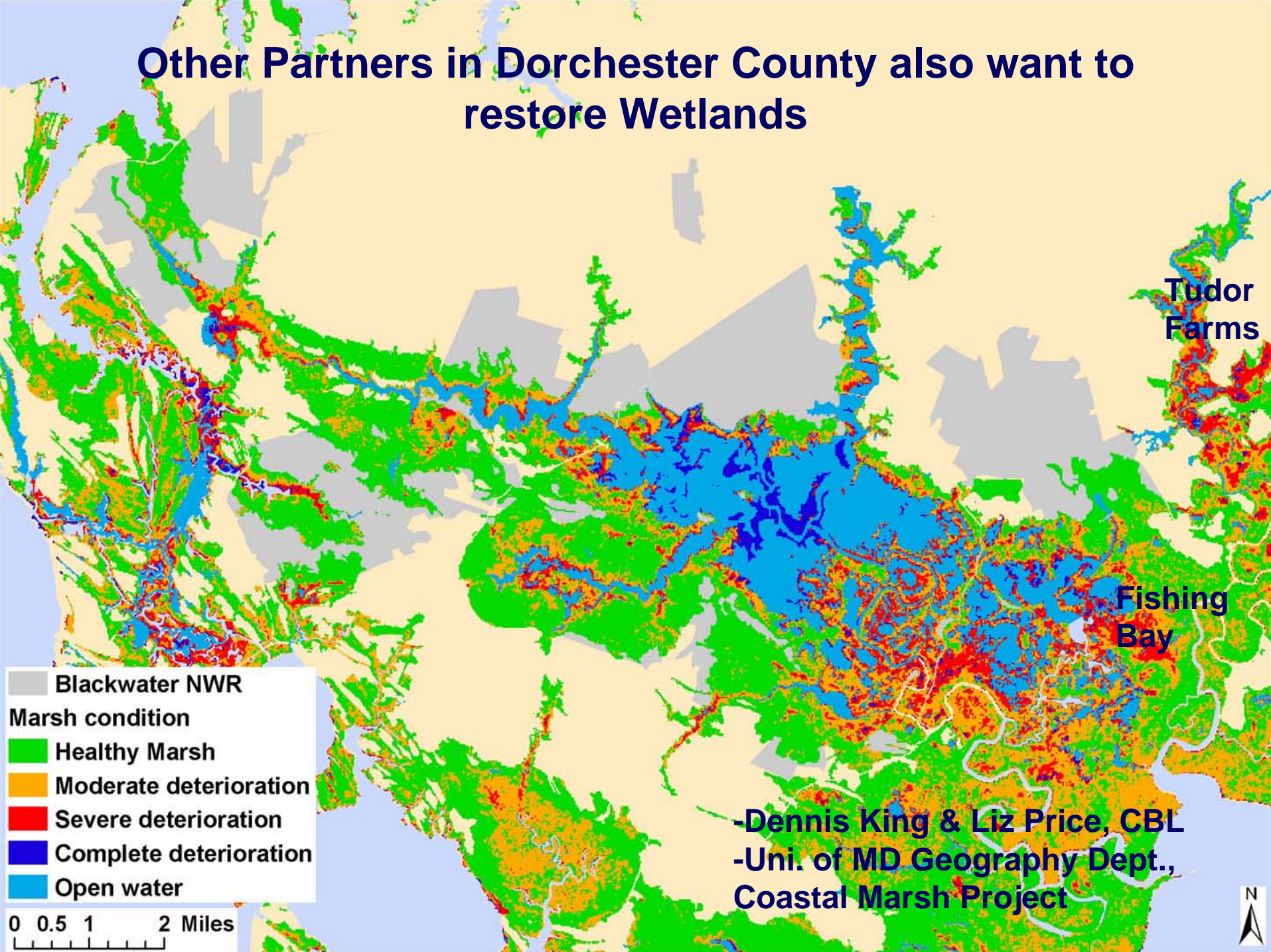
2 feet requires **25,813,000** cubic yards

3 feet requires **38,720,000** cubic yards

\*5 feet requires **64,533,000** cubic yards



# Other Partners in Dorchester County also want to restore Wetlands



Tudor Farms

Fishing Bay

- Blackwater NWR
- Marsh condition
- Healthy Marsh
- Moderate deterioration
- Severe deterioration
- Complete deterioration
- Open water

-Dennis King & Liz Price, CBL  
-Uni. of MD Geography Dept.,  
Coastal Marsh Project

0 0.5 1 2 Miles





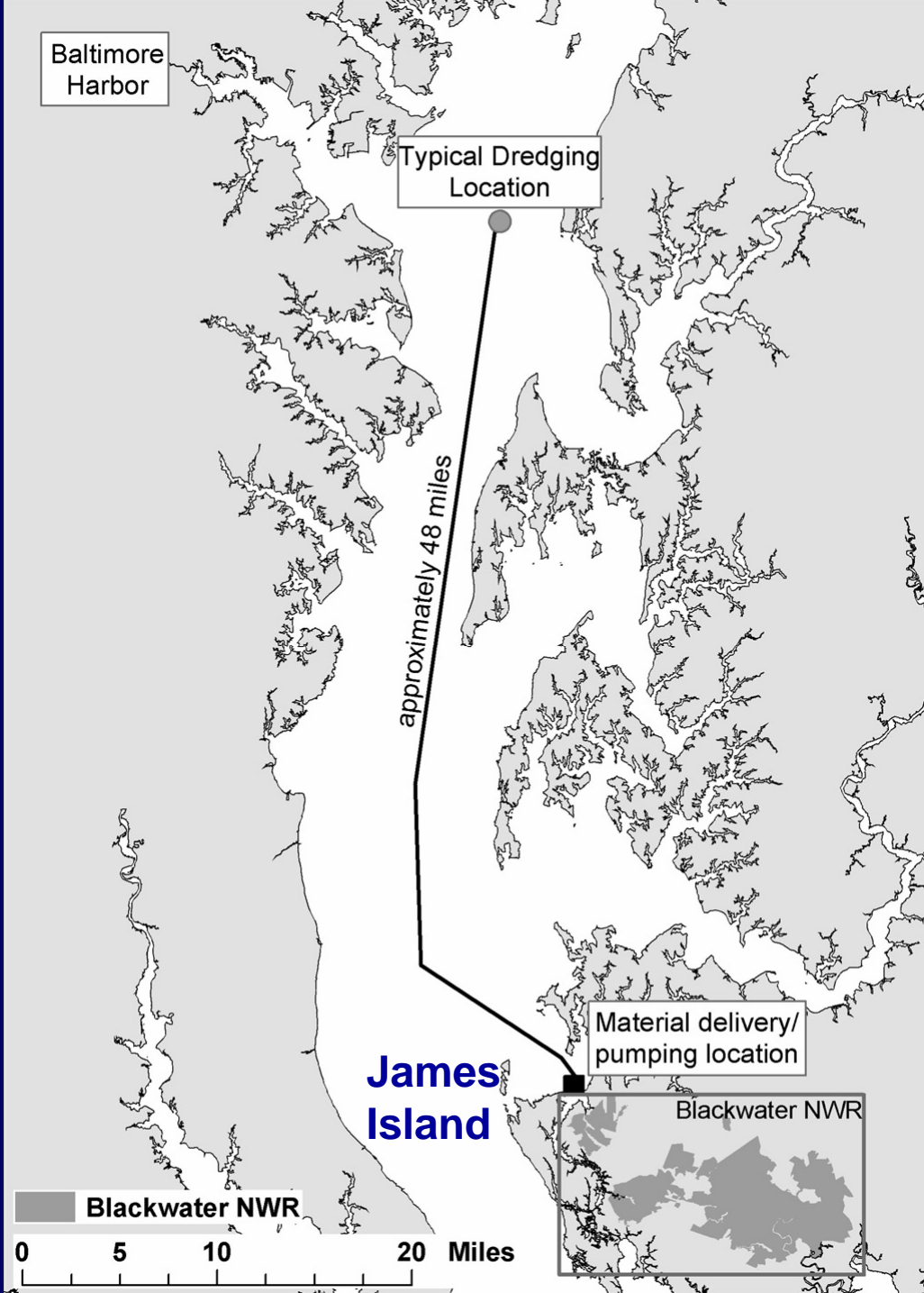
**Dorchester Restoration  
provides placement  
opportunities  
for dredged material  
for 20 to 50 years  
and would  
restore the watershed**



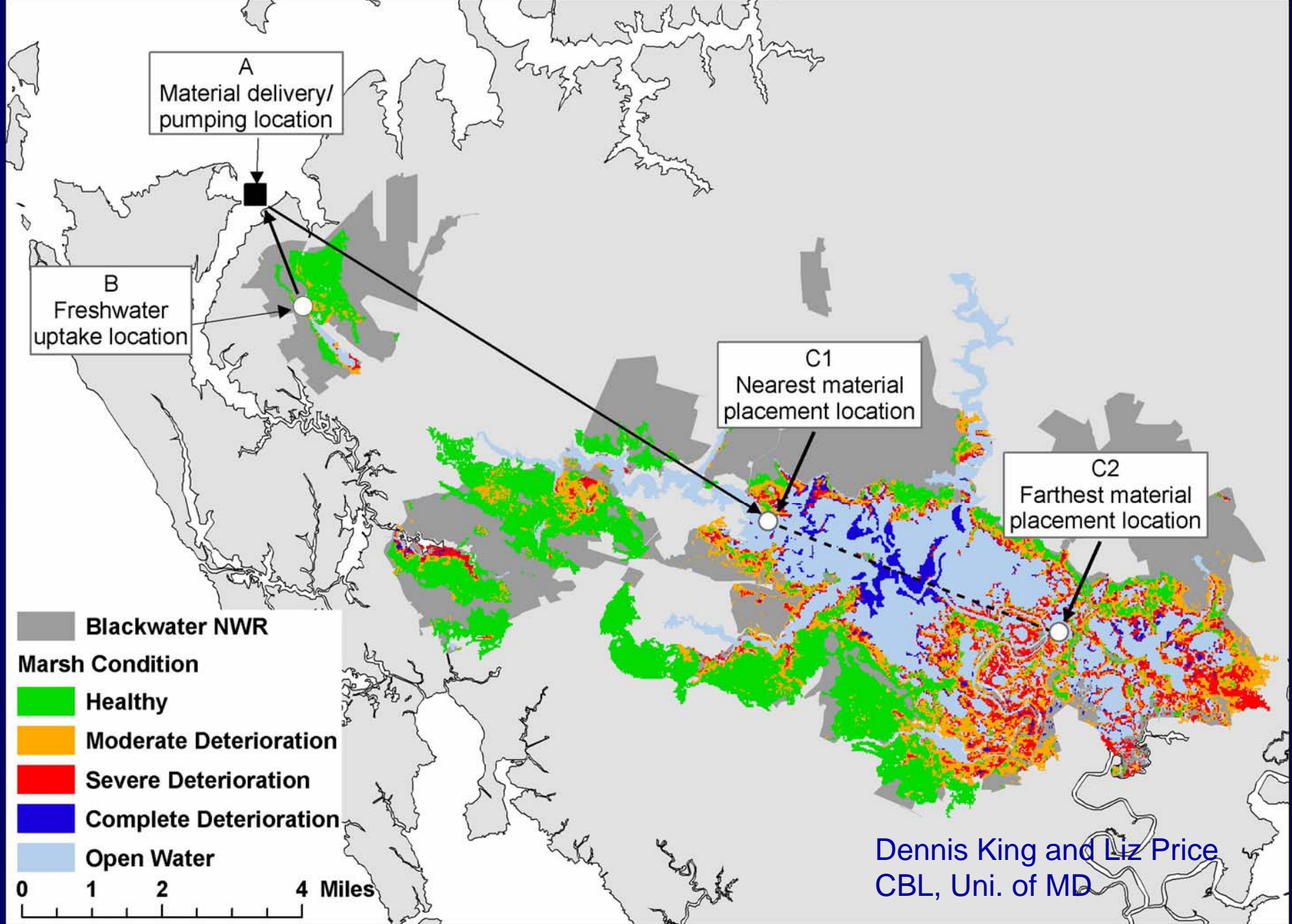


**Bucket and barge to move clean dredged material**

**James Island could be used as a re-handling station**







Note: To maintain the proper salinity, freshwater is piped 1.5 miles from Site B in Blackwater to Site A, the barge material delivery site, and is used to pump material back into Blackwater. Site C1 represents the nearest material placement site within Blackwater which is about 8 miles from Site A. Site C2 is the farthest material placement site, and is about 13 miles from Site A.



**Using fresh or brackish water would minimize any saline impacts from clean dredged material**





# Future Wetland Restoration Benefits

1. Ecosystem and Environmental Restoration
2. Placement of Substantial amounts of Dredged Material
3. Easy Public Access, Community Involvement, Public Support
4. Prevent additional wetland loss





**5. Watershed restoration benefits finfish, shellfish fisheries, wildlife, and the overall health of the Chesapeake Bay Ecosystem**







**Blackwater Restoration can only be achieved through the use of clean dredged material.**

**Currently, we do not know of any other options to restore these valuable wetlands**

**FEB 13 2005**




# **Congress appropriated \$247,000 to Army Corps in FY 2006**

**Purpose: Develop Project Management Plan**

- 1. Create Sub-groups – technical expertise**
- 2. Determine Biological/Technical Data gaps**
- 3. Engineering and Economics**
- 4. Estimate Costs for Full Implementation**



An aerial photograph showing a wetland restoration project. A dark river flows through the center, surrounded by green marshland. In the background, a dense forest covers a hillside. The text is overlaid in the center of the image.

Wetland Restoration is  
feasible and beneficial, and is  
critical to avoid additional wetland  
loss at Blackwater NWR





**Citizen's Advisory Group and Technical  
Working Group.**

**If you would like to serve on a group,**

**Please contact Dixie Birch:**

**Email: [dixie\\_birch@fws.gov](mailto:dixie_birch@fws.gov)**

**Phone: 410-228-2692, ext. 118**

**Pilot study using 2-10 acres of material**